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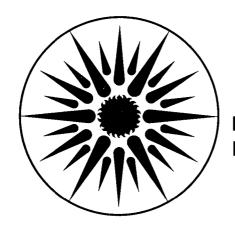
## ENERGY & ENVIRONMENT DIVISION

Worldwide Status of Energy Standards for Buildings

**Appendices** 

K.B. Janda and J.F. Busch

February 1993



**ENERGY & ENVIRONMENT DIVISION** 

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# WORLDWIDE STATUS OF

### **ENERGY STANDARDS FOR BUILDINGS**

**Appendices** 

(supporting material for the authors' article of the same title, published in *Energy—The International Journal*, 19:1, 1994)

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February 1993

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Belgium	
Canada	
Chile	
China	
Colombia	
Czechoslovakia (former)	
Denmark	
England & Wales	
France	
Hong Kong	
Indonesia	
Israel	
Ivory Coast	
Jamaica	
Japan	
Malaysia	
Netherlands	
New Zealand	
Northern Ireland	
Norway	
Pakistan	
Philippines	
Poland	
Portugal	
Romania	
Scotland	
Singapore	
South Africa	
South Korea	
Sweden	
Switzerland	
<sub>O</sub> Thailand	
U.S.S.R. (former)	
United States	

#### APPENDIX A

Cover Letter to Respondents and Mail Survey

Fax: +1 510-486-6996

MS 90-4000; Berkeley CA 94720 USA

#### Dear Respondent:

This is an informal survey designed to gain information about the worldwide status of energy efficiency standards for buildings, particularly for non-residential buildings including offices, schools, and hotels. Our project has three goals: 1) to understand and learn from the experience of countries with existing building energy standards; 2) to locate areas where these lessons might be applied and energy standards might be effectively proposed and developed; and 3) to share the information gathered with all participating countries.

#### About the term "standard"

We want to gain information about activities undertaken specifically for the purpose of INCREASING ENERGY EFFICIENCY in buildings and gather existing documentation on this subject. For the purposes of this survey, we will use the word "standard" to refer interchangeably to what also might be called codes, criteria, guidelines, norms, laws, protocols, provisions, recommendations, requirements, regulations, rules, or standards. Depending on the country, the "standard" may be contained in one document, be part of another larger document (such as a general building code), or be comprised of several documents.

We are sending this survey to contacts around the world who hold various positions in organizations ranging from government to academia to professional associations. Since we designed the survey to be answered by people with this breadth of background, it is likely that some of the questions on the following pages may lie outside your area of expertise. If you should find yourself uncertain about a particular question or set of questions, please answer the survey to the best of your knowledge, adding a question mark (?) or comment in the space provided. If you could suggest someone else who would know the answers to some of these questions about your country, please include their name(s) and contact information so we can solicit their input. If convenient, you may also photocopy this survey and give them a copy for their use.

Since overseas mail can often be time-consuming and uncertain, we would appreciate receiving your responses by telefax if possible.

Thank you for taking the time to participate in this survey. Please contact us if you have any questions that need immediate attention.

John Busch, Ph.D. Kathryn Janda

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	STANDARDS FOR ENERGY EFFICIENCY IN BUILDINGS
	IN(please fill in the name of your country)
Th	e focus of our research is on ENERGY STANDARDS for NON-RESIDENTIAL BUILDINGS. is survey has been designed to solicit information about this particular subject, and some estions may not apply equally to all types of energy standards for buildings. Please respond appropriate for the situation in your country.
SE	CTION I: GENERAL OVERVIEW OF BUILDING ENERGY STANDARDS
1.	Does your country have BUILDING STANDARDS of ANY KIND (e.g., health, structural safety, fire prevention)?
	<ul> <li>a. At the NATIONAL level?</li> <li>b. At the STATE or regional level?</li> <li>c. At the LOCAL or municipal level?</li> <li>d.   There are no building standards of ANY kind at any level. (Go to Question 20.)</li> </ul>
2.	Some countries have STANDARDS to INCREASE the ENERGY EFFICIENCY of BUILDINGS. Such standards can be voluntary or mandatory, and they are often developed issued, and/or implemented by governments, electric utilities, industry groups, or professional associations.
•	To the best of your knowledge, are there any proposed or existing ENERGY EFFICIENCY STANDARDS for BUILDINGS in your country? ( <i>Check EITHER a or b.</i> )
	<ul> <li>a.</li></ul>
	b.   Energy standards for buildings DO EXIST (or have been proposed) at the national, regional, or local level.
	<ul> <li>Which building sectors are covered by these standards? (Check ONE of the following.)</li> <li>1. □ Residential buildings ONLY (Go to Question 4)</li> <li>2. □ Non-residential buildings ONLY (e.g., commercial, institutional)</li> <li>3. □ BOTH non-residential and residential buildings</li> <li>4. □ Other: (Please specify.)</li> </ul>

3.	3. a. What is the status of energy standards in NATIONAL level in your country? (Co	
	☐ Voluntary - compliance with stand	oped and is currently under consideration  has been developed or proposed
		untary or mandatory NATIONAL ENERGY esidential buildings in your country?
	b. What is the status of energy standards f REGIONAL level? (Check all that apply)	or NON-RESIDENTIAL buildings at the STATE or )
	☐ Voluntary → VOLUN	rimately how many MANDATORY or NTARY regional energy standards apply to idential buildings in your country?
. •	<del>_</del>	tates or regions have adopted them?
	c. What is the status of energy standards for AREAS or CITIES in your country? (C	or NON-RESIDENTIAL buildings in LOCAL heck all that apply.)
	☐ Voluntary → VOLUN	imately how many MANDATORY or JTARY local energy standards apply to idential buildings in your country?
	<del>_</del>	ities or municipal areas have adopted them?

4.	Please use the following criteria to select basis for answering Questions 5-19. (		
	<ol> <li>This energy standard applies to</li> <li>I am most familiar with this en</li> <li>There is ONLY ONE energy standards applies to</li></ol>	ergy standard. Indard for NON-RESIDEN S for NON-RESIDENTIAL	JTIAL buildings.
	Energy Standard Title:		
	Date (Specify adopted, effective, or publi	ished):	•
	Issuing Organization:		•
	Geographic area covered:   Nation	·	
٠	Region(s	s): (specify)	
	☐ City(ies)	: (specify)	
SE	CTION II: DESCRIPTION OF SPECIFIED	ENERGY STANDARDS	
5.	To what kinds of buildings does the stan	dard specified in Question	n 4 apply?
	a. Please indicate BUILDING TYPE(s):	(Check all that apply.)	
	Offices	☐ Restaurants	☐ Retail stores
	☐ Hotels	☐ Hospitals	☐ Schools
	Government facilities	☐ Churches/mosques	☐ Industrial Buildings
	☐ Residential (single-family)	☐ Residential (multi-fa	mily)
	ALL Buildings	☐ Other: (Please specify	<b>/.)</b>
		•	
	b. Please indicate BUILDING VINTAGI	E: (Check one.)	
	☐ New buildings		
	Existing buildings (through	retrofits)	
	Both new and existing build	lings	

c. Please indicate any ADDITIONAL BUILDING CHARACTERISTICS used to define the scope of the standard's applicability: (Check all that apply.)
<ul><li>1. □ Physical size (e.g., floor area)</li><li>➡ What size limit(s)?</li></ul>
2. ☐ Amount of energy used (e.g., kilowatts)  What amount(s)?
3. ☐ Type of fuel used (e.g., electricity)  Which fuel(s)?
4. ☐ Air-conditioned 5. ☐ Other: ( <i>Please specify</i> .)
Which of the following terms best describes the basic approach of the standard(s) specified in Question 4? (Check one.)
☐ Prescriptive (i.e. building materials or dimensions of some building elements are specified)
Performance-based (i.e. design flexibility is maintained within a specified level of performance of the building element, system, or building as a whole)
☐ Both prescriptive and performance methods are used in the standard.
Other (Please describe):
Are the following subjects INCLUDED in the energy standard identified in Question 4?
<ul> <li>a. Whole-building ENERGY REQUIREMENTS/limitations:   Yes No ?  If yes, check all that apply below:  Energy target (e.g., total btu or kilowatt-hour/floor area)  Peak electricity demand (e.g., peak kilowatt-hours/floor area)  Energy cost target  Other (Please specify):</li> </ul>

<ul><li>b. BUILDING ENVELOPE heat loss or heat gain provision If yes, check all that apply below:</li><li></li></ul>	s: 🔲 Yes	□No	?
☐ Wall system (e.g., insulation, exterior surface of	color)		
Fenestration system (e.g., glass type, amount,	·	f window	s)
☐ Infiltration (e.g., air changes per hour)	r		-,
☐ Other (Please specify):		1.	•
_ \ \ / /33/			
c. LIGHTING provisions (interior or exterior):  If yes, check all that apply below:	☐ Yes	□ No	□ ?
<ul> <li>Control requirements or credits (e.g., occupantime clocks)</li> </ul>	cy sensors,	number of	switches,
Installed lighting power density requirement	$s (W/m^2)$		
Illumination requirements (lux, footcandles)			
☐ Other (Please specify):			
d. MECHANICAL provisions:  If yes, check all that apply below:	☐ Yes	□No	<b>?</b>
☐ Air/water distribution efficiency	•		•
☐ Load calculations for equipment sizing (e.g.,	chillers, mot	tors)	
<ul><li>Controls (e.g., energy management systems, t</li><li>Ventilation</li></ul>			
Equipment efficiency (e.g., motors, chillers, fa	ns)	•	
Other (Please specify):	•	,	
• • • • • • • • • • • • • • • • • • • •			
e. Are there any OTHER major provisions included in the described above? (e.g., electrical specifications, thermost cooling season)  If yes, please specify:			

#### SECTION III: STANDARDS DEVELOPMENT PROCESS

8. Please list the names of the ORGANIZATION the ENERGY standard specified in Question  Types of Organizations:  G = Government agency  I = Industry group (e.g.,  A = Academic institution  R = Research group (pub)  L = Local interest group  F = Foreign development  O = Other (please describe	equipment or material or private)  at agency (or other no	pages if necessary.) al suppliers)
a. Organization Name:	Type:	(See list above)
b. Organization Name:	Type:	(See list above)
c. Organization Name:	Type:	(See list above)
d. Organization Name:	Type:	(See list above)
9. Which one of the following two terms BEST of what requirements the standard should common a.   Consensus - several different organi (If different from those listed in Question comment below)	ntain? ( <i>Check one and</i> zations reached a cor	d describe below.)

b. 

Mandate - a single organization or entity made most decisions (Please provide the name of this organization or entity below)

	•
10.	Standards are generally developed using information about physical attributes and energy use of existing buildings and climate data for the geographic area. What kind of information was used in developing the energy standard specified in Question 4? (Check all that apply.)
	<ul> <li>a. PHYSICAL CHARACTERISTICS of existing buildings (e.g., size, function, types of walls and windows)</li> </ul>
	<ol> <li>Not available, and not used in standard.</li> <li>Estimated using professional judgement.</li> <li>Gathered through audits or surveys for the purpose of the standard.</li> <li>Already available prior to standard development.</li> </ol>
	b. ENERGY USE of existing buildings (e.g., annual consumption, peak demand, load patterns)
	<ol> <li>Not available, and not used in standard.</li> <li>Estimated using professional judgement.</li> <li>Estimated through computer simulations.</li> <li>Gathered through audits or surveys for the purpose of the standard.</li> <li>Already available prior to standard development.</li> </ol>
	c. WEATHER data (e.g., direct and indirect solar radiation, temperature, humidity)
	<ol> <li>Not available, and not used in standard.</li> <li>Estimated using professional judgement.</li> <li>Gathered through measurements for the purpose of the standard.</li> <li>Already available prior to standard development.</li> </ol>
÷	d. Other information: (Please specify)
11.	Energy standards are often developed with reference to standards from other countries. Were standards or information from a DIFFERENT COUNTRY (i.e., other than your own) used in developing the energy standard specified in Question 4?
	<ul> <li>No</li> <li>Yes ➡ Please specify the country(ies) of origin and kind(s) of information used: (e.g. American: ASHRAE 90.1-1989; Jamaica: EEBC-90)</li> </ul>

12. In developing the standard, computer simulations are sometimes used to determine energy and economic performance of different building designs. Were any COMPUTER PROGRAMS (e.g., DOE-2 or other building energy models) used in the development of the standard?

☐ No (Go to Question 13.)

Yes a. Which programs?

b. Are computer simulations also used to attain COMPLIANCE with the standard?

☐ Yes ☐ No ☐ Uncertain

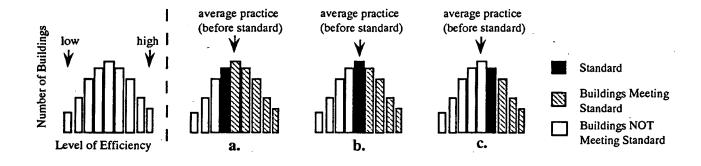
➡ If yes and different from above, please list:

13. Which of the following statements best describes the goal of the standard, as depicted in the graphs below? (Check one.)

a. 
The standard is set at a level LOWER THAN CURRENT PRACTICE to eliminate the most inefficient building designs.

b. The standard is set at a level approximately EQUAL TO CURRENT PRACTICE to encourage moderate levels of efficiency.

c. The standard is set at a level ABOVE CURRENT PRACTICE to promote highly-efficient buildings and encourage technological development.



14.		the following considerations influence the inc standard? (Check one box for each considerati	ns influence the inclusion or exclusion of certain measures in for each consideration and comment below.)					
	a.	Cost effectiveness	☐ Yes	□No	Uncertain			
	b.	Market or local availability of energy efficient products	☐ Yes	□ No	☐ Uncertain			
	c.	Similarity/difference to local design practice	Yes	□ No	Uncertain			
	d.	Comfort	Yes	□No	Uncertain			
	e.	Other (Please specify below):						
	C	OMMENTS:						
		•						
15.	Ener	gy standards are often revised and updated to	reflect techno	ological imp	rovements.			
	a. Is	. Is the standard in your country scheduled for regular REVIEW and REVISION?						
	ā	No (Go to Question 16)						
	u	Yes ➡ Please describe process below:						
			,	•	,			
				^				
		oes the revision process include procedures to ARLIER VERSIONS of the standard?	MONITOR a	nd EVALUA	ATE the success of			
	<u> </u>	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~						
		Yes ➡ Please describe procedures below:						

#### SECTION IV: IMPLEMENTATION AND COMPLIANCE

16. In many cases, building energy standards are added to existing (non-energy) building standards. In other cases, governments have created new agencies to implement and e building energy standards.							forc
			characterize the ENTITIES involved (Check all that apply.)	d in IMPLE	EMEŅTIN	G energy standa	rds
	a. An EXISTING agency,					_(please specify), v The agency's as: (Check one)	was
		2.	☐ Buildings ☐ Energy ☐ Other:(please :	specify)			
	b. 🔲		nd separate agency,				as
	•	formed in	(year) to implement energy	standards	for buildi	ngs.	
c.   The standards are voluntary; there is no government agency designated to implement them.					signated to		
d.  Other NON-GOVERNMENT entity(ies) (e.g., energy utility, profession issues or implements the standard. ( <i>Please specify below</i> ):					ofessional associa	ıtion	
17.	enginee:	rs, and otl (Go to C	NING or EDUCATION about the s ner professionals? Question 18.) e indicate all TRAINING/EDUCA		-	ed for architects,	
		a.	Written guidelines to assist with compliance procedure	☐ Yes	□No	Uncertain	
		b.	Example calculations	☐ Yes	□No	☐ Uncertain	
		<b>c.</b>	Compliance forms Workshop(s), seminars(s), or conference(s)	☐ Yes ☐ Yes	□ No □ No	☐ Uncertain☐ Uncertain	
		e.	Information or resource center	☐ Yes	🔲 No	Uncertain	
		f	Other (Please describe helow):				

- 18. Both mandatory and voluntary standards often have mechanisms to encourage compliance. Such mechanisms can be designed as positive incentives and/or penalties, and they can apply at several different stages of the design and construction process.
  - a. What COMPLIANCE MECHANISMS are used in your country, and at what stage in the construction process are they directed? (More than one term may apply.)

Compliance Mechanisms:

C = Certification/approval N = No mechanism

I = Incentive (positive reward) O = Other policy mechanism

P = Penalty (negative incentive) ? = Uncertain

Please CIRCLE all appropriate terms-- C, I, P, N, O, ?-- for each construction stage below:

- 1. PRIOR to construction- (e.g., design stage analysis): C I P N O ?

  Approximately what percent of designs are checked?

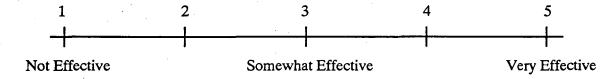
  Comments:
- 2. DURING construction (e.g., on-site inspections): C I P N O

  Approximately what percent of sites are checked?

  Comments:
- 3. AFTER construction (e.g., inspection, energy analysis) C I P N O ?

  Approximately what percent of buildings are checked?

  Comments:
- 4. Are there any OTHER procedures not related to a particular stage of the construction process (e.g., utility hook-up)? (*Please specify*.)
- b. Overall, how effective do you feel the combined compliance mechanisms are at gaining compliance with the standard? (Circle one and comment below.)



Why?

19.	Have any of the following TYPES of ASSESSMENTS or audits of the impact from energy standards for buildings been conducted?
•	a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings. (Check all that apply.)
	<ol> <li>Completed → Please give reference information for any published results:</li> <li>In progress</li> <li>Planned</li> <li>None conducted</li> </ol>
	b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard as compared to typical buildings. (Check all that apply.)
	<ol> <li>Completed → Please give reference information for any published results:</li> <li>In progress</li> <li>Planned</li> <li>None conducted</li> </ol>
	c. COST EFFECTIVENESS based on engineering economic CALCULATIONS (i.e., simulation and modelling). (Check all that apply.)
	<ol> <li>Completed → Please give reference information for any published results:</li> <li>In progress</li> <li>Planned</li> <li>None conducted</li> </ol>
	d. COST EFFECTIVENESS based on ACTUAL COSTS incurred and measured savings achieved (i.e., case studies). (Check all that apply.)
	<ol> <li>Completed → Please give reference information for any published results:</li> <li>In progress</li> <li>Planned</li> <li>None conducted</li> </ol>
	e. Other Assessments (please describe project goal and check current stage of completion):
	<ol> <li>Completed → Please give reference information for any published results:</li> <li>In progress</li> <li>Planned</li> </ol>

#### SECTION V: FURTHER INFORMATION ON ENERGY CONSERVATION

20. Are there EFFICIENCY TESTING FACILITIES and PROCEDURES established in your country for any of the following items? (Circle all that apply.)

a. Motors Yes No?
b. Insulation Yes No?

d. Ballasts Yes No ?
e. Fixtures Yes No ?

c. Air conditioners/chillers/ Yes No ? other appliances

f. Thermal properties Yes No ? of materials

g. Other (please specify):

21. To provide further information about the context of building energy issues in your country, please describe what OTHER PROGRAMS or POLICIES (besides standards) have been developed to INCREASE ENERGY EFFICIENCY in BUILDINGS. (e.g., energy utility initiatives, energy awareness campaigns, utility rebates, free or subsidized energy audits) Please list program type(s) and identify supporting organization(s):

Please suggest up to three ADDITIONAL SOURCES of information (i.e., books, periodicals, newspaper reports, or journal articles) about ENERGY EFFICIENCY for BUILDINGS in your country that could help provide a context for understanding this topic: (Please specify language of suggested reference material, English is preferred.)

1.

2.

3.

					8 87 -	
22.					otain a copy of the specific ation for it (in English if	
	a.		in Question 4?		ten copy of the ENERGY name, mailing address, p	
		Name Addre				
		Tel:		Fax:		
	b.	standard	(s) and whom we	should contact	G DOCUMENTATION available to obtain them: (If difference number, and fax number)	rent from above,
		Types of	Documentation:		·	
		Conta Addre	ct Name: ess:			·
		Tel:		Fax:		
	c.		any OTHER ener hat were NOT spe		for NON-RESIDENTIAL ion 4?	buildings in your
				fy OTHER ene	rgy standard(s) below and tion: (Attach additional pa	
			1. Energy Star Issuing Org Contact Na Address:	ganization:		
			Tel:		Fax:	e e
			2. Energy Star Issuing Org Contact Na Address:	ganization:		
			Tel:		Fax:	

	Are there OTHER PEOPLE or I should respond to the questions titles and contact information be	s raised in this survey? If so, p	lease list their names and/or
	Contact Name: Address:	·	
	Tel:	Fax:	
	Contact Name: Address:		
	Tel:	Fax:	
			· .
		FINISH	
	nk you for participating in this eceive a copy of our findings wh		
Sur	vey completed by		
	Name:		
	Title:		
	Organization:		•
	Address:		
	Tel:	Fax:	
	Date completed:		

PLEASE RETURN SURVEY (VIA TELEFAX OR AIR MAIL) TO:

Kathryn Janda Lawrence Berkeley Laboratory Energy Analysis Program, MS 90-4000 Berkeley, CA 94720 USA

Tel: +1 510-486-5793 Fax: +1 510-486-6996

e-mail: kbjanda@dante.lbl.gov

#### APPENDIX B

Input Key and Survey Data Table

This appendix abbreviates information gathered from all 59 surveys received.

#### INPUT KEY FOR SURVEY DATA TABLE

	Question	Letter Code = Description
		(Note: "-" = None exist and "?" = Not answered)
	ENERAL OVERVIEW OF BUILDING	
	which country has building standards	N = National
prevention	nd (e.g., health, structural safety, fire	R = Regional L = Local
	ectors for which energy efficiency	R = Residential buildings ONLY
	for buildings have been proposed or	N = Non-residential buildings ONLY (e.g., commercial, institutional)
do curren		B = BOTH non-residential and residential buildings
-		O = Other (additional description requested)
	energy standards for NON- TIAL buildings at the national,	M = Mandatory: compliance with standard legally required for construction approval.  V = Voluntary: compliance with standard recommended by not required.
	and local levels.	P = Proposed: standard has been developed an is currently under consideration.
		- = None: no building energy standard has been developed or proposed
		U = Uncertain: there may or may not be a standard at this level.
energy sta		No key necessary.
	DESCRIPTION OF SPECIFIED ENERG	
Question 4	types covered by standard specified in	A = ALL Buildings C = Commercial/retail stores
Question	•	D = Hospitals
		E = Educational facilities (schools)
		F = Restaurants
]		G = Government facilities
	•	H = Hotels I = Industrial Buildings
1		M = Multi-family residential
		O = Offices
		R = Religion-related buildings (churches/mosques)
		S = Single-family residential X = Other (additional description requested)
5b Building v	rintage covered by standard.	N = New buildings
Juliania .	mage to verez by standard.	E = Existing buildings (through retrofits)
		B = Both new and existing buildings
	l building characteristics used to	P = Physical size (e.g., floor area)
	scope of the standard's	E = Amount of energy (e.g., kilowatts)
applicabi	nty.	F = Type of fuel (e.g., electricity) A = Air-Conditioned
		O = Other (additional description requested)
6. Basic appr	roach of the standard.	Pr = Prescriptive (i.e. building materials or dimensions of some building elements are specified)
		Pe = Performance-based (i.e. design flexibility is maintained within a specified level of
		performance of the building element, system, or building as a whole)  Bo = Both prescriptive and performance methods are used in the standard.
7a. Whole-bui	lding energy requirements included	E = Energy amount target (e.g., total btu or kilowatt-hour/floor area)
in standar		P = Peak electricity demand (e.g., peak kilowatt-hours/floor area)
		C = Energy cost target
		O = Other (additional description requested)
7b. Building e	nvelope heat loss or heat gain	R = Roof W = Well custom (e.g. inculation, cutorior curface color)
provisions	included in standard.	W = Wall system (e.g., insulation, exterior surface color) F = Fenestration system (e.g., glass type, amount, placement of windows)
		I = Infiltration (e.g., air changes per hour)
		O = Other (additional description requested)
	provisions (interior or exterior)	C = Control requirements or credits (e.g., occupancy sensors, number of switches, time clocks)
included i	n standard.	P = Installed lighting power density requirements (W/m <sup>2</sup> )
	·	I = Illumination requirements (lux, foot-candles) O = Other (additional description requested)
7d. Mechanica	I provisions included in standard.	A = Air/water distribution efficiency
	•	L = Load calculations for equipment sizing (e.g., chillers, motors)
		C = Controls (e.g., energy management systems, time clocks)
*		V = Ventilation  F = Faultment officiency (e.g., motors, chillers, fans)
	•	E = Equipment efficiency (e.g., motors, chillers, fans) O = Other (additional description requested)
7e. Other pro	visions.	Y = Yes (additional description requested)
		N = No
SECTION III:	STANDARDS DEVELOPMENT PROC	CESS
	organizations that played important	G = Government agency
roles in de	veloping energy standards.	I = Industry group (e.g., equipment or material suppliers)
		A = Academic institution R = Research group (public or private)
		L = Local interest group
	:	F = Foreign development agency (or other non-local institution)
		O = Other (additional description requested)
	volved in deciding what requirements	C = Consensus - several different organizations reached a compromise  M = Mandata - a single organization or antity made most desirious
the standa	rd should contain.	M = Mandate - a single organization or entity made most decisions

10a. Information about physical characteristics of	N = Not available, and not used in standard.
existing buildings (e.g., size, function, types of	E = Estimated using professional judgment.
walls and windows) used.	G = Gathered through audits or surveys for the purpose of the standard.
	A = Already available prior to standard development.
10b. Information about energy use of existing	N = Not available, and not used in standard.
buildings (e.g., annual consumption, peak	E = Estimated using professional judgment.
demand, load patterns).	C = Computer simulations used for estimates.
<u>'</u>	G = Gathered through audits or surveys for the purpose of the standard.
<u> </u>	A = Already available prior to standard development.
10c. Information about weather data (e.g., direct	N = Not available, and not used in standard.
and indirect solar radiation, temperature,	E = Estimated using professional judgment.
humidity).	C = Computer simulations used for estimates.
	G = Gathered through audits or surveys for the purpose of the standard.
	A = Already available prior to standard development.
10d. Other information?	Y = Yes (additional description requested)
	N = No
11. Standards from a different country used.	Name of country.
12a. Computer programs used to develop standard.	Name of program.
12b. Computer programs used for compliance.	Y = Yes
· · · · · · · · · · · · · · · · · · ·	N = No
13. Goal of standard	L = The standard is set at a level LOWER than current practice to eliminate the most
	inefficient building designs.
·	E = The standard is set at a level approximately EQUAL to current practice to encourage
	moderate levels of efficiency.
	A = The standard is set at a level ABOVE current practice to promote highly-efficient
	buildings and encourage technological development.
14. Considerations influencing the inclusion or	E = Cost effectiveness
exclusion of certain measures.	A = Market or local availability of energy efficient products
·	S = Similarity/difference to local design practice
	C = Comfort
· ·	O = Other (additional description requested)
15a. Provision for regular review.	Y = Yes (additional description requested)
· ·	N = No
15b. Revision includes evaluation of earlier	Y = Yes (additional description requested)
standard.	N = No
SECTION IV: IMPLEMENTATION AND COMPLIA	INCE
16. Entities involved in implementing energy	E = Existing agency
standards.	N = New and separate agency
	V = Standards are voluntary; no implementation agency
	O = Other (additional description requested)
16a. Former focus of existing agency.	B = Buildings
	E = Energy
	O = Other (additional description requested)
17. Types of training and education provided for	W = Written guidelines to assist with compliance procedure
architects, engineers, and other professionals.	E = Example calculations
	C = Compliance forms
•	S = Seminars(s), workshop(s), or conference(s)
·	I = Information or resource center
	O = Other (additional description requested)
18. Compliance mechanisms before, during, and	C = Certification/approval
after construction.	I = Incentive (positive reward)
	P = Penalty (negative incentive)
	N = No mechanism
	O = Other policy mechanism (additional description requested)
	? = Uncertain
18d. Effectiveness of mechanisms	Scale of 1 (not effective) to 5 (very effective)
19. Assessments conducted:	C = Completed
a. Energy savings potential	I = In progress
b. Measured energy savings	P = Planned
c. Calculated cost effectiveness	N = None conducted
d. Actual cost effectiveness	
SECTION V: FURTHER INFORMATION ON ENER	GY CONSERVATION
20. Items for which efficiency testing facilities and	
procedures exist.	I = Insulation
•	A = Air conditioners/chillers/other appliances
	B = Ballasts
	F = Fixtures
•	T = Thermal properties of materials
	O = Other (additional description requested)
21. Other programs or policies developed to	U = Utility initiatives
increase energy efficiency in buildings.	I = Information programs
	R = Rebates
,	A = Audits (free or subsidized)
·	B = Building energy standards
	T = Time of day pricing
•	L = Labeling of appliances
	G = Government energy policy
	O = Other (additional description requested)

#### Survey Data Table (all 59 Respondents)

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for further		ilding	Stand g Sec	RES St	IDEN anda		Year	Building Types	d)	able eristi	ach	<u> </u>	20 eg	60	vical	_	zatior ved	Pro	cal	Use	Data	
analysis (countr with standards)	ies	Any Building Standards	Energy Standard Building Sectors	National	Regiona	Local		:	Vintage	Applicable Characteristics	Approach	Whole Building	Building Envelope	Lighting	Mechanical	Other	Organizations Involved	Decision Process	Physical Characteristics	Energy Use	Weather Data	Other
Australia	×	NRL	В	P	P	P	1993	0	N	A	Во	E	RWFIO	<u>-</u>		-	GGA	С	G	E	GA	<u>[-]</u>
Australia		NRL	В	P	V₽	P	1991	HSMED	N		Pr	-	RWIO	-	v	-	GG	м	A	CA	A	I
Australia		NRL	В	P	P	P	-	-	N	-	•	?	?	3	?	-	G	С	?	?	?	$oxed{-}$
Bangladesh		-	-	-	-	-	-	-	-	-	-	-	_	-	-	_	•	•		<b>-</b> ·	-	<u> </u>
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Belgium		R	R	-	-	-	-	HSDMX	В	0	Pe	-	RWF	-	v	Y	GAR	С	A	A	A	<u>-</u>
Botswana		NL	-	-	•	•	-	-	ı	•	•	-	-	-	-	-	•	-	-	-	_	E
Brazil		NL	-	-	-	-	-	-	1	ı	•	-	-	-	-	-	-	-	-	<b>-</b>	-	Ŀ
Canada	X	NRL	В	P	М	М	1983	A	N	AO	Pr	?	RWFIO	P	CVE	_	RRG	М	Е	E	A	-
Chile	X	NRL	В	MV	1	ı	1960	A	В	-	Pe	ı	RWFI	1	-	Y	GAL	С	G	G	G	$\blacksquare$
China	×	NR	В	М	-	-	1993	н	N	A	Во	E	RWFI	-	ALCVE	Y	GAA	С	EG	G	G	
China		NRL	R	-	-	-	1986	м	N	P	Во	E	RW	?	?	-	GA	?	EGA	ECGA	GA	
Colombia	×	N	В	PM			199?	OHGCSM	N	PA	Во	•	-	CPI	ÄLCVE	Y	GIAF	U	G	G	G	
Colombia		NL	В	М	-	-	-	A	N	P	Pr	?	?	I	-	-	GGIO	U	N	N	N	
Costa Rica		-	-	-	-	1	-	•	-	-	-	1	-	ı		-	-	1	-	-	-	
Czechoslovakia	Ø	N	В	М	-	ı	1979	OHFDMX	В	PE	Pe	E	RWFIO	1	ı	1	GAGO	U	EG	EG	EG '	<b>-</b>
Czechoslovakia		NR	В	Р	Р	P	1979	A	N	PF	Во	1	RWFI	0		Y	AR	U	E	E	E	G
Czechoslovakia		N	В	M	-	•	1973	A	N	PE	Во	EPC	RWFI	1	AV	1	G	M	A	G	G	[-]
Czechoslovakia		N	В	м	MV	•	?	A	В	PEO	Ą	EPO	•	1	1	-	GIGG	С	N	N	G	-
Denmark	×	N	В	м	-	-	1982	A	N	P	Во	1	RWFI	1	cvo	-	GGR	С	-	•	-	В
Denmark		N	В	М	-	-	1982	A	N	•	Pe	E	RWFO	•	CVE	1	GG	м	A	A '	A	[-]
Djibouti			-				1991	s	N		Pr					1						[-]
England & Wales	S⊠	N	В	-	м	-	1990	A	В	0	Во	EO	RWFO	1	cvo	-	GIAR	С	EGA	EA	A	Y
France	×	NL	В	м	-	-	1988	OHGFDC	N	F	Во	ı	RWFIO	-	CV	Y	GGRG	С	GA	ECG	A	-
France		N	В	м	-		1988	OHGFDC	N	-	Pe	•	RWFIO	-	ALCVE	Y	GGGL	C	A.	A	A	-
Hong Kong	×	N	N	P	P	P	1991	ОН	N	A	Pe	?	RWF	-		1	GRR	С	G	CG	A	$\lceil - \rceil$
Indonesia	×	NRL	N	VΡ	-	•	?	OHGDMI	N	A	Во	EPC	RWFI	CPIO	ALCVE	-	GARG	С	EG	ECG	G A	D
Israel	×	N	R	М	ט	ט	1989	SM	N	-	Pe	-	RWFI	1	•	-	GAA	С	EG	G	A	F
Israel		NL	R	м	-	-	1989	SM	N	0	Во	0	RWIO	-	<u>-</u>		GALL	С	A	С	A	s
Ivory Coast	×	N	В	P	-	-	1992	A	В	AO	Во	EC	RWF	CPI	ALCVE	Y	GAF	С	EGA	ECG	GA	[-]
Jamaica	×	N	N	MV	-	-	1992	OHGFDR	В	PEA	Во	EC	RWF	CPI	ALCVE	Y	GLIA	С	EGA	ECA	G	Y
Japan	×	NL	В	MV	-	-	1980	0	N	P	Pe	-	RWFI	0	-	Y	GOO ·	M	A	A	A	

#### Survey Data Table (cont.)

III: DEVEL		Т (с						IMI	LEMEN	_							E					V: OTHER			
#11:	#12:	1 -	ı	#14: •	#1		#16:		#17:	#1	18: C	om	plian	e me	thod	ls	1.		Savi	ing ents		#20:	#21:	☑ Indicates 35	
Other Information Sources	Computer Programs Used	Computer Compliance?	Goal	Considerations	Regular Review?	EMANIPA Grsion?	Implementing Entity	Former Focus	Training/ Education	Before	%	During	Warrangio	After	%	Effectiveness	┡	ergy	la l	Actual	Other	Testing Facilities	Other Programs	surveys selected for further analysis (countrie with standards)	es
USA: ASHRAB	DOE-2	N	A	EASC	Y	Y	E	В	-	N		N		N			N	N	P	₽	P	MIAT	UBL	Australia	×
- None	TEMPAL CHEETAH	N	E	EASCO	Y	Y	E		WEI	С	10	С	?	С	?	5	С	₽	С	N	₽	IABM	ODF	Australia	
USA: ASERAE CEBO Singapore	ESP-II BUNYIP DOE-2	ט	E	EA	N	ט	E	В	-	-		-		_			-	-	1	-	-	MAB	UG	Australia	
- None	No	-	-	-	-	-	ı	-	-	-		-		-		-	_	-	1	1	-	-	В	Bangladesh	
- None	Yes	Y	A	EASC	Y	Y	E	E	WECSI	P	-	P	-	P	-	2	С	С	U	U	N	I	IA	Belgium	×
- Hone	No	ט	A	ESC	Y	Y	E	В	WECSI	С	31	С	31	N		4	N	С	С	С		IATO	T	Belgium	
- None	No	-	-	-	-	-	-	-	-	-		-		-		-	-	-	•	-	1	IATO	В	Botswana	
- None	No	-	-	-	-	-	-	-	-	-		-		-		-	-	-	-	-	1	MIABFT	IAL '	Brazil	
USA: ASBRAB	- None	N	A	EASC	Y	И	E	В	WSI	С	?	0	?	С	?	5	С	С	С	С	N	MIAT	ALUG	Canada	×
- None	- None	N	L	ASC	Y	Y	E	В	WECSI	CI		N	,	N		5	?	?	?	?	?	MIABFT		Chile	×
USA: ASERAE	- None	?	A	EAC	Y	Y	-		WECS	-	_	-	-	-	-	-	С	N	N	N	N	IAT	?	China	×
Yes	?	?	A	υ	ט	3	3		?	C <sub>1</sub>	?	P	?	P	?	3	?	С	С	С	N	?	?	China	
USA: ASERAE Jameica:	DOE-2	N	Е	EASC	Y	Y	E	E	WECSI	I		I		I		?	N	N	N	N	N	мв	-	Colombia	×
USA	- None	ט	-	?	N	N	ΕO	0	-	С	50	U		υ		2	N	N	N	N	N	?	?	Colombia	
- None	- None	-	-	-	1	-	-	-	-	-		-		-		-	-	-	-	-	-	-	AL	Costa Rica	
Germany: DIN Austria:	- None	3	A	ESC	Y	N	E	E	WES	C	10	₽	50	С	90	5	I,	С	I	I	3	MIAFTO	?	Czechoslovakia	×
Russian: Poland: STAS Germany: DIH	Yes	υ	A	υ	Y	Y	E	В	WECSI	I	75	N		N		3	P	N	N	N	-	MIBT	0	Czechoslovakia	
- None	No	ט	A	E	Y	Y	ט		ט	C	10	С	?	C	?	2	-	-	f	-	-	IABFT	-	Czechoslovakia	
Yes: EN ISO	No	N	A	•	N	N	ΕV		sī	ı		0		0		-	I	N	N	P	P	0	•	Czechoslovakia	
- None	TSBI	N	A	EAC	Y	N	E	В	W	C	?	С	?	С	?	4	С	С	С	N	_	ITO	IAR	Denmark	×
- Hone	No	υ	A	EASC	Y	Y	E	В	WECSI	U	10	N		N		5	I	N	I	N	-	MITO	UIAR	Denmark	
																								Djibouti	
- Hone	BREDEM ESP-II	В	A	EACO	Y	Y	Ε.	0	WESI	U	10	С	?	N	?	4	I	I	С	N	I	MIABTO	IG	England & Wales	×
- Hone	Uncertain	บ	L	EAC	Y	N	E	В	WECS	U	?	?	?	?	?	?	С	?	?	?	?	MIABFT	AIR	France	×
- Hone	- None	3	A	E	N	N	E	В	WES	CI	?	CI	?	PN	?	3	С	С	I	I	N	IAT	?	France	
UK USA Austrelia 6	DOE-2-1D	N	A	EAS	N	U	E	В	WEC	С	10	N		N		5	С	N	N	N	-	-	-	Hong Kong	×
Singapores	DOE-2 ASEAM	Y	A	EASC	Y	N	E	В	WESI	С	?		?		?	-	P	I	N	N	-	MIFT	IA	Indonesia	×
Germany: DIM	- None	บ	L	E	Y	Y	E	В	WECSI	С	-	N	-	С	-	4	-	-	P	P	-	IAT	-	Israel	×
- Hon●	TARP	N	A	EAS	Y	Y	E	В	WECSI	С	15	P	15	N	-	2	С	N	С	N	N	IT	-	Israel	
Jamaica:	OASIS CODYBA DOE-2	Y	A	EASC	ט	N	E	E	WECS	-	-	-	-	-	-	-	I	-	I	-	-	0	-	Ivory Coast	×
USA: ASERAE Melaysia Theiland	ASEAM DOE-2.1D	Y	A	EASC	N	N	E	В	WECSI	С	?						U	I	С	?	С	A	IG	Jamaica	×
Uncertain	Uncertain	Y	A	ES	N	Y	E	В	WSI	С	10	N		N		5	N	-	-	-	D	MIAT	I	Japan	×

#### Survey Data Table (all 59 Respondents)

☑ Indicates 35		1: O' #1:	VER\ #2:	#3:	tatus		#4:	#5: Appli of Star	cab	ility	OF SI #6:	#7:			in Standa		#8:	₩9	#10	ENT/PR : :formatic		
surveys selected for further analysis (countri with standards)	ı	Any Building Standards	Energy Standard Building Sectors	National Co 23	Regiona Wadi	- TIAL	Year	Building	Vintage	Applicable Characteristics	Approach	Whole Building	Building 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Lighting	Mechanical	Other	Organizations Involved	Decision Process	Physical Characteristics	Energy Use	Weather Data	Other
Malaysia	×	NRL	N	v	v	v	1989	OHGFC	N	E	Pe	-	RWFI	CPI	LŒ	-	GA	С		GA	A	
Mexico		-	-	-	•	,	-	-	1	-	•	-	-	•	1	-	•	•	-	-	-	$oxed{\mathbb{H}}$
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New Zealand	×	N	В	М	-	-	1982	OHGDCR	В	P	Во	E	RWFI	P	LCV	N	GR	М	GA	CG	A	Ŀ
New Zealand		NRL	В	v	v	٧	1977	OHGSFC	N	-	Во	-	RW	-	-	_	GGAI	С	A	G	A	且
New Zealand		N	R	_	-	-	1992	s	N	ю	Во	E	RWFIO	-	-	_	IAG	0	A	С	A	ᅵ
New Zealand		N	В	V	-	-	1982	OHGDCR	В	P	Во	E	RWFI	P	LCV	_	GLIG	С	GA	CG	A	H
Northern Ireland	I⊠	N	В	м	м	М	1991	A	В	PE	Pe	•	RWF	-	С	-	GGR	С	G	G	A	닏
Norway	×	N	В	М	-	-	1987	A	В	-	Во	-	RWFI	-	A	_	GRGI	М	G	С	G	且
Pakistan	×	NRL	В	V	-	-	1990	OHGSFC	N	0	Во	E	RWFI	со	ALCVE	Y	GG	С	Е	С	A	
Philippines	×	N	N	VP	-	-	198?	OHGCDF	В	E	Во	P	RWFI	CPI	ALCVE	_	GAFO	С	G	G	G	ᅵᅴ
Poland	×	N	В	М	-	-	1991	A	В	PA	Pe	E .	RWFIO	?	?	-	GR	3	A	?	A	ᅵ
Poland		N	В	м	-	•	1991	A	В	-	Pe	-	RWFI	-	-	Y	GRG	С	E	E	N	
Portugal	×	N	В	М	-	-		A	В	0	Во	E	RWFI	0	-	-	GGAA	С	A	E	A	ᅵ
Romania	×	NRL	В	V	-	-	?	A	В	PE	Pr	E	Y	-	?	-	GRI	м	Е	EG	G	且
Russia	×	N	В	P	P	-	1991	A	В	E	Pe	E	RWFIO	-	_	-	RRRR	С	A	CG	A	Ŀ
Scotland	×	N	В	М	_	-	?	A	N		Во	E	RWF	-	Y	Y	GIAR	М	?	?	?	
Singapore	⊠	N	В	м			1980	Α -	N	EA	Во	-	RWFI	CPI	cv	Y	GAGL	С	G	E	G	Ŀ
South Africa	⊠	NL	N	v	٧	-	?	OGD	N	E	Pe	E	?	?	?	-	A	М	E	EC	A	
South Africa		NRL	-	-	-	-	-	-	-	_	-	-		_	_	-	-	-	-	-	-	
South Korea	⊠	N	В	м			1992	OHGFDC	N	P ·	Во	E	RWFI	CPI	LCE	Y	GGR	C	EGA	ECGA	GA	Ŀ
Sweden	×	N	В	M	-	-	1989	A	N	0	Pe	0	RWFI	10	v	н	G	M	-	EC	A	
Switzerland	×	N	В	М	М	М	1988	A	В	PEF	Во	E	RWFI	•	LE	-	GA	С	A	E	A	
Switzerland		NRL	В	MV	М	М	88/9	A	N	EF	Во	E	0	-	A	Y	GA	С	EG.	CG	A	Ŀ
Thailand	×	N	N	P	P	P	1987	OHGFDC	В	E	Pr	-	RWFI	CP	LVE		GGA	М	A	A	A	T
USA	×	NRL	В	MV	MV	М	1989	OHFDRC	N	0	Во	С	WF	CP	LCVE	Y	GRII	n	E	C	A	
Venezuela		N	-		-	-	-	-	-	-	_		-	-	-	-	<u>-</u>	-		-		<u> -</u>

#### Survey Data Table (cont.)

CHEST PARTY	<b>OPMEN</b>	Т (	ont	)			IV:	IMI	LEMEN	ΓAΊ	IOI	JAN	JD C	OM	LIA	NC	E					V: OTHER	RINFO		
#11:	#12:			#14:	#1	5:	#16:		#17:						ethoc		-	9: 5	Savi	ng		#20:	#21:	57 x 1: oc	
Other	pası	nce?		tions	iew?	ion?	ing	Focus				٠		Ι,		ss	<u> </u>	ses ergy	sme	nts st		Testing Facilities			
Other Information Sources	Computer Programs Used	Computer Compliance?	Goal	Considerations	Regular Review?	Manitoversion?	Implementing Entity	Former For	Training/ Education	Before	manana %	During Construction	%	After	onon neiloo	Effectiveness	Potential		lal	_	Other	racilities	Other Programs	for further analysis (countri with standards)	es
Singapore: USA: ASBRAE	DOE-2 ASEAM-2	N-	E	EAC	Y	N	V	-	ES	N		N		N			С	₽	С	С		MIAB	IAE	Malaysia	×
- None	- None	-	-	_	-	_	1	-	-	•		1	•	-		_	ŀ	-	1	-	1	MABT	AIB	Mexico	
- None	CEN TC 89 TCM ISSO pub.	N	E	EC	Y	N	E	В	WECI	C	10	P	10	N	0	4	U	N	С	N	P	IATO	IURA	Netherlands	×
USA: ASERAR UK: BS 5422:	SUSTEP	A	E	ES	Y	N	E	В	0	U	90	C	25	С	?	4	P	С	P	₽	N	IT	υ	New Zealand	×
No	No	ซ	A	EASC	Y	N	EN	В	-	CF	10	CP	. 3	CI	. 3	5	I	I	I	I	I	IT	G	New Zealand	
Яо	ALF	Y	•	0	N	N	0	?	-	U	10	N		N	,	3	I	I	N	N	N	IAT	ָט	New Zealand	
USA: ASHRAB UK: BS 5422:	Uncertain	ט	E	ES	Y	N	E	В	•	U	90	С	25	С	?	4	P	С	₽	P	N	IT	ָט	New Zealand	
England and Wales:	BREDEM CIBSE	N	A	EASCO	Y	Y	E	В	WES	C	10	С	75	С	95	5	C	I	С	I	-	IT	I	Northern Ireland	×
Denmark Sweden Finland	Yes	?	E	E	Y	Y	E	0	WE	С	10	?	?	С	?	3	С	С	С	С	-	ับ	IR	Norway	×
US: ASERAE	- None	ט	A	EASC	Y	N	E	0	WECS	N		N	_	N	-	-	С	P	I	P	N	MBF	AIB	Pakistan	×
Theilands	DOE-2 ASEAM	N	E	EASC	Y	Y	E	0	-	U		U		υ		_	N	N	N	N	N	ABFO	IAR	Philippines	×
Yes	Uncertain	3	L	EASC	Y	Y	E	3	WEI	?	3	?	?	?	?	?	С	P	?	?	?	IBT	?	Poland	×
UK: Building Sweden:	MAIN Energy	Y	A	EAC	Y	N	E	В	WES	С	ט	С	บ	N	0	2	P	I	P	P	N	IT	G	Poland	
France Spain	- None	ט	E	s	N	-	E	0	WECS	С	?	N	?	N	?	3.	С	P	P	N	P	MIAFTO	I	Portugal	×
European	Uncertain	?	E	EAS	Y	ט	ט		WECS	P	?	?		?		2	I	I	I	I	I	MIT	I	Romania	×
ISO-9164 Cormany: DIN Sweden: SBH	HEAT	Y	A	EAC	Y	N	E	В	-	-		-		С		3	P	I	I	N		ITO	G	Russia	×
England and	Uncertain	3	3	EASC	Y	Y	E		WES	U		U		υ	-	-	-	-	-	-	-	-	_	Scotland	×
USA: ASHRAE	- None	И	A	EASC	Y	Y	E	В	WECS	С	-	·N		С		5	С	С	С	С	-	IBT	I	Singapore	×
- None	QUICK	Y	E	ESC	N	?	E	В		N	5	N	0	N	0	1	С	С	I	I	P	IT	AT	South Africa	X
- None	- None	1	-	-	-	-	-	1	-	_		-		-		1	1	-	-	-	-	IT	AT	South Africa	
	DOE-2 Trakload TRNSYS	Y	A	EASC	Y	Y	E	В	WECS	С	50	СО	50	CP	3	3	₽	P	P	P	P	MIABFT	GUIA	South Korea	×
	ENORM	Y	A	EC	Y	Y	E	В	WESI	С	10	С	?	С	?	5	-	-	-	-	-	IAT	-	Sweden	×
Germany: DIN France:	- None	?	L	EC	Y	Y	3	?	ESI	С	10	-	-	-	_	-	I	I	I	I	-	IAT	В	Switzerland	×
- Youe	DOE-2	υ	L	EACO	Y	Y	E	В	WECS	С	10	N	-	N	-	4	С	С	c	С	N	IT	G	Switzerland	
Singapore USA: ASHRAE	DOE-2	Y	A	EASC	Y	_	E	E	WE	P	10	P	-	P	?	-	I	P	P	N	N	AB	υG	Thailand	×
~ None	DOE-2	Y	A	AC	Y	N	ΕO	E	WES	С	?	υ	?	ט	?	5	С	С	N	N	N	MIAT	UG	USA	×
- None	- None	_	-	-	-	-	-		-	_		_		_		-	-	-	-	-	-	IBT	U	Venezuela	

#### **APPENDIX C**

#### Surveyed Details of Selected Energy Standards in 35 Countries

Country Name	Page Number
Australia	
beigium	
Canada	
Chile	
China	
Colombia	
Czechoslovakia (former)	
Denmark	
England & Wales	
France	
Hong Kong	
Indonesia	
Israel	
Ivory Coast	
Jamaica	
Japan	
Malaysia	
Netherlands	
New Zealand	· ·
Northern Ireland	
Norway	
Pakistan	
Philippines	
Poland	
Portugal	
Romania	
Scotland	
Singapore	
South Africa	
South Korea	
Sweden	
SwedenSwitzerland	
Thailand	
U.S.S.R. (former)	
United States	

In most cases only one survey from each country was received, but in cases where multiple surveys were returned we did not attempt to verify or "correct" discrepancies between respondents from the same country. To develop our comparative analysis set and this appendix, we selected the surveys which seemed to contain the most reliable information.



## **AUSTRALIA**



ENERAL OVERVIEW OF BUILDING ENERGY STANDARDS	
General building standards exist at the following governmental level	els: National Regional Local
2. Proposed or existing ENERGY standards cover the following build	ding sectors: Both Residential and Non-Residential
Status of Non-Residential Building Energy Standards at the:     a. National level: Proposed b. Regional I  ———————————————————————————————————	level: Proposed c. Local level: Proposed
4. Single energy standard selected for further description:  Title, Organization: Building Envelope, Australian Sta	ndards Association
Year: 1993 Geographic Coverage: Nation	Abbreviated Title: ASA-1993
ESCRIPTION OF SPECIFIED ENERGY STANDARDS - AS	;A-1993
5. The standard defined in Question 4 applies to the following kinds of	f buildings:
a. Building types: b. Buildin	ng <b>vintage:</b> v buildings
<u> </u>	characteristics:
·	ir-Conditioned
<u> </u>	
Basic approach of the standard:     Both prescriptive and portain of the standard:  7. The following subjects are included in the energy standard:	erformance
a. Whole building energy provisions:	b. Building envelope provisions:
E- Energy amount target	Roof
	Wall system
	Fenestration system Infiltration
	Other: Thermal mass, internal load
c. Lighting provisions:	d. Mechanical provisions:
- None	- None
e. Other provisions:	
- None	
e. Other provisions:  - None	

DARDS DEVELOPMENT PROCESS - ASA-1993		
Organizations involved in developing the standard:		
Government agency: Energy Research and Develop	oment Cooperation	
Government agency: Standards Association, Aust		
Academic institution: SOLARCH, University of N		
Academic listitution. SOLARCH, University of 1	New Bount Wates	
		<del></del>
Decision Process: Consensus Comment:	<del></del>	
belsion rioces.		
0. Information used in developing the standard:		
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings	S <b>:</b>
Gathered through audits and surveys	Estimated using professional	
Gamered unough addits and surveys	Estimated using professional	Judgment
c. WEATHER data	d. Other information	
Gathered through measurements	- None	
Already available prior to standard		
2. COMPUTER programs used:  a. In developing the standard:  DOE-2	b. For complying with the standard:	No
	b. For complying with the standard:	<u>No</u>
	b. For complying with the standard:	<u>No</u>
	b. For complying with the standard:	<u>No</u>
	b. For complying with the standard:	<u>No</u>
a. In developing the standard:  DOE-2	b. For complying with the standard:	<u>No</u>
a. In developing the standard:  DOE-2	b. For complying with the standard:	<u>No</u>
a. In developing the standard:  DOE-2  3. Standard is set at a level:  Above current practice		No
a. In developing the standard:  DOE-2  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of measures in		No
a. In developing the standard:  DOE-2  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness	in the standard:	<u>No</u>
a. In developing the standard:  DOE-2  3. Standard is set at a level: Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness  Availability of energy efficient products	in the standard:	<u>No</u>
a. In developing the standard:  DOE-2  3. Standard is set at a level: Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design	in the standard:	
a. In developing the standard:  DOE-2  3. Standard is set at a level: Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness  Availability of energy efficient products	in the standard:  Comments:	
a. In developing the standard:  DOE-2  3. Standard is set at a level: Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design	in the standard:  Comments:	
a. In developing the standard:  DOE-2  3. Standard is set at a level: Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Comfort	in the standard:  Comments:	
a. In developing the standard:  DOE-2  3. Standard is set at a level: Above current practice  E - Cost effectiveness  Availability of energy efficient products Similarity/difference to local design  Comfort  5a. Standard scheduled for regular review and revision?	in the standard:  Comments:	
a. In developing the standard:  DOE-2  3. Standard is set at a level: Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Comfort	in the standard:  Comments:	
a. In developing the standard:  DOE-2  3. Standard is set at a level: Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Comfort  5a. Standard scheduled for regular review and revision?  Yes: Standards Australia committees initiate these	in the standard:  Comments:	
3. Standard is set at a level: Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Comfort  5a. Standard scheduled for regular review and revision?	in the standard:  Comments:	

- None  Compliance mechanisms used at different stages in construction process:  a. PRIOR to construction:  No mechanism  Percent designs checked:  Comment:  Comment:	Entities involved in IMPLEMENTING energ	yy standards:	
Buildings  TRAINING & EDUCATION provided for architects, engineers and other professionals:  - None  Compliance mechanisms used at different stages in construction process:  a. PRIOR to construction:  No mechanism  No mechanism  Percent designs checked:  Comment:  C	Existing agency: Standards Au	stralia	
Buildings  TRAINING & EDUCATION provided for architects, engineers and other professionals:  - None  Compliance mechanisms used at different stages in construction process:  a. PRIOR to construction:  No mechanism  Percent designs checked:  Comment  Description of effectiveness of combined compliance mechanisms (scale of 1-5):  1. Explanation for effectiveness in part e:  Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  None conducted  Description of the energy standards impact:  C. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned  C. COST EFFECTIVENESS based on ACTUAL COSTS:			
TRAINING & EDUCATION provided for architects, engineers and other professionals:  - None    Compliance mechanisms used at different stages in construction process:   Compliance mechanisms used at different stages in construction:   No mechanism	• • • • • • • • • • • • • • • • • • • •	sible for implementation, its former focus was	on buildings, energy, or another area:
Compliance mechanisms used at different stages in construction process:   a. PRIOR to construction:	Buildings		
Compliance mechanisms used at different stages in construction process:   a. PRIOR to construction:	7. TRAINING & EDUCATION provided for a	rchitects, engineers and other professionals	:
a. PRIOR to construction: No mechanism    No mechanism	- None		· · · · · · · · · · · · · · · · · · ·
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No mechanism    No mechanism   No mechanism   No mechanism			
a. PRIOR to construction: No mechanism    No mechanism			
No mechanism    No mechanism   No mechanism   No mechanism	3. Compliance mechanisms used at different	t stages in construction process:	
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	il CIIII u	i properties of materials					
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21. Other	r Drogra	ams or policies developed to increase en	erav efficiency in build	dinas:			
		initiatives		•	onormi tora	ets developed by B.I	- N
		g energy standards	Commenc	punning	energy rargo	eis developed by b.i	<i>)</i>  VI
		g of appliances	—				
La	abeling	g or appliances					
A	ا مردانا	l accompand information about anounced	Esismon fou buildings i	in. Assets	alia		
		I sources of information about energy ef					
1.	E.R.	D.C. Compendium (P.O. Box 629	); Canberra, ACT.	2601, Aus	stralia)		
			· -				
2.	A.N	Z.S.E.S. (Australia New Zealand	d Solar Energy So	ciety) Pro	ceedings of	conferences.	
_							
3.	AIR	AH (Australian Institute of Refr	rigeration. Air-Co	nditioning	and Heatin	ng) Journal	
3.	AIR	AH (Australian Institute of Refr	igeration, Air-Co	nditioning	, and Heatir	ng) Journal	
3.	AIR	AH (Australian Institute of Refr	rigeration, Air-Co	nditioning	g, and Heatir	ng) Journal	
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22. Conta Nar Address Coo Tel Tyr	act for v me: s: untry: l: pes of s	Pritten copy of energy standard specifical Deo K. Prasad Associate Director, SOLARCH P.O. Box 1 Kensington 2033 Australia 61-2-697-4868 Supporting information available:	ed in Question 4: Fax: 61-2-662		g, and Heatir	ng) Journal	
22. Conta Nar Address Coo Tel Typ	act for v me: s: untry: l: pes of s	Pritten copy of energy standard specifical Deo K. Prasad Associate Director, SOLARCH P.O. Box 1 Kensington 2033 Australia 61-2-697-4868 Supporting information available:	ed in Question 4: Fax: 61-2-662		z, and Heatir	ng) Journal	
22. Conta Nar Address Coo Tel Typ	act for v me: s: untry: l: pes of s	Pritten copy of energy standard specifical Deo K. Prasad Associate Director, SOLARCH P.O. Box 1 Kensington 2033 Australia 61-2-697-4868 Supporting information available:	ed in Question 4: Fax: 61-2-662		z, and Heatir	ng) Journal	
22. Conta Nar Address Coo Tel Typ	act for v me: s: untry: l: pes of s	Pritten copy of energy standard specifical Deo K. Prasad Associate Director, SOLARCH P.O. Box 1 Kensington 2033 Australia 61-2-697-4868 Supporting information available:	ed in Question 4: Fax: 61-2-662		z, and Heatir	ng) Journal	
22. Conta Nar Address Coo Tel Typ	act for v me: s: untry: l: pes of s	Pritten copy of energy standard specifical Deo K. Prasad Associate Director, SOLARCH P.O. Box 1 Kensington 2033 Australia 61-2-697-4868 Supporting information available:	Fax: 61-2-662	-1378	z, and Heatir	ng) Journal	
22. Conta Nar Address Coo Tel Typ	act for v me: s: untry: l: pes of s	Pritten copy of energy standard specification. Deo K. Prasad Associate Director, SOLARCH P.O. Box 1 Kensington 2033 Australia 61-2-697-4868 Supporting information available:  ergy standards for non-residential building	Fax: 61-2-662	-1378 I		ng) Journal	
22. Conta Nar Address Coo Tel Typ	act for v me: s: untry: l: pes of s	Pritten copy of energy standard specifical Deo K. Prasad Associate Director, SOLARCH P.O. Box 1 Kensington 2033 Australia 61-2-697-4868 supporting information available: ergy standards for non-residential buildings	Fax: 61-2-662	-1378 I ector, SOL	ARCH	ng) Journal	
22. Conta Nar Address Coo Tel Typ	act for v me: s: untry: l: pes of s	Pritten copy of energy standard specifical Deo K. Prasad Associate Director, SOLARCH P.O. Box 1 Kensington 2033 Australia 61-2-697-4868 supporting information available: ergy standards for non-residential buildings	Fax: 61-2-662	-1378 I ector, SOL New Sou	ARCH		
22. Conta Nar Address Coo Tel Typ	act for v me: s: untry: l: pes of s	Pritten copy of energy standard specifical Deo K. Prasad Associate Director, SOLARCH P.O. Box 1 Kensington 2033 Australia 61-2-697-4868 supporting information available: ergy standards for non-residential buildings	Pax: 61-2-662.  Deo K. Prasad Associate Dire University of	-1378  I ector, SOL New Sournsington	ARCH	Country: Austral	
22. Conta Nar Address Coo Tel Typ	act for v me: s: untry: l: pes of s	Pritten copy of energy standard specifical Deo K. Prasad Associate Director, SOLARCH P.O. Box 1 Kensington 2033 Australia 61-2-697-4868 supporting information available: ergy standards for non-residential buildings	Pax: 61-2-662  Deo K. Prasad Associate Dire University of P.O. Box 1, Ke New South W	-1378  lector, SOL New Sournsington Vales	ARCH th Wales	Country: Austral	
22. Conta Nar Address Coo Tel Typ	act for v me: s: untry: l: pes of s	Deo K. Prasad Associate Director, SOLARCH P.O. Box 1 Kensington 2033 Australia 61-2-697-4868 supporting information available:  ergy standards for non-residential buildi Survey completed by: Title:	Deo K. Prasad Associate Dire University of P.O. Box 1, Ke New South W 61-2-697-4868	-1378  lector, SOL New Sournsington Vales	ARCH th Wales		



## **BELGIUM**



•	lards exist at the following g		National	Regional	Local
2. Proposed or existing	ENERGY standards cover to	ne rollowing building	sectors: Reside	ntial Only	
3. Status of Non-Reside a. National level:	ntial Building Energy Stand Voluntary		Voluntary	c. Local level:	Voluntary
• •	rd selected for further desc	-			
Title, Organization:	Réglementatin therm Wallonne	ique pour les loge	ments neufs (K7	0-Be500). 1984. Min	istere de la Re
Year: 1984	Geographic Coverage:	Regions	Abbreviated Title	K70-BE500:1984	
RIPTION OF SPECI	FIED ENERGY STANI	DARDS - K70-BI	E500:1984		
5. The standard defined in	n Question 4 applies to the f	ollowing kinds of buil	dings:		
a. Building types:		b. Building vin	•		
	nily residential	New bui	ldings		
W Wattra	nily residential	- None	acteristics:		
6. Basic approach of the	standard: Performan				
a. Whole building end	<del></del>		. Building envelope p	rovisions:	
E- Energy amo	unt target		Other: perform	nance thermique de l e)	'envelope
			<del></del>		
c. Lighting provision	»	d	. Mechanical provisi	ons:	
c. Lighting provision - None	s: .	d	. Mechanical provision - None	ns:	
<b>. .</b>	S:	d	•	ons:	

	onne
Research group: C.S.T.C.	
Academic institution: U. Lg, U.C.L, U.M.S.	
Industry group: Ordre des architectes; COMITA	(isolants); verries etc.
ecision Process: Consensus Comment:	
nformation used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Gathered through audits and surveys	Estimated using professional judgment
Already available prior to standard	Computer simulations used for estimates
	Gathered through audits and surveys
	Already available prior to standard
c. WEATHER data	d. Other information
Gathered through measurements	- None
Already available prior to standard	
Timeday available prior to building	
	· · · · · · · · · · · · · · · · · · ·
COMPUTER programs used:	
a. In developing the standard: Yes	b. For complying with the standard: Yes
· · · · · · · · · · · · · · · · · · ·	
Observation Advantage Control of the	
Standard is set at a level: Above current practice	
Standard is set at a level: Above current practice Considerations influencing the inclusion or exclusion of measures	in the standard:
Considerations influencing the inclusion or exclusion of measures	in the standard:  Comments:
Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness	
Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products	
E - Cost effectiveness  Availability of energy efficient products Similarity/difference to local design	
Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products	Comments:
E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Comfort	Comments:
Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Comfort  Standard scheduled for regular review and revision?	Comments:
E - Cost effectiveness  Availability of energy efficient products Similarity/difference to local design Comfort  Standard scheduled for regular review and revision?  Yes: nouvelles normes pour le esleuf des coefficient	Comments:
E - Cost effectiveness  Availability of energy efficient products Similarity/difference to local design Comfort  Standard scheduled for regular review and revision?  Yes: nouvelles normes pour le esleuf des coefficient	Comments:

### 3 BELGIUM

### IMPLEMENTATION AND COMPLIANCE - K70-BE500:1984 16. Entities involved in IMPLEMENTING energy standards: Existing agency: Ministere de la Region Wallonnne D.G.C.R. If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Compliance forms Seminars, workshops, or conferences Information or resource center 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Penalty Penalty Penalty Percent designs checked: -Percent sites checked: -Percent buildings checked: -Comment: Comment: Comment: d. Other compliance procedures -None e. Effectiveness of combined compliance mechanisms (scale of 1-5): 2 f. Explanation for effectiveness in part e: . 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Completed c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Completed d. COST EFFECTIVENESS based on ACTUAL COSTS: Completed e. Other Assessments: None conducted

Efficiency testing facilities and procedures established	<b>j</b> :
Insulation	
·	· · · · · · · · · · · · · · · · · · ·
Other programs or policies developed to increase energ	gy efficiency in buildings:
Information programs	Comment Campagne cornet d'epoigne energie (habitat
Audits (free or subsidized)	existent); guichets de l'energie; A geela EPEE,
	logements soliare, ecoles-hopitaux, lieux de cultes (diagnostics thermiques)
	—   Cunto (unight shirt uniques)
Additional sources of information about energy effic	iency for buildings in: Belgium
• • • • • • • • • • • • • • • • • • •	leau de borol
2. Applicatin de la réglementatin K90-B	e500
3. Ecrnotec: rentabilite des investissemen	ts URE pour le logement existant.
·	
Contact for written copy of energy standard specified	in Question 4:
Name:	
ddress: Ministere de la Région Wallonne l' direction de l'energie	D.G.T.R.
avenue Prince de Liege, 7	
5100 Namur (Jambes)	•
Country: Belgium	
Tel: 32 81 321 541	Fax: 32 81 30 66 00
Types of supporting information available:	
-None	
Other energy standards for non-residential building	s:
-None	·
Survey completed by	H Claniur
Survey completed by: Title:	H. Gleniur Architecte
	Architecte Ministere de la Région Walernne D.G.T.R.
	Architecte Ministere de la Région Walernne D.G.T.R. Direction de l'energie; 7, avenue Prince de Liege
Title:	Architecte Ministere de la Région Walernne D.G.T.R. Direction de l'energie; 7, avenue Prince de Liege 5100 Nomur Country: Belgium
	Architecte Ministere de la Région Walernne D.G.T.R. Direction de l'energie; 7, avenue Prince de Liege



## **CANADA**



2. Proposed or existing	dards exist at the following of ENERGY standards cover the standards cover the standards are standards.		National sectors: Roth P	Regional	Local
		•	Both K	esidential and inon-	Kesidentiai
Status of Non-Reside     a. National level:	ential Building Energy Stand Proposed	dards at the: b. Regional level:	Mandatory	c. Local level:	Mandator
4. Single energy standa	ard selected for further des	cription:			
Title, Organization:	Loi sur l'économie de l'énergie dans les nou travail. (National Re	veaux Bâtiments.	Ministeres de l'e		
Year: 1983	Geographic Coverage:	Regions	Abbreviated Title	: NRCC-22432	
RIPTION OF SPECI	FIED ENERGY STANI	DARDS - NRCC	-22432		
5. The standard defined i	n Question 4 applies to the 1	following kinds of buil	dings:		
a. Building types:		b. Building vin	•		
A - All Buildi	ngs	New bui	ildings		
		c. Other char	acteristics:		
			Conditioned		
		O - Other	r: heating system	ıs	
		<del>-  </del>			
		~			
6. Basic approach of the	e standard: Prescripti	ve			
	are included in the energy	standard:			•
<ol><li>The following subjects</li></ol>			o. Building envelope p	mvisions.	
	eray provisions:	1 5			
a. Whole building en	ergy provisions:	, .			
	ergy provisions:		Roof		
a. Whole building en	ergy provisions:				
a. Whole building en	ergy provisions:		Roof Wall system		
a. Whole building en	ergy provisions:		Roof Wall system Fenestration sy Infiltration		ials
a. Whole building en			Roof Wall system Fenestration sy Infiltration	estem I properties of mater	ials
a. Whole building en	s:		Roof Wall system Fenestration sy Infiltration Other: therma	estem I properties of mater	ials
a. Whole building en ? - Uncertain  c. Lighting provision	s:		Roof Wall system Fenestration sy Infiltration Other: therma  Mechanical provision Controls Ventilation	estem  I properties of mater  ns:	ials
a. Whole building en ? - Uncertain  c. Lighting provision	s:		Roof Wall system Fenestration sy Infiltration Other: therma  Mechanical provision Controls	estem  I properties of mater  ns:	ials
a. Whole building en ? - Uncertain  c. Lighting provision	s:		Roof Wall system Fenestration sy Infiltration Other: therma  Mechanical provision Controls Ventilation	estem  I properties of mater  ns:	ials
a. Whole building en ? - Uncertain  c. Lighting provision Power density	S: 7		Roof Wall system Fenestration sy Infiltration Other: therma  Mechanical provision Controls Ventilation	estem  I properties of mater  ns:	ials
a. Whole building en ? - Uncertain  c. Lighting provision	S: 7		Roof Wall system Fenestration sy Infiltration Other: therma  Mechanical provision Controls Ventilation	estem  I properties of mater  ns:	rials
a. Whole building en ? - Uncertain  c. Lighting provision Power density	S: 7		Roof Wall system Fenestration sy Infiltration Other: therma  Mechanical provision Controls Ventilation	estem  I properties of mater  ns:	ials

	ouncil A-1980
Government agency: Bureau de l'efficacite Enèrge	
ecision Process: Mandate Comment:	
nformation used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Estimated using professional judgment	Estimated using professional judgment
c. WEATHER data	d. Other information
Already available prior to standard	- None
Alleady available prior to standard	
	•   .
tandards from a different country used as source material:	
USA: ASHRAE 90A-1980	·
	· · · · · · · · · · · · · · · · · · ·
OMPUTER programs used:	
OMPUTER programs used:	b. For complying with the standard: No
OMPUTER programs used: a. In developing the standard: - None	b. For complying with the standard: No
	b. For complying with the standard: No
	b. For complying with the standard: No
	b. For complying with the standard: No
a. In developing the standard:  - None	b. For complying with the standard: No
	b. For complying with the standard: No
a. In developing the standard:  - None	
a. In developing the standard:  - None  - None  - Standard is set at a level:  Above current practice  - Onsiderations influencing the inclusion or exclusion of measures	
a. In developing the standard:  - None  - None  - Standard is set at a level:  - Above current practice  - Above current practice  - Cost effectiveness	in the standard:
a. In developing the standard:  - None  - None  - Standard is set at a level:  Above current practice  - Onsiderations influencing the inclusion or exclusion of measures	in the standard:
a. In developing the standard:  - None  Standard is set at a level:  Above current practice  onsiderations influencing the inclusion or exclusion of measures  E - Cost effectiveness  A - Availability of energy efficient products	s in the standard: Corruments:
a. In developing the standard:  - None  Standard is set at a level:  Above current practice  considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design	s in the standard: Corruments:
a. In developing the standard:  - None  Standard is set at a level:  Above current practice  considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design  C - Comfort	s in the standard: Corruments:
a. In developing the standard:  - None  Standard is set at a level:  - Above current practice  - Cost effectiveness  - Availability of energy efficient products  - Similarity/difference to local design  - Comfort  - Standard scheduled for regular review and revision?	s in the standard:  Comments:
a. In developing the standard:  - None  Standard is set at a level:  - Above current practice  - Cost effectiveness  - Availability of energy efficient products  - Similarity/difference to local design  - Comfort  - Standard scheduled for regular review and revision?	s in the standard: Corruments:

### IMPLEMENTATION AND COMPLIANCE - NRCC-22432 16. Entities involved in IMPLEMENTING energy standards: Existing agency: Régie du Bâtiment If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: **Buildings** 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Seminars, workshops, or conferences Information or resource center 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Certification/approval Other policy mechanism Certification/approval Percent sites checked: ? Percent buildings checked: ? Percent designs checked: ? Comment: Comment: Comment: d. Other compliance procedures Yes: (see below) e. Effectiveness of combined compliance mechanisms (scale of 1-5): 5 f. Explanation for effectiveness in part e: Builders, architects, and engineers must give a "conform certificate" to the owner. 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Completed c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Completed d. COST EFFECTIVENESS based on ACTUAL COSTS: Completed e. Other Assessments: None conducted

Utility initiatives Government energy policy  Additional sources of information about energy efficiency for buildings in: Canada  1. La Maîtrise de l'energie. Association Québécoise pour la maîtrise de l'energie (AQME)  5. Place Ville-Marie, 9e étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada  2.  3.  2. Contact for written copy of energy standard specified in Question 4:  Name:  Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils  Bureau de l'efficacité énergétique 425 Ave. Viger Quest, Bureau 600  Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946	. Elliololloy t	esting facilities and procedures establishe	d:	
Air conditioners/chillers/other appliances Thermal properties of materials  Other programs or policies developed to increase energy efficiency in buildings:  Audits (free or subsidized)  Labeling of appliances  Utility initiatives  Government energy policy  Additional sources of information about energy efficiency for buildings in: Canada  1. La Maitrise de l'energie. Association Québécoise pour la maîtrise de l'energie (AQME)  5, Place Ville-Marie, 9e étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada  2.  3.  Contact for written copy of energy standard specified in Question 4:  Name:  Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by:  Title:  General Region (Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-6946	Motors			
Thermal properties of materials    Comment:   Comment:   Bureau de l'efficacite energetique, and   Hydro-Quebec.				
Audits (free or subsidized) Labeling of appliances Utility initiatives Government energy policy  Additional sources of information about energy efficiency for buildings in: Canada  1. La Maîtrise de l'energie. Association Québécoise pour la maîtrise de l'energie (AQME). 5, Place Ville-Marie, 9e étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada  2. 3. 4. Contact for written copy of energy standard specified in Question 4:  Name: Address: Les Publications du Québec 3, Complexe des Jardins H5B 13B Quebec Country: Canada  Tel: 514 873 6101 Fac: 514 873-0369  Types of supporting information available: "Reglement-Commenté" (New edition will be available: Autumn 1992 from les publications du Qué Other energy standards for non-residential buildings: Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Av. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada Tel: 514-873-6946	Air cor	ditioners/chillers/other appliance	es	
. Other programs or policies developed to increase energy efficiency in buildings:  Audits (free or subsidized) Labeling of appliances Utility initiatives Government energy policy  Additional sources of information about energy efficiency for buildings in: Canada  1. La Maîtrise de l'energie. Association Québécoise pour la maîtrise de l'energie (AQME) 5, Place Ville-Marie, 9e étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada  2. 3.  Contact for written copy of energy standard specified in Question 4:  Name: Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Av. Viger Ouest, Bureau 600 Montreal, H2Z 1W9  Country: Canada  Tel: 514-873-6946	Therma			
Audits (free or subsidized) Labeling of appliances Utility initiatives Government energy policy  Additional sources of information about energy efficiency for buildings in: Canada  1. La Maîtrise de l'energie. Association Québécoise pour la maîtrise de l'energie (AQME) 5, Place Ville-Marie, 9e étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada  2. 3. 4. Contact for written copy of energy standard specified in Question 4:  Name: Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué Cother energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité energétique 425 Ave. Viger Quest, Bureau 600 Montreal, H2Z 1W9 Country: Canada Tel: 514-873-6946				· · · · · · · · · · · · · · · · · · ·
Labeling of appliances Utility initiatives Government energy policy  Additional sources of information about energy efficiency for buildings in: Canada  1. La Maîtrise de l'energie. Association Québécoise pour la maîtrise de l'energie (AQME)  5. Place Ville-Marie, 9e étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada  2.  3.  Contact for written copy of energy standard specified in Question 4:  Name: Address:  Les Publications du Québec  3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-6946	. Other progr	ams or policies developed to increase ener	gy efficiency in build	lings:
Labeling of appliances Utility initiatives Government energy policy  Additional sources of information about energy efficiency for buildings in: Canada  1. La Maîtrise de l'energie. Association Québécoise pour la maîtrise de l'energie (AQME)  5. Place Ville-Marie, 9e étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada  2.  3.  Contact for written copy of energy standard specified in Question 4:  Name: Address:  Les Publications du Québec  3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-6946	Audits	(free or subsidized)	Comment	Bureau de l'efficacite energetique, and
Utility initiatives Government energy policy  Additional sources of information about energy efficiency for buildings in: Canada  1. La Maîtrise de l'energie. Association Québécoise pour la maîtrise de l'energie (AQME) 5, Place Ville-Marie, 9e étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada  2.  3.  Contact for written copy of energy standard specified in Question 4:  Name: Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada Tel: 514-873-6946	Labelin	g of appliances		Hydro-Quebec.
Additional sources of information about energy efficiency for buildings in: Canada  1. La Maîtrise de l'energie. Association Québécoise pour la maîtrise de l'energie (AQME)  5, Place Ville-Marie, 9e étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada  2.  3.  Contact for written copy of energy standard specified in Question 4:  Name:  Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946	Utility	initiatives		
1. La Maîtrise de l'energie. Association Québécoise pour la maîtrise de l'energie (AQME) 5, Place Ville-Marie, 9e étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada 2. 3. 4. Contact for written copy of energy standard specified in Question 4:  Name: Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946	Govern	ment energy policy		
1. La Maîtrise de l'energie. Association Québécoise pour la maîtrise de l'energie (AQME) 5, Place Ville-Marie, 9e étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada 2. 3. 3. Contact for written copy of energy standard specified in Question 4:  Name: Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946				
5. Place Ville-Marie, \$\frac{9}{2}\text{ etage}\$, Bureau 903. Montreal, Quebec. H3B 2G2 Canada  2.  3.  Contact for written copy of energy standard specified in Question 4:  Name:  Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité energétique 425 Ave. Viger Quest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946	Addition	al sources of information about energy effic	ciency for buildings i	n: Canada
5, Place Ville-Marie, Se étage, Bureau 903. Montreal, Quebec. H3B 2G2 Canada  2.  3.  Contact for written copy of energy standard specified in Question 4:  Name:  Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy  Title: Chef de Division: Conseils  Bureau de l'efficacité energétique 425 Ave. Viger Ouest, Bureau 600  Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946	1. Ĭ.a.	Maîtrise de l'energie Association (	Ouébécoise nou	· la maîtrise de l'energie (AOMF)
2. 3. Contact for written copy of energy standard specified in Question 4:  Name: Address: Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada Tel: 514 873 6101 Fax: 514 873-0369 Types of supporting information available: "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings: Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada Tel: 514-873-5463 Fax: 514-873-6946	5. F	lace Ville-Marie, 9e étage, Bureau	903. Montreal. C	Duebec. H3B 2G2 Canada
Contact for written copy of energy standard specified in Question 4:  Name: Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946	-	. •	- "	
Name: Address:  Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available: "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings: Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada Tel: 514-873-5463 Fax: 514-873-6946	2			
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Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946	Name:	•		
Les Publications du Québec 3, Complexe des Jardins H5B 13E Quebec  Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available: "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946	\ddress:			
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Country: Canada  Tel: 514 873 6101 Fax: 514 873-0369  Types of supporting information available:  "Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy  Title: Chef de Division: Conseils  Bureau de l'efficacité énergétique  425 Ave. Viger Ouest, Bureau 600  Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946				
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"Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy  Title: Chef de Division: Conseils  Bureau de l'efficacité énergétique  425 Ave. Viger Ouest, Bureau 600  Montreal, H2Z 1W9  Country: Canada  Tel: 514-873-5463  Fax: 514-873-6946	Tel:	514 873 6101	Fax: 514 873-0	369
"Reglement Commenté" (New edition will be available: Autumn 1992 from les publications du Qué  Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy  Title: Chef de Division: Conseils  Bureau de l'efficacité énergétique  425 Ave. Viger Ouest, Bureau 600  Montreal, H2Z 1W9  Country: Canada  Tel: 514-873-5463  Fax: 514-873-6946	Times of	ounnesting information available.		· ·
Other energy standards for non-residential buildings:  Energy Efficiency of Electrical and Hydrocarbon-Fueled Appliances Law.  Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada Tel: 514-873-5463 Fax: 514-873-6946		••		
Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada Tel: 514-873-5463 Fax: 514-873-6946	<u>"Re</u>	glement Commenté" (New edition	will be available	: Autumn 1992 from les publications du Québe
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Survey completed by: Jean-Pierre Roy Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada Tel: 514-873-5463 Fax: 514-873-6946	Other en	ergy standards for non-residential building	· IS:	
Survey completed by:  Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9  Country: Canada  Tel: 514-873-5463  Fax: 514-873-6946				nd Appliances I are
Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946	Ene	agy Efficiency of Electrical and Hy	urocardon-ruele	ed Apphances Law.
Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada Tel: 514-873-5463 Fax: 514-873-6946				· · · · · · · · · · · · · · · · · · ·
Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada Tel: 514-873-5463 Fax: 514-873-6946				
Title: Chef de Division: Conseils Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946		Survey completed by:	Jean-Pierre Ro	· · · · · · · · · · · · · · · · · · ·
Bureau de l'efficacité énergétique 425 Ave. Viger Ouest, Bureau 600 Montreal, H2Z 1W9 Country: Canada  Tel: 514-873-5463 Fax: 514-873-6946				
425 Ave. Viger Ouest, Bureau 600  Montreal, H2Z 1W9  Country: Canada  Tel: 514-873-5463  Fax: 514-873-6946				
Tel: 514-873-5463 Fax: 514-873-6946			425 Ave. Viger	Ouest, Bureau 600
			Montreal, H22	Z 1W9 Country: Canada
·		Tel:	514-873-5463	Fax: 514-873-6946
			= 145.155	
		Date completed:	7/13/92	



## **CHILE**



2. Proposed or existing	dards exist at the following g ENERGY standards cover the		National Regional sectors: Both Residential and N	Local  Ion-Residential
3. Status of Non-Reside a. National level:	ntial Building Energy Stand Mandatory Voluntary	dards at the: b. Regional level	c. Local k	
•	Nch 1029 y Wch1960			
<b>Year:</b> 1960	Geographic Coverage:	Nation	Abbreviated Title: Nch 1029 y W	/ch1960
RIPTION OF SPECI	FIED ENERGY STANI	DARDS - Nch 1	029 y Wch1960	
	n Question 4 applies to the f		·	
a. Building types:		b. Building vi	itage: v and existing	
<u>A - All Buildi</u>	ngs	—   Both ne	v and existing	
		c. Other cha	acteristics:	
		- None		
		_	·	
		-		
6. Basic approach of the	estandard: Performan	ce-based		
••	e standard: Performan are included in the energy s			
••	are included in the energy s	standard:	. Building envelope provisions:	
7. The following subjects	are included in the energy s	standard:	a. Building envelope provisions:  Roof	
7. The following subjects a. Whole building end	are included in the energy s	standard:	Roof Wall system	
7. The following subjects a. Whole building end	are included in the energy s	standard:	Roof Wall system Fenestration system	
7. The following subjects a. Whole building end	are included in the energy s	standard:	Roof Wall system	
7. The following subjects a. Whole building end	are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration system	
7. The following subjects a. Whole building end - None	are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration system Infiltration	
7. The following subjects  a. Whole building end  - None  c. Lighting provision	are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions:	
7. The following subjects  a. Whole building end  - None  c. Lighting provision	are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions:	
7. The following subjects  a. Whole building end  - None  c. Lighting provision	are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions:	
7. The following subjects a. Whole building end - None - None c. Lighting provision - None	are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions:	
7. The following subjects  a. Whole building end  - None  c. Lighting provision	are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions:	

8. Organizations involved in developing the standard:	
Government agency: Institute Nacional Normaliz	zacion
Academic institution: Universidades	
Local interest group	
9. Decision Process: Consensus Comment:	
10. Information used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Gathered through audits and surveys	Gathered through audits and surveys
Gathered through addits and surveys	Gathered fillough addits and surveys
c. WEATHER data	d. Other information
Gathered through measurements	- None
11. Standards from a different country used as source material:	
- None	
	<u> </u>
	*
2. COMPUTER programs used:	
• . 5	·
a. In developing the standard: - None	b. For complying with the standard: No
	b. For complying with the standard: No
	b. For complying with the standard: No
	b. For complying with the standard: No
	b. For complying with the standard: No
a. In developing the standard:  - None	b. For complying with the standard: No
	b. For complying with the standard: No
a. In developing the standard:  - None  - None  - Lower than current practice	
a. In developing the standard:  - None  - None  - Standard is set at a level:  Lower than current practice  4. Considerations influencing the inclusion or exclusion of measures	
a. In developing the standard:  - None  3. Standard is set at a level:  Lower than current practice  4. Considerations influencing the inclusion or exclusion of measures  Availability of energy efficient products	in the standard:
a. In developing the standard:  - None  3. Standard is set at a level:  Lower than current practice  4. Considerations influencing the inclusion or exclusion of measures  Availability of energy efficient products  Similarity/difference to local design	in the standard:
a. In developing the standard:  - None  3. Standard is set at a level:  Lower than current practice  4. Considerations influencing the inclusion or exclusion of measures  Availability of energy efficient products	in the standard: Comments:
a. In developing the standard:  - None  3. Standard is set at a level:  Lower than current practice  4. Considerations influencing the inclusion or exclusion of measures  Availability of energy efficient products  Similarity/difference to local design	in the standard: Comments:
a. In developing the standard:  - None  3. Standard is set at a level:  Lower than current practice  4. Considerations influencing the inclusion or exclusion of measures  Availability of energy efficient products  Similarity/difference to local design	in the standard: Comments:
a. In developing the standard:  - None  13. Standard is set at a level:  Lower than current practice  14. Considerations influencing the inclusion or exclusion of measures  Availability of energy efficient products  Similarity/difference to local design  Comfort	in the standard: Comments:
a. In developing the standard:  - None  3. Standard is set at a level:  Lower than current practice  Lower than current practice  Availability of energy efficient products Similarity/difference to local design Comfort  15a. Standard scheduled for regular review and revision?	in the standard: Comments:
a. In developing the standard:  - None  13. Standard is set at a level:  Lower than current practice  14. Considerations influencing the inclusion or exclusion of measures  Availability of energy efficient products  Similarity/difference to local design  Comfort	in the standard: Comments:
a. In developing the standard:  - None  3. Standard is set at a level:  Lower than current practice  Lower than current practice  Availability of energy efficient products Similarity/difference to local design Comfort  15a. Standard scheduled for regular review and revision?	in the standard: Comments:
a. In developing the standard:  - None  3. Standard is set at a level:  Lower than current practice  Lower than current practice  Availability of energy efficient products Similarity/difference to local design Comfort  15a. Standard scheduled for regular review and revision?	in the standard: Comments:

### IMPLEMENTATION AND COMPLIANCE - Nch 1029 y Wch1960 16. Entities involved in IMPLEMENTING energy standards: Existing agency: Instituto Nacional de Normalizacion If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Compliance forms Seminars, workshops, or conferences Information or resource center 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Certification/approval No mechanism No mechanism Incentive Percent designs checked: Percent sites checked: Percent buildings checked: Comment: Comment: Comment d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): 5 f. Explanation for effectiveness in part e: \_ 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: d. COST EFFECTIVENESS based on ACTUAL COSTS: e. Other Assessments: ?

	iency testing facilities and procedures established:
	Motors sulation
	ir conditioners/chillers/other appliances
	allasts
_	ixtures
T	hermal properties of materials
21. Othe	er programs or policies developed to increase energy efficiency in buildings:  Comment:
<del></del>	
_	
	dditional sources of information about energy efficiency for buildings in: Chile
1.	
2.	
2	
Э.	
22. Conta	act for written copy of energy standard specified in Question 4:
Na	
Addres	s:
Co	ountry:
.*	
Te	l: Fax:
Ту	pes of supporting information available:
	her energy standards for non-residential buildings:
Oti	
Oti	
Ott	

Country: Chile

Tel:

562-698-2071 x 130

Fax: 562-671-2799

Date completed:

4/8/92



## **CHINA**



2 Proposed or existing	ENERGY standards cover t	ho foilmuing huilding	eastore: D .1 D		
2. Proposed or existing	, ENERGY Stalldards COVER L	he tollowing building	Both Re	esidential and Non-	Kesidential
3. Status of Non-Resid	ential Building Energy Stan	dards at the:			- None
a. National level: _	Mandatory	b. Regional level:	- None	c. Local level:	- 110116
-					
4 Single energy stand	ard selected for further des	cription:			
• •	: "Energy Conservation	•	an Puilding Env	alama amd Air Candit	iamima fan T
riue, Organization	Hotels," The Nationa				
	1992/93				
Year: 1993	_ Geographic Coverage: _	Nation	Abbreviated Title:	NTSB-93	
			•		
RIPTION OF SPEC	IFIED ENERGY STAN	DARDS - NTSB-	93		
5. The standard defined	in Question 4 applies to the	following kinds of build	dings:		
a. Building types:		b. Building vin	tage:		
H - Hotels		New bui	ldings		
	·	c. Other chara	actorictics.		
			onditioned		
		<del>X - Au - C</del>	Orientioned		
				<del>-,</del>	
C. Daois annusach af th	o otomoloude Doth				
<ol><li>Basic approach of th</li></ol>	e standard: Both preso	criptive and perfor	mance		
7. The following subject	s are included in the energy:	standard:			
	s are included in the energy a nergy provisions:		. Building envelope pr	ovisions:	
a. Whole building er	nergy provisions:		. Building envelope pr	ovisions:	
	nergy provisions:		Roof	ovisions:	
a. Whole building er	nergy provisions:		Roof Wall system		
a. Whole building er	nergy provisions:		Roof		
a. Whole building er	nergy provisions:		Roof Wall system Fenestration sy		
a. Whole building er E- Energy am	nergy provisions: nount target	b	Roof Wall system Fenestration sy	stem	
a. Whole building er	nergy provisions: nount target	b	Roof Wall system Fenestration sy Infiltration  Mechanical provision	stem	
a. Whole building er  E- Energy am  c. Lighting provision	nergy provisions: nount target	b	Roof Wall system Fenestration sy Infiltration  Mechanical provision Air/Water dist	stem	ing
a. Whole building er  E- Energy am  c. Lighting provision	nergy provisions: nount target	b	Roof Wall system Fenestration sy Infiltration  Mechanical provision Air/Water dist	stem  ns: ribution efficiency	ing
a. Whole building er  E- Energy am  c. Lighting provision	nergy provisions: nount target	b	Roof Wall system Fenestration sy Infiltration  Mechanical provision Air/Water dist Load Calculation Controls Ventilation	stem  ns:  ribution efficiency ons for equipment siz	ing
a. Whole building er  E- Energy am  c. Lighting provision	nergy provisions: nount target	b	Roof Wall system Fenestration sy Infiltration  Mechanical provision Air/Water dist Load Calculation Controls	stem  ns:  ribution efficiency ons for equipment siz	ing
a. Whole building er  E- Energy am  c. Lighting provision  None	nergy provisions: nount target ns:	b	Roof Wall system Fenestration sy Infiltration  Mechanical provision Air/Water dist Load Calculation Controls Ventilation	stem  ns:  ribution efficiency ons for equipment siz	ing
a. Whole building er  E- Energy am  c. Lighting provision  - None  e. Other provisions	nergy provisions: nount target ns:		Roof Wall system Fenestration sy Infiltration  Mechanical provision Air/Water dist Load Calculation Controls Ventilation Equipment efficience	stem  ns:  ribution efficiency ons for equipment siz  ciency	ing

8. Organizations involved in developing the standard:	
8. Organizations involved in developing the standard:  Government agency: The Bureau of Standards and	d Pating of the Construction Ministry
Academic institution: Institute of Air Conditionin	
Academic institution: Beijing Institute of Archite	
	uanzhou Institute of Architectureal Design; Middle uth-China Instititute of Architectural Design; East-C
10. Information used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Estimated using professional judgment	Gathered through audits and surveys
Gathered through audits and surveys	Cadiered anough addits and surveys
c. WEATHER data	d. Other information
Gathered through measurements	- None
Oldicica dirough neusurements	
	<del></del>
12. COMPUTER programs used:	
a. In developing the standard: - None	, b. For complying with the standard: ?
13. Standard is set at a level: Above current practice	
14. Considerations influencing the inclusion or exclusion of measures	in the standard:
	Comments:
·	-
E - Cost effectiveness A - Availability of energy efficient products	_ 1
E - Cost effectiveness	_

Yes: The standard will be approved by the Bureau of Standard and Rating of the Construction Ministry. I believe that it will be reviewed and revised after application of the Standard.

b. Does revision include procedures to MONITOR and EVALUATE earlier versions of the standard?

Yes	

### IMPLEMENTATION AND COMPLIANCE - NTSB-93 16. Entities involved in IMPLEMENTING energy standards: - None: the standard is proposed If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Compliance forms Seminars, workshops, or conferences 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Percent sites checked: -Percent buildings checked: -Percent designs checked: -Comment: Comment: Comment: d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): f. Explanation for effectiveness in part e: The Standard hasn't been approved. 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: research report (in Chinese) b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: None conducted c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: None conducted d. COST EFFECTIVENESS based on ACTUAL COSTS: None conducted e. Other Assessments: None conducted

### FURTHER INFORMATION ON ENERGY CONSERVATION - China

Insulation Air conditioners	/chillers/other applianc	res
Thermal properti		
Other programs or polici	ies developed to increase ener	
?		Comment:
	· · · · · · · · · · · · · · · · · · ·	
A -1-1911 1	:	day to the state of the state o
		ciency for buildings in: China
1		
2		
3		
	of energy standard specified	······································
Name:		
Name: dress:		
	:	
dress:		
dress:		
dress: Country:		
dress:		Fax:
dress: Country:	nformation available:	Fax:
dress: Country: Tel: Types of supporting in	nformation available: ation_of_the_Standard."	
dress: Country: Tel: Types of supporting in		
Tel: Types of supporting ir	ation of the Standard."	
Tel: Types of supporting ir		
Tel: Types of supporting ir	ation of the Standard."	
Tel: Types of supporting ir	ation of the Standard."	
Tel: Types of supporting ir	ation of the Standard."	
Tel: Types of supporting ir	ation of the Standard." ds for non-residential building	js:
Tel: Types of supporting ir	ation of the Standard."	Lang Siwei Director, Institute of Air Conditioning
Tel: Types of supporting ir	ation of the Standard."  ds for non-residential building  Survey completed by:	Lang Siwei Director, Institute of Air Conditioning China Academy of Building Research
Tel: Types of supporting ir	ation of the Standard."  ds for non-residential building  Survey completed by:	Lang Siwei Director, Institute of Air Conditioning China Academy of Building Research P.O. Box 752
Tel: Types of supporting ir	ation of the Standard."  ds for non-residential building  Survey completed by:  Title:	Lang Siwei Director, Institute of Air Conditioning China Academy of Building Research P.O. Box 752 Beijing 100013 Country: PR China
Tel: Types of supporting ir	ation of the Standard."  ds for non-residential building  Survey completed by:	Lang Siwei Director, Institute of Air Conditioning China Academy of Building Research P.O. Box 752



## **COLOMBIA**



	ndards exist at the following o	jovernmental levels:	National
2. Proposed or existing	ENERGY standards cover t	he following building	sectors: Both Residential and Non-Resident
2 Status of Non-Posid	ential Building Energy Stand	darde at the	
a. National level:	Proposed		c. Local level:
a rational reven	Mandatory	b. regional evel.	
-	Voluntary		
<del>-</del>			
	ard selected for further des		
Title, Organization	Proposed energy star	ıdard	
Year: 199?	Geographic Coverage:	Nation	Abbreviated Title: PES
RIPTION OF SPEC	IFIED ENERGY STAN	DARDS - PES	
5. The standard defined	in Question 4 applies to the t	iollowing kinds of buil	lings:
a. Building types:		b. Building vin	tage:
O - Offices		New bui	ldings
H - Hotels			
G - Governm	ent Facilities	c. Other char	
	cial/retail stores		ral size (10,000 sq. ft)
	mily residential	A - Air-C	onditioned
<u>M - Multi-fa</u>	mily residential		
		-	
Regic annmach of th	e standard: Both preso	riptive and perfor	mance
. Dasic approach of the			
	s are included in the energy	tlandard:	
'. The following subject	s are included in the energy s		Building envelope provisions:
'. The following subject a. Whole building en	<b>-</b> .		Building envelope provisions:
'. The following subject	<b>-</b> .		Building envelope provisions: - None
'. The following subject a. Whole building en	<b>-</b> .		•
'. The following subject a. Whole building en	<b>-</b> .		•
'. The following subject a. Whole building en	<b>-</b> .		•
'. The following subject a. Whole building en	nergy provisions:	b	•
a. Whole building en	nergy provisions:	b	- None
c. Lighting provision Control require Power density	nergy provisions:  ns: rements	b	- None  Mechanical provisions:
c. Lighting provision Control require Power density	nergy provisions:	b	- None  Mechanical provisions:  Air/Water distribution efficiency
c. Lighting provision Control require Power density	nergy provisions:  ns: rements	b	- None  Mechanical provisions:  Air/Water distribution efficiency  Load Calculations for equipment sizing
c. Lighting provision Control require Power density	nergy provisions:  ns: rements	b	- None  Mechanical provisions:  Air/Water distribution efficiency  Load Calculations for equipment sizing  Controls
c. Lighting provision Control require Power density Illumination	nergy provisions:  ns: rements y requirements	b	- None  Mechanical provisions:  Air/Water distribution efficiency Load Calculations for equipment sizing Controls Ventilation
c. Lighting provision Control require Power density	nergy provisions:  ns: rements y requirements	b	- None  Mechanical provisions:  Air/Water distribution efficiency Load Calculations for equipment sizing Controls Ventilation

	rgia
Industry group	
Academic institution	
Foreign development agency: World Bank	
Decision Process: Consensus Comment:	
Information used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Gathered through audits and surveys	Gathered through audits and surveys
Catherea through address and our veys	Suntered intought dudits and surveys
c. WEATHER data	d. Other information
Gathered through measurements	- None
	_
Standards from a different country used as source material:	
USA: ASHRAE 90.1-89	
Jamaica: EEBC-90	
	· · ·
COMPUTER programs used:	· · · · · · · · · · · · · · · · · · ·
COMPUTER programs used:  a. In developing the standard: DOE-2	b. For complying with the standard: No
	b. For complying with the standard: No
	b. For complying with the standard: No
	b. For complying with the standard: No
	b. For complying with the standard: No
a. In developing the standard:  DOE-2	b. For complying with the standard: No
	b. For complying with the standard: No
a. In developing the standard:  DOE-2  Standard is set at a level: Equal to current practice	
a. In developing the standard:  DOE-2  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measure	es in the standard:
a. In developing the standard:  DOE-2  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness	
a. In developing the standard:  DOE-2  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products	es in the standard: Comments:
a. In developing the standard:  DOE-2  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design	es in the standard:
a. In developing the standard:  DOE-2  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products	es in the standard: Comments:
a. In developing the standard:  DOE-2  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design	es in the standard: Comments:
a. In developing the standard:  DOE-2  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design  C - Comfort	es in the standard: Comments:
a. In developing the standard:  DOE-2  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design  C - Comfort  Standard scheduled for regular review and revision?	es in the standard:  Comments:
a. In developing the standard:  DOE-2  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design  C - Comfort	es in the standard:  Comments:
a. In developing the standard:  DOE-2  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design  C - Comfort  Standard scheduled for regular review and revision?	es in the standard:  Comments:

### IMPLEMENTATION AND COMPLIANCE - PES 16. Entities involved in IMPLEMENTING energy standards: Existing agency: utilities If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: Energy 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Compliance forms Seminars, workshops, or conferences Information or resource center 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Incentive Incentive Incentive Percent designs checked: Percent sites checked: Percent buildings checked: Comment: Comment: Comment: d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): f. Explanation for effectiveness in part e: \_ 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: None conducted b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: None conducted c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: None conducted d. COST EFFECTIVENESS based on ACTUAL COSTS: None conducted e. Other Assessments: None conducted

## FURTHER INFORMATION ON ENERGY CONSERVATION - Colombia 20. Efficiency testing facilities and procedures established: Motors Ballasts 21. Other programs or policies developed to increase energy efficiency in buildings: - None Comment: \_ Additional sources of information about energy efficiency for buildings in: Colombia 1. World Bank preliminary report: Estudiode Eficiencia Energetica en Colombia (Phase 1&2, in Spanish) 22. Contact for written copy of energy standard specified in Question 4: Name: Address: Country: Fax: Types of supporting information available: Other energy standards for non-residential buildings: Survey completed by: Santiago Moreno Title: Principal W.J. Dannehy 3717 Columbia Pike, Suite 200 Arlington, VA 22204 Country: Tel: (703)486-8470 Fax: 703-486-8472 Date completed: 10/13/92



## **CZECHOSLOVAKIA**



•	dards exist at the following g			onai		
2. Proposed or existing	ENERGY standards cover th	e following build	ding sectors: B	oth Reside	ntial and Non-R	esidential
3. Status of Non-Reside a. National level:	ential Building Energy Stand Mandatory	ards at the: b. Regional I	evel: - Non	e	c. Local level: -	- None
•	ard selected for further desc CSN 73 0540 Thermo-	-	- artics of anaim	ooring stru		
ride, Organización.	Nomenclature, Requi Measurement, Prague	rements and	criteria. 1/1/7	), Federal o	ffice for Standard	ds and
<b>Year:</b> 1979	Geographic Coverage: _	Nation	Abbreviate	ed Title: <u>C</u>	SN 73 0540	
RIPTION OF SPECI	FIED ENERGY STAND	ARDS - CS	N 73 0540			
i. The standard defined i	n Question 4 applies to the fo	ollowing kinds of	buildings:			
a. Building types:		b. Buildin	g vintage:			
O - Offices		Both	new and exist	ing		
H - Hotels		c Other	characteristics:			
F - Restauran		1	rysical size: vo	lumo		
D - Hospitals			nount of energy		t on size	
	mily residential	E-AI	nount of energy	. dependen	t on size	
X - Other: ag	ricultural buildings	_		<u> </u>		
		<u> </u>	<del></del>			
i. Basic approach of the following subjects a. Whole building en E- Energy amo	are included in the energy sergy provisions:		b. Building env Roof Wall sys	· · · · · · · · · · · · · · · · · · ·	ns:	
				ion system		
***************************************		<del></del>	Infiltrati			
	<del></del>		Other: fl			
c. Lighting provision	<b>IS:</b>		d. Mechanical	provisions:		
- None			- None			
				<del></del>		
e. Other provisions:	:					
e. Other provisions:						

### STANDARDS DEVELOPMENT PROCESS - CSN 73 0540

	ague; Technical University, Bratislava
Government agency: Ministry of Building Trade	
Other: design organizations	
cision Process: Consensus Comment:	
ormation used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Estimated using professional judgment	Estimated using professional judgment
Gathered through audits and surveys	Gathered through audits and surveys
c. WEATHER data	d. Other information
	- None
Estimated using professional judgment Gathered through measurements	
Gathered unough measurements	•
andards from a different country used as source material:	- I
Germany: DIN 4108 Wämeschutz im Hochban	
Austria: Onorm B 8110	· · · · · · · · · · · · · · · · · · ·
	<u></u>
	· · ·
	· · · · · · · · · · · · · · · · · · ·
· · · · · · · · · · · · · · · · · · ·	
MDI ITEO programa usadi	
DMPUTER programs used:	
DMPUTER programs used:  In developing the standard: - None	b. For complying with the standard: ?
, •	b. For complying with the standard: ?
, •	b. For complying with the standard:
, •	b. For complying with the standard: ?
, •	b. For complying with the standard: ?
, •	b. For complying with the standard: ?
andard is set at a level: Above current practice	
andard is set at a level: Above current practice	s in the standard:
andard is set at a level: Above current practice  nsiderations influencing the inclusion or exclusion of measures  E - Cost effectiveness	s in the standard: Comments:
andard is set at a level: Above current practice  E - Cost effectiveness Similarity/difference to local design	s in the standard:
andard is set at a level: Above current practice  nsiderations influencing the inclusion or exclusion of measures  E - Cost effectiveness	s in the standard: Comments:
andard is set at a level: Above current practice  E - Cost effectiveness Similarity/difference to local design	s in the standard: Comments: Cost effectiveness is dominant.
andard is set at a level: Above current practice  E - Cost effectiveness Similarity/difference to local design	s in the standard: Comments: Cost effectiveness is dominant.
andard is set at a level: Above current practice  E - Cost effectiveness Similarity/difference to local design	s in the standard: Comments: Cost effectiveness is dominant.
andard is set at a level: Above current practice  E - Cost effectiveness Similarity/difference to local design Comfort  tandard scheduled for regular review and revision?	s in the standard:  Comments:  Cost effectiveness is dominant.
andard is set at a level: Above current practice  E - Cost effectiveness Similarity/difference to local design Comfort  tandard scheduled for regular review and revision?	s in the standard:  Comments:  Cost effectiveness is dominant.  Cost effectiveness is dominant.  Cost effectiveness is dominant.  Cost effectiveness is dominant.

# 3 CZECHOSLOVAKIA IMPLEMENTATION AND COMPL

	for Standards	
If an existing agency was made respons	ible for implementation, its former focus was o	n buildings, energy, or another area:
Energy	<u> </u>	
TRAINING & EDUCATION provided for are	chitects, engineers and other professionals:	
Written guidelines to assist with		
Example calculations Seminars, workshops, or conferen		
Serimiars, workshops, or connects	inces	
Compliance mechanisms used at different	stages in construction process:	
a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
Certification/approval	Penalty	Certification/approval
Percent designs checked: 100	Percent sites checked: 50	Percent buildings checked: 90
Comment:	Comment:	Comment:
		_
	-	<u> </u>
		· ·
d. Other compliance procedures - Non	ie	
e. Effectiveness of combined compliance		
e. Effectiveness of combined compliance		ıst cooperate.
e. Effectiveness of combined compliance	mechanisms (scale of 1-5): _5_  Designers and realizers [builders] mi	ıst cooperate.
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:	mechanisms (scale of 1-5):5_  Designers and realizers [builders] mi	ıst cooperate.
e. Effectiveness of combined compliance of the first of t	mechanisms (scale of 1-5):5_  Designers and realizers [builders] mi	ust cooperate.
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based	mechanisms (scale of 1-5): _5_  Designers and realizers [builders] must be standards' impact: don prototypical (not actual) buildings:	ıst cooperate.
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress	mechanisms (scale of 1-5): _5_  Designers and realizers [builders] misstandards' impact: d on prototypical (not actual) buildings:	
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress  b. MEASUREMENTS OF ENERGY SAVINGS	mechanisms (scale of 1-5):5_  Designers and realizers [builders] mustandards' impact: If on prototypical (not actual) buildings:  GS in actual buildings complying with standards	d:
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress  b. MEASUREMENTS OF ENERGY SAVINGS	mechanisms (scale of 1-5): _5_  Designers and realizers [builders] misstandards' impact: d on prototypical (not actual) buildings:	d:
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress  b. MEASUREMENTS OF ENERGY SAVING Completed: Rehanek, J. "Improven	mechanisms (scale of 1-5):5_  Designers and realizers [builders] mustandards' impact: If on prototypical (not actual) buildings:  GS in actual buildings complying with standards	d:
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress  b. MEASUREMENTS OF ENERGY SAVING Completed: Rehanek, J. "Improven	mechanisms (scale of 1-5): _5_  Designers and realizers [builders] must standards' impact: don prototypical (not actual) buildings:  GS in actual buildings complying with standard wement of Thermo-Technical Properties	d:
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress  b. MEASUREMENTS OF ENERGY SAVING Completed: Rehanek, J. "Improving In progress  c. COST EFFECTIVENESS based on engine statements of complete services and the same services are serviced in progress."	mechanisms (scale of 1-5): _5_  Designers and realizers [builders] must standards' impact: don prototypical (not actual) buildings:  GS in actual buildings complying with standard wement of Thermo-Technical Properties	d: es of Building Structures. SNTL Pr
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress  b. MEASUREMENTS OF ENERGY SAVING Completed: Rehanek, J. "Improving In progress  c. COST EFFECTIVENESS based on engine statements of complete services and the same services are serviced in progress."	mechanisms (scale of 1-5):5_  Designers and realizers [builders] mustandards' impact: d on prototypical (not actual) buildings:  GS in actual buildings complying with standard vernent of Thermo-Technical Properties ineering economic CALCULATIONS:	d: es of Building Structures. SNTL Pr
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress  b. MEASUREMENTS OF ENERGY SAVING Completed: Rehanek, J. "Improving In progress  c. COST EFFECTIVENESS based on engine services and the complete services are serviced in progress."	mechanisms (scale of 1-5):5_  Designers and realizers [builders] mistandards' impact: d on prototypical (not actual) buildings:  GS in actual buildings complying with standard vernent of Thermo-Technical Properties ineering economic CALCULATIONS:	d: es of Building Structures. SNTL Pr
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress  b. MEASUREMENTS OF ENERGY SAVING Completed: Rehanek, J. "Improving In progress  c. COST EFFECTIVENESS based on enging In progress	mechanisms (scale of 1-5):5_  Designers and realizers [builders] mistandards' impact: d on prototypical (not actual) buildings:  GS in actual buildings complying with standard vernent of Thermo-Technical Properties ineering economic CALCULATIONS:	d: es of Building Structures. SNTL Pr

### FURTHER INFORMATION ON ENERGY CONSERVATION - Czechoslovakia

	ors		
	ılation		
		illers/other appliance	PS .
	ures	mers/outer appliance	<del></del>
	rmal properties	of materials	
	er: fire protection		<del></del>
<u>Our</u>	ci. inc protection	or materials	
?			gy efficiency in buildings: Comment:
Addit	ional sources of info	rmation about energy effic	ciency for buildings in: Czechoslovakia
1. ]	Journal of Federa	al Office for Standard	s and Measurement (in Czech, Magazín CSN)
			al Technics, Acoustics, and Daylighting." Alfa Bratislava, 1985 ika, Akustika a Osvetlenie.")
3. J	Rehanek, J. 1982	. Thermo-Technical S	Standards. (In Czech, "Tepelne Technicke Normy") Funm Prague
idress:	Federal Offic Distribution Na Príkope 1 113 47 Prague try: Czechoslova	17	Measurement
Tel:	235 2152	•	Fax:
	s of supporting infor	mation available:	- <del></del>
	., .		Standards. (In Czech, "Tepelne Technicke Normy") Funm Prague
-			
	energy standards fo	or non-residential building	
Other		•	
			erties of Engineering Structures. Industrial Plants. (FESM)
		ermo-Technical Prope	
			Ivan Chmurny Slovak Technical University Department of Building Physics
		ermo-Technical Prope	Ivan Chmurny Slovak Technical University Department of Building Physics Radlinského 11
		ermo-Technical Prope	Ivan Chmurny Slovak Technical University Department of Building Physics Radlinského 11 813 68 Bratislava Country: Czechoslovak
		Survey completed by: Title:	Ivan Chmurny Slovak Technical University Department of Building Physics Radlinského 11 813 68 Bratislava Country: Czechoslovak



## **DENMARK**



	ENERGY standards cover t	-	ng sectors: Both Re	sidential and Non-R	esidential
<ol> <li>Status of Non-Residence</li> <li>a. National level:</li></ol>	ential Building Energy Stand Mandatory	dards at the: b. Regional lev	rel: - None	c. Local level:	- None
-	ard selected for further des	-		_	
Title, Organization	Building Regulations	i, Danish Minist	try of Building and I	Housing (Effective A	oril 1, 1983
Year: 1982	Geographic Coverage:	Nation	Abbreviated Title:	BR-DMBH, 1982	
RIPTION OF SPEC	IFIED ENERGY STANI	DARDS - BR-T	OMBH, 1982		
	in Question 4 applies to the 1		<del>-</del>		
a. Building types:		b. Building	· ·		
A - All Build	ings	New b	ouildings		
			aracteristics:		
		<u>P - Phy</u>	vsical size		
					<del></del>
					<del></del>
			· · · · · · · · · · · · · · · · · · ·		<del></del>
			***	-	
. Basic approach of th	e standard: Both presc	riptive and per	formance		•
. The following subjects	s are included in the energy s	standard:			
a. Whole building en			b. Building envelope pro	visions:	
- None	ang, promoterior		Roof		
			Wall system		
<del>-</del>			Fenestration sys	tem	
		<u> </u>	Infiltration		
			d. Mechanical provision	s:	
c. Lighting provision	ns:				
c. Lighting provision - None	15:		Controls		
	ns:		Controls Ventilation		
	ns:		Controls Ventilation	requirements for cer	ntral heatir
	<b>15:</b>		Controls Ventilation	requirements for cer	ntral heatir
- None			Controls Ventilation	requirements for cer	ntral heatir
			Controls Ventilation	requirements for cer	ntral heatir

Government agency: Energy Agency	
Research group: National Building Research In	nstitute
Decision Process: Consensus Comment:	
Information used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
	-   <del>-</del>
c. WEATHER data	<del>-</del>
c. WEATHEN Gata	d. Other information
_	Building Regulations concern only new buildings
	_
Chandarda from a different country used as source metarials	
Standards from a different country used as source material:	•
- None	
COMPUTER programs used:	
a. In developing the standard: TSBI	b. For complying with the standard: No
a. III developing the standard.	b. For complying with the standard.
· · · · · · · · · · · · · · · · · · ·	
•	
	1
Standard is set at a level: Above current practice	
Considerations influencing the inclusion or exclusion of measure	
E - Cost effectiveness	Comments:
Availability of energy efficient products	
Comfort	
	1
a. Standard scheduled for regular review and revision?	
	ler revision.
Yes: the 1983 regulations are at the moment und	
Yes: the 1983 regulations are at the moment und	

6. Entities involved in IMPLEMENTING energ		
Existing agency: Building Agen	cy (administered by municipalities)	
If an existing agency was made respons Buildings	sible for implementation, its former focus was on	buildings, energy, or another area:
7. TRAINING & EDUCATION provided for an	chitects, engineers and other professionals:	
Written guidelines to assist with	n compliance procedure	
	<u></u>	
8. Compliance mechanisms used at different	stages in construction process:	
a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
Certification/approval	Certification/approval	Certification/approval
Percent designs checked: ? Comment:	Percent sites checked: ?	Percent buildings checked: ? Comment:
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d. Other compliance procedures -		
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e. Effectiveness of combined compliance	mechanisms (scale of 1-5): 4	
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20. Efficier	ncy testing facilities and procedures established:			
Inst	ulation			
The	ulation ermal properties of materials			
Oth	ner: boilers (oil and gas)			
1 Othern	programs or policies developed to increase energy e	fficiency in build	finas:	
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Into	ormation programs	Comment:		y has been under the Minist
	dits (free or subsidized)	1	Ministry of Engl	uilding up to 1989, whereafte
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		·	Agency).	· · · · · · · · · · · · · · · · · · ·
Addi	itional sources of information about energy efficience	y for buildings i	n: Denmark	
1	"Denmark Uses Energy Better," National	Building Ag	en'cu	
1.	Delimark Oses Energy Detter, National	Dunuing Ag	ency	
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2.	"Energy Efficiency in New Buildings." Re	port conduct	ed by COWICONS	ult and SBL in Denmark at th
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## ENGLAND & WALES



) Proposed or evicting F	ards exist at the following g :NERGY standards cover to		
Proposed of existing E	MENGI Standards COVER to	ic rollowing build	ing sectors: Both Residential and Non-Residential
	ntial Building Energy Stand		vel: Mandatory c. Local level:
•	d selected for further desc	•	
Title, Organization:	The Building Regulat	tions, Part L, D	epartment of the Environment (England and Wales
Year: 1990	Geographic Coverage:	Nation	Abbreviated Title: BR-ADL1, 1990
IIPTION OF SPECIF	TED ENERGY STAN	DARDS - BR-	ADL1, 1990
. The standard defined in	Question 4 applies to the f	ollowing kinds of I	buildings:
a. Building types:		b. Building	vintage:
A - All Buildin	ıgs	Both 1	new and existing
		c. Other c	haracteristics:
		i i	exception made for unheated buildings
	<u>, , , , , , , , , , , , , , , , , , , </u>		
Pagis approach of the	etenderdi. Doth muses		-fo
. basic approach of the	standard: Both presc	npuve and per	Tormance
The following subjects a	are included in the energy s	standard:	
a. Whole building ener	gy provisions:		b. Building envelope provisions:
E- Energy amou	unt target		Roof
	or space heating for d	lwellings	Wall system
		· · · · ·	Fenestration system
			Other: Floor insulation
c. Lighting provisions:	<b>:</b>		d. Mechanical provisions:
c. Lighting provisions: - None	:	-	d. Mechanical provisions:  Controls
			·
	:		Controls Ventilation Other: insulation of ducts, pipework and hot w
	:		Controls Ventilation
- None	:		Controls Ventilation Other: insulation of ducts, pipework and hot w
	-		Controls Ventilation Other: insulation of ducts, pipework and hot w

### ENGLAND & WALES 2 STANDARDS DEVELOPMENT PROCESS - BR-ADL1, 1990 8. Organizations involved in developing the standard: Government agency: British Research Establishment Industry group Academic institution Research group Other: Public consultation 9. Decision Process: Consensus Comment: Lead taken by central government. Result becomes mandatory. 10. Information used in developing the standard: a. PHYSICAL CHARACTERISTICS of existing buildings b. ENERGY USE of existing buildings: Estimated using professional judgment Estimated using professional judgment Gathered through audits and surveys Already available prior to standard Already available prior to standard c. WEATHER data d. Other information Yes: cost of improvements to enable cost-effectiveness Already available prior to standard calculations to be made. 11. Standards from a different country used as source material: 12. COMPUTER programs used: b. For complying with the standard: BREDEM a. In developing the standard: BREDEM ESP-II 13. Standard is set at a level: Above current practice 14. Considerations influencing the inclusion or exclusion of measures in the standard: E - Cost effectiveness Availability of energy efficient products Other: Capability of construction industry to standard without undue techinical risks. 15a. Standard scheduled for regular review and revision? Yes: 1) Consultation with Building Regulation Advisory Committee, experts; 2) Public consultation; 3)

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b. Does revision include procedures to MONITOR and EVALUATE earlier versions of the standard? Yes: Through consultation process, with strong emphasis on technical risk.

Parliamentary approval.

### 3 ENGLAND & WALES

### IMPLEMENTATION AND COMPLIANCE - BR-ADL1, 1990 16. Entities involved in IMPLEMENTING energy standards: Existing agency: Department of the Environment, enforced at local level If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: Other: Environment, planning, land use 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Seminars, workshops, or conferences Information or resource center 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Certification/approval Certification/approval No mechanism Percent designs checked: 100 Percent sites checked: ? Percent buildings checked: low Comment: Comment: Comment: Random inspection for energy measures (100% for other measures, e.g. foundations). d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): 4 f. Explanation for effectiveness in part e: Accepted as part of standard building control system. 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: In progress c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Completed d. COST EFFECTIVENESS based on ACTUAL COSTS: None conducted e. Other Assessments: In progress: survey of methods to achieve specified levels.

### FURTHER INFORMATION ON ENERGY CONSERVATION - England & Wales

Insulation Air conditioners/chillers/other appliances Ballasts Thermal properties of materials Other: controls  1. Other programs or policies developed to increase energy efficiency in buildings: Information programs Government energy policy  Additional sources of information about energy efficiency for buildings in: England & Wales  1. The Building Regulations, 1985 (1990 Edition), Part L. The Conservation of Fuel and Power, HMSC London.  2. A.B. Birtleg, "Achieving Energy Efficiency in Buildings," Proceedings of the 14th Annual Internatic Conference for Energy Economics. Honolulu, 1991  3.  2. Contact for written copy of energy standard specified in Question 4:  Name: Address:  BRE Bookshop Bucknalls Lane, Garston Watford WD2 7JR England Country: United Kingdom Tel: 44-923-664 444 Fax: Types of supporting information available:  ———————————————————————————————————	Motors	<b>.</b>	
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Additional sources of information about energy efficiency for buildings in: England & Wales  1. The Building Regulations, 1985 (1990 Edition), Part L- The Conservation of Fuel and Power, HMSC London.  2. A.B. Birtleg, "Achieving Energy Efficiency in Buildings," Proceedings of the 14th Annual Internation Conference for Energy Economics. Honolulu, 1991.  3			
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77.22 / JA	Country: Tel: Types of	Bucknalls Lane, Garston Watford WD2 7JR England United Kingdom 44-923-664 444  If supporting information available:  hergy standards for non-residential buildings:  Survey completed by:	George Henderson Energy Economics and Statistics Section
Tel: 44 923 664 517 Fax: 44 923 664 097	Country: Tel: Types of	Bucknalls Lane, Garston Watford WD2 7JR England United Kingdom 44-923-664 444  If supporting information available:  hergy standards for non-residential buildings:  Survey completed by:	George Henderson Energy Economics and Statistics Section British Research Establishment
	Country: Tel: Types of	Bucknalls Lane, Garston Watford WD2 7JR England United Kingdom 44-923-664 444  If supporting information available:  hergy standards for non-residential buildings:  Survey completed by:	George Henderson Energy Economics and Statistics Section British Research Establishment Garston
Date completed: 3/6/92	Country: Tel: Types of	Bucknalls Lane, Garston Watford WD2 7JR England United Kingdom  44-923-664 444  i supporting information available:  mergy standards for non-residential buildings:  Survey completed by: Title:	George Henderson Energy Economics and Statistics Section British Research Establishment Garston Watford WD2 7JR Country: England



## **FRANCE**



	dards exist at the following g		<u>National</u>	Local	
2. Proposed or existing i	ENERGY standards cover the	ne following building	sectors: Both Re	sidential and Non-	Residential
3. Status of Non-Reside	ntial Building Energy Stand	lards at the:			4
a. National level:	Mandatory	b. Regional level:	- None	c. Local level:	- None
_		J			
	·				
1. Single energy standa	rd selected for further desc	cription:			
Title Organization:	Regulmentation Ther	mique Tertiaire	Energy Efficiency	Standards in Non-	Recidential
riac, Organización.	Buildings. Ministry of				<u> </u>
Year: 1988	Geographic Coverage: _	Nation	Abbreviated Title:	CSTB-88	
			-		
IPTION OF SPECI	FIED ENERGY STAND	DARDS - CSTB-	88		
. The standard defined in	n Question 4 applies to the fo	ollowing kinds of buil	dinas:		***************************************
a. Building types:		b. Building vir	<del>-</del>		
O - Offices		New bu	•		
H - Hotels		_		<del> </del>	
G - Governme	ent Facilities	c. Other char	acteristics:		
F - Restaurant		F - Type	of fuel: more restr	ictive for electric he	ating system
D - Hospitals		_			
	al/retail stores				
	al facilities (schools)	_			
			<del></del>		
I - Industrial l	buildings	I <u></u>			
	and an all an all and an all and an all and an all and an all an all an all and an all an all and an all a				
Deele ammuse bedake					
. Basic approach of the	standard: Both presc	riptive and perfo	rmance		
••	<del></del>		rmance		
. The following subjects	are included in the energy s	standard:		wicione:	
. The following subjects a. Whole building end	are included in the energy s	standard:	b. Building envelope pro	visions:	
. The following subjects	are included in the energy s	standard:	n. Building envelope pro	visions:	
. The following subjects a. Whole building end	are included in the energy s	standard:	Building envelope pro Roof Wall system		
. The following subjects a. Whole building end	are included in the energy s	standard:	Roof Wall system Fenestration sys		
. The following subjects a. Whole building end	are included in the energy s	standard:	Roof Wall system Fenestration sys	tem	
. The following subjects a. Whole building end	are included in the energy s	standard:	Roof Wall system Fenestration sys		
. The following subjects a. Whole building end	are included in the energy s ergy provisions:	tandard:	Roof Wall system Fenestration sys	item ulation, solar gains	
. The following subjects a. Whole building ene - None	are included in the energy s ergy provisions:	tandard:	Roof Wall system Fenestration sys Infiltration Other: floor inst	tem ulation, solar gains	
. The following subjects a. Whole building end - None - C. Lighting provision:	are included in the energy s ergy provisions:	tandard:	Roof Wall system Fenestration sys Infiltration Other: floor inst	item ulation, solar gains	nt
. The following subjects  a. Whole building ene  - None  - C. Lighting provision:	are included in the energy s ergy provisions:	tandard:	Roof Wall system Fenestration sys Infiltration Other: floor inst	ulation, solar gains s: otive on equipment	nt
. The following subjects a. Whole building end - None - C. Lighting provision:	are included in the energy s ergy provisions:	tandard:	Roof Wall system Fenestration sys Infiltration Other: floor inst	ulation, solar gains s: otive on equipment	nt
. The following subjects a. Whole building ene - None - C. Lighting provision:	are included in the energy s ergy provisions:	tandard:	Roof Wall system Fenestration sys Infiltration Other: floor inst	ulation, solar gains s: otive on equipment	nt
. The following subjects a. Whole building ene - None - None c. Lighting provision: - None	are included in the energy s ergy provisions:	tandard:	Roof Wall system Fenestration sys Infiltration Other: floor inst	ulation, solar gains s: otive on equipment	nt
a. Whole building end - None  c. Lighting provisions - None  e. Other provisions:	are included in the energy s ergy provisions:	tandard:	Roof Wall system Fenestration sys Infiltration Other: floor inst Controls: descrip Ventilation: descrip	tem  ulation, solar gains  s:  otive on equipment criptive on equipme	

Government agency: Ministry of Industry	
Research group: CSTB	
Government agency: Ademe	
Decision Process: Consensus Comment: E	nergy producers, professional associations
Information used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Gathered through audits and surveys	Estimated using professional judgment
Already available prior to standard	Computer simulations used for estimates
	Gathered through audits and surveys
a NEATUED date	
c. WEATHER data	d. Other information
Already available prior to standard	- None
	-
Standards from a different country used as source material:	1 ,
- None	
•	
COMPUTER programs used:	
a. In developing the standard: Uncertain	b. For complying with the standard: Uncertain
	b. For complying with the standard: Uncertain
	b. For complying with the standard: Uncertain
a. In developing the standard:  Uncertain	b. For complying with the standard: Uncertain
a. In developing the standard:  Uncertain	b. For complying with the standard: Uncertain
a. In developing the standard:  Uncertain	
a. In developing the standard:  Uncertain	
a. In developing the standard:  Uncertain  Standard is set at a level:  Lower than current practice	
a. In developing the standard:  Uncertain  Uncertain  Standard is set at a level:  Lower than current practice  Considerations influencing the inclusion or exclusion of measure	
a. In developing the standard:  Uncertain  Uncertain  Standard is set at a level:  Lower than current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness	es in the standard:
a. In developing the standard:  Uncertain  Standard is set at a level:  Lower than current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products	es in the standard:
a. In developing the standard:  Uncertain  Standard is set at a level:  Lower than current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness	es in the standard:
a. In developing the standard:  Uncertain  Standard is set at a level:  Lower than current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products	es in the standard:
a. In developing the standard:  Uncertain  Standard is set at a level:  Lower than current practice  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products	es in the standard:
a. In developing the standard:  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products  C - Comfort  Standard scheduled for regular review and revision?	es in the standard:  Comments:
a. In developing the standard:  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products  C - Comfort  Standard scheduled for regular review and revision?	es in the standard:
a. In developing the standard:  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  A - Availability of energy efficient products  C - Comfort  Standard scheduled for regular review and revision?	es in the standard:  Comments:

### IMPLEMENTATION AND COMPLIANCE - CSTB-88 16. Entities involved in IMPLEMENTING energy standards: Existing agency: CSTB If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Compliance forms Seminars, workshops, or conferences 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Certification/approval Percent designs checked: ? Percent buildings checked: ? Percent sites checked: ? Comment: Comment: Comment: technical certification on materials and equipment d. Other compliance procedures - None e. Effectiveness of combined compliance mechanisms (scale of 1-5): ? f. Explanation for effectiveness in part e: \_\_ 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: goal: -25% heating consumption; economy: 50,000TOE/year b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: d. COST EFFECTIVENESS based on ACTUAL COSTS: e. Other Assessments: ?

20. Efficiency testino fac	ilities and procedures established	<b>á</b> :				
Insulation				<del></del>		
Air conditione	rs/chillers/other appliance	es		<del></del>		
				<del></del>		
Fixtures						
	erties of materials_					
	· · · · · · · · · · · · · · · · · · ·					
	olicies developed to increase energ					
Audits (free or	subsidized)	Comment:	Third par	ty financing, s	subsidized fisc	al
Information pro	ograms		incentives	tor existing b	uildings	
Rebates		_ 1				
· · · · · · · · · · · · · · · · · · ·		1				
**						
Additional sources	of information about energy effici	iency for buildings i	in: France			
1 -						
<u> </u>						
	-					
2						
				<del></del>		
3.						
3.						
322. Contact for written co						
322. Contact for written co						
3	ppy of energy standard specified i	in Question 4:				
3	ppy of energy standard specified i					
3	ppy of energy standard specified i	in Question 4:				
3	ppy of energy standard specified i	in Question 4:				
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3	ppy of energy standard specified i	in Question 4:				
3	ppy of energy standard specified i	in Question 4:				
3	ppy of energy standard specified i	in Question 4:				
3	ppy of energy standard specified i	Fax:  Robert Angiol Environment a 500, route des	letti and Energy l		Agency (Adem	e)
3	ppy of energy standard specified in graph of energy standard specified in graph of the	Fax:  Robert Angiol Environment a 500, route des Sophia-Antip	letti and Energy l Lucioles	Management A		
3	ppy of energy standard specified in graph of energy standard specified in graph of the	Fax:  Robert Angiol Environment a 500, route des	letti and Energy l Lucioles		Country: France	



## **HONG KONG**



i. General building stand	dards exist at the following o	governmental levels:	National		
2. Proposed or existing F	ENERGY standards cover t	he following building	sectors: Non-Resi	dential Only	
Status of Non-Resider     a. National level:	ntial Building Energy Stand	dards at the: b. Regional level:		c. Local level:	Propose
a. Nauona level	Froposed	u. negrona reva.	rroposed	o zoancio.	
A Single energy standa	rd selected for further des	crintion:		-	
• •	Code of Practice on C	•	orall Thormal Trans	for Value to Buildi	na Envolon
riue, Organization.	Hong Kong Governm			sier value to build)	ng Envelop
Year: 1991	Geographic Coverage:	Cities	Abbreviated Title:	OTTV-HKG, 1991	
RIPTION OF SPECIF	FIED ENERGY STANI	DARDS - OTTV	-HKG, 1991		
	n Question 4 applies to the f		•		
a. Building types:		b. Building vir	-		
Offices		New bu	lidings		
Hotels		c. Other char	acteristics:		
	· · · · · · · · · · · · · · · · · · ·	A - Air-C	Conditioned		
					·····
	· · · · · · · · · · · · · · · · · · ·				
		I			
6. Basic approach of the	estandard: Performan	ice-based			
	<del></del>				
7. The following subjects	are included in the energy				
			o. Building envelope prov	isions:	÷
7. The following subjects			Roof	isions:	
7. The following subjects			Roof Wall system		
7. The following subjects			Roof		
7. The following subjects			Roof Wall system		
7. The following subjects a Whole building ene	ergy provisions:		Roof Wall system Fenestration syst	em	
7. The following subjects a. Whole building ene ?	ergy provisions:		Roof Wall system Fenestration syst	em	
7. The following subjects a Whole building ene	ergy provisions:		Roof Wall system Fenestration syst	em	
7. The following subjects a. Whole building ene ?	ergy provisions:		Roof Wall system Fenestration syst	em	
7. The following subjects a. Whole building ene ?	ergy provisions:		Roof Wall system Fenestration syst	em	
7. The following subjects a. Whole building ene ?	ergy provisions:		Roof Wall system Fenestration syst	em	
7. The following subjects a. Whole building ene ?	ergy provisions:		Roof Wall system Fenestration syst	em	

	uilding Ordinance Office sulting Engineers
Research group: Charles Eley and Associates	
ecision Process: Consensus Comment: Ho	ong Kong Government and J Roger Preston & Partners
nformation used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Gathered through audits and surveys	Computer simulations used for estimates
	Gathered through audits and surveys
c. WEATHER data	d. Other information
Already available prior to standard	- None
	-
Standards from a different country used as source material:	
UK	
USA	· · · · · · · · · · · · · · · · · · ·
Australia & NZ	· · · · · · · · · · · · · · · · · · ·
ASEAN	
Japan	·
COMPUTER programs used:	
a. In developing the standard: DOE-2-1D	b. For complying with the standard: No
· ·	-
	1
Standard is set at a level: Above current practice	
	· · · · · · · · · · · · · · · · · · ·
onsiderations influencing the inclusion or exclusion of measure	· ·
E - Cost effectiveness	Comments:
Availability of energy efficient products	
Similarity/difference to local design	
	_
	•
Standard scheduled for regular review and revision?	
·	

#### IMPLEMENTATION AND COMPLIANCE - OTTV-HKG, 1991 16. Entities involved in IMPLEMENTING energy standards: Existing agency: The Building Ordinance Office If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: **Buildings** 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Compliance forms 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: c. AFTER construction: b. DURING construction: No mechanism Certification/approval No mechanism Percent designs checked: 100 Percent buildings checked: Percent sites checked: Comment: Comment Comment: d. Other compliance procedures - None e. Effectiveness of combined compliance mechanisms (scale of 1-5): 5 f. Explanation for effectiveness in part e: Because the professionals are made to be responsible and if deviations are discovered will be penalized. 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: None conducted c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: None conducted d. COST EFFECTIVENESS based on ACTUAL COSTS: None conducted e. Other Assessments: - None

#### FURTHER INFORMATION ON ENERGY CONSERVATION - Hong Kong 20. Efficiency testing facilities and procedures established: - None 21. Other programs or policies developed to increase energy efficiency in buildings: Comment: \_ Additional sources of information about energy efficiency for buildings in: Hong Kong 22. Contact for written copy of energy standard specified in Question 4: Name: Peter Osburne Address: **Building Ordinance Office Buildings and Lands Department** Murray Building, Garden Road Country: Hong Kong 852 848 2830 Tel: Fax: Types of supporting information available: - None Other energy standards for non-residential buildings: - None Survey completed by: K. C. Chan Title: Partner J. Roger Preston & Partners Level 3 Maxi Mall, City Gardens 233 Electric Road Country: Hong Kong Tel: 852-887-3321 Fax: 852-887-8897 Date completed: 3/26/92



# **INDONESIA**



-	dards exist at the following g		National	Regional	Local
. Proposed or existing	ENERGY standards cover the	e following building	sectors: Non-Re	sidential Only	····
. Status of Non-Reside a. National level:	ential Building Energy Stand Voluntary Proposed		- None	c. Local level:	- None
	Direktorat Tata Ang		Directorate of Bui	lding)	
Year: ?	Geographic Coverage:	Nation	Abbreviated Title:	DITABA	
IPTION OF SPECI	FIED ENERGY STANK	DARDS - DITAI	3A		
	in Question 4 applies to the f				
a. Building types:	ii Question 4 applies to the r	b. Building vin	_		
O - Offices		New bui	•		
H - Hotels	<del></del>	—   <del> </del>	85		
G - Governm	ent Facilities	c. Other chara	acteristics:		•
D - Hospitals		<u>A - Air-C</u>	onditioned		
	mily residential				
I - Industrial					
The following subjects	e standard: Both presc s are included in the energy s	standard:			
a. Whole building en	ergy provisions:	þ	. Building envelope pr	ovisions:	
E- Energy am			Roof		
E- Energy amo	ricity demand		Wall system		
E- Energy am	ricity demand		Wall system Fenestration sys	stem	
E- Energy amo	ricity demand		Wall system	stem	
E- Energy amo	ricity demand It target		Wall system Fenestration sys		
E- Energy am P- Peak electr C- Energy cos	ricity demand it target		Wall system Fenestration sys Infiltration  Mechanical provision	is:	
E- Energy ame P- Peak electric C- Energy cos  c. Lighting provision Control require Power density	ricity demand it target  is: rements	d	Wall system Fenestration sys Infiltration  Mechanical provision Air/Water dist	is: ribution efficiency	ing
E- Energy ame P- Peak electric C- Energy cos c. Lighting provision	ricity demand it target  is: rements		Wall system Fenestration sys Infiltration  Mechanical provision Air/Water dist	is:	ing
E- Energy ame P- Peak electric C- Energy cos  c. Lighting provision Control require Power density Illumination	ricity demand it target  is: rements		Wall system Fenestration system Infiltration  Mechanical provision Air/Water dist Load Calculatio	is: ribution efficiency	ing
E- Energy ame P- Peak electric C- Energy cos  c. Lighting provision Control require Power density Illumination	ricity demand It target  IS: rements y requirements		Wall system Fenestration sys Infiltration  Mechanical provision Air/Water dist Load Calculatio Controls	is: ribution efficiency ns for equipment siz	ing
E- Energy ame P- Peak electric C- Energy cos  c. Lighting provision Control require Power density Illumination of Other: recommenders	ricity demand It target  Is: Tements Verequirements Imendation to use dayli		Wall system Fenestration sys Infiltration  Mechanical provision Air/Water dist Load Calculatio Controls Ventilation	is: ribution efficiency ns for equipment siz	ing
E- Energy ame P- Peak electric C- Energy cos  c. Lighting provision Control require Power density Illumination	ricity demand It target  Is: Tements Verequirements Imendation to use dayli		Wall system Fenestration sys Infiltration  Mechanical provision Air/Water dist Load Calculatio Controls Ventilation	is: ribution efficiency ns for equipment siz	ing

#### STANDARDS DEVELOPMENT PROCESS - DITABA 8. Organizations involved in developing the standard: Government agency: Directorate of Building, Department of Public Works Academic institution: Bandung Institute of Technology Research group: Indonesia Institute of Science Government agency: Building Research Center, Department of Public Works Foreign development agency: ASEAN-US Energy project, Energy Conservation in Buildings 9. Decision Process: Consensus Comment: 10. Information used in developing the standard: a. PHYSICAL CHARACTERISTICS of existing buildings b. ENERGY USE of existing buildings: Estimated using professional judgment Estimated using professional judgment Computer simulations used for estimates Gathered through audits and surveys Gathered through audits and surveys c. WEATHER data d. Other information Data on local materials, equipment, and installation Gathered through measurements commonly used. Already available prior to standard: 11. Standards from a different country used as source material: Singapore: Energy Conservation Handbook 12. COMPUTER programs used: a. In developing the standard: DOE-2 b. For complying with the standard: Yes **ASEAM** 13. Standard is set at a level: Above current practice 14. Considerations influencing the inclusion or exclusion of measures in the standard: E - Cost effectiveness Availability of energy efficient products Local design practice and local materials as well as local availability of equipment and products will Similarity/difference to local design give great influence on the applicability of the Comfort standard.

## 3 INDONESIA

	gy standards:	
Existing agency: Directorate of	<del></del>	
·	nsible for implementation, its former focus was	on buildings, energy, or another area:
Buildings		
•	rchitects, engineers and other professionals:	
Written guidelines to assist with Example calculations		
Seminars, workshops, or confer	ences	· · · · · · · · · · · · · · · · · · ·
Information or resource center		
Compliance mechanisms used at differen	at ctange in construction process:	
a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
Certification/approval		
Percent designs checked: ?	Percent sites checked: ?	Percent buildings checked: ?
Comment:	Comment:	Comment:
		•
d. Other compliance procedures - No	one .	·
d. Other compliance procedures - No		•
d. Other compliance procedures - No e. Effectiveness of combined compliance		
e. Effectiveness of combined compliance		
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of	e mechanisms (scale of 1-5):e: No evaluation has been done.	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of Types of assessments or audits of energy	e: No evaluation has been done.  y standards' impact:	·
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL base	e mechanisms (scale of 1-5):e: No evaluation has been done.	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of Types of assessments or audits of energy	e: No evaluation has been done.  y standards' impact:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL base	e: No evaluation has been done.  y standards' impact:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL base Planned b. MEASUREMENTS OF ENERGY SAVI	e: No evaluation has been done.  y standards' impact:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL base Planned	e: No evaluation has been done.  y standards' impact: ed on prototypical (not actual) buildings:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL base Planned b. MEASUREMENTS OF ENERGY SAVI	e: No evaluation has been done.  y standards' impact: ed on prototypical (not actual) buildings:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL base Planned  b. MEASUREMENTS OF ENERGY SAVII In progress	e: No_evaluation has been done.  y standards' impact: ed on prototypical (not actual) buildings:  NGS in actual buildings complying with stand	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL base Planned b. MEASUREMENTS OF ENERGY SAVI	e: No_evaluation has been done.  y standards' impact: ed on prototypical (not actual) buildings:  NGS in actual buildings complying with stand	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base Planned b. MEASUREMENTS OF ENERGY SAVII In progress c. COST EFFECTIVENESS based on en	e: No_evaluation has been done.  y standards' impact: ed on prototypical (not actual) buildings:  NGS in actual buildings complying with stand	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part of Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base Planned b. MEASUREMENTS OF ENERGY SAVII In progress c. COST EFFECTIVENESS based on en	e: No evaluation has been done.  y standards' impact: ed on prototypical (not actual) buildings:  NGS in actual buildings complying with stand	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part of  Types of assessments or audits of energy  a. ENERGY SAVINGS POTENTIAL base  Planned  b. MEASUREMENTS OF ENERGY SAVII  In progress  c. COST EFFECTIVENESS based on en  None conducted	e: No evaluation has been done.  y standards' impact: ed on prototypical (not actual) buildings:  NGS in actual buildings complying with stand	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part of  Types of assessments or audits of energy  a. ENERGY SAVINGS POTENTIAL base  Planned  b. MEASUREMENTS OF ENERGY SAVII  In progress  c. COST EFFECTIVENESS based on en  None conducted  d. COST EFFECTIVENESS based on A	e: No evaluation has been done.  y standards' impact: ed on prototypical (not actual) buildings:  NGS in actual buildings complying with stand	

20 Efficience			•.
EV. Enicidicy (	esting facilities and procedures establishe	d:	
Motors			
Insulat Fixture			
	al properties of materials		•
THETH	ir properties of materials		<del></del>
	<del></del>		
	ams or policies developed to increase ener		•
Informa	ation programs .	Comment:	Energy awareness campaigns for government
Audits	(free or subsidized)		officials; Energy conservation in buildings seminars.
	al sources of information about energy effic	•	
	ninar Proceeding: Seminar Kebijaks icy on Energy Conservation in Buil		si Energy Dalam Bangunan Gedung (Seminar on
	,	• •	
			edung Negara Dalam Kaitannya Denga N
3. (fr:	anslation of above) Guideline for t	ne Use of Buildir	ng Materials for Government Buildings in Relatio
	nergy Conservation.		
22. Contact for	written copy of energy standard specified	in Question 4:	
Name:	Ir. Noraya		
Address:	DITABA, Public Works Departme	ent	* .
	Kramat Raya 63		•
	Jakarta		
Country:	Indonesia	:	
•	•		
•			
Tel:	62 21 346 939	Fax:	
Tel:	62 21 346 939 supporting information available:	Fax:	
Tel: Types of Bui	supporting information available:  Iding Standard, Daylighting and	Artificial Lightir	g Standards (Contact Ir. Soeprapto; Puslitbang
Tel: Types of Bui	supporting information available:	Artificial Lightir	g Standards (Contact Ir. Soeprapto; Puslitbang donesia)
Tel: Types of Bui Per	supporting information available: Iding Standard, Daylighting and nukiman, Public Works Dept., Cile	Artificial Lightin	g Standards (Contact Ir. Soeprapto; Puslitbang donesia)
Tel: Types of Bui Per	supporting information available: Iding Standard, Daylighting and nukiman, Public Works Dept., Cile ergy standards for non-residential building	Artificial Lightir nyi, Bandung, In <b>s</b> :	donesia)
Tel: Types of Bui Per	supporting information available: Iding Standard, Daylighting and nukiman, Public Works Dept., Cile	Artificial Lightir nyi, Bandung, In <b>s</b> :	donesia)
Tel: Types of Bui Per	supporting information available: Iding Standard, Daylighting and nukiman, Public Works Dept., Cile ergy standards for non-residential building	Artificial Lightir nyi, Bandung, In <b>s</b> :	donesia)
Tel: Types of Bui Per	supporting information available: Iding Standard, Daylighting and nukiman, Public Works Dept., Cile ergy standards for non-residential building	Artificial Lightir nyi, Bandung, In <b>s</b> :	donesia)
Tel: Types of Bui Per	supporting information available: Iding Standard, Daylighting and nukiman, Public Works Dept., Cile ergy standards for non-residential building	Artificial Lightir nyi, Bandung, In <b>s</b> :	donesia) on Practice and Monitoring
Tel: Types of Bui Per	supporting information available: Iding Standard, Daylighting and nukiman, Public Works Dept., Cile ergy standards for non-residential building neral Policy on Energy; Guide on Er	Artificial Lightinnyi, Bandung, In Is: nergy Conservation Dr. Soegijanto Professor, Tek	donesia) on Practice and Monitoring nik Fisika
Tel: Types of Bui Per	supporting information available: Iding Standard, Daylighting and nukiman, Public Works Dept., Cile ergy standards for non-residential building neral Policy on Energy; Guide on Er Survey completed by:	Artificial Lightinnyi, Bandung, Ins.  s: nergy Conservation  Dr. Soegijanto Professor, Tek Institut Teknol	on Practice and Monitoring  nik Fisika ogi Bandung
Tel: Types of Bui Per	supporting information available: Iding Standard, Daylighting and nukiman, Public Works Dept., Cile ergy standards for non-residential building neral Policy on Energy; Guide on Er Survey completed by:	Artificial Lightinnyi, Bandung, Ins.  s:  nergy Conservation  Dr. Soegijanto  Professor, Tek Institut Teknol Jalan Ganesha	on Practice and Monitoring  nik Fisika ogi Bandung 10
Tel: Types of Bui Per	supporting information available:  Iding Standard, Daylighting and nukiman, Public Works Dept., Cile ergy standards for non-residential building neral Policy on Energy; Guide on En	Artificial Lighting, In Invi. Bandung, In Invi. Bandung, In Invi. Bandung Invi. Bandung Invi. Bandung 40132	on Practice and Monitoring  nik Fisika ogi Bandung  10  Country: Indonesia
Tel: Types of Bui Per	supporting information available: Iding Standard, Daylighting and nukiman, Public Works Dept., Cile ergy standards for non-residential building neral Policy on Energy; Guide on Er Survey completed by:	Artificial Lightinnyi, Bandung, Ins.  s:  nergy Conservation  Dr. Soegijanto  Professor, Tek Institut Teknol Jalan Ganesha	on Practice and Monitoring  nik Fisika ogi Bandung 10



## **ISRAEL**



2 Proposed or existing	dards exist at the following g ENERGY standards cover to		National Sectors: Pasido	ontial Only	
2. Proposed of existing	ENERGY Standards COVER II	ite rollowing bulluling	Reside	ential Only	
3. Status of Non-Reside a. National level:	ential Building Energy Stand Mandatory (R)	dards at the: b. Regional level	Uncertain	c. Local level:	Uncertain
4. Single energy standa	ard selected for further des	cription:		-	
Title, Organization:	"Thermal Insulation	of Residential Bu	uildings, " the St	andard Institution of I	srael
Year: 1989	Geographic Coverage:	Nation	Abbreviated Titl	e: <u>TIRB-SII, 1989</u>	
RIPTION OF SPECI	FIED ENERGY STAN	DARDS - TIRB-	SII, 1989		
5. The standard defined i	n Question 4 applies to the 1	following kinds of bui	ldings:		
a. Building types:		b. Building vi	•		
	mily residential	New bu	ildings		
M - Multi-fai	mily residential	c. Other cha	acteristics:		
		- None			
<del></del>					
	· · · · · · · · · · · · · · · · · · ·				<del></del>
	e standard: Performan	ce-based			
<ol><li>Basic approach of the</li></ol>			<del></del>		
• •	<del></del>		<del></del>		
7. The following subjects	are included in the energy	standard:	o. Building envelope i	provisions:	
7. The following subjects a. Whole building en	are included in the energy	standard:	<b>D. Building envelope</b>	provisions:	
7. The following subjects	are included in the energy	standard:	Roof	provisions:	
7. The following subjects a. Whole building en	are included in the energy	standard:	Roof Wall system Fenestration s		
7. The following subjects a. Whole building en	are included in the energy	standard:	Roof Wall system		
7. The following subjects a. Whole building en	s are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration s	ystem	
7. The following subjects a. Whole building end - None	s are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration s Infiltration	ystem	
7. The following subjects  a. Whole building end  - None  - C. Lighting provision	s are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration s Infiltration	ystem	
7. The following subjects  a. Whole building end  - None  - C. Lighting provision	s are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration s Infiltration	ystem	
7. The following subjects  a. Whole building end  - None  - C. Lighting provision	s are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration s Infiltration	ystem	
7. The following subjects a. Whole building end - None - None c. Lighting provision - None	s are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration s Infiltration	ystem	
7. The following subjects  a. Whole building end  - None  - C. Lighting provision	s are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration s Infiltration	ystem	

<ol><li>Entities involved in IMPLEMENTING energ</li></ol>	y standards:	
Existing agency: municipal aut	horities	
If an existing agency was made respons	sible for implementation, its former focus was	on buildings, energy, or another area:
Buildings		
17. TRAINING & EDUCATION provided for an	chitagte angineers and other professionals	•
	•	
Written guidelines to assist with Example calculations		· · · · · · · · · · · · · · · · · · ·
Compliance forms		
Seminars, workshops, or confere	nces	
Information or resource center		
18. Compliance mechanisms used at different	etage in construction process	
a. PRIOR to construction:		A AFTED construction.
	b. DURING construction:	c. AFTER construction:
Certification/approval	No mechanism	Certification/approva
<u> </u>		
Percent designs checked:	Percent sites checked: -	Percent buildings checked:
Comment:	Comment:	Comment:
		Inspection by consumers
d Other compliance procedures		
d. Other compliance procedures	mechanisms (scale of 1-5): 4	
e. Effectiveness of combined compliance	mechanisms (scale of 1-5): 4	
e. Effectiveness of combined compliance	· <del></del>	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part ex	-	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part explanation for effectiveness of assessments or audits of energy	standards' impact:	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part ex	standards' impact:	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part explanation for effectiveness of assessments or audits of energy	standards' impact:	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part explanation for effectiveness of assessments or audits of energy	standards' impact:	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part en  19. Types of assessments or audits of energy  a. ENERGY SAVINGS POTENTIAL bases	standards' impact:	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part en  19. Types of assessments or audits of energy  a. ENERGY SAVINGS POTENTIAL bases	standards' impact: d on prototypical (not actual) buildings:	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part en  19. Types of assessments or audits of energy  a. ENERGY SAVINGS POTENTIAL bases	standards' impact: d on prototypical (not actual) buildings:	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part en  19. Types of assessments or audits of energy  a. ENERGY SAVINGS POTENTIAL bases	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with stand	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part entropy  a. ENERGY SAVINGS POTENTIAL bases  b. MEASUREMENTS OF ENERGY SAVINGS	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with stand	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part en  19. Types of assessments or audits of energy  a. ENERGY SAVINGS POTENTIAL bases	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with stand	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part en  19. Types of assessments or audits of energy  a. ENERGY SAVINGS POTENTIAL bases	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with stand	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part end  19. Types of assessments or audits of energy  a. ENERGY SAVINGS POTENTIAL based  b. MEASUREMENTS OF ENERGY SAVIN  c. COST EFFECTIVENESS based on eng  Planned	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with stand	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part en  19. Types of assessments or audits of energy  a. ENERGY SAVINGS POTENTIAL bases	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with stand	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part explanation for effectiveness for explanation for effectiveness in part explanation for effectiveness for explanation for explanation for effectiveness for explanation for effectiveness for explanation for effectiveness for explanation for effectiveness for explanation for explanation for effectiveness for explanation for ex	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with stand	

Insulation		
	s/chillers/other applianc	es
Thermal proper	rties of materials	
	· · · · · · · · · · · · · · · · · · ·	
	· · · · · · · · · · · · · · · · · · ·	
Other programs or po	licies developed to increase ener	gy efficiency in buildings:
-		Comment:
Additional courses	al information about success off-	sianar far kuildinga in. Israal
	of information about energy effic	
	· · · · · · · · · · · · · · · · · · ·	gy
2		
		·
3		
Contact for written co	py of energy standard specified	in Question 4:
Name:	py of energy standard specified	in Question 4:
Name: dress:	py of energy standard specified	in Question 4:
Name:	py of energy standard specified	in Question 4:
Name: dress:	py of energy standard specified	in Question 4:
Name: dress:	py of energy standard specified	in Question 4:
Name: dress:	py of energy standard specified	in Question 4:
Name: dress: Country: Tel:	py of energy standard specified ginformation available:	
Name: dress: Country:  Tel: Types of supporting	j information available: y for the Israeli Standard;	
Name: dress: Country:  Tel: Types of supporting	j information available:	Fax:
Name: dress: Country:  Tel: Types of supporting Commentar tel:972 4 292	g information available: y for the Israeli Standard; 242; fax: 972 4 324 534	Fax: Technical Institution for Building Research; Prof. A. Bentur;
Name: dress: Country:  Tel: Types of supporting Commentar tel:972 4 292  Other energy stand	j information available: y for the Israeli Standard;	Fax: Technical Institution for Building Research; Prof. A. Bentur;
Name: dress: Country:  Tel: Types of supporting Commentar tel:972 4 292	g information available: y for the Israeli Standard; 242; fax: 972 4 324 534	Fax: Technical Institution for Building Research; Prof. A. Bentur;
Name: dress: Country:  Tel: Types of supporting Commentar tel:972 4 292  Other energy stand	g information available: y for the Israeli Standard; 242; fax: 972 4 324 534	Fax: Technical Institution for Building Research; Prof. A. Bentur;
Name: dress: Country:  Tel: Types of supporting Commentar tel:972 4 292  Other energy stand	y information available: y for the Israeli Standard; 242; fax: 972 4 324 534 ards for non-residential building	Fax: Technical Institution for Building Research; Prof. A. Bentur; ps:
Name: dress: Country:  Tel: Types of supporting Commentar tel:972 4 292  Other energy stand	y information available:  y for the Israeli Standard; 242; fax: 972 4 324 534  ards for non-residential building  Survey completed by:	Fax: Technical Institution for Building Research; Prof. A. Bentur; gs: Eng. Raya Hizi
Name: dress: Country:  Tel: Types of supporting Commentar tel:972 4 292  Other energy stand	y information available: y for the Israeli Standard; 242; fax: 972 4 324 534 ards for non-residential building	Fax: Technical Institution for Building Research; Prof. A. Bentur; ps:
Name: dress: Country:  Tel: Types of supporting Commentar tel:972 4 292  Other energy stand	y information available:  y for the Israeli Standard; 242; fax: 972 4 324 534  ards for non-residential building  Survey completed by:	Fax:  Technical Institution for Building Research; Prof. A. Bentur;  js:  Eng. Raya Hizi Head of Building Branch Standards Institution of Israel Standardization Deparment, 42 Chaim Levanon St.
Name: dress: Country:  Tel: Types of supporting Commentar tel:972 4 292  Other energy stand	y information available:  y for the Israeli Standard; 242; fax: 972 4 324 534  ards for non-residential building  Survey completed by:	Fax:  Technical Institution for Building Research; Prof. A. Bentur;  js:  Eng. Raya Hizi Head of Building Branch Standards Institution of Israel



# **IVORY COAST**



	ENERGY standards cover t	ne following building	g sectors: Both Residential and Non-Residential
B. Status of Non-Reside	ntial Building Energy Stand	dards at the:	
a. National level:	Proposed	b. Regional level	i: c. Local level:
<del></del>	<del></del>		
 L. Single energy standa	rd selected for further des	cription:	
0		-	timents", 1992. (Energy Efficiency Code, Draft Vers
·····, ··· <b>g</b>			ureau des Economies d'Energie. Plan to be develope
Year: 1992	Geographic Coverage:	Nation	Abbreviated Title: IC-1993
RIPTION OF SPECI	FIED ENERGY STAN	DARDS - IC-19	93
	Question 4 applies to the 1	• -	_
a. Building types:		b. Building vi	-
<u>A - All Buildi</u>	ngs	Both ne	ew and existing
		c. Other cha	uracteristics:
	<del></del>	—   A - Air-	Conditioned
		— O - Oth	er: natural ventilation
<del> </del>	<del></del>	—	
		-	
	·	— I ———	
		— I <u> </u>	
. Basic approach of the	standard: Both preso	riptive and perfo	ormance
		<u> </u>	
. The following subjects	are included in the energy	standard:	
			b. Building envelope provisions:
a. Whole building ene	rgy provisions:		
a. Whole building ene E- Energy amo	rgy provisions:		Roof
a. Whole building ene	rgy provisions:		Roof Wall system
a. Whole building ene E- Energy amo	rgy provisions:		Roof
a. Whole building ene E- Energy amo	rgy provisions:		Roof Wall system
a. Whole building ene E- Energy amo C- Energy cost	rgy provisions: ount target target		Roof Wall system
a. Whole building ene E- Energy amo C- Energy cost  c. Lighting provisions	rgy provisions:  ount target target		Roof Wall system Fenestration system  d. Mechanical provisions:
a. Whole building ene E- Energy amo C- Energy cost	rgy provisions:  ount target target		Roof Wall system Fenestration system  d. Mechanical provisions: Air/Water distribution efficiency
a. Whole building ene E- Energy amo C- Energy cost  c. Lighting provisions Control require Power density	rgy provisions:  ount target target	(	Roof Wall system Fenestration system  d. Mechanical provisions:
a. Whole building ene E- Energy amo C- Energy cost  c. Lighting provisions Control require Power density	rgy provisions: ount target target	(	Roof Wall system Fenestration system  d. Mechanical provisions: Air/Water distribution efficiency Load Calculations for equipment sizing
a. Whole building ene E- Energy amo C- Energy cost  c. Lighting provisions Control require Power density	rgy provisions: ount target target	(	Roof Wall system Fenestration system  d. Mechanical provisions: Air/Water distribution efficiency Load Calculations for equipment sizing Controls
a. Whole building ene E- Energy amo C- Energy cost  c. Lighting provisions Control require Power density Illumination re	rgy provisions: ount target target	(	Roof Wall system Fenestration system  d. Mechanical provisions: Air/Water distribution efficiency Load Calculations for equipment sizing Controls Ventilation
a. Whole building ene E- Energy amo C- Energy cost  c. Lighting provisions Control require Power density Illumination re  e. Other provisions:	rgy provisions: ount target target	(	Roof Wall system Fenestration system  d. Mechanical provisions: Air/Water distribution efficiency Load Calculations for equipment sizing Controls Ventilation

OO TOTALLIA ABOUTO TO	reau des Economies d'Ene	rgie ·	
Academic institution: I	<del></del>		
Foreign development as	gency: ESMAP/ACDI	<del></del>	
		,	
9. Decision Process: Consensus	Comment:		
10. Information used in developing t	ne standard:		
a. PHYSICAL CHARACTERIS		b. ENERGY USE of existing buildings:	
Estimated using profes		Estimated using professional ju	
Gathered through aud		Computer simulations used for	
Already available pri	or to standard	Gathered through audits and s	surveys
c. WEATHER data		d. Other information	
Gathered through mea		- None	
Already available pri			
Alleady available pri	or to standard	•	•
11. Standards from a different coun	try used as source material:		
Jamaica: EEBC-92	-,		
Janiaica. BBBC-92			
		·	
2. COMPUTER programs used:			
• •	OASIS	. b. For complying with the standard: Y	es: may be used
COMPUTER programs used:     a. In developing the standard:	OASIS	b. For complying with the standard: $\underline{\underline{Y}}$	es: may be used
• •	CODYBA	b. For complying with the standard: $\underline{\underline{Y}}$	es: may be used
• •		b. For complying with the standard: $\underline{\underline{Y}}$	es: may be used
• •	CODYBA	b. For complying with the standard: $\underline{\underline{Y}}$	es: may be used
• •	CODYBA	b. For complying with the standard: $\underline{\underline{Y}}$	es: may be used
a. In developing the standard:	CODYBA DOE-2	b. For complying with the standard: $\underline{\underline{Y}}$	es: may be used
• •	CODYBA DOE-2	b. For complying with the standard: $\underline{\underline{Y}}$	es: may be used
a. In developing the standard:	CODYBA DOE-2  ove current practice		es: may be used
a. In developing the standard:      3. Standard is set at a level: About the income influencing the income.  About the income influencing the income.	CODYBA DOE-2  ove current practice		es: may be used
<ul> <li>a. In developing the standard:</li> <li>3. Standard is set at a level: About the incommon that is a set of the incommon that</li></ul>	ODYBA DOE-2  ove current practice  clusion or exclusion of measures	s in the standard:	es: may be used
a. In developing the standard:  13. Standard is set at a level: About the incomplete of the incomplete	CODYBA DOE-2  ove current practice  clusion or exclusion of measures  rgy efficient products	s in the standard:	
a. In developing the standard:  3. Standard is set at a level: About the incomplete of the incomplete	CODYBA DOE-2  ove current practice  clusion or exclusion of measures  rgy efficient products	s in the standard:  Comments:	
a. In developing the standard:  13. Standard is set at a level: About the incomplete of the incomplete	CODYBA DOE-2  ove current practice  clusion or exclusion of measures  rgy efficient products	s in the standard: Comments:	
a. In developing the standard:  3. Standard is set at a level: About the incomplete of the incomplete	CODYBA DOE-2  ove current practice  clusion or exclusion of measures  rgy efficient products	s in the standard: Comments:	
a. In developing the standard:  3. Standard is set at a level: About the incomplete of the incomplete	CODYBA DOE-2  ove current practice  clusion or exclusion of measures  rgy efficient products ce to local design	s in the standard: Comments:	
a. In developing the standard:  3. Standard is set at a level: Ab.  4. Considerations influencing the inc.  E - Cost effectiveness  A - Availability of ener.  S - Similarity/difference  C - Comfort  15a. Standard scheduled for regular  Unsure: do not know the	CODYBA DOE-2  ove current practice  clusion or exclusion of measures  rgy efficient products  ce to local design  review and revision?  ne answer, as this will be	s in the standard:  Comments:	
a. In developing the standard:  3. Standard is set at a level: Ab.  4. Considerations influencing the inc.  E - Cost effectiveness  A - Availability of ener.  S - Similarity/difference  C - Comfort  15a. Standard scheduled for regular  Unsure: do not know the	CODYBA DOE-2  ove current practice  clusion or exclusion of measures  rgy efficient products  ce to local design  review and revision?  ne answer, as this will be	s in the standard: Comments:	

## IMPLEMENTATION AND COMPLIANCE - IC-1993 16. Entities involved in IMPLEMENTING energy standards: Existing agency: Bureau des Economies d'Energie If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Compliance forms Seminars, workshops, or conferences 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Percent designs checked: \_-\_\_\_ Percent sites checked: -Percent buildings checked: -Comment: Comment Comment: d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): f. Explanation for effectiveness in part e: =\_\_\_ 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: In progress b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: In progress d. COST EFFECTIVENESS based on ACTUAL COSTS: e. Other Assessments: -

Caron and a banding federal	ch and testing facility, but not for energy
	· ·
. Other programs or policies developed to inc	rease energy efficiency in buildings:
<u></u>	
	energy efficiency for buildings in: Ivory Coast
<b>1.</b> <u>-</u>	
· · · · · · · · · · · · · · · · · · ·	
2	
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3	
Contact for written copy of energy standard	d specified in Question 4:
. Contact for written copy of energy standard Name: Address:	d specified in Question 4:
Name:	d specified in Question 4:
Name: .ddress:	d specified in Question 4:
Name: .ddress:	d specified in Question 4:
Name: ddress: Country:	
Name: .ddress: Country:	Faxc
Name: ddress: Country:	Faxc
Name: .ddress: Country:	Faxc
Name: .ddress: Country:	Faxc
Name: .ddress: Country:	Fax: e:
Name: ddress: Country:  Tel: Types of supporting information available  -	Fax: e:
Name: ddress: Country:  Tel: Types of supporting information available  -	Fax: e:
Name: ddress: Country:  Tel: Types of supporting information available  -	Fax: e:
Name: ddress: Country:  Tel: Types of supporting information available  -	Fax: e: tial buildings:
Name: ddress: Country:  Tel: Types of supporting information available	Fax: e: tial buildings: bleted by: Jean Thibon Title: Ingenieur E.N.S.I.G.C
Name: ddress: Country:  Tel: Types of supporting information available	Fax: e:  bleted by: Jean Thibon Title: Ingenieur E.N.S.I.G.C Bureaux des Economies Enérgies
Name: ddress: Country:  Tel: Types of supporting information available	Fax: e:  bleted by: Jean Thibon Title: Ingenieur E.N.S.I.G.C Bureaux des Economies Enérgies B.P. 2541
Name: ddress: Country:  Tel: Types of supporting information available	Fax: e:  bleted by: Jean Thibon Title: Ingenieur E.N.S.I.G.C Bureaux des Economies Enérgies



# **JAMAICA**



_	ards exist at the following g	•	National		<u> </u>
. Proposed or existing E	NERGY standards cover the	e following building	sectors: Non-Re	sidential Only	
a. National level: M	ntial Building Energy Stand (andatory (G) oluntary (all	lards at the: b. Regional level:	- None	c. Local level:	- None
. Single energy standar	d selected for further desc	ription:			
· ·	Energy Efficiency Bui	•	C-92), October 199	2. Jamaica Bureau o	of Standards
Year: 1992	Geographic Coverage:	Nation	Abbreviated Title:	EEBC-92	
IPTION OF SPECIF	IED ENERGY STAND	ARDS - EEBC	92		
	Question 4 applies to the fo				
a. Building types:	adesiron 4 applies to the in	b. Building vir	•		
O - Offices		1	v and existing		
H - Hotels		_   <del></del>	v and existing		
G - Governmen	nt Facilities	c. Other char	acteristics:		
F - Restaurants		P - Physic	cal size: > 93 sq. n	neter of floor area	
D - Hospitals		E - Amou	nt of energy: > 11	W/sq. meter	
R - Religion-re	lated	A - Air-C	onditioned		
M - Multi-fam					
C - Commercia	l/retail stores				
a. Whole building energy E- Energy amou	are included in the energy s gy provisions: unt target	_	a. Building envelope pro Roof	ovisions:	
C- Energy cost	target		Wall system Fenestration sys	******	
			Tenestration sys	stent	
c. Lighting provisions:	:	c	l. Mechanical provision	s:	
Control require	ments		Air/Water dist	ribution efficiency	
Power density			Load Calculatio	ns for equipment siz	ing
Illumination red	quirements: recomme	ndations	Controls		
			Ventilation	• .	
			Equipment effic	iencv	
			<u> </u>		
e. Other provisions:					

8. Organizations involved in developing the standard:	•
Government agency: Jamaica Bureau of Standards	; Ministry of Mines and Energy; Kingston Town Planning
	ers; Jamaica Institute of Architects; EEBC Review Committee
Industry group: Jamaica Public Service Co. (elec.	
Academic institution: University of West Indies	
Foreign development agency: World Bank, ESMA	P; Dublin Bloome & the Deringer Group
_	
9. Decision Process: Consensus Comment:	
10. Information used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Estimated using professional judgment	Estimated using professional judgment
Gathered through audits and surveys	Computer simulations used for estimates
Already available prior to standard	Already available prior to standard
Aneuty available prior to standard	initially available prior to barratia
c. WEATHER data	d. Other information
	Yes: See Energy and Economic Analysis Report in
Gathered through measurements	Support of EEBC-92 by J. Cumper & S. Marslim, 1992.
	.
11. Standards from a different country used as source material:	
	•
USA: ASHRAE 90.1-1989	
Malaysia	
Thailand	
Philippines	
Indonesia	
	•
12. COMPUTER programs used:	•
a. In developing the standard: ASEAM -2D	b. For complying with the standard: Yes
DOE-2.1D	
	l
13. Standard is set at a level: Above current practice: 30-35	% above current
14. Considerations influencing the inclusion or exclusion of measures	in the standard:
E - Cost effectiveness	Comments:
A - Availability of energy efficient products	-
S - Similarity/difference to local design	
C - Comfort	
Condoit	
	·
45- Otandard asheddad for manifes modern and modelar	
15a. Standard scheduled for regular review and revision?	
NR	
b. Does revision include procedures to MONITOR and EVALUA	ATE parties versions of the standard?
	TI E CALIFOR VELSIONIS OF ALC STATEMENTS:
N.R.	

. Entities involved in IMPLEMENTING energ	y standards:	
Existing agency: Jamaica Bureau	of Standards (plus other agencies in	nvolved in development)
If an existing agency was made respons	sible for implementation, its former focus was	on buildings, energy, or another area:
Buildings		
TDAINING & EDITOATION provided for an	chitects, engineers and other professionals:	
•	•	
Written guidelines to assist with	compliance procedure	
Example calculations		
Compliance forms Seminars, workshops, or confere		·
Information or resource center		
. Compliance mechanisms used at different		
a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
Certification/approval		
•		
Percent designs checked: ?	Percent sites checked:	Percent buildings checked:
Comment:	Comment:	Comment:
		Comment
Certification is powerful in		
English tradition (strong in		
Jamaica)		
d. Other compliance procedures		
e. Effectiveness of combined compliance	mechanisms (scale of 1-5):	
G. 2	<del></del>	
C. Combon attack and afficiency and to much as		
f. Explanation for effectiveness in part e:	**	
т. Explanation for effectiveness in part e:		
•	standards' impact:	
. Types of assessments or audits of energy	•	
. Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based	d on prototypical (not actual) buildings:	
. Types of assessments or audits of energy	d on prototypical (not actual) buildings:	
. Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based	d on prototypical (not actual) buildings:	
a. ENERGY SAVINGS POTENTIAL based Completed: J. Deringer & J. Gill	d on prototypical (not actual) buildings: ing, ACEEE Proceedings, 1992.	ned.
a. ENERGY SAVINGS POTENTIAL based Completed: J. Deringer & J. Gill b. MEASUREMENTS OF ENERGY SAVIN	d on prototypical (not actual) buildings:	ard:
a. ENERGY SAVINGS POTENTIAL based Completed: J. Deringer & J. Gill	d on prototypical (not actual) buildings: ing, ACEEE Proceedings, 1992.  GS in actual buildings complying with stand	
a. ENERGY SAVINGS POTENTIAL based Completed: J. Deringer & J. Gill b. MEASUREMENTS OF ENERGY SAVIN	d on prototypical (not actual) buildings: ing, ACEEE Proceedings, 1992.  GS in actual buildings complying with stand	
a. ENERGY SAVINGS POTENTIAL based Completed: J. Deringer & J. Gill b. MEASUREMENTS OF ENERGY SAVIN In progress	d on prototypical (not actual) buildings: ing, ACEEE Proceedings, 1992.  GS in actual buildings complying with stand	
a. ENERGY SAVINGS POTENTIAL based Completed: J. Deringer & J. Gill b. MEASUREMENTS OF ENERGY SAVIN In progress  c. COST EFFECTIVENESS based on eng	d on prototypical (not actual) buildings: ing, ACEEE Proceedings, 1992.  GS in actual buildings complying with stand ineering economic CALCULATIONS:	
a. ENERGY SAVINGS POTENTIAL based Completed: J. Deringer & J. Gill b. MEASUREMENTS OF ENERGY SAVIN In progress	d on prototypical (not actual) buildings: ing, ACEEE Proceedings, 1992.  GS in actual buildings complying with stand ineering economic CALCULATIONS:	
a. ENERGY SAVINGS POTENTIAL based Completed: J. Deringer & J. Gill b. MEASUREMENTS OF ENERGY SAVIN In progress  c. COST EFFECTIVENESS based on eng	d on prototypical (not actual) buildings: ing, ACEEE Proceedings, 1992.  GS in actual buildings complying with stand ineering economic CALCULATIONS:	
a. ENERGY SAVINGS POTENTIAL based Completed: J. Deringer & J. Gill b. MEASUREMENTS OF ENERGY SAVIN In progress c. COST EFFECTIVENESS based on eng Completed: J. Deringer & J. Gill	d on prototypical (not actual) buildings: ing, ACEEE Proceedings, 1992.  GS in actual buildings complying with stand ineering economic CALCULATIONS: ling, ACEEE Proceedings, 1992.	
a. ENERGY SAVINGS POTENTIAL based Completed: J. Deringer & J. Gill b. MEASUREMENTS OF ENERGY SAVIN In progress c. COST EFFECTIVENESS based on eng Completed: J. Deringer & J. Gill d. COST EFFECTIVENESS based on A	d on prototypical (not actual) buildings: ing, ACEEE Proceedings, 1992.  GS in actual buildings complying with stand ineering economic CALCULATIONS: ling, ACEEE Proceedings, 1992.	

## FURTHER INFORMATION ON ENERGY CONSERVATION - Jamaica 20. Efficiency testing facilities and procedures established: Air conditioners/chillers/other appliances 21. Other programs or policies developed to increase energy efficiency in buildings: Information programs Comment: \_ Government energy policy: DSM Additional sources of information about energy efficiency for buildings in: Jamaica 22. Contact for written copy of energy standard specified in Question 4: Name: Joe Gilling Address: **ESMAP** Country: Tel: Types of supporting information available: Other energy standards for non-residential buildings: Survey completed by: Roosevelt DaCosta Title: Group Director, Engineering Jamaica Bureau of Standards 6 Winchester Kingston 10 Country: Jamaica Tel: 809 926-3140 Fax: 809 929 4736 Date completed: 10/30/92



# **JAPAN**



	ENERGY standards cover t	he following buildin	g sectors: Both Re	sidential and Non-	Residential
3. Status of Non-Reside a. National level: _ _	ential Building Energy Stan Mandatory Voluntary	dards at the: b. Regional leve	: - None	c. Local level:	- None
• •	ard selected for further des  "Standards of Owner for Office Use" Minis	r's Evaluation Re	egarding the Ration	nalization of Energy listry; Ministry of Cor	Use in Build astruction
Year: 1980	Geographic Coverage:	Nation	Abbreviated Title:	MITI, 1980	
RIPTION OF SPEC	IFIED ENERGY STAN	DARDS - MITI	, 1980		
i. The standard defined i	in Question 4 applies to the	following kinds of bu	uildings:		
a. Building types:		b. Building v	•		
Offices		New b	uildings		
	· · · · · · · · · · · · · · · · · · ·	c. Other cha	aracteristics:		
		P - Phys	sical size: > 2000 sq	. m	
		_			
	· · · · · · · · · · · · · · · · · · ·				
6. Basic approach of th	e standard: Performar s are included in the energy				
	s are included in the energy		b. Building envelope pr	ovisions:	
'. The following subjects	s are included in the energy		Roof	ovisions:	
'. The following subjects a. Whole building en	s are included in the energy		Roof Wall system		
'. The following subjects a. Whole building en	s are included in the energy		Roof		
'. The following subjects a. Whole building en	s are included in the energy		Roof Wall system Fenestration sys		
7. The following subjects a. Whole building en - None	s are included in the energy ergy provisions:		Roof Wall system Fenestration sys	stem	
7. The following subjects a. Whole building en - None - C. Lighting provision	s are included in the energy ergy provisions:	standard:	Roof Wall system Fenestration sys Infiltration	stem	
7. The following subjects a. Whole building en - None - C. Lighting provision	s are included in the energy ergy provisions:	standard:	Roof Wall system Fenestration sys Infiltration  d. Mechanical provision	stem	
7. The following subjects a. Whole building en - None - C. Lighting provision	s are included in the energy ergy provisions:	standard:	Roof Wall system Fenestration sys Infiltration  d. Mechanical provision	stem	
7. The following subjects a. Whole building en - None - C. Lighting provision	s are included in the energy ergy provisions:	standard:	Roof Wall system Fenestration sys Infiltration  d. Mechanical provision	stem	
7. The following subjects a. Whole building en - None - C. Lighting provision	s are included in the energy ergy provisions:	standard:	Roof Wall system Fenestration sys Infiltration  d. Mechanical provision	stem	

B. Organizations involved in developing the standard:		
Government agency: Ministry of International Trac	le and Industry/Ministry of Cons	truction
Other: Energy Conservation Center		
Other: Institute of Building Energy Conservation		
Decision Process: Mandate Comment: Mir	nistry held a council.	
0. Information used in developing the standard:		
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings	<b>:</b> :
Already available prior to standard	Already available prior to	standard
		,
c. WEATHER data	d. Other information	•
Already available prior to standard	- None	
·		
COMPLITED and arrange used		
		Voc
2. COMPUTER programs used:  a. In developing the standard:  Uncertain	b. For complying with the standard:	Yes Fach constructor ha
	b. For complying with the standard:	Each constructor ha
a. In developing the standard:  Uncertain	b. For complying with the standard:	
	b. For complying with the standard:	Each constructor ha
a. In developing the standard:  Uncertain	b. For complying with the standard:	Each constructor ha
a. In developing the standard:  Uncertain  Uncertain  Above current practice	in the standard:	Each constructor ha
a. In developing the standard:  Uncertain  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness	·	Each constructor ha
a. In developing the standard:  Uncertain  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of measures in the standard is set at a level.	in the standard:  Comments:	Each constructor ha program.
a. In developing the standard:  Uncertain  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness  Similarity/difference to local design	in the standard:  Comments:	Each constructor ha program.
a. In developing the standard:  Uncertain  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness	in the standard:  Comments:	Each constructor ha program.
a. In developing the standard:  Uncertain  3. Standard is set at a level: Above current practice  4. Considerations influencing the inclusion or exclusion of measures in E - Cost effectiveness  Similarity/difference to local design	in the standard:  Comments:	Each constructor ha program.
3. Standard is set at a level: Above current practice 4. Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Similarity/difference to local design	in the standard:  Comments:	Each constructor ha program.
a. In developing the standard:    Uncertain	in the standard:  Comments:	Each constructor ha program.

#### IMPLEMENTATION AND COMPLIANCE - MITI, 1980 16. Entities involved in IMPLEMENTING energy standards: Existing agency: local offices of the Ministry of Construction If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: **Buildings** 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Seminars, workshops, or conferences Information or resource center 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: No mechanism Certification/approval No mechanism Percent designs checked: 100 Percent sites checked: Percent buildings checked: Comment: Comment: Comment: All office buildings with floor space above 2000 sq. m. d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): 5 f. Explanation for effectiveness in part e: \_ 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: None conducted b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: d. COST EFFECTIVENESS based on ACTUAL COSTS: e. Other Assessments: Done by constructors voluntarily

### FURTHER INFORMATION ON ENERGY CONSERVATION - Japan 20. Efficiency testing facilities and procedures established: Motors Insulation Air conditioners/chillers/other appliances Thermal properties of materials 21. Other programs or policies developed to increase energy efficiency in buildings: Information programs Comment: Japanese-language sample of information campaign enclosed. Additional sources of information about energy efficiency for buildings in: Japan 1. Journal of "The Society of Heating, Air-Conditioning, and Sanitary Engineers of Japan," address: Kirashinjuke 1-8-1, Shinjuku-ku, Tokyo. Tel: 81 3 3363 8261 2. The Magazine of Building Equipment. Address: Nihonbaski Hon-Machi 4-14-2 Chiioku, Tokyo. Tel: 81 3 3668 4059 22. Contact for written copy of energy standard specified in Question 4: Name: Address: Agency of National Resources and Energy Ministry of International Trade and Industry Chiyodaku; Kasumigaseki 1-3-1 Tokyo Country: Japan 81 3 35-01-1511 81 3 3580-8439 Tel: Fax: Types of supporting information available: Other energy standards for non-residential buildings: -None

Survey completed by: Misuo Iguchi

> Title: Senior Technical Advisor

> > **Energy Conservation Center** 2-39-3, Nishi-Shinbashi

Minato-Ku

Tokyo

Country: Japan 105

Tel: 81-3-3433-0312

Fax: 81-3-3433-0393

Date completed: 3/31/92



## **MALAYSIA**



	lards exist at the following (	governmental levels:	National	Regional	Local
2. Proposed or existing E	ENERGY standards cover t	he following building:	sectors: Non-R	esidential Only	
Status of Non-Resider     a. National level:	ntial Building Energy Stan Voluntary	dards at the: b. Regional level:	Voluntary	c. Local level:	Voluntary
•	rd selected for further des "Guidelines for Energy Posts.	•	ildings", Ministi	y of Energy Telecomr	nunications, a
Year: 1989	Geographic Coverage:	Nation	Abbreviated Title	e: GEEB-METP, 1989	)
RIPTION OF SPECI	FIED ENERGY STAN	DARDS - GEEB-	METP, 1989		
	Question 4 applies to the				
a. Building types:	,	b. Building vin	-		
O - Offices		New Bu	ldings		
H - Hotels		c. Other chara	atoriotico.		
G - Governme				ak design rate > 10W/	m2 (installed)
F - Restaurant	s al/retail stores	<u>E-Alliou</u>	ill of ellergy. pe	ak design rate > 10vv/	niz (nistaneu)
<u> </u>					
6. Basic approach of the	standard: Performar	nce-based			
7. The following subjects	are included in the energy	standard:			
ionoming ounlook	<b>~</b> *	oun racing.			
a. Whole building ene			. Building envelope p	provisions:	
-			Roof	provisions:	
a. Whole building ene			Roof Wall system		
a. Whole building ene			Roof Wall system Fenestration s		
a. Whole building ene			Roof Wall system		
a. Whole building ene - None - None c. Lighting provisions	ergy provisions:	b	Roof Wall system Fenestration s	ystem	
a. Whole building ene - None - None  c. Lighting provisions Control require	ergy provisions: s: ements	b	Roof Wall system Fenestration s Infiltration  Mechanical provision	ystem	ing
a. Whole building ene - None - None  c. Lighting provisions Control require Power density	ergy provisions: s: ements	b	Roof Wall system Fenestration s Infiltration  Mechanical provision Load calculation Controls	ystem  ons:  ons for equipment sizi	ing
a. Whole building ene - None - None  c. Lighting provisions Control require Power density	ergy provisions: s: ements	b	Roof Wall system Fenestration s Infiltration  Mechanical provision	ystem  ons:  ons for equipment sizi	ing
a. Whole building ene - None - None  c. Lighting provisions Control require Power density	ergy provisions: s: ements	b	Roof Wall system Fenestration s Infiltration  Mechanical provision Load calculation Controls	ystem  ons:  ons for equipment sizi	ing
a. Whole building ene - None  c. Lighting provisions Control require Power density Illumination	ergy provisions: s: ements	b	Roof Wall system Fenestration s Infiltration  Mechanical provision Load calculation Controls	ystem  ons:  ons for equipment sizi	ing

#### STANDARDS DEVELOPMENT PROCESS - GEEB-METP, 1989

	nunications and Posts, Malaysia aysia
ecision Process: Consensus Comment: Profe	essional institutions (e.g., engineering, architecture); ding_organizations/associations
	ing organizations/associations
information used in developing the standard:	1
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Gathered through audits and surveys	Gathered through audits and surveys
	Already available prior to standard
c. WEATHER data	d. Other information
Already available prior to standard	
Standards from a different country used as source material:	
Singapore: Building Regulations	·
USA: ASHRAE 90.1P	· · · · · · · · · · · · · · · · · · ·
	<del></del>
	<del></del>
COMPUTER programs used:	
a. In developing the standard: DOE-2	b. For complying with the standard: No
ASEAM-2	
e	
Standard is set at a level: Equal to current practice	· · · · · · · · · · · · · · · · · · ·
	the standard:
Considerations influencing the inclusion or exclusion of measures in	_
<b>▼</b>	Comments:
E - Cost effectiveness	1
E - Cost effectiveness  Availability of energy efficient products	Standards were prepared so that it would not com
E - Cost effectiveness	Standards were prepared so that it would not contoo much to implement them. Comfort is
E - Cost effectiveness Availability of energy efficient products Comfort	Standards were prepared so that it would not contoo much to implement them. Comfort is
E - Cost effectiveness Availability of energy efficient products Comfort	Standards were prepared so that it would not contoo much to implement them. Comfort is
E - Cost effectiveness Availability of energy efficient products Comfort	Standards were prepared so that it would not contoo much to implement them. Comfort is
E - Cost effectiveness Availability of energy efficient products Comfort  Standard scheduled for regular review and revision?	Standards were prepared so that it would not contoo much to implement them. Comfort is maintained.
Availability of energy efficient products  Comfort  Standard scheduled for regular review and revision?	Comments:  Standards were prepared so that it would not contain too much to implement them. Comfort is maintained.  on in buildings is working on a revision of standards.

#### IMPLEMENTATION AND COMPLIANCE - GEEB-METP, 1989 16. Entities involved in IMPLEMENTING energy standards: Voluntary standards; no agency If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Example calculations Seminars, workshops, or conferences 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: No mechanism No mechanism No mechanism Percent sites checked: Percent designs checked: Percent buildings checked: Comment: Comment: Comment: d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): f. Explanation for effectiveness in part e: \_ 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: "Energy and Economic Analysis of Commercial Buildings Standards in Malaysia." J.J. Deringer, b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Planned c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Completed: see above d. COST EFFECTIVENESS based on ACTUAL COSTS: Completed e. Other Assessments:

Linolatoy t	esting facilities and procedures establishe	d:	
Motors	•		
Insulat			
Air con	nditioners/chillers/other appliance	es	<del></del>
Ballas	t-a		•
		· · · · · · · · · · · · · · · · · · ·	
	rams or policies developed to increase energ		
	ation programs: Ministry of Energy,		
Audits	Ministry of Energy, Efficiency Training: Ministry of		
Energy	Efficiency Training: Ministry of		
<del></del>			
Δddition	al sources of information about energy effic	iency for buildings in Mala	vsia
	••		
1. Ser	ninar papers and compiled manual		
		•	
2			
3		·	
			•
2. Contact for	written copy of energy standard specified	in Question 4:	
Name:			٠.
	•		
	Consumer I Init		the state of the s
	Energy Unit Ministry of Energy, Telecommunic	rations, and Posts	
	Energy Unit Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant		
Address:	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar		
Address:	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant		
Address:	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar		
Address:  Country: Tel:	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222	ran	
Address:  Country: Tel:	Ministry of Energy, Telecommunio Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia	ran	
Address:  Country: Tel:	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222	ran	
Address:  Country: Tel:	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222	ran	
Country: Tel: Types of	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222	Fax: 60-3-255-7901	
Country: Tel: Types of	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222 supporting information available: ergy standards for non-residential building	Fax: 60-3-255-7901	
Country: Tel: Types of Other en	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222 supporting information available: ergy standards for non-residential building	Fax: 60-3-255-7901	
Country: Tel: Types of Other en	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222 supporting information available: ergy standards for non-residential building	Fax: 60-3-255-7901	
Country: Tel: Types of Other en	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222 supporting information available: ergy standards for non-residential building	Fax: 60-3-255-7901	
Country: Tel: Types of Other en	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222 supporting information available: ergy standards for non-residential building	Fax: 60-3-255-7901  S:  K.S. Kannan	Theiresting
Country: Tel: Types of Other en	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222 supporting information available: ergy standards for non-residential building	Fax: 60-3-255-7901  S:  K.S. Kannan Faculty of Mechanical I	
Country: Tel: Types of Other en	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222 supporting information available: ergy standards for non-residential building	Fax: 60-3-255-7901  S:  K.S. Kannan Faculty of Mechanical I Universiti Teknologi M	Malaysia
Country: Tel: Types of Other en	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222 supporting information available: ergy standards for non-residential building	Fax: 60-3-255-7901  S:  K.S. Kannan Faculty of Mechanical I	Malaysia
Country: Tel: Types of Other en	Ministry of Energy, Telecommunic Wisma Damansara, Jalan Semant 50668 Kuala Lumpar Malaysia 60-3-2562222 supporting information available: ergy standards for non-residential building	Fax: 60-3-255-7901  S:  K.S. Kannan Faculty of Mechanical I Universiti Teknologi M Karung Berkunci 791; 80	Malaysia 1990 Johor Bahru



# **NETHERLANDS**



5. The standard defined in Question 4 applies to the following kinds of buildings:  a. Building types:  O - Offices  H - Hotels  S - Single-family residential  M - Multi-family residential  D - Hospitals  E - Educational facilities (schools)  6. Basic approach of the standard: Performance-based	c. Local level: Mandatory
FRIPTION OF SPECIFIED ENERGY STANDARDS - Bouwbershuit, 1992  5. The standard defined in Question 4 applies to the following kinds of buildings:  a. Building types:  O - Offices  H - Hotels S - Single-family residential M - Multi-family residential D - Hospitals E - Educational facilities (schools)  6. Basic approach of the standard:  Performance-based  7. The following subjects are included in the energy standard:  a. Whole building energy provisions:  - None  Bouwbershuit, 1992  b. Building vintage:  Both new and existing  c. Other characteristics:  b. Building envelope provisions:  Roof Wall system	
5. The standard defined in Question 4 applies to the following kinds of buildings:  a. Building types:  O - Offices  H - Hotels  S - Single-family residential  M - Multi-family residential  D - Hospitals  E - Educational facilities (schools)  6. Basic approach of the standard:  a. Whole building energy provisions:  - None  Both new and existing  c. Other characteristics:  Both new and existing  c. Other characteristics:  Both new and existing  c. Other characteristics:  Both new and existing  b. Building envelope provisions:  Both new and existing  c. Other characteristics:	uwbersluit, 1992
5. The standard defined in Question 4 applies to the following kinds of buildings:  a. Building types:  O - Offices  H - Hotels  S - Single-family residential  M - Multi-family residential  D - Hospitals  E - Educational facilities (schools)  6. Basic approach of the standard:  a. Whole building energy provisions:  - None  Both new and existing  c. Other characteristics:  Both new and existing  c. Other characteristics:  Both new and existing  c. Other characteristics:  Both new and existing  b. Building envelope provisions:  Both new and existing  c. Other characteristics:	
O - Offices H - Hotels S - Single-family residential M - Multi-family residential D - Hospitals E - Educational facilities (schools)  6. Basic approach of the standard: Performance-based  7. The following subjects are included in the energy standard: a. Whole building energy provisions:  - None  Both new and existing  c. Other characteristics:	
H - Hotels S - Single-family residential M - Multi-family residential D - Hospitals E - Educational facilities (schools)  6. Basic approach of the standard: Performance-based 7. The following subjects are included in the energy standard: a. Whole building energy provisions: - None    Roof Wall system	
S - Single-family residential  M - Multi-family residential  D - Hospitals  E - Educational facilities (schools)  6. Basic approach of the standard: Performance-based  7. The following subjects are included in the energy standard:  a. Whole building energy provisions:  - None  Boof  Wall system	
M - Multi-family residential D - Hospitals E - Educational facilities (schools)  6. Basic approach of the standard: Performance-based  7. The following subjects are included in the energy standard: a. Whole building energy provisions: - None    Roof Wall system	
D - Hospitals E - Educational facilities (schools)  6. Basic approach of the standard: Performance-based  7. The following subjects are included in the energy standard:  a. Whole building energy provisions:  - None  Boof Wall system	
E - Educational facilities (schools)  6. Basic approach of the standard: Performance-based  7. The following subjects are included in the energy standard:  a. Whole building energy provisions:  - None  Building envelope provisions:  Roof Wall system	
6. Basic approach of the standard: Performance-based  7. The following subjects are included in the energy standard:  a. Whole building energy provisions:  - None  - None  Roof Wall system	
7. The following subjects are included in the energy standard:  a. Whole building energy provisions:  - None  - None  Roof Wall system	,
7. The following subjects are included in the energy standard:  a. Whole building energy provisions:  - None  - None  Roof Wall system	
	<b>S:</b>
Infiltration	
c. Lighting provisions:  d. Mechanical provisions:	
- None Other: efficiency of na	
	atural gas boilers for rooms

#### STANDARDS DEVELOPMENT PROCESS - Bouwbersluit, 1992

	s
Research group: Novem TNO	
Other: NNI - standards commission - representat	tion of all interested groups who design standard
	alculations and descriptions were consensus, but the NN mmission (and the government) made the levels manate
formation used in developing the standard: a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Already available prior to standard	Not available, not used in standard
c. WEATHER data	d. Other information
Already available prior to standard	- None
andards from a different country used as source material:	
- None	
	·
•	
OMPUTER programs used:	
a. In developing the standard: CEN TC 89	b. For complying with the standard: No
TCM	
ISSO pub. 16	
ISSO pub. 16  Landard is set at a level: Equal to current practice	
landard is set at a level: Equal to current practice	s in the standard:
tandard is set at a level: Equal to current practice ensiderations influencing the inclusion or exclusion of measure	s in the standard: Comments:
landard is set at a level: Equal to current practice ensiderations influencing the inclusion or exclusion of measure E - Cost effectiveness	
tandard is set at a level: Equal to current practice ensiderations influencing the inclusion or exclusion of measure:  E - Cost effectiveness  Comfort	Comments:
landard is set at a level: Equal to current practice ensiderations influencing the inclusion or exclusion of measure E - Cost effectiveness	Comments:
tandard is set at a level: Equal to current practice ensiderations influencing the inclusion or exclusion of measure:  E - Cost effectiveness  Comfort	Comments:
landard is set at a level: Equal to current practice ensiderations influencing the inclusion or exclusion of measures E - Cost effectiveness Comfort	Comments:
tandard is set at a level: Equal to current practice ensiderations influencing the inclusion or exclusion of measure E - Cost effectiveness Comfort	Comments:
landard is set at a level: Equal to current practice ensiderations influencing the inclusion or exclusion of measures E - Cost effectiveness Comfort	Comments:
tandard is set at a level: Equal to current practice ensiderations influencing the inclusion or exclusion of measure:  E - Cost effectiveness  Comfort  Standard scheduled for regular review and revision?	Comments:
tandard is set at a level: Equal to current practice  ensiderations influencing the inclusion or exclusion of measure  E - Cost effectiveness  Comfort  Standard scheduled for regular review and revision?  Yes: Until July 1, 1992, revision every year. The	Comments:
tandard is set at a level: Equal to current practice ensiderations influencing the inclusion or exclusion of measure:  E - Cost effectiveness  Comfort  Standard scheduled for regular review and revision?	Comments:

<ol><li>Entities involved in IMPLEMENTING energy:</li></ol>	standards:	
Existing agency: all local commun	nities	
, , ,	ole for implementation, its former focus was o	n buildings, energy, or another area:
Buildings	·····	
7. TRAINING & EDUCATION provided for arch	itects, engineers and other professionals:	
Written guidelines to assist with	compliance procedure	
Example calculations		
Compliance forms Information or resource center		
information of resource center		
8. Compliance mechanisms used at different st	rages in construction process.	
a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
Certification/approval	Penalty	No mechanism
Downstanium stantal 100	Parameter should 10	Description of the state of the
Percent designs checked: 100	Percent sites checked: 10	Percent buildings checked: (
Comment:	Comment:	Comment:
Approval required to become	Penalty consists of no	
the license for construction.	permission to finish construction.	
	TOTAL METROLE	<del></del>
d. Other compliance procedures - None		
e. Effectiveness of combined compliance m		
e. Effectiveness of combined compliance m	echanisms (scale of 1-5): 4	struction. Inspection during constru
e. Effectiveness of combined compliance me	echanisms (scale of 1-5): 4	
e. Effectiveness of combined compliance me f. Explanation for effectiveness in part e:	echanisms (scale of 1-5): 4  License is needed before starting consist very simple.	
e. Effectiveness of combined compliance me f. Explanation for effectiveness in part e: ] 9. Types of assessments or audits of energy st	echanisms (scale of 1-5): 4  License is needed before starting consist very simple.  tandards' impact:	
e. Effectiveness of combined compliance m  f. Explanation for effectiveness in part e: ]  Types of assessments or audits of energy st  a. ENERGY SAVINGS POTENTIAL based of	echanisms (scale of 1-5): 4  License is needed before starting consist very simple.  tandards' impact: on prototypical (not actual) buildings:	
e. Effectiveness of combined compliance m  f. Explanation for effectiveness in part e: ]  7. Types of assessments or audits of energy st  a. ENERGY SAVINGS POTENTIAL based of Completed: National Environme	echanisms (scale of 1-5): 4  License is needed before starting consist very simple.  tandards' impact: on prototypical (not actual) buildings: and Plan Plus (NMP+), 1990.	
e. Effectiveness of combined compliance m  f. Explanation for effectiveness in part e: ]  Types of assessments or audits of energy st  a. ENERGY SAVINGS POTENTIAL based of	echanisms (scale of 1-5): 4  License is needed before starting consist very simple.  tandards' impact: on prototypical (not actual) buildings: and Plan Plus (NMP+), 1990.	
e. Effectiveness of combined compliance m  f. Explanation for effectiveness in part e: ]  7. Types of assessments or audits of energy st  a. ENERGY SAVINGS POTENTIAL based of Completed: National Environme	echanisms (scale of 1-5): 4  License is needed before starting consists very simple.  tandards' impact: on prototypical (not actual) buildings: ntal Plan Plus (NMP+), 1990. ng, 1990.	
e. Effectiveness of combined compliance median for effectiveness in part e: J. S. Types of assessments or audits of energy st a. ENERGY SAVINGS POTENTIAL based of Completed: National Environme Completed: Noto Energiebesparian b. MEASUREMENTS OF ENERGY SAVINGS	echanisms (scale of 1-5): 4  License is needed before starting consists very simple.  tandards' impact: on prototypical (not actual) buildings: ntal Plan Plus (NMP+), 1990. ng, 1990.	
e. Effectiveness of combined compliance median for effectiveness in part e: J. S. Types of assessments or audits of energy st a. ENERGY SAVINGS POTENTIAL based of Completed: National Environme Completed: Noto Energiebesparian b. MEASUREMENTS OF ENERGY SAVINGS	echanisms (scale of 1-5):4_  License is needed before starting consists very simple.  tandards' impact: on prototypical (not actual) buildings: ntal Plan Plus (NMP+), 1990. ng, 1990.  S in actual buildings complying with standards	
e. Effectiveness of combined compliance median for effectiveness in part e: J. S. Types of assessments or audits of energy st a. ENERGY SAVINGS POTENTIAL based of Completed: National Environme Completed: Noto Energiebesparian b. MEASUREMENTS OF ENERGY SAVINGS	echanisms (scale of 1-5):4_  License is needed before starting consists very simple.  tandards' impact: on prototypical (not actual) buildings: ntal Plan Plus (NMP+), 1990. ng, 1990.  S in actual buildings complying with standards	
e. Effectiveness of combined compliance m  f. Explanation for effectiveness in part e: ]  g. Types of assessments or audits of energy st  a. ENERGY SAVINGS POTENTIAL based of Completed: National Environme Completed: Noto Energiebesparia  b. MEASUREMENTS OF ENERGY SAVINGS None conducted  c. COST EFFECTIVENESS based on engin	echanisms (scale of 1-5):4_  License is needed before starting consist very simple.  tandards' impact: on prototypical (not actual) buildings: ntal Plan Plus (NMP+), 1990. ng, 1990.  S in actual buildings complying with standards in actual buildings complying with standards eering economic CALCULATIONS:	
e. Effectiveness of combined compliance m  f. Explanation for effectiveness in part e: J  g. Types of assessments or audits of energy st  a. ENERGY SAVINGS POTENTIAL based of Completed: National Environme Completed: Noto Energiebesparin  b. MEASUREMENTS OF ENERGY SAVINGS None conducted	echanisms (scale of 1-5):4_  License is needed before starting consist very simple.  tandards' impact: on prototypical (not actual) buildings: ntal Plan Plus (NMP+), 1990. ng, 1990.  S in actual buildings complying with standards in actual buildings complying with standards eering economic CALCULATIONS:	
e. Effectiveness of combined compliance m  f. Explanation for effectiveness in part e: ]  g. Types of assessments or audits of energy st  a. ENERGY SAVINGS POTENTIAL based of Completed: National Environme Completed: Noto Energiebesparia  b. MEASUREMENTS OF ENERGY SAVINGS None conducted  c. COST EFFECTIVENESS based on engin	echanisms (scale of 1-5):4_  License is needed before starting consist very simple.  tandards' impact: on prototypical (not actual) buildings: ntal Plan Plus (NMP+), 1990. ng, 1990.  S in actual buildings complying with standards in actual buildings complying with standards eering economic CALCULATIONS:	
e. Effectiveness of combined compliance m  f. Explanation for effectiveness in part e: ]  g. Types of assessments or audits of energy st  a. ENERGY SAVINGS POTENTIAL based of Completed: National Environme Completed: Noto Energiebesparia  b. MEASUREMENTS OF ENERGY SAVINGS None conducted  c. COST EFFECTIVENESS based on engin	echanisms (scale of 1-5):4_  License is needed before starting consists very simple.  Landards' impact:  on prototypical (not actual) buildings:  ntal Plan Plus (NMP+), 1990.  ng, 1990.  S in actual buildings complying with standards  eering economic CALCULATIONS:  chhater. Ministry of Housing.	
e. Effectiveness of combined compliance m  f. Explanation for effectiveness in part e: ]  g. Types of assessments or audits of energy st a. ENERGY SAVINGS POTENTIAL based of Completed: National Environme Completed: Noto Energiebesparia  b. MEASUREMENTS OF ENERGY SAVINGS None conducted  c. COST EFFECTIVENESS based on engine Completed: Novem, Voorbaldpa  d. COST EFFECTIVENESS based on ACT	echanisms (scale of 1-5):4_  License is needed before starting consists very simple.  Landards' impact:  on prototypical (not actual) buildings:  ntal Plan Plus (NMP+), 1990.  ng, 1990.  S in actual buildings complying with standards  eering economic CALCULATIONS:  chhater. Ministry of Housing.	

#### FURTHER INFORMATION ON ENERGY CONSERVATION - Netherlands

Insulation Air conditioners/chillers/other appliance	ps: white goods hoilers
Thermal properties of materials	s. withe goods, boliers
Other: boilers	
ther programs or policies developed to increase energ	gy efficiency in buildings:
Information programs	Comment: Ministry of Housing and Environment/Economic
Utility initiatives	Affairs; all utilities (Milieu Aklie Plan);
Rebates	subsidies in existing buildings; awareness
Audits (free or subsidized)	campaign in all governmental buildings by
	Novem and Ministry of Housing
Additional sources of information about energy effic	iency for buildings in: Netherlands
<del></del>	
1. Environmental Action Plan from the	utilities (English)
	Energiebesporing, Ministry of Housing and Environment
(English)	· · · · · · · · · · · · · · · · · · ·
3. Lecture: "Regulations for the Energy Pe	erformance of Buildings: a Status Quo" by S. REnes, Government
Building Agency, Ministry of Housing	(Available in English by request, R. Trines)
	•
ontact for written copy of energy standard specified	in Question 4:
	in Question 4:
Name: H.L. von Duijze	in Question 4:
Name: H.L. von Duijze  lress: Ministry of Housing	in Question 4:
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001	in Question 4:
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman	in Question 4:
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001	in Question 4:
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman	in Question 4:
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman	in Question 4:  Fax: 31 79 516 431
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman  Country: The Netherlands  Tel: 31 79 272 003	
Name: H.L. von Duijze  lress: Ministry of Housing Box 3001 2700 KA Zosterman  Country: The Netherlands	
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman  Country: The Netherlands  Tel: 31 79 272 003	
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Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman  Country: The Netherlands  Tel: 31 79 272 003	Fax: 31 79 516 431
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman  Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building	Fax: 31 79 516 431
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building Yes: Building Standards for Government	Fax: 31 79 516 431  IS: Ental Buildings, Government Buildings Agency.
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building Yes: Building Standards for Government	Fax: 31 79 516 431
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building Yes: Building Standards for Government	Fax: 31 79 516 431  IS: Ental Buildings, Government Buildings Agency.
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building Yes: Building Standards for Government	Fax: 31 79 516 431  IS: Ental Buildings, Government Buildings Agency.
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building Yes: Building Standards for Governme (from above) Minn S. Renes; Box 26	Fax: 31 79 516 431  IS: Ental Buildings, Government Buildings Agency.  0952; 2500 E2 Don Hoog; tel: 31 70 356 7890; fax: 31 70 356 7588
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman  Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building Yes: Building Standards for Governme (from above) Minn S. Renes; Box 26  Survey completed by:	Fax: 31 79 516 431  S: ental Buildings, Government Buildings Agency.  0952; 2500 E2 Don Hoog; tel: 31 70 356 7890; fax: 31 70 356 7588  Ruud Trines Project-Manager Novem Sittard
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman  Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building Yes: Building Standards for Governme (from above) Minn S. Renes; Box 26  Survey completed by:	Fax: 31 79 516 431  Sental Buildings, Government Buildings Agency.  0952; 2500 E2 Don Hoog; tel: 31 70 356 7890; fax: 31 70 356 7588  Ruud Trines Project-Manager Novem Sittard Swentiboldstraat 21
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman  Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building Yes: Building Standards for Governme (from above) Minn S. Renes; Box 20  Survey completed by: Title:	Fax: 31 79 516 431  Sental Buildings, Government Buildings Agency.  0952; 2500 E2 Don Hoog; tel: 31 70 356 7890; fax: 31 70 356 7588  Ruud Trines Project-Manager Novem Sittard Swentiboldstraat 21 P.O. Box 17, 6130 AA Sittard Country: The Netherland
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman  Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building Yes: Building Standards for Governme (from above) Minn S. Renes; Box 26  Survey completed by:	Fax: 31 79 516 431  SE: ental Buildings, Government Buildings Agency.  0952; 2500 E2 Don Hoog; tel: 31 70 356 7890; fax: 31 70 356 7588  Ruud Trines Project-Manager Novem Sittard Swentiboldstraat 21
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman  Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building Yes: Building Standards for Governme (from above) Minn S. Renes; Box 26  Survey completed by: Title:	Fax: 31 79 516 431  Section of the state of
Name: H.L. von Duijze  Iress: Ministry of Housing Box 3001 2700 KA Zosterman  Country: The Netherlands  Tel: 31 79 272 003  Types of supporting information available:  Other energy standards for non-residential building Yes: Building Standards for Governme (from above) Minn S. Renes; Box 20  Survey completed by: Title:	Fax: 31 79 516 431  S: ental Buildings, Government Buildings Agency.  0952; 2500 E2 Don Hoog; tel: 31 70 356 7890; fax: 31 70 356 7588  Ruud Trines Project-Manager Novem Sittard Swentiboldstraat 21 P.O. Box 17, 6130 AA Sittard Country: The Netherland



## **NEW ZEALAND**



2. Proposed or existing	ENERGY standards cover the	ne following building	sectors: Both F	Residential and Non-	Residential
	ntial Building Energy Stand Mandatory			c. Local level:	None
•	rd selected for further desc Building Industry Au for Energy Conservat	thority, Approve			Code of Pract
Year: 1982	Geographic Coverage: _	Nation	Abbreviated Title	e: BIA H1	
RIPTION OF SPECI	FIED ENERGY STANI	DARDS - BLA I	ł1		
	n Question 4 applies to the f				
a. Building types:		b. Building vi	intage:		
O - Offices H - Hotels		Both ne	w and existing		
G - Governme	ent Facilities	c. Other cha			
D - Hospitals		P - Phys	ical size: > 50 sq.	m	
	ial/retail stores	_		······································	
R - Religion-r	elated	_			·
	•				
	· · · · · · · · · · · · · · · · · · ·	I	·		
i. Basic approach of the  The following subjects  a. Whole building end  E- Energy amo	are included in the energy sergy provisions:		b. Building envelope   Roof Wall system Fenestration s		
			Infiltration		
c. Lighting provision	s:		d. Mechanical provisi	ons:	
Power density	·		Load Calculat	ions for equipment siz	ing
			Controls		
			Ventilation		
e. Other provisions:	rgets presently set for				

	Industry Authori	
Research group: Building Res	earch Association	of New Zealand
Decision Process: Mandate	Comment: I	Decree taking into account public comment
	· -	
nformation used in developing the stand	ard:	
a. PHYSICAL CHARACTERISTICS of	existing buildings	b. ENERGY USE of existing buildings:
Gathered through audits and	l surveys	Computer simulations used for estimates
Already available prior to s		Gathered through audits and surveys
c. WEATHER data		d. Other information
	.7	- None
Already available prior to s	standard	
Standards from a different country used	l ac cource material:	
USA: ASHRAE - Handbook of		
UK:	Tundamentais	<del></del>
BS 5422: 1977		
IHVE Guide Books		
UK: CIBS Energy Codes		
COMPUTER programs used:		
. * * *	TEP	b. For complying with the standard: ALF
a in neveroping the standard.	<u> </u>	or to complying that all call and all all all all all all all all all al
a. In developing the standard: SUS		1
a. In developing the standard: 505		
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a. in developing the standard: 505	,	<del></del>
a. in developing the standard: 505	,	
a. In developing the standard: 505  Standard is set at a level: Equal to determine the standard is set at a level.	current practice	
Standard is set at a level: Equal to o		
Standard is set at a level: Equal to considerations influencing the inclusion of E - Cost effectiveness	or exclusion of measu	res in the standard: Comments:
Standard is set at a level: Equal to co	or exclusion of measu	
Standard is set at a level: Equal to considerations influencing the inclusion of E - Cost effectiveness	or exclusion of measu	
Standard is set at a level: Equal to considerations influencing the inclusion of E - Cost effectiveness	or exclusion of measu	
Standard is set at a level: Equal to considerations influencing the inclusion of E - Cost effectiveness	or exclusion of measu	Comments:
Standard is set at a level: Equal to considerations influencing the inclusion of E - Cost effectiveness Similarity/difference to local	or exclusion of measur	Comments:
Standard is set at a level: Equal to of Considerations influencing the inclusion of E - Cost effectiveness Similarity/difference to local content of the con	or exclusion of measured design	Comments:
Standard is set at a level: Equal to of Considerations influencing the inclusion of E - Cost effectiveness Similarity/difference to local content of the con	or exclusion of measured design	Comments:
Standard is set at a level: Equal to considerations influencing the inclusion of E - Cost effectiveness Similarity/difference to local  Standard scheduled for regular review Yes: when BIA has funding, F	or exclusion of measured design	to full technical and committee review

#### 3 NEW ZEALAND

	<b>/ standards:</b> try Authority	
	ible for implementation, its former focus was on bu	ildings, energy, or another area:
Buildings	· · · · · · · · · · · · · · · · · · ·	
•	chitects, engineers and other professionals:	
Other: training expected to be pr	ovided by industry	
Compliance mechanisms used at different	stages in construction process:	
a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
Certification/approval	Certification/approval	Certification/approval
<u> </u>	<u> </u>	
Percent designs checked: 90  Comment:	Percent sites checked: 25 Comment:	Percent buildings checked: 10 Comment:
On a licin.	Small buildings 100%; Large	Territorial authority mu
	buildings about 25%	give a code compliance
d. Other compliance procedures NB: E	Building code is administered by territor	certificate.
e. Effectiveness of combined compliance r	nechanisms (scale of 1-5): 4	
e. Effectiveness of combined compliance r		
e. Effectiveness of combined compliance r	nechanisms (scale of 1-5):4_	
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based	nechanisms (scale of 1-5): 4  standards' impact:	
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:	nechanisms (scale of 1-5): 4  standards' impact:	
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based	nechanisms (scale of 1-5): 4  standards' impact:	
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based Planned	nechanisms (scale of 1-5): 4  standards' impact:	
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based Planned  b. MEASUREMENTS OF ENERGY SAVING Completed: Baird, Brander, Bru	standards' impact: on prototypical (not actual) buildings:  GS in actual buildings complying with standard:	at Victoria University, Wellin
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based Planned  b. MEASUREMENTS OF ENERGY SAVING Completed: Baird, Brander, Bru	nechanisms (scale of 1-5):4_  standards' impact: i on prototypical (not actual) buildings:  GS in actual buildings complying with standard:	at Victoria University, Wellin
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based Planned  b. MEASUREMENTS OF ENERGY SAVING Completed: Baird, Brander, Bru Completed: Other reports on Cl	standards' impact: on prototypical (not actual) buildings: GS in actual buildings complying with standard: thns, Donn, Isaacs, Pool, in Architecture D building energy use in Auckland and	at Victoria University, Wellin
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part e:  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based Planned  b. MEASUREMENTS OF ENERGY SAVING Completed: Baird, Brander, Bru	standards' impact: on prototypical (not actual) buildings: GS in actual buildings complying with standard: thns, Donn, Isaacs, Pool, in Architecture D building energy use in Auckland and	at Victoria University, Wellin
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part explanation for effectiveness for energy a. Energy Saving Completed: Baird, Brander,	standards' impact: on prototypical (not actual) buildings: GS in actual buildings complying with standard: thns, Donn, Isaacs, Pool, in Architecture D building energy use in Auckland and	at Victoria University, Wellin
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part explanation for effectiveness for energy a. Energy Saving Completed: Baird, Brander,	standards' impact: I on prototypical (not actual) buildings:  GS in actual buildings complying with standard: Linns, Donn, Isaacs, Pool, in Architecture BD building energy use in Auckland and ineering economic CALCULATIONS:	at Victoria University, Wellin
e. Effectiveness of combined compliance of f. Explanation for effectiveness in part explanation for effectiv	standards' impact: I on prototypical (not actual) buildings:  GS in actual buildings complying with standard: Linns, Donn, Isaacs, Pool, in Architecture BD building energy use in Auckland and ineering economic CALCULATIONS:	at Victoria University, Wellin

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Thermal properties of materials		
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		· · · · · · · · · · · · · · · · · · ·
other programs or policies developed to increase energy	officionas in buils	, lingo,
		•
Utility initiatives	Comment:	The major electricity generating utility has
	.	developed an "Energy Efficient House" progra that includes management and appliances.
<u>-i-</u>	-	mat netides management and appliances
	- 1	
Additional sources of information about energy efficien	ov for herildings	in. Nov. Zooland
1. Building Research Association of New Z	ealand. ALF	Manual.
	· · · · · · · · · · · · · · · · · · ·	
2. Baird, Donn, Pool, Brander & Chan. "End	ergy Performa	ance of Buildings," CRC Press, Boca Raton,
Florida. 1983. (New Zealand commercia	al buildings)	<u> </u>
3		
Name:		
lress:	and .	
Iress: Standards Association of New Zeala	and	
lress:	and	
Iress: Standards Association of New Zeala Private Bag, Wellington	and ·	
Iress: Standards Association of New Zeala Private Bag, Wellington Country:		
Iress: Standards Association of New Zeala Private Bag, Wellington Country: Tel:		
Standards Association of New Zeala Private Bag, Wellington  Country:  Tel: Fa  Types of supporting information available:	a)C:	
Iress: Standards Association of New Zeala Private Bag, Wellington Country: Tel:	a)C:	
Standards Association of New Zeala Private Bag, Wellington  Country:  Tel: Fa  Types of supporting information available:	a)C:	
Standards Association of New Zeala Private Bag, Wellington  Country:  Tel: Fa  Types of supporting information available:  Building Code Performance, from Hamis	a)C:	
Standards Association of New Zeala Private Bag, Wellington Country:  Tel: Fa Types of supporting information available: Building Code Performance, from Hamis Other energy standards for non-residential buildings:	a)C:	
Standards Association of New Zeala Private Bag, Wellington  Country:  Tel: Fa  Types of supporting information available:  Building Code Performance, from Hamis	a)C:	
Standards Association of New Zeala Private Bag, Wellington Country:  Tel: Fa Types of supporting information available: Building Code Performance, from Hamis Other energy standards for non-residential buildings:	a)C:	
Standards Association of New Zeala Private Bag, Wellington Country:  Tel: Fa Types of supporting information available: Building Code Performance, from Hamis Other energy standards for non-residential buildings:	a)C:	
Standards Association of New Zeala Private Bag, Wellington  Country:  Tel: Fa  Types of supporting information available: Building Code Performance, from Hamis  Other energy standards for non-residential buildings: NZD 4220	sh Handley.	
Standards Association of New Zeala Private Bag, Wellington  Country:  Tel: Fa  Types of supporting information available: Building Code Performance, from Hamis  Other energy standards for non-residential buildings: NZD 4220  Survey completed by:	sh Handley.  Nigel Isaacs	OW.
Standards Association of New Zeala Private Bag, Wellington Country:  Tel: Fa Types of supporting information available: Building Code Performance, from Hamis Other energy standards for non-residential buildings: NZD 4220  Survey completed by: Title: I	sh Handley.  Nigel Isaacs Research Fell	
Standards Association of New Zeala Private Bag, Wellington Country:  Tel: Fa Types of supporting information available: Building Code Performance, from Hamis Other energy standards for non-residential buildings: NZD 4220  Survey completed by: Title:	sh Handley.  Nigel Isaacs Research Fell Centre for Bui	lding Performance Research
Standards Association of New Zeala Private Bag, Wellington Country:  Tel: Fa Types of supporting information available: Building Code Performance, from Hamis Other energy standards for non-residential buildings: NZD 4220  Survey completed by: Title:	sh Handley.  Nigel Isaacs Research Fell Centre for Bui	
Standards Association of New Zeala Private Bag, Wellington  Country:  Tel: Fa  Types of supporting information available: Building Code Performance, from Hamis  Other energy standards for non-residential buildings: NZD 4220  Survey completed by: If Title: If It	Nigel Isaacs Research Fell Centre for Bui School of Arc PO Box 600	lding Performance Research hitecture, Victoria University of Wellingto <b>Country:</b> New Zealan
Standards Association of New Zeala Private Bag, Wellington  Country:  Tel: Fa  Types of supporting information available: Building Code Performance, from Hamis  Other energy standards for non-residential buildings: NZD 4220  Survey completed by: If Title: If It	sh Handley.  Nigel Isaacs Research Fell Centre for Bui	lding Performance Research hitecture, Victoria University of
Standards Association of New Zealar Private Bag, Wellington  Country:  Tel: Fa  Types of supporting information available: Building Code Performance, from Hamis  Other energy standards for non-residential buildings: NZD 4220  Survey completed by: 1 Title: 1	Nigel Isaacs Research Fell Centre for Bui School of Arc PO Box 600	lding Performance Research hitecture, Victoria University of Wellingto <b>Country:</b> New Zealar

FURTHER INFORMATION ON ENERGY CONSERVATION - New Zealand

## 

## NORTHERN IRELAND



	BUILDING ENERGY	<i>-</i>			
1. General building stand	dards exist at the following (	governmental levels:	Nationa	1	
2. Proposed or existing f	ENERGY standards cover t	he following building	sectors: Both	Residential and No	on-Residential
3. Status of Non-Reside	ential Building Energy Stan	dards at the:			
a. National level:	Mandatory	b. Regional level	Mandatory	c. Local le	el: Mandatory
				<del></del>	
4. Single energy standa	rd selected for further des	cription:			
Title, Organization:	Building Regulations and Power, July 1, 19	s (Northern Irelan 1911 Department (	d) 1990 plus ar of the Environn	nendment Part F, Co nent for Northern Ire	nservation of Fu land
<b>Year:</b> 1991	Geographic Coverage:	Nation	Abbreviated T	itle: BR-DENI, 199	1
RIPTION OF SPECIF	FIED ENERGY STAN	DARDS - BR-DI	ENI, 1991		
5. The standard defined in	n Question 4 applies to the	following kinds of bui	ldings:		
a. Building types:		b. Building vi	•		
A - All Buildin	ngs	Both ne	w and existing		
		c. Other cha			
<del></del>		I D Dh:			~
				esidential >30 sq. m	
			ınt of energy: L	ndustrial or storage >	50W/sq. m
			ınt of energy: L		50W/sq. m
			ınt of energy: L	ndustrial or storage >	50W/sq. m
•	are included in the energy	E - Amou	unt of energy: Ii oth	ndustrial or storage > er buildings > 25 W/s	50W/sq. m
7. The following subjects a. Whole building ene	are included in the energy	E - Amou	oth  b. Building envelop	ndustrial or storage > er buildings > 25 W/s	50W/sq. m
7. The following subjects	are included in the energy	E - Amou	oth  oth  b. Building envelop	ndustrial or storage > er buildings > 25 W/s	50W/sq. m
7. The following subjects a. Whole building ene	are included in the energy	E - Amou	oth  b. Building envelop	ndustrial or storage > er buildings > 25 W/s e provisions:	50W/sq. m
7. The following subjects a. Whole building ene	are included in the energy	E - Amou	oth  D. Building envelop  Roof Wall system	ndustrial or storage > er buildings > 25 W/s e provisions:	50W/sq. m
7. The following subjects a. Whole building ene	are included in the energy ergy provisions:	E - Amou	oth  D. Building envelop  Roof Wall system	er buildings > 25 W/s er provisions:	50W/sq. m
7. The following subjects  a. Whole building ene  - None	are included in the energy ergy provisions:	E - Amou	oth  D. Building envelop  Roof  Wall system  Fenestration	er buildings > 25 W/s er provisions:	50W/sq. m
7. The following subjects  a. Whole building ene  - None  c. Lighting provisions	are included in the energy ergy provisions:	E - Amou	oth  b. Building envelop  Roof Wall system Fenestration	er buildings > 25 W/s er provisions:	50W/sq. m
7. The following subjects  a. Whole building ene  - None  c. Lighting provisions	are included in the energy ergy provisions:	E - Amou	oth  b. Building envelop  Roof Wall system Fenestration	er buildings > 25 W/s er provisions:	50W/sq. m
7. The following subjects  a. Whole building ene  - None  c. Lighting provisions	are included in the energy ergy provisions:	E - Amou	oth  b. Building envelop  Roof Wall system Fenestration	er buildings > 25 W/s er provisions:	50W/sq. m
7. The following subjects  a. Whole building ene  - None  c. Lighting provisions	are included in the energy ergy provisions:	E - Amou	oth  b. Building envelop  Roof Wall system Fenestration	er buildings > 25 W/s er provisions:	50W/sq. m

### STANDARDS DEVELOPMENT PROCESS - BR-DENI, 1991

Research group: Building Research Establishme	ment (England and Wales)
	ent
cision Process: Consensus Comment: Pr	ublic consultation on proposals.7
formation used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Gathered through audits and surveys	Gathered through audits and surveys
c. WEATHER data	d. Other information
Already available prior to standard	- None
	-
tandards from a different country used as source material:	
England and	
Wales:	
	<del></del>
	<del></del>
	•
•	
OMPUTER programs used:	
OMPUTER programs used: a. In developing the standard: BREDEM	, b. For complying with the standard: No
• •	b. For complying with the standard: No
a. In developing the standard: BREDEM	b. For complying with the standard: No
a. In developing the standard: BREDEM	b. For complying with the standard: No
a. In developing the standard: BREDEM	b. For complying with the standard: No
a. In developing the standard: BREDEM	b. For complying with the standard: No
a. In developing the standard:  BREDEM  CIBSE Energy Code	b. For complying with the standard: No
a. In developing the standard:  BREDEM  CIBSE Energy Code  standard is set at a level:  Above current practice	
a. In developing the standard:  BREDEM  CIBSE Energy Code	
a. In developing the standard:  BREDEM  CIBSE Energy Code  standard is set at a level:  Above current practice  considerations influencing the inclusion or exclusion of measure	
a. In developing the standard:  BREDEM  CIBSE Energy Code  standard is set at a level:  Above current practice  considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness	es in the standard:
a. In developing the standard:  BREDEM  CIBSE Energy Code  standard is set at a level:  Above current practice  considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  Availability of energy efficient products	es in the standard:
a. In developing the standard:  BREDEM  CIBSE Energy Code  standard is set at a level:  Above current practice  considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design	es in the standard: Comments:
a. In developing the standard:  BREDEM  CIBSE Energy Code  ctandard is set at a level:  Above current practice  considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Cost effectiveness	es in the standard: Comments:
a. In developing the standard:  BREDEM  CIBSE Energy Code  tandard is set at a level:  Above current practice  considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design	es in the standard: Comments:
tandard is set at a level: Above current practice  E - Cost effectiveness  Availability of energy efficient products Similarity/difference to local design Cost effectiveness Other:  Standard scheduled for regular review and revision?	es in the standard:  Comments:
a. In developing the standard:  BREDEM  CIBSE Energy Code  standard is set at a level:  Above current practice  considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Cost effectiveness  Other:  Standard scheduled for regular review and revision?  Yes: BRE research leads to proposals=>public	es in the standard: Comments:
a. In developing the standard:    BREDEM     CIBSE Energy Code	es in the standard:  Comments:

Environment (NI)	
or implementation, its former focus was on b	ouildings, energy, or another area:
· ·	
npliance procedure	
es in construction process:	
b. DURING construction:	c. AFTER construction:
Certification/approval	Certification/approval
Percent sites checked: 75	Percent buildings checked: 9
Comment:	Comment:
Most buildings checked atsome stage; many checkedfrequently.	Objective is inspection of every building on comple
ns for every building are checked / a istruction inspections and final inspe	pproved. Everyone [15] aware of ctions. Plus powers to force
•	
<u> </u>	· · · · · · · · · · · · · · · · · · ·
ing economic CALCULATIONS:	
AL COSTS:	
	Certification/approval Percent sites checked: 75 Comment:  Most buildings checked at some stage; many checked frequently.  manisms (scale of 1-5): 5 mas for every building are checked/anstruction inspections and final inspeddards' impact: prototypical (not actual) buildings:  mactual buildings complying with standard: mactual buildings complying with standard:

### FURTHER INFORMATION ON ENERGY CONSERVATION - Northern Ireland

Insulation Thermal properties of materials	
Thermal properties of materials	
Other programs or policies developed to increase energ	y efficiency in buildings:
Information programs	Comment: Energy awareness campaigns- Department of
	Economic Development, Energy Efficiency
	Service
	<b>- I</b>
Additional sources of information about energy efficient	ency for buildings in: Northern Ireland
: · · · · · · · · · · · · · · · · · · ·	ved Document L
2. BREDEM- Domestic Energy Model	
3. CIBSE Building Energy Code, Part 2.	
Contact for written copy of energy standard specified in	n Question 4:
Name:	n Question 4:
Name: idress: HMSO Bookshop	n Question 4:
Name:  Idress: HMSO Bookshop 80 Chichester St.	n Question 4:
Name: idress: HMSO Bookshop	n Question 4:
Name:  Idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY	n Question 4:
Name:  Idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY Country: Northern Ireland	n Question 4:
Name:  Idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY Country: Northern Ireland	
Name:  Idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY Country: Northern Ireland  Tel: 44-323-238451 Types of supporting information available:	
Name:  Idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY Country: Northern Ireland  Tel: 44-323-238451 Types of supporting information available:	Fac
Name:  idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY  Country: Northern Ireland  Tel: 44-323-238451  Types of supporting information available: Buillding Amendment regulations (N.I.)	Fax: ) 1991, Technical Booklet F, Conservation of Fuel and Power.
Name:  Idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY Country: Northern Ireland  Tel: 44-323-238451 Types of supporting information available:	Fax: ) 1991, Technical Booklet F, Conservation of Fuel and Power.
Name:  idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY  Country: Northern Ireland  Tel: 44-323-238451  Types of supporting information available: Buillding Amendment regulations (N.I.)	Fax: ) 1991, Technical Booklet F, Conservation of Fuel and Power.
Name:  idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY  Country: Northern Ireland  Tel: 44-323-238451  Types of supporting information available: Buillding Amendment regulations (N.I.)	Fax: ) 1991, Technical Booklet F, Conservation of Fuel and Power.
Name:  idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY  Country: Northern Ireland  Tel: 44-323-238451  Types of supporting information available: Buillding Amendment regulations (N.I.)  Other energy standards for non-residential buildings	Fax: ) 1991, Technical Booklet F, Conservation of Fuel and Power.
Name:  idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY Country: Northern Ireland  Tel: 44-323-238451  Types of supporting information available: Buillding Amendment regulations (N.I.)  Other energy standards for non-residential buildings  Survey completed by:	Fax:  1991, Technical Booklet F, Conservation of Fuel and Power.  David L Stewart
Name:  idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY  Country: Northern Ireland  Tel: 44-323-238451  Types of supporting information available: Buillding Amendment regulations (N.I.)  Other energy standards for non-residential buildings	Fax:  1991, Technical Booklet F, Conservation of Fuel and Power.  David L. Stewart Principal Architect
Name:  idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY Country: Northern Ireland  Tel: 44-323-238451  Types of supporting information available: Buillding Amendment regulations (N.I.)  Other energy standards for non-residential buildings  Survey completed by:	Fax:  1991, Technical Booklet F, Conservation of Fuel and Power.  David L. Stewart Principal Architect Department of the Environment for Northern Ireland Cawood House, 24/26 Arthur St.
Name:  idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY Country: Northern Ireland  Tel: 44-323-238451  Types of supporting information available: Buillding Amendment regulations (N.I.)  Other energy standards for non-residential buildings  Survey completed by:	Fax:  1991, Technical Booklet F, Conservation of Fuel and Power.  David L. Stewart Principal Architect Department of the Environment for Northern Ireland Cawood House, 24/26 Arthur St. Belfast, BT 1 4 GP Country: Northern Irela
Name:  idress: HMSO Bookshop 80 Chichester St. Belfast, BTI 4JY Country: Northern Ireland  Tel: 44-323-238451  Types of supporting information available: Buillding Amendment regulations (N.I.)  Other energy standards for non-residential buildings  Survey completed by:	Fax:  1991, Technical Booklet F, Conservation of Fuel and Power.  David L. Stewart Principal Architect Department of the Environment for Northern Ireland Cawood House, 24/26 Arthur St.



# **NORWAY**



	ENERGY standards cover to	he following buildin	g sectors: Both	Residential and Non-	Residential
3. Status of Non-Reside a. National level:	ntial Building Energy Stan Mandatory	dards at the: b. Regional leve	al: None	c. Local level:	- None
I. Single energy standa	rd selected for further des	cription:			
Title, Organization:	"Thermal Insulation Regulations)	and Air Impervi	iousness" (Chapt	er 53 of the Norwegian	Building
Year: 1987	Geographic Coverage:	Nation	Abbreviated Ti	tle: NBR-53-87	
RIPTION OF SPECI	FIED ENERGY STAN	DARDS - NBR	-53-87		
. The standard defined in	Question 4 applies to the		-		
a. Building types:		b. Building	•		
A - All Buildi	ngs	Both n	ew and existing		
			aracteristics:		÷
		- None			
		_			
				· · · · · · · · · · · · · · · · · · ·	
					J
. Basic approach of the	standard: Both preso	criptive and perf	formance_		
The following subjects	are included in the energy	standard:			
a. Whole building end			b. Building envelope	provisions:	
- None			Roof	•	
- 14016			Wall system		
			Fenestration	system	
			Infiltration		
	S:		d. Mechanical provis	sions:	
c. Lighting provisions			Air/Water d	istribution efficiency	
c. Lighting provision: - None					

### IMPLEMENTATION AND COMPLIANCE - NBR-53-87 16. Entities involved in IMPLEMENTING energy standards: Existing agency: National Office of Building Technology and Administration If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: Other: general building codes 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Certification/approval Certification/approval Percent designs checked: 100 Percent sites checked: ? Percent buildings checked: ? Comment: Comment: Comment: All designs are checked at Uncertain whether onsite local level. But the quality of inspections are undertaken. the check is not 100%. The d. Other compliance procedures - None e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3 f. Explanation for effectiveness in part e: Problems with personnel qualifications. As mentioned above, system is under revision. 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: Noregian consulting firm Energidata a/s has conducted several surveys of energy savings b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Completed: Surveys have been undertaken by the research institution NBI. c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Completed: Ref. Energidata a/s d. COST EFFECTIVENESS based on ACTUAL COSTS: Completed: Ref. NBI and Energidata a/s e. Other Assessments: \_- None

Unsure	
	•
. Other programs or policies developed to increase	e energy efficiency in buildings:
Information programs	Comment: Focus on increasing efficiency in existing
Rebates	buildings.
Additional assumes of information about anormal	ny affinianay fay hyildinga in. Nartyay
Additional sources of information about energy	
1. The Ministry of Petroleum and En	nergy. "Energy Economizing and Energy Research," Report No. 61 to
3	
. Contact for written copy of energy standard spe	ecified in Question 4:
Name:	ecified in Question 4:
Name: Address:	ecified in Question 4:
Name:	ecified in Question 4:
Name: Address:	ecified in Question 4:
Name: Address:	ecified in Question 4:
Name: Address:	ecified in Question 4:
Name: Address: Country:	
Name: Address: Country: Tel:	
Name: Address: Country: Tel:	
Name: Address: Country:  Tel: Types of supporting information available:	Fax:
Name: Address: Country: Tel:	Fax:
Name: Address: Country:  Tel: Types of supporting information available:	Fax:
Name: Address: Country:  Tel: Types of supporting information available:	Fax:
Name: Address: Country:  Tel: Types of supporting information available:	Fax:
Name: Address: Country:  Tel: Types of supporting information available:	Fax:
Name: Address: Country:  Tel: Types of supporting information available:  Other energy standards for non-residential bu	Fax:  uildings:  1 by: ?  itle: Ministry of Petroleum and Energy
Name: Address: Country:  Tel: Types of supporting information available:  Other energy standards for non-residential bu	Fax:  Liby: ?  itle: Ministry of Petroleum and Energy P.O. Box 8148 Dep.
Name: Address: Country:  Tel: Types of supporting information available:  Other energy standards for non-residential bu	Fax:  Liby: ?  itle: Ministry of Petroleum and Energy P.O. Box 8148 Dep. Riso National Library, P.O. Box 49
Name: Address: Country:  Tel: Types of supporting information available:  Other energy standards for non-residential bu  Survey completed Ti	Fax:  Liby: ?  itle: Ministry of Petroleum and Energy P.O. Box 8148 Dep. Riso National Library, P.O. Box 49



# **PAKISTAN**



	dards exist at the following g	overnmental levels:	National	Regional	Local
2. Proposed or existing	ENERGY standards cover the	ne following buildin	g sectors: Both R	esidential and Non-	-Residential
	ential Building Energy Stand Voluntary		d: - None	c. Local level:	- None
	ard selected for further desc Building Energy Code	-	NERCON, Environ	nment and Urban Af	fairs Division
Year: 1990	Geographic Coverage:	Nation	Abbreviated Title	BEC, 1990	
RIPTION OF SPECI	FIED ENERGY STAND	DARDS - BEC,	1990		
	n Question 4 applies to the fo				*
a. Building types:	адобает тарриос то што т	b. Building v	•		
O - Offices			uildings		
	Hospitals/ Schools	_			
G - Governme		c. Other cha	aracteristics:		. •
	mily residential	Other: I	ermanent buildin	gs/human habitation	n
F - Restaurant				,	
	ial/retail stores	— I ——			
		<del></del>			
7. The following subjects	Both prescue are included in the energy s				
7. The following subjects a. Whole building end	are included in the energy sergy provisions:		b. Building envelope p	rovisions:	
7. The following subjects	are included in the energy sergy provisions:		b. Building envelope p	rovisions:	
7. The following subjects a. Whole building end	are included in the energy sergy provisions:		b. Building envelope por Roof Wall system		
7. The following subjects a. Whole building end	are included in the energy sergy provisions:		b. Building envelope p  Roof Wall system Fenestration sy		
7. The following subjects a. Whole building end	are included in the energy sergy provisions:		b. Building envelope por Roof Wall system		
7. The following subjects a. Whole building end	s are included in the energy s ergy provisions: ount target		b. Building envelope p  Roof Wall system Fenestration sy	stem	
c. Lighting provision	s are included in the energy s ergy provisions: ount target ss:		b. Building envelope por Roof Wall system Fenestration sy Infiltration  d. Mechanical provision	stem	
7. The following subjects a. Whole building end E- Energy amo	s are included in the energy s ergy provisions: ount target ss:		b. Building envelope por Roof Wall system Fenestration sy Infiltration  d. Mechanical provision Air/Water dis	stem	zing
c. Lighting provision	s are included in the energy s ergy provisions: ount target ss:		b. Building envelope por Roof Wall system Fenestration sy Infiltration  d. Mechanical provision Air/Water dis	stem  ns: tribution efficiency	zing
c. Lighting provision	s are included in the energy s ergy provisions: ount target ss:		b. Building envelope p  Roof Wall system Fenestration sy Infiltration  d. Mechanical provisio Air/Water dis Load Calculation	stem  ns: tribution efficiency	zing
c. Lighting provision	s are included in the energy s ergy provisions: ount target ss:		b. Building envelope por Roof Wall system Fenestration sy Infiltration  d. Mechanical provision Air/Water dis Load Calculation Controls	stem  ns: tribution efficiency ons for equipment size	zing
c. Lighting provision Control requir	s are included in the energy sergy provisions: count target  ss: cements ghting		b. Building envelope por Roof Wall system Fenestration sy Infiltration  d. Mechanical provision Air/Water dis Load Calculation Controls Ventilation	stem  ns: tribution efficiency ons for equipment size	zing
c. Lighting provision	s are included in the energy s ergy provisions: ount target  s: rements ghting		b. Building envelope por Roof Wall system Fenestration sy Infiltration  d. Mechanical provision Air/Water dis Load Calculation Controls Ventilation	stem  ns: tribution efficiency ons for equipment size	zing

	fairs Division	
Government agency: Pakistan Public Works Dep	ur tirett	
Decision Process: Consensus Comment:		
	<del></del>	
Information used in developing the standard:	1	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing building	
Estimated using professional judgment	Computer simulations used	for estimates
		-
		<del></del>
c. WEATHER data	d. Other information	
Already available prior to standard	- None	· · · <u> · · · · · · · · · · · · · · ·</u>
rincual available prior to standard		
	-	
Standards from a different country used as source material:		
US: California Title 24,	·	
US: ASHRAE		
	<del> </del>	
COMPUTER programs used:		
	, b. For complying with the standard:	Uncertain
COMPUTER programs used:	b. For complying with the standard:	Uncertain
COMPUTER programs used:	b. For complying with the standard:	Uncertain
COMPUTER programs used:  a. In developing the standard: - None	b. For complying with the standard:	Uncertain
COMPUTER programs used:  a. In developing the standard: - None	b. For complying with the standard:	Uncertain
COMPUTER programs used:  a. In developing the standard:  - None	b. For complying with the standard:	Uncertain
COMPUTER programs used:  a. In developing the standard: - None	b. For complying with the standard:	Uncertain
COMPUTER programs used:  a. In developing the standard:  - None  Standard is set at a level:  Above current practice		Uncertain
computer programs used:  a. In developing the standard:  - None  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures	s in the standard:	Uncertain
computer programs used:  a. In developing the standard:  - None  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness	s in the standard: Comments:	
computer programs used:  a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products	s in the standard:  Comments:  The basic aim was to produ	ce a code which can b
COMPUTER programs used:  a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design	s in the standard: Comments:	ce a code which can l tise, materials, and
computer programs used:  a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products	s in the standard:  Comments:  The basic aim was to producompiled using local exper	ce a code which can l tise, materials, and
COMPUTER programs used:  a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design	s in the standard:  Comments:  The basic aim was to producompiled using local exper	ce a code which can l tise, materials, and
computer programs used:  a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Comfort	s in the standard:  Comments:  The basic aim was to producompiled using local exper	ce a code which can l tise, materials, and
COMPUTER programs used:  a. In developing the standard:None	s in the standard:  Comments:  The basic aim was to producompiled using local expertechnology.	ce a code which can b tise, materials, and
computer programs used:  a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Comfort	s in the standard:  Comments:  The basic aim was to producompiled using local expertechnology.	ce a code which can b tise, materials, and

Entities involved in IMPLEMENTING ene	rgy standards:	
Existing agency: ENERCON		
• • • • • •	nsible for implementation, its former focus was	on buildings, energy, or another area:
Other: energy efficiency		
TRAINING & EDUCATION provided for	architects, engineers and other professionals	· ·
Written guidelines to assist w	ith compliance procedure	
Example calculations		
Compliance forms		
Seminars, workshops, or confe	rences	
Compliance mechanisms used at differe	nt stages in construction process:	
a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
No mechanism	No mechanism	No mechanism
Percent designs checked:	Percent sites checked: -	Percent buildings checked:
Comment:	Comment:	Comment
O THINK	-	
d. Other compliance procedures - N		
e. Effectiveness of combined compliance	ce mechanisms (scale of 1-5):	
e. Effectiveness of combined compliance		
e. Effectiveness of combined compliand	ce mechanisms (scale of 1-5):	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of energy	ce mechanisms (scale of 1-5): e: gy standards' impact:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL bases	ce mechanisms (scale of 1-5):	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of energy	ce mechanisms (scale of 1-5): e: gy standards' impact:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL bases	ce mechanisms (scale of 1-5): e: gy standards' impact:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of energia. ENERGY SAVINGS POTENTIAL base Completed	e: gy standards' impact: sed on prototypical (not actual) buildings:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of energia. ENERGY SAVINGS POTENTIAL base Completed	ce mechanisms (scale of 1-5): e: gy standards' impact:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of ener a. ENERGY SAVINGS POTENTIAL base Completed b. MEASUREMENTS OF ENERGY SAV	e: gy standards' impact: sed on prototypical (not actual) buildings:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of ener a. ENERGY SAVINGS POTENTIAL base Completed b. MEASUREMENTS OF ENERGY SAV	e: gy standards' impact: sed on prototypical (not actual) buildings:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of ener a. ENERGY SAVINGS POTENTIAL base Completed  b. MEASUREMENTS OF ENERGY SAV Planned	ce mechanisms (scale of 1-5): e: gy standards' impact: sed on prototypical (not actual) buildings:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of ener a. ENERGY SAVINGS POTENTIAL base Completed  b. MEASUREMENTS OF ENERGY SAV Planned  c. COST EFFECTIVENESS based on e	ee mechanisms (scale of 1-5): e: gy standards' impact: sed on prototypical (not actual) buildings: INGS in actual buildings complying with stand	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of ener a. ENERGY SAVINGS POTENTIAL base Completed  b. MEASUREMENTS OF ENERGY SAV Planned  c. COST EFFECTIVENESS based on e	ce mechanisms (scale of 1-5): e: gy standards' impact: sed on prototypical (not actual) buildings:	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of ener a. ENERGY SAVINGS POTENTIAL base Completed  b. MEASUREMENTS OF ENERGY SAV Planned  c. COST EFFECTIVENESS based on e In progress	e: gy standards' impact: sed on prototypical (not actual) buildings:  INGS in actual buildings complying with stand	
e. Effectiveness of combined compliance f. Explanation for effectiveness in part Types of assessments or audits of ener a. ENERGY SAVINGS POTENTIAL base Completed  b. MEASUREMENTS OF ENERGY SAV Planned  c. COST EFFECTIVENESS based on e	e: gy standards' impact: sed on prototypical (not actual) buildings:  INGS in actual buildings complying with stand	
e. Effectiveness of combined compliance  f. Explanation for effectiveness in part  Types of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL base Completed  b. MEASUREMENTS OF ENERGY SAVE Planned  c. COST EFFECTIVENESS based on each progress	e: gy standards' impact: sed on prototypical (not actual) buildings:  INGS in actual buildings complying with stand	

HEH INFUR	RMATION ON ENERGY CONSERV	/AIIUN - Pakistan
20. Efficiency 1	testing facilities and procedures established	xd:
Motors		
Ballas	<del></del>	
Fixture	25	
21 Other nma	rams or policies developed to increase energ	rmy afficiency in huildings:
	·	
	(free or subsidized)	Comment: Described in "Building Sector Energy Conservation Programme of Pakistan," Energy
	ation programs ng energy standards	and Buildings, 15-16 (1990/91):533-535.
bullali	ig energy standards	
Addition	al sources of information about energy effici	ciency for buildings in: Pakistan
1 Jan	ny Gul Najam 1990 "The Evolutio	on and Future Direction of a Comprehensive Building Energy
		n." 2nd Intl Energy Conservation Symposium, Karachi-Pakistan
	•	
	shad, M.K. et al. 1990. "The Buildin nservation Symposium, KarachiP	ng Energy Code of Pakistan," presented at 2nd Intl Energy Pakistan.
	• •	
		lasud. 1990. "Building Energy Simulation: Computer Modelling
Bu	ildings in Pakistan," presented at 2r	and Intl Energy Conservation Symposium, Karachi-Pakistan.
2. Contact for	written copy of energy standard specified	l in Question 4:
	·	
Name:	Gul Najam Jamy	
Address:	Deputy Chief (Buildings)	
	ENERCON, Buland Markaz	
	33-Blue Area	
	Islamabad	
Country:	Pakistan	
		Fax: 92 826212
Tel:	92 813003/813009	Fax: 92 826212
Types of	supporting information available:	
Co	de compliance handbook, available	e from FNFRCON
200		
Other er	nergy standards for non-residential building	ne:
		jo.
<u>-N</u>	one	
		· ·
	_	· ·
	Survey completed by:	Gul Najam Jamy
	Title:	Deputy Chief (Buildings)
		ENERCON
		Buland Markaz, 33, Blue Area
		Islamabad Country: Pakistan
	Tel:	92 813003 <b>Fax:</b> 92 826212
	Date completed:	3/8/92



### **PHILIPPINES**



Dropond as aviation !	ENEDCV etapolarda aaree 4	na fallangina, kwildina	contare: At D 11 11 01
Proposed or existing I	ENERGY standards cover to	ie ioliowing bullding	sectors: Non-Residential Only
Status of Non-Reside	ntial Building Energy Stand	dards at the:	
a. National level:	Voluntary	<ul><li>b. Regional level:</li></ul>	c. Local level:
	Proposed		
Single energy standa	rd selected for further des	cription:	
			rds, Office of Energy Affairs
riae, Organización.	Proposed building E	nergy Use Standa	us, Office of Thereby Atlans
Year: 198?	Geographic Coverage:	Nation	Abbreviated Title: BEUS-OEA
PTION OF SPECI	FIED ENERGY STANI	DARDS - BEUS	OEA
The standard defined in	n Question 4 applies to the 1	ollowing kinds of buil	dings:
a. Building types:	,,	b. Building vir	-
O - Offices		T	v and existing
H - Hotels			
G - Governme	ent Facilities	c. Other char	
C - Commerci	al/retail stores	E - Amou	nt of energy: Energy usage of more than 10W/sq.
D - Hospitals,	/ schools		
F - Restaurant		_	
	<u></u> -		
	estandard: Both preso	riptive and perfo	
Basic approach of the		arperte area perre	rmance
			rmance
The following subjects	are included in the energy	standard:	·
	are included in the energy	standard:	. Building envelope provisions:
The following subjects  a. Whole building end	are included in the energy sergy provisions:	standard:	·
The following subjects	are included in the energy sergy provisions:	standard:	Building envelope provisions:  Roof
The following subjects  a. Whole building end	are included in the energy sergy provisions:	standard:	Roof Wall system
The following subjects  a. Whole building end	are included in the energy sergy provisions:	standard:	Building envelope provisions:  Roof
The following subjects  a. Whole building end	are included in the energy sergy provisions:	standard:	Roof Wall system Fenestration system
The following subjects  a. Whole building end P- Peak electr	are included in the energy sergy provisions: icity demand	standard:	Roof Wall system Fenestration system Infiltration
The following subjects  a. Whole building end P- Peak electr  C. Lighting provision:	are included in the energy sergy provisions: icity demand	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions:
The following subjects  a. Whole building end P- Peak electr  c. Lighting provision  Control requir	are included in the energy sergy provisions: icity demand s:	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions: Air/Water distribution efficiency
The following subjects  a. Whole building end P- Peak electr  c. Lighting provision  Control requir  Power density	are included in the energy sergy provisions: icity demand s: ements	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions: Air/Water distribution efficiency Load Calculations for equipment sizing
The following subjects  a. Whole building end P- Peak electr  c. Lighting provision  Control requir	are included in the energy sergy provisions: icity demand s: ements	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions: Air/Water distribution efficiency Load Calculations for equipment sizing Controls
The following subjects  a. Whole building end P- Peak electr  c. Lighting provision  Control requir  Power density	are included in the energy sergy provisions: icity demand s: ements	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions: Air/Water distribution efficiency Load Calculations for equipment sizing Controls Ventilation
The following subjects  a. Whole building end P- Peak electr  c. Lighting provision  Control requir  Power density	are included in the energy sergy provisions: icity demand s: ements	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions: Air/Water distribution efficiency Load Calculations for equipment sizing Controls
The following subjects  a. Whole building end P- Peak electr  c. Lighting provision  Control requir  Power density	are included in the energy sergy provisions: icity demand s: ements equirements	standard:	Roof Wall system Fenestration system Infiltration  Mechanical provisions: Air/Water distribution efficiency Load Calculations for equipment sizing Controls Ventilation

# STANDARDS DEVELOPMENT PROCESS - BEUS-OEA 8. Organizations involved in developing the standard: Government agency: Office of Energy Affairs; Philippine Council for Industry and Energy Research and Academic institution: University of Philippines Foreign development agency: U.S. Agency for International Development; Lawrence Berkeley Laboratory Other: technical Committee composed of building experts and practitioners 9. Decision Process: Consensus Comment: 10. Information used in developing the standard: a. PHYSICAL CHARACTERISTICS of existing buildings b. ENERGY USE of existing buildings: Gathered through audits and surveys Gathered through audits and surveys c. WEATHER data d. Other information - None Gathered through measurements 11. Standards from a different country used as source material: 12. 13. 14. C

Thailand:		<u> </u>	
		<del></del>	
· · · · · · · · · · · · · · · · · · ·			
		•	
2. COMPUTER programs used:	•		
a. In developing the standard:	DOE-2	, b. For complying with the standard:	No
	ASEAM		
		_	
8. Standard is set at a level: Equ	ual to current practice		
<ul> <li>Considerations influencing the inc</li> <li>E - Cost effectiveness</li> </ul>	lusion or exclusion of measu	res in the standard: Comments:	
Availability of energy	efficient products		
Similarity/difference to	o local design		
Comfort			
·			•
5a. Standard scheduled for regular	review and revision?		
Yes	· · · · · · · · · · · · · · · · · · ·		
h Door revision include proced	uras to MONITOR and EVAL	.UATE earlier versions of the standard?	
Yes			
.165			
	C - 9	91	

	ergy standards:	
Existing agency: Department	of Public Works & Highways	
If an existing agency was made resp	consible for implementation, its former focus was	on buildings, energy, or another area:
Other: public works		
	r architects, engineers and other professionals:	
NT	a monnecos, enginecio and outer processionals.	
· · · · · · · · · · · · · · · · · · ·		
8. Compliance mechanisms used at differ		•
a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
Uncertain	Uncertain	Uncertain
Percent designs checked:	Percent sites checked:	Percent buildings checked:
Comment:	Comment:	Comment:
· · · · · · · · · · · · · · · · · · ·		
d. Other compliance procedures - N	None	
d. Other compliance procedures		
d. Other compliance procedures  e. Effectiveness of combined compliance		
e. Effectiveness of combined complian	nce mechanisms (scale of 1-5):  rt e: Compliance mechanisms are still be	eing developed. Currently, the
e. Effectiveness of combined compliant	nce mechanisms (scale of 1-5): rt e: Compliance mechanisms are still be standardsa re subject to final appro	eing developed. Currently, the
e. Effectiveness of combined compliant f. Explanation for effectiveness in page 9. Types of assessments or audits of energy	rt e: Compliance mechanisms are still be standardsa re subject to final appro	eing developed. Currently, the
e. Effectiveness of combined complian f. Explanation for effectiveness in pa  9. Types of assessments or audits of ene a. ENERGY SAVINGS POTENTIAL ba	nce mechanisms (scale of 1-5): rt e: Compliance mechanisms are still be standardsa re subject to final appro	eing developed. Currently, the
e. Effectiveness of combined compliant f. Explanation for effectiveness in page 9. Types of assessments or audits of energy	rt e: Compliance mechanisms are still be standardsa re subject to final appro	eing developed. Currently, the
e. Effectiveness of combined compliant f. Explanation for effectiveness in pa  9. Types of assessments or audits of eneral energy SAVINGS POTENTIAL by None conducted	rt e: Compliance mechanisms are still be standardsa re subject to final approgray standards' impact: ased on prototypical (not actual) buildings:	eing developed. Currently, the oval as a referral code of the Nation
e. Effectiveness of combined compliant f. Explanation for effectiveness in page 9. Types of assessments or audits of energy SAVINGS POTENTIAL bandone conducted  b. MEASUREMENTS OF ENERGY SA	rt e: Compliance mechanisms are still be standardsa re subject to final appro	eing developed. Currently, the oval as a referral code of the Nation
e. Effectiveness of combined compliant f. Explanation for effectiveness in pa  9. Types of assessments or audits of eneral energy SAVINGS POTENTIAL by None conducted	rt e: Compliance mechanisms are still be standardsa re subject to final approgray standards' impact: ased on prototypical (not actual) buildings:	eing developed. Currently, the oval as a referral code of the Nation
e. Effectiveness of combined compliant f. Explanation for effectiveness in page 9. Types of assessments or audits of energy SAVINGS POTENTIAL bandone conducted  b. MEASUREMENTS OF ENERGY SA	rt e: Compliance mechanisms are still be standardsa re subject to final approgray standards' impact: ased on prototypical (not actual) buildings:	eing developed. Currently, the oval as a referral code of the Nation
e. Effectiveness of combined compliant f. Explanation for effectiveness in page 9. Types of assessments or audits of energy savings potential be None conducted  b. MEASUREMENTS OF ENERGY SANone conducted	rt e: Compliance mechanisms are still be standardsa re subject to final approgray standards' impact: ased on prototypical (not actual) buildings:	eing developed. Currently, the oval as a referral code of the Nation
e. Effectiveness of combined compliant f. Explanation for effectiveness in page 9. Types of assessments or audits of energy savings potential be None conducted  b. MEASUREMENTS OF ENERGY SANone conducted	rt e: Compliance mechanisms are still be standards are subject to final approragy standards impact: ased on prototypical (not actual) buildings:	eing developed. Currently, the oval as a referral code of the Nation
e. Effectiveness of combined compliant f. Explanation for effectiveness in page 9. Types of assessments or audits of energy savings potential be None conducted  b. MEASUREMENTS OF ENERGY SANONE conducted  c. COST EFFECTIVENESS based on	rt e: Compliance mechanisms are still be standards are subject to final approragy standards impact: ased on prototypical (not actual) buildings:	eing developed. Currently, the oval as a referral code of the Nation
e. Effectiveness of combined compliant f. Explanation for effectiveness in page 9. Types of assessments or audits of energy savings potential be None conducted  b. MEASUREMENTS OF ENERGY SANONE conducted  c. COST EFFECTIVENESS based on	rt e: Compliance mechanisms are still be standardsa re subject to final approrry standards' impact: ased on prototypical (not actual) buildings:  VINGS in actual buildings complying with stand engineering economic CALCULATIONS:	eing developed. Currently, the oval as a referral code of the Nation

Air conditioners/chillers/other appliances Ballasts Fixtures Other: fuels  Cher: fuels  Comment: Other programs or policies developed to increase energy efficiency in buildings: Information programs Addit (free or subsidized) Rebates  Additional sources of information about energy efficiency for buildings in: Additional sources of information about energy efficiency for buildings in: Phillippines: National Engineerin Center  Additional sources of information about energy efficiency for buildings in: Phillippines  1				
Comment: Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Country: Philippines  Tel: 63 2 877 633 Types of supporting information available:  Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merrit Road, Fort Bonifacio Makati, Metro Manila Country: Philippines  Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Country: Philippines  Fig. 63 2 877 633 Types of supporting information available:  Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merrit Road, Fort Bonifacio Makati, Metro Manila Country: The Philippin Tel: 63 2 877 633 Fac: 63 2 817-8603			ces	
Other: fuels  21. Other programs or policies developed to increase energy efficiency in buildings:  Information programs Audits (free or subsidized) Rebates  Additional sources of information about energy efficiency for buildings in: Philippines: National Engineerin Center  Additional sources of information about energy efficiency for buildings in: Philippines: National Engineerin Center  2.  3.  22. Contact for written copy of energy standard specified in Question 4:  Name: Charisse B. Tablante  Address: Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila  Country: Philippines  Tel: 63 2 877 633 Fac: 63 2 877 633  Types of supporting information available:  Other energy standards for non-residential buildings: None  Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila  Country: The Philippin  Tel: 63 2-877-633 Fac: 63-2-817-8603				
21. Other programs or policies developed to increase energy efficiency in buildings:  Information programs Audits (free or subsidized) Rebates  Additional sources of information about energy efficiency for buildings in:  Additional sources of information about energy efficiency for buildings in:  Philippines  1				
Comment   Audits (free or subsidized)   Rebates   Comment   Comm	Other.	Idelo		
Comment   Audits (free or subsidized)   Rebates   Comment   Comm				
Comment   Audits (free or subsidized)   Rebates   Comment   Comm				· · · · · · · · · · · · · · · · · · ·
Comment   Audits (free or subsidized)   Rebates   Comment   Comm				
Audits (free or subsidized) Rebates  Industry and Energy Research and Developmen University of Philippines; National Engineerin Center  Additional sources of information about energy efficiency for buildings in: Philippines  1	1. Other progr	rams or policies developed to increase en	ergy efficiency in build	dings:
Audits (free or subsidized)  Rebates  Industry and Energy Research and Developmen University of Philippines; National Engineerin Center  Additional sources of information about energy efficiency for buildings in: Philippines  1	Informa	ation programs	Comment:	
Additional sources of information about energy efficiency for buildings in: Philippines  1	Audits	(free or subsidized)		Industry and Energy Research and Developmen
Additional sources of information about energy efficiency for buildings in: Philippines  1	Rebate	s		
Additional sources of information about energy efficiency for buildings in: Philippines  1				Center
2			•	
2. Contact for written copy of energy standard specified in Question 4:  Name: Charisse B. Tablante  Address: Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila  Country: Philippines  Tel: 63 2 877 633 Fax: 63 2 877 633  Types of supporting information available:	Addition	al sources of information about energy eff	iciency for buildings	in: Philippines
2. Contact for written copy of energy standard specified in Question 4:  Name: Charisse B. Tablante  Address: Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila  Country: Philippines  Tel: 63 2 877 633 Fax: 63 2 877 633  Types of supporting information available:	1 -			
2. Contact for written copy of energy standard specified in Question 4:  Name: Charisse B. Tablante  Address: Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila  Country: Philippines  Tel: 63 2 877 633 Fax: 63 2 877 633  Types of supporting information available:	••			
2. Contact for written copy of energy standard specified in Question 4:  Name: Charisse B. Tablante  Address: Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila  Country: Philippines  Tel: 63 2 877 633 Fax: 63 2 877 633  Types of supporting information available:	•			
2. Contact for written copy of energy standard specified in Question 4:  Name: Charisse B. Tablante  Address: Office of Energy Affairs				
2. Contact for written copy of energy standard specified in Question 4:  Name: Charisse B. Tablante  Address: Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila  Country: Philippines  Tel: 63 2 877 633 Fax: 63 2 877 633  Types of supporting information available:  Other energy standards for non-residential buildings: None  Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila Country: The Philippin  Tel: 63-2-877-633 Fax: 63-2-817-8603	•			
Name: Charisse B. Tablante  Address: Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila  Country: Philippines  Tel: 63 2 877 633 Fax: 63 2 877 633  Types of supporting information available:  Other energy standards for non-residential buildings: None  Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila Country: The Philippin  Tel: 63-2-877-633 Fax: 63-2-817-8603	3			
Name: Charisse B. Tablante  Address: Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila  Country: Philippines  Tel: 63 2 877 633 Fax: 63 2 877 633  Types of supporting information available:  Other energy standards for non-residential buildings: None  Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila Country: The Philippin  Tel: 63-2-877-633 Fax: 63-2-817-8603				
Makati, Metro Manila  Country: Philippines  Tel: 63 2 877 633  Types of supporting information available:	2. Contact for		d in Question 4:	
Types of supporting information available:	Name:	Charisse B. Tablante Office of Energy Affairs	d in Question 4:	· ,
Other energy standards for non-residential buildings:  None  Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila  Country: The Philippin Tel: 63-2-877-633  Fax: 63-2-817-8603	Name: Address:	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila	d in Question 4:	
Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila  Country: The Philippin Tel: 63-2-877-633  Fax: 63-2-817-8603	Name: Address: Country:	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines		633
None  Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila  Country: The Philippin Tel: 63-2-877-633  Fac: 63-2-817-8603	Name: Address: Country: Tel:	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633		633
None  Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila  Country: The Philippin Tel: 63-2-877-633  Fac: 63-2-817-8603	Name: Address: Country: Tel:	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633		633
None  Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila  Country: The Philippin Tel: 63-2-877-633  Fac: 63-2-817-8603	Name: Address: Country: Tel:	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633		633
Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila Country: The Philippin Tel: 63-2-877-633 Fax: 63-2-817-8603	Name: Address: Country: Tel:	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633		633
Survey completed by: Charisse B. Tablante Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila Country: The Philippin Tel: 63-2-877-633 Fax: 63-2-817-8603	Name: Address: Country: Tel: Types of	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633 supporting information available:	<b>Fax:</b> 63 2 877 0	633
Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila  Tel: 63-2-877-633  Fax: 63-2-817-8603	Name: Address: Country: Tel: Types of	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633 supporting information available: ergy standards for non-residential buildir	<b>Fax:</b> 63 2 877 0	633
Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila  Tel: 63-2-877-633  Fax: 63-2-817-8603	Name: Address: Country: Tel: Types of	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633 supporting information available: ergy standards for non-residential buildir	<b>Fax:</b> 63 2 877 0	633
Title: Chief, Conservation Division Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila  Tel: 63-2-877-633  Fax: 63-2-817-8603	Name: Address: Country: Tel: Types of	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633 supporting information available: ergy standards for non-residential buildir	<b>Fax:</b> 63 2 877 0	633
Office of Energy Affairs; Office of the President Merritt Rd., Fort Bonifacio Makati, Metro Manila  Tel: 63-2-877-633  Fax: 63-2-817-8603	Name: Address: Country: Tel: Types of	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633 supporting information available: ergy standards for non-residential buildir	<b>Fax:</b> 63 2 877 0	633
Merritt Rd., Fort Bonifacio Makati, Metro Manila  Country: The Philippin  Tel: 63-2-877-633  Fax: 63-2-817-8603	Name: Address: Country: Tel: Types of	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633 supporting information available: ergy standards for non-residential building	Fax: 63 2 877 0	
Makati, Metro Manila Country: The Philippin  Tel: 63-2-877-633 Fax: 63-2-817-8603	Name: Address: Country: Tel: Types of	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633 supporting information available: ergy standards for non-residential building	Fax: 63 2 877 0	ablante rvation Division
Tel: 63-2-877-633 Fax: 63-2-817-8603	Name: Address: Country: Tel: Types of	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633 supporting information available: ergy standards for non-residential building	Fax: 63 2 877 0	ablante rvation Division rgy Affairs; Office of the President
	Name: Address: Country: Tel: Types of	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633 supporting information available: ergy standards for non-residential building	Fax: 63 2 877 0  One of the content	ablante rvation Division rgy Affairs; Office of the President Fort Bonifacio
Date completed: 4/2/92	Name: Address: Country: Tel: Types of	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633 supporting information available:  ergy standards for non-residential building the Survey completed by: Title:	Fax: 63 2 877 of the following of the fo	ablante rvation Division rgy Affairs; Office of the President Fort Bonifacio o Manila  Country: The Philippin
	Name: Address: Country: Tel: Types of	Charisse B. Tablante Office of Energy Affairs Merrit Road, Fort Bonifacio Makati, Metro Manila Philippines 63 2 877 633 supporting information available:  ergy standards for non-residential building the Survey completed by: Title:	Fax: 63 2 877 of the following of the fo	ablante rvation Division rgy Affairs; Office of the President Fort Bonifacio o Manila  Country: The Philippin



### **POLAND**



i. General bulluling stall	dards exist at the following (	jovernmental levels:	Nation	nal		
2. Proposed or existing	ENERGY standards cover t	he following buildin	g sectors: Bo	th Residential and Nor	-Residential	
Status of Non-Reside	ential Building Energy Stan	dands at the				
a. National level:	Mandatory		evel: - None c. l		Local level: - None	
<u></u> -				<del>_</del>		
 L Single energy stands	ard selected for further des	crintion:		<del></del>		
			or Standardiz:	ation, Measures, and Qu	iality Contro	
·						
Year: 1991	Geographic Coverage:	Nation	Abbreviated	Title: PN-91/B-02020		
	FIED ENERGY STAN			•		
	n Question 4 applies to the		-			
a. Building types:		b. Building v	•			
A - All Buildi	ngs	Both ne	ew and existin	g		
	····	c. Other chi	aracteristics:			
		—   P - Phy:	sical size			
		$\overline{A - Air}$	Conditioned			
			-			
. Basic approach of the	estandard: Performar	ce-based	<del> </del>			
. The following subjects	are included in the energy	standard:				
a. Whole building en			b. Building envelo	one provisions:		
G. THI I OTC DUIMING GIR			-	spo providiono.		
-	ount target		Roof			
E- Energy amo				111	<u></u> -	
-			Wall syste			
-			Fenestratio	n system		
-			Fenestratio	n system	in walls	
E- Energy amo			Fenestration Infiltration Other: Per	n system n cent of setting humidity	in walls	
E- Energy amo	s:		Fenestratio Infiltratio Other: Pero	n system n cent of setting humidity	in walls	
E- Energy amo	s:		Fenestration Infiltration Other: Per	n system n cent of setting humidity	in walls	
E- Energy amo	s:		Fenestratio Infiltratio Other: Pero	n system n cent of setting humidity	in walls	
E- Energy amo	s:		Fenestratio Infiltratio Other: Pero	n system n cent of setting humidity	in walls	
E- Energy amo	s:		Fenestratio Infiltratio Other: Pero	n system n cent of setting humidity	in walls	
E- Energy amo			Fenestratio Infiltratio Other: Pero	n system n cent of setting humidity	in walls	
E- Energy amo			Fenestratio Infiltratio Other: Pero	n system n cent of setting humidity	in walls	
E- Energy amo			Fenestratio Infiltratio Other: Pero	n system n cent of setting humidity	in walls	

### STANDARDS DEVELOPMENT PROCESS - PN-91/B-02020 8. Organizations involved in developing the standard: Government agency: PKNMIJ Research group: Institute of Building Technique 9. Decision Process: ? Comment: 10. Information used in developing the standard: a. PHYSICAL CHARACTERISTICS of existing buildings b. ENERGY USE of existing buildings: Already available prior to standard c. WEATHER data d. Other information - None Already available prior to standard 11. Standards from a different country used as source material: 12. COMPUTER programs used: a. In developing the standard: Uncertain b. For complying with the standard: ? 13. Standard is set at a level: Lower than current practice 14. Considerations influencing the inclusion or exclusion of measures in the standard: Comments: E - Cost effectiveness A - Availability of energy efficient products S - Similarity/difference to local design C - Comfort 15a. Standard scheduled for regular review and revision? Yes: The former standard PN-82/B-02020 was established 9 years ago and has been changed twice. b. Does revision include procedures to MONITOR and EVALUATE earlier versions of the standard? Yes: Standards PN-91/B 02020 is compulsory and PN-82/B-02020 was compulsory too.

### IMPLEMENTATION AND COMPLIANCE - PN-91/B-02020 16. Entities involved in IMPLEMENTING energy standards: Existing agency: PKNMIJ If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Information or resource center 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Percent designs checked: ? Percent sites checked: ? Percent buildings checked: ? Comment: Comment: Comment: d. Other compliance procedures - None e. Effectiveness of combined compliance mechanisms (scale of 1-5): ? f. Explanation for effectiveness in part e: 2\_\_\_\_ 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Planned c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: d. COST EFFECTIVENESS based on ACTUAL COSTS: e. Other Assessments: ?

	esting facilities and procedures establishe	ed:	
Insulat	·		
Ballas	ts		•
Therm	al properties of materials		<u></u>
	<del></del>		
		······································	<del></del>
			•
1. Other progr	rams or policies developed to increase ene	rgy efficiency in buildings:	
•			
		I	
Addition	al sources of information about energy effic	ciency for buildings in: Poland	
1			
2			
<u></u>			
J			
2. Contact for	written copy of energy standard specified	l in Question 4:	
Name:	PKNMiJ, Foreigh Relations Depa		
Name:	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2		
Name: Address:	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa		
Name: Address:	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2		
Name: Address: Country:	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland	artment	
Name: Address: Country: Tel:	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34		
Name: Address: Country: Tel:	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland	artment	
Name: Address: Country: Tel:	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34	artment	
Name: Address: Country: Tel:	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34	artment	
Name: Address:  Country: Tel: Types of	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34 supporting information available:	Fax: 48 22 20 83 78	
Name: Address:  Country: Tel: Types of	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34	Fax: 48 22 20 83 78	
Name: Address:  Country:  Tel:  Types of	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34 supporting information available:	Fax: 48 22 20 83 78	
Name: Address:  Country: Tel: Types of	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34 supporting information available:	Fax: 48 22 20 83 78	
Name: Address:  Country:  Tel:  Types of	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34 supporting information available:	Fax: 48 22 20 83 78	
Name: Address:  Country:  Tel:  Types of	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34 supporting information available: ergy standards for non-residential building	Fax: 48 22 20 83 78  Roland Izbicki	
Name: Address:  Country:  Tel:  Types of	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34 supporting information available: ergy standards for non-residential building	Fax: 48 22 20 83 78  Roland Izbicki Polski Komitet Normaliza	acyjny (PKNIJ)
Name: Address:  Country:  Tel:  Types of	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34 supporting information available: ergy standards for non-residential building	Fax: 48 22 20 83 78  Roland Izbicki Polski Komitet Normaliza Building Department	acyjny (PKNIJ)
Name: Address:  Country:  Tel:  Types of	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34 supporting information available: ergy standards for non-residential building	Fax: 48 22 20 83 78  Roland Izbicki Polski Komitet Normaliza	,
Name: Address:  Country:  Tel:  Types of	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34 supporting information available: ergy standards for non-residential building	Fax: 48 22 20 83 78  Roland Izbicki Polski Komitet Normaliza Building Department ul. Swietokrzyska 14b	Country: Poland
Name: Address:  Country:  Tel:  Types of	PKNMiJ, Foreigh Relations Depa ul. Electoralna 2 00-950 Warsawa Poland 48 22 20 54 34 supporting information available: ergy standards for non-residential building Survey completed by: Title:	Fax: 48 22 20 83 78  Roland Izbicki Polski Komitet Normaliza Building Department ul. Swietokrzyska 14b Warszawa	,



### **PORTUGAL**



2. Proposed or existing ENERGY standards cover the following building sectors:  Both Residential and Non-Residential  3. Status of Non-Residential Building Energy Standards at the:  a. National level:  Mandatory  b. Regional level:					
•	ndard selected for further des	scription:			
Year:	Geographic Coverage:	Nation Abbreviated Title: CSOPT-91			
RIPTION OF SPE	CIFIED ENERGY STAN	IDARDS - CSOPT-91			
	d in Question 4 applies to the f				
a. Building types		b. Building vintage:			
A - All Bui	dings	Both new and existing			
		c. Other characteristics:			
		Other: Limiting nominal thermal loads (winter and summ conditions)			
		Conditions			
S. Basic approach of	the standard: Both preso	criptive and performance			
	cts are included in the energy				
a. Whole building	energy provisions:	b. Building envelope provisions:			
F F	mount target	Roof Wall system			
E- Energy a		Fenestration system			
E- Energy a					
E- Energy a		Infiltration			
	Onc:				
c. Lighting provis		d. Mechanical provisions:			
c. Lighting provis	ions: er density used for calcul	d. Mechanical provisions:			
c. Lighting provis		d. Mechanical provisions:			
c. Lighting provis		d. Mechanical provisions:			
c. Lighting provis	er density used for calcul	d. Mechanical provisions:			

Government agency: DGE (Lisbon)	
Government agency. DGE (LISDON)	
Academic institution: FUEP (Porto)	
Academic institution: IST (Lisbon)	
Pacialan Processor Concorners	Majority decision, no consensus reached for final version.
	Organizations included: AIP, LNEC, AECOPS
Information used in developing the standard:	
• -	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Already available prior to standard	Estimated using professional judgment
c. WEATHER data	d. Other information
Already available prior to standard	- None
·	
Standards from a different country used as source material:	T ,
France (moderate extent)	
Spain	
	<del></del>
COMDITED programs used:	
COMPUTER programs used:	
COMPUTER programs used:  a. In developing the standard:  - None	b. For complying with the standard: Uncertain
· ·	b. For complying with the standard: Uncertain
· ·	b. For complying with the standard: Uncertain
· ·	b. For complying with the standard: Uncertain
· ·	b. For complying with the standard: Uncertain
· ·	b. For complying with the standard:  Uncertain
· ·	b. For complying with the standard:  Uncertain
a. In developing the standard:  - None  Standard is set at a level: Equal to current practice	
a. In developing the standard:  - None	
a. In developing the standard:  - None  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measu	
a. In developing the standard:  - None  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measu  Similarity/difference to local design	res in the standard: Comments:
a. In developing the standard:  - None  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measures Similarity/difference to local design	res in the standard: Comments: Pressure from AECOPS (the Building Constructor
a. In developing the standard:  - None  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measu  Similarity/difference to local design	rres in the standard:
a. In developing the standard:  - None  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measu  Similarity/difference to local design	res in the standard:  Comments:  Pressure from AECOPS (the Building Constructor Association) not to set the standard to a level about the standard the s
a. In developing the standard:  - None  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measu  Similarity/difference to local design	res in the standard:  Comments:  Pressure from AECOPS (the Building Constructor Association) not to set the standard to a level about the standard the s
a. In developing the standard:  - None  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measu  Similarity/difference to local design	res in the standard:  Comments:  Pressure from AECOPS (the Building Constructor Association) not to set the standard to a level about the standard the s
a. In developing the standard:  - None  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measu  Similarity/difference to local design	res in the standard:  Comments:  Pressure from AECOPS (the Building Constructor Association) not to set the standard to a level about the standard the s
a. In developing the standard:  - None  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measu  Similarity/difference to local design	res in the standard:  Comments:  Pressure from AECOPS (the Building Constructor Association) not to set the standard to a level about the standard the s
a. In developing the standard:  Standard is set at a level:  Equal to current practice  Considerations influencing the inclusion or exclusion of measu  Similarity/difference to local design  a. Standard scheduled for regular review and revision?	res in the standard:  Comments:  Pressure from AECOPS (the Building Constructor Association) not to set the standard to a level about the standard the s

If an existing agency: Cons. Sup. Obras Pub. Tranp.  If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area:  Other: general  17. TRAINING & EDUCATION provided for architects, engineers and other professionals:  Written guidelines to assist with compliance procedure  Example calculations  Compliance forms  Seminars, workshops, or conferences  18. Compliance mechanisms used at different stages in construction process:  a. PRIOR to construction:  Certification/approval  Percent designs checked: ?  Commert.  Major local authorities enforce approval; smaller local authorities unable to enforce  discussion.  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  1. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly, bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNET1 in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS: None conducted	16. Entities involved in IMPLEMENTING energy star	ndards:	
Other: general  17. TRAINING & EDUCATION provided for architects, engineers and other professionals:  Written guidelines to assist with compliance procedure  Example calculations Compliance forms Seminars, workshops, or conferences  18. Compliance mechanisms used at different stages in construction process:  a. PRIOR to construction:  Certification/approval  Percent designs checked: ? Comment:  Major local authorities enforce approval; smaller local authorities unable to enforce discussion.  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	Existing agency: Cons. Sup. Obras Pu	ıb. Tranp.	
Other: general  17. TRAINING & EDUCATION provided for architects, engineers and other professionals:  Written guidelines to assist with compliance procedure  Example calculations Compliance forms Seminars, workshops, or conferences  18. Compliance mechanisms used at different stages in construction process:  a. PRIOR to construction:  Certification/approval  Percent designs checked: ? Comment:  Major local authorities enforce approval; smaller local authorities unable to enforce discussion.  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	Kan ada mana mada manana iki a	in invitation its farmer facts was an built	fine energy or another emer
17. TRAINING & EDUCATION provided for architects, engineers and other professionals:  Written guidelines to assist with compliance procedure  Example calculations  Compliance forms  Seminars, workshops, or conferences  18. Compliance mechanisms used at different stages in construction process:  a. PRIOR to construction:  Certification/approval  Percent designs checked: ?  Comment:  Major local authorities enforce approval; smaller local authorities unable to enforce.  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: for solar houses made by FEUP/LNET1 in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:		or implementation, its former focus was on built	uings, energy, or another area:
Written guidelines to assist with compliance procedure Example calculations Compliance forms Seminars, workshops, or conferences  18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: Certification/approval  Percent designs checked: ? Comment: Major local authorities enforce approval, smaller local authorities unable to enforce discussion.  d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	Other: general		
Example calculations Compliance forms Seminars, workshops, or conferences  18. Compliance mechanisms used at different stages in construction process: a PRIOR to construction: Certification/approval  Percent designs checked: ? Comment: Major local authorities enforce approval; smaller local authorities unable to enforce discussion.  d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  1. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to: 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on ACTUAL COSTS:	17. TRAINING & EDUCATION provided for architecture	cts, engineers and other professionals:	
Compliance forms   Seminars, workshops, or conferences		mpliance procedure	
Seminars, workshops, or conferences  18. Compliance mechanisms used at different stages in construction process:  a. PRIOR to construction:  Certification/approval  Percent designs checked: ?  Comment:  Major local authorities enforce approval; smaller local authorities unable to enforce  authorities unable to enforce  discussion.  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5):  f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:			
18. Compliance mechanisms used at different stages in construction process:  a. PRIOR to construction:  Certification/approval  Percent designs checked: ?  Comment:  Major local authorities enforce approval; smaller local authorities unable to enforce  authorities unable to enforce  e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e:  Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to smaller to completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:			
a PRIOR to construction:    Certification/approval	Seminars, workshops, or conferences		
a PRIOR to construction:  Certification/approval  Percent designs checked: ?  Commert:  Major local authorities enforce approval; smaller local authorities unable to enforce  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5):  1. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying, the standard to smaller to:  19. Types of assessments or audits of energy standards impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:			
a PRIOR to construction:  Certification/approval  Percent designs checked: ?  Comment:  Major local authorities enforce approval; smaller local authorities unable to enforce  In the compliance of other standards, but not for one under discussion.  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5):  J. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on ACTUAL COSTS:			
No mechanism   No m	•	1	
Percent designs checked: Percent sites checked: high Comment:  Major local authorities enforce approval; smaller local authorities unable to enforce  discussion.  Checks for compliance of other standards, but not for one under discussion.  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to:  19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
Comment:  Major local authorities enforce approval; smaller local standards, but not for one under authorities unable to enforce discussion.  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	Certification/approval	No mechanism	No mechanism
Comment:  Major local authorities enforce approval; smaller local standards, but not for one under discussion.  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to:  19. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	Demont designs charled: ?	Percent sites checked high	Percent huildings checked hi
Major local authorities enforce approval; smaller local standards, but not for one under discussion.  Checks for compliance of other standards, but not one under discussion.  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	·		· -
approval; smaller local authorities unable to enforce discussion.  d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e; Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:			
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d. Other compliance procedures  e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:			one under discussion.
e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3.5  f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities			
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f. Explanation for effectiveness in part e: Compliance is most effective in large urban areas and there are a few problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	e. Effectiveness of combined compliance mech	nanisms (scale of 1-5): 3.5	
problems (mainly bureaucratic) in applying the standard to smaller to 19. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	·	· · · · · · · · · · · · · · · · · · ·	1.1
19. Types of assessments or audits of energy standards' impact:  a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings:  Completed: for solar houses made by FEUP/LNETI in the region of Porto  b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	f. Explanation for effectiveness in part e: $\Omega$	mpliance is most effective in large urb	an areas and there are a tew
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b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:  Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:			
Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:		v FEUP/LNETI in the region of Porto	
Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:		<u> </u>	
Planned: this type of work is carried out by universities  c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:			
c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:  Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	Completed: for solar houses made b		
Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	Completed: for solar houses made b	n actual buildings complying with standard:	
Planned: this type of work is carried out by universities  d. COST EFFECTIVENESS based on ACTUAL COSTS:	Completed: for solar houses made b	n actual buildings complying with standard:	
d. COST EFFECTIVENESS based on ACTUAL COSTS:	Completed: for solar houses made b	n actual buildings complying with standard:	
	b. MEASUREMENTS OF ENERGY SAVINGS in Planned: this type of work is carried	n actual buildings complying with standard: d out by universities	
	b. MEASUREMENTS OF ENERGY SAVINGS in Planned: this type of work is carried.  c. COST EFFECTIVENESS based on engineer	n actual buildings complying with standard: d out by universities ring economic CALCULATIONS:	
None conducted	b. MEASUREMENTS OF ENERGY SAVINGS in Planned: this type of work is carried.  c. COST EFFECTIVENESS based on engineer	n actual buildings complying with standard: d out by universities ring economic CALCULATIONS:	
Tone conducted	b. MEASUREMENTS OF ENERGY SAVINGS in Planned: this type of work is carried.  c. COST EFFECTIVENESS based on engineer Planned: this type of work is carried.	n actual buildings complying with standard: d out by universities ring economic CALCULATIONS: d out by universities	

### FURTHER INFORMATION ON ENERGY CONSERVATION - Portugal

Motors Insulation	<u> </u>
Air conditioners/chillers/other appliance	OC .
Fixtures	55
Thermal properties of materials	
Other: refrigeration equipment (tests avail	lable only for law or moderate
	lable only for low or moderate
power	· · · · · · · · · · · · · · · · · · ·
Information programs  Information programs  Additional sources of information about energy efficient.  A energia em Portugal - DGE Min. India	Comment: General public information (electricity use, he losses in buildings); Subsidized solar thermal panels (program terminated)
masonry solutions used in Portugal-Ll  3. The Portuguese information is seldom:	ials - thermal properties, physical properties of most common NEC Laboratório Nacional de Engenharia Civil specific for buildings. Usually it considers different sectors r to Portugues language publications.
<ol> <li>Contact for written copy of energy standard specified</li> <li>Name:</li> </ol>	
Address:	cos o Transmortos (CSOPT)
Address:  Conselho Superior de Obras Públio R.S. Mamede ao Caldas 1196 Lisboa Codex	cas e Transportes (CSOPT)
Address:  Conselho Superior de Obras Públic R.S. Mamede ao Caldas 1196 Lisboa Codex  Country: Portugal	
Address:  Conselho Superior de Obras Públic R.S. Mamede ao Caldas 1196 Lisboa Codex  Country: Portugal  Tel: 351-1-8884234	cas e Transportes (CSOPT)  Fax: 351-1-876430
Address:  Conselho Superior de Obras Públio R.S. Mamede ao Caldas 1196 Lisboa Codex  Country: Portugal	
Address:  Conselho Superior de Obras Públic R.S. Mamede ao Caldas 1196 Lisboa Codex  Country: Portugal  Tel: 351-1-8884234  Types of supporting information available:	Fax: 351-1-876430  JP - Univ. do Porto; R. dos Bragas; 4099 Porto Codex; Portugal.
Address:  Conselho Superior de Obras Públic R.S. Mamede ao Caldas 1196 Lisboa Codex  Country: Portugal  Tel: 351-1-8884234  Types of supporting information available: Program disk: Oliveria Fernandes; FEL	Fax: 351-1-876430  JP - Univ. do Porto; R. dos Bragas; 4099 Porto Codex; Portugal.
Conselho Superior de Obras Pública R.S. Mamede ao Caldas 1196 Lisboa Codex  Country: Portugal  Tel: 351-1-8884234  Types of supporting information available:  Program disk: Oliveria Fernandes; FEL Tel: 351-2-311-254; Fax: 351-2-319-280	Fax: 351-1-876430  JP - Univ. do Porto; R. dos Bragas; 4099 Porto Codex; Portugal. ) s:
Conselho Superior de Obras Públic R.S. Mamede ao Caldas 1196 Lisboa Codex Country: Portugal Tel: 351-1-8884234 Types of supporting information available: Program disk: Oliveria Fernandes; FEL Tel: 351-2-311-254; Fax: 351-2-319-280 Other energy standards for non-residential buildings	Fax: 351-1-876430  JP - Univ. do Porto; R. dos Bragas; 4099 Porto Codex; Portugal. ) s:
Conselho Superior de Obras Pública R.S. Mamede ao Caldas 1196 Lisboa Codex  Country: Portugal  Tel: 351-1-8884234  Types of supporting information available:  Program disk: Oliveria Fernandes; FEL Tel: 351-2-311-254; Fax: 351-2-319-280  Other energy standards for non-residential building Yes: Reg. da Qualidade do Sist. de Cli	Fax: 351-1-876430  JP - Univ. do Porto; R. dos Bragas; 4099 Porto Codex; Portugal. ) s:
Conselho Superior de Obras Públic R.S. Mamede ao Caldas 1196 Lisboa Codex Country: Portugal Tel: 351-1-8884234 Types of supporting information available: Program disk: Oliveria Fernandes; FEL Tel: 351-2-311-254; Fax: 351-2-319-280 Other energy standards for non-residential buildings	Fax: 351-1-876430  JP - Univ. do Porto; R. dos Bragas; 4099 Porto Codex; Portugal. ) s:
Conselho Superior de Obras Pública R.S. Mamede ao Caldas 1196 Lisboa Codex Country: Portugal Tel: 351-1-8884234 Types of supporting information available: Program disk: Oliveria Fernandes; FEL Tel: 351-2-311-254; Fax: 351-2-319-280 Other energy standards for non-residential buildings Yes: Reg. da Qualidade do Sist. de Cli	Fax: 351-1-876430  JP - Univ. do Porto; R. dos Bragas; 4099 Porto Codex; Portugal.  S: imatizacao em Edificios; CSOPT  Luis Roriz  Universidade do Algave Escola Superior de Tecnologia
Conselho Superior de Obras Pública R.S. Mamede ao Caldas 1196 Lisboa Codex Country: Portugal Tel: 351-1-8884234 Types of supporting information available: Program disk: Oliveria Fernandes; FEL Tel: 351-2-311-254; Fax: 351-2-319-280 Other energy standards for non-residential buildings Yes: Reg. da Qualidade do Sist. de Cli	Fax: 351-1-876430  JP - Univ. do Porto; R. dos Bragas; 4099 Porto Codex; Portugal.  IS:  imatizacao em Edificios; CSOPT  Luis Roriz  Universidade do Algave Escola Superior de Tecnologia



# **ROMANIA**



2. Proposed or existing ENERGY s	tandards cover the follo	wing building:	sectors: Both R	esidential and Non-	Residential
3. Status of Non-Residential Buildi a. National level: Volunt				c. Local level:	
4. Single energy standard selected Title, Organization: Buildin	•				
Year: ? Geogra	phic Coverage: Na	tion	Abbreviated Title	: BR-Romania	
RIPTION OF SPECIFIED EN	ERGY STANDARD	<b>S -</b> BR-Ro	mania		
. The standard defined in Question		-	-		
a. Building types:		b. Building vin	tage: v and existing		
A - All Buildings					
		c. Other chara P - Physic			
			nt of energy		
<ol> <li>Basic approach of the standard:</li> <li>The following subjects are included.</li> <li>Whole building energy provision</li> </ol>	ed in the energy standar		. Building envelope p	rovisions:	
E- Energy amount targe			Yes		
c. Lighting provisions:		d	. Mechanical provision	ns:	
- None			?		
e. Other provisions:					

Government agency	
Research group	
Industry group	
·	
Decision Process: Mandate Comment:	
-	
Information used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Estimated using professional judgment	Estimated using professional judgment
	Gathered through audits and surveys
c. WEATHER data	d. Other information
C. d I d	- None
Gathered through measurements	
. COMPUTER programs used:  a. In developing the standard: Uncertain	b. For complying with the standard: ?
COMPUTER programs used:  a. In developing the standard:  Uncertain	b. For complying with the standard: ?
a. In developing the standard: Uncertain	b. For complying with the standard: ?
• •	b. For complying with the standard: ?
a. In developing the standard: Uncertain	b. For complying with the standard: ?
a. In developing the standard:  Uncertain	b. For complying with the standard: ?
a. In developing the standard: Uncertain	b. For complying with the standard: ?
a. In developing the standard:  Uncertain  Uncertain  Equal to current practice	
a. In developing the standard:  Uncertain  Uncertain  Standard is set at a level:  Equal to current practice  Considerations influencing the inclusion or exclusion of measures	in the standard:
a. In developing the standard:  Uncertain  Uncertain  Standard is set at a level:  Equal to current practice  Considerations influencing the inclusion or exclusion of measures	in the standard: Comments:
a. In developing the standard:  Uncertain  Uncertain  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products	in the standard: Comments:
a. In developing the standard:  Uncertain  Uncertain  Standard is set at a level:  Equal to current practice  Considerations influencing the inclusion or exclusion of measures	Comments:
a. In developing the standard:  Uncertain  Uncertain  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products	in the standard: Comments:
a. In developing the standard:  Uncertain  Uncertain  Standard is set at a level: Equal to current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design	in the standard: Comments:
a. In developing the standard:    Uncertain	in the standard: Comments:
a. In developing the standard:    Uncertain	in the standard: Comments:
a. In developing the standard:    Uncertain	in the standard: Comments:
a. In developing the standard:    Uncertain	in the standard: Comments:

Entities involved in IMPLEMENTING ener	gy standards:	
Under revision		
If an existing agency was made respon	nsible for implementation, its former focus was o	on buildings, energy, or another area:
	,	
TRAINING & EDUCATION provided for a	rchitects, engineers and other professionals:	
Written guidelines to assist wi		
Example calculations		
Compliance forms		
Seminars, workshops, or confer	ences	· · · · · · · · · · · · · · · · · · ·
		•
Compliance mechanisms used at differen	it stages in construction process:	
a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
Penalty	?	?
Percent designs checked: 2	Percent sites checked:	Percent buildings checked
Comment:	Comment:	Comment:
Difficult to estimate.	Difficult to estimate.	Difficult to estimate
	_	
	•	
d. Other compliance procedures - No	one	
e. Effectiveness of combined compliance	e mechanisms (scale of 1-5): 2	
f Evaluation for effectiveness in part	e:	·
i. Explanation for effectiveness in part		
i. Explanation for electiveness in part		
	v standards' impact:	
Types of assessments or audits of energ		
Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base	y standards' impact: ed on prototypical (not actual) buildings:	
Types of assessments or audits of energ		
Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base		
Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base In progress	ed on prototypical (not actual) buildings:	ırd:
Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base In progress		ırd:
Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base In progress b. MEASUREMENTS OF ENERGY SAVI	ed on prototypical (not actual) buildings:	ırd:
Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base In progress b. MEASUREMENTS OF ENERGY SAVI	ed on prototypical (not actual) buildings:	ırd:
Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base In progress b. MEASUREMENTS OF ENERGY SAVI	ed on prototypical (not actual) buildings:  NGS in actual buildings complying with standa	ırd:
Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base In progress b. MEASUREMENTS OF ENERGY SAVI In progress	ed on prototypical (not actual) buildings:  NGS in actual buildings complying with standa	
Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base In progress b. MEASUREMENTS OF ENERGY SAVI In progress c. COST EFFECTIVENESS based on en	ed on prototypical (not actual) buildings:  NGS in actual buildings complying with standa	
Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base In progress b. MEASUREMENTS OF ENERGY SAVI In progress c. COST EFFECTIVENESS based on en In progress	ed on prototypical (not actual) buildings:  NGS in actual buildings complying with standa	
Types of assessments or audits of energ  a. ENERGY SAVINGS POTENTIAL base In progress  b. MEASUREMENTS OF ENERGY SAVI In progress  c. COST EFFECTIVENESS based on en In progress  d. COST EFFECTIVENESS based on a	ed on prototypical (not actual) buildings:  NGS in actual buildings complying with standa	
Types of assessments or audits of energ a. ENERGY SAVINGS POTENTIAL base In progress b. MEASUREMENTS OF ENERGY SAVI In progress c. COST EFFECTIVENESS based on en In progress	ed on prototypical (not actual) buildings:  NGS in actual buildings complying with standa	

Motors					
Insulati	on		•		
Therma	l properties	of materials		<u> </u>	
				·	
				<del></del>	
				······································	
Other progra	ams or policies	developed to increase ene	rgy efficiency in buildings:		
Informa	ition program	ns			
	<del></del>	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	
			—   · · · · · · · · · · · · · · · · · ·		
Additiona	d sources of info	ormation about energy effi	ciency for buildings in: Ror	nania	
<u></u>					
2					,
-·					
3:					
J					
		energy standard specified			
Contact for Name:					
Name:					•
Name: ddress:					•
Name: ddress:					•
Name: ddress: Country:					
Name: ddress: Country: Tel:	written copy of	energy standard specified	d in Question 4:		•
Name: ddress: Country: Tel: Types of	written copy of	energy standard specified	d in Question 4:		
Name: ddress: Country: Tel:	written copy of	energy standard specified	d in Question 4:		
Name: ddress: Country: Tel: Types of:	supporting info	energy standard specified	d in Question 4:		
Name: ddress: Country:  Tel: Types of: - Na Other end	supporting info	energy standard specified	d in Question 4:		
Name: ddress: Country: Tel: Types of:	supporting info	energy standard specified	d in Question 4:		
Name: ddress: Country:  Tel: Types of: - Na Other end	supporting info	energy standard specified	d in Question 4:		
Name: ddress: Country:  Tel: Types of: - Na Other end	supporting info	energy standard specified	d in Question 4:		
Name: ddress: Country:  Tel: Types of: - Na Other end	supporting info	energy standard specified mation available:  for non-residential buildin  Survey completed by:	Fax:  Adrian Gheorghe		
Name: ddress: Country:  Tel: Types of: - Na Other end	supporting info	energy standard specified mation available: for non-residential buildin	Fax:  Adrian Gheorghe Division of Nuclear	Safety	
Name: ddress: Country:  Tel: Types of: - Na Other end	supporting info	energy standard specified mation available:  for non-residential buildin  Survey completed by:	Fax:  Adrian Gheorghe Division of Nuclear International Atomic	Safety Energy Agency	0
Name: ddress: Country:  Tel: Types of: - Na Other end	supporting info	energy standard specified mation available:  for non-residential buildin  Survey completed by:	Fax:  Adrian Gheorghe Division of Nuclear	Safety Energy Agency 2.O. Box 200, A-140	0 Country: Austria



# **SCOTLAND**



a. National level:	ntial Building Energy Stand Mandatory	el: c. Local level:	
	rd selected for further desc Building Regulations	•	
Year: ?	Geographic Coverage:	Nation	Abbreviated Title: BR-SCT
RIPTION OF SPECI	FIED ENERGY STANI	DARDS - BR-9	CT CONTRACTOR OF THE CONTRACTO
i. The standard defined in a. Building types: A - All Buildi	n Question 4 applies to the f	b. Building New b	_
•		- None	
	standard: Both presc		formance
<ul> <li>I ne tollowing subjects</li> <li>a. Whole building energy</li> </ul>	are included in the energy s ergy provisions:	standard:	b. Building envelope provisions:
E- Energy amo	•••		Roof
			Wall system Fenestration system
			Terestration system
			d. Mechanical provisions:
c. Lighting provisions	S:		Yes
c. Lighting provisions - None	<b>5:</b>	<del></del>	
	5:		

Covernment agency	
Government agency Industry group	
Academic institution	
Pocoarch group	
Account Broad	
Decision Process: Mandate Comment:	
	L PHEDOVILOR of antalogue building
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
?	?
	_
c. WEATHER data	d. Other information
	- None
?	
	-
COMPUTER programs used:	
COMPUTER programs used:	
COMPUTER programs used:  a. In developing the standard: Uncertain	
COMPUTER programs used:  a. In developing the standard:  Uncertain	
COMPUTER programs used:  a. In developing the standard:  Uncertain	
COMPUTER programs used:  a. In developing the standard:  Uncertain	
COMPUTER programs used:  a. In developing the standard:  Uncertain	b. For complying with the standard:
COMPUTER programs used:  a. In developing the standard:  Uncertain  Standard is set at a level:  Considerations influencing the inclusion or exclusion of measure	b. For complying with the standard:
COMPUTER programs used:  a. In developing the standard:  Uncertain  Standard is set at a level:  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness	b. For complying with the standard: ?
COMPUTER programs used:  a. In developing the standard:  Uncertain  Standard is set at a level:  Considerations influencing the inclusion or exclusion of measure	b. For complying with the standard: ?
COMPUTER programs used:  a. In developing the standard:  Uncertain  Standard is set at a level:  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  Availability of energy efficient products	b. For complying with the standard: ?
COMPUTER programs used:  a. In developing the standard:  Uncertain  Uncertain  Standard is set at a level:  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design	b. For complying with the standard: ?
COMPUTER programs used:  a. In developing the standard:  Uncertain  Uncertain  Standard is set at a level:  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design	b. For complying with the standard: ?
COMPUTER programs used:  a. In developing the standard:  Uncertain  Standard is set at a level:  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Comfort	b. For complying with the standard: ?
COMPUTER programs used:  a. In developing the standard: Uncertain  Standard is set at a level: ?  Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design  Comfort  a. Standard scheduled for regular review and revision?	b. For complying with the standard: ?

### IMPLEMENTATION AND COMPLIANCE - BR-SCT 16. Entities involved in IMPLEMENTING energy standards: Existing agency If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Seminars, workshops, or conferences 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Uncertain Uncertain Uncertain Percent designs checked: Percent sites checked: Percent buildings checked: Comment: Comment: Comment: d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): f. Explanation for effectiveness in part e: \_\_ 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: d. COST EFFECTIVENESS based on ACTUAL COSTS: e. Other Assessments: -

	<del></del>
Other programs or policies developed to increase	se energy efficiency in buildings:
Additional sources of information about ener	•
1	
-	
3	· · · · · · · · · · · · · · · · · · ·
Address: - Country:	
Tel:	Faxc
Types of supporting information available:	
Other energy standards for non-residential t	buildings:
	·
-	
Survey complete	Title: Senior Architect Building Directorate, Scottish Office
	Title: Senior Architect



### **SINGAPORE**



Proposed or existing ENERGY standards cover the following building sectors:  Both Residential and Non-Residential				
. Status of Non-Reside a. National level:	ential Building Energy Stand Mandatory	lards at the: b. Regional level:	c. Local level:	
. Single energy standa	rd selected for further desc	ription:		
Title, Organization:	Control Regulations:	Building Control	Buildings and Building Services", Singapore Bu Division, Public Works Department. This Hand building code, S148/89.	
Year: 1980	Geographic Coverage: _	Nation	Abbreviated Title: S 148/89, Div. 10	
IPTION OF SPECI	FIED ENERGY STANI	DARDS - S 148/	9. Div. 10	
	n Question 4 applies to the f			
a. Building types:		b. Building vin	•	
A - All Buildi	ings	New bui	•	
		c. Other chara		
			ciensucs: nt of energy: >30kw cooling capacity for AC equi	
			onditioned	
		_   <del></del>	Attationed	
····				
		-		
•		riptive and perfor		
. Basic approach of the	estandard: Both presc	ipuve and perior	mance	
,			mance	
The following subjects	are included in the energy s	tandard:		
The following subjects a. Whole building end	are included in the energy s	tandard:	Building envelope provisions:	
The following subjects	are included in the energy s	tandard:	Building envelope provisions:  Roof	
The following subjects a. Whole building end	are included in the energy s	tandard:	Building envelope provisions:	
The following subjects a. Whole building end	are included in the energy s	tandard:	Building envelope provisions:  Roof Wall system	
The following subjects a. Whole building end - None	are included in the energy sergy provisions:	tandard:	Building envelope provisions:  Roof Wall system Fenestration system Infiltration	
The following subjects  a. Whole building end  - None  - Lighting provision	are included in the energy sergy provisions:	tandard:	Building envelope provisions:  Roof Wall system Fenestration system Infiltration  Mechanical provisions:	
The following subjects a. Whole building end - None	are included in the energy sergy provisions:	tandard:	Building envelope provisions:  Roof Wall system Fenestration system Infiltration	
The following subjects  a. Whole building end  - None  - None  c. Lighting provision  Control requir	s are included in the energy sergy provisions:  sergy provisions:	tandard:	Building envelope provisions:  Roof Wall system Fenestration system Infiltration  Mechanical provisions: Controls	
The following subjects  a. Whole building end  - None  - None  c. Lighting provision  Control requir  Power density	s are included in the energy sergy provisions:  ss: ements	tandard:	Building envelope provisions:  Roof Wall system Fenestration system Infiltration  Mechanical provisions: Controls	
The following subjects  a. Whole building end  - None  - None  c. Lighting provision  Control requir  Power density	s are included in the energy sergy provisions:  ss: ements	tandard:	Building envelope provisions:  Roof Wall system Fenestration system Infiltration  Mechanical provisions: Controls	

### STANDARDS DEVELOPMENT PROCESS - \$148/89, Div. 10

	ngapore	
Government agency: Public Utilities Board		
Local interest group: Institution of Engineers		
Local interest group: Singapore Institute of Arch	itects	
Decision Process: Consensus Comment:		
Information used in developing the standard:	'	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings	•
Gathered through audits and surveys	Estimated using professional	
Gualetta anough additional our veyo	Estimated using professional	Juagineria
c. WEATHER data	d. Other information	
	- None	
Gathered through measurements		
<u>-</u>	<del>-</del>	
Standards from a different country used as source material:		
USA: ASHRAE 90		
USA: ASHRAE 90		
	·	
	<del></del>	
COMDITTED programs used.		
COMPUTER programs used:		NT-
COMPUTER programs used:  a. in developing the standard: - None	b. For complying with the standard:	No
, •	b. For complying with the standard:	No
, •	b. For complying with the standard:	No
, •	b. For complying with the standard:	No
, •	b. For complying with the standard:	No
a. In developing the standard:  - None	b. For complying with the standard:	No
, •	b. For complying with the standard:	<u>No</u>
a. In developing the standard:  - None		No
a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures		No
a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness	s in the standard:	No
a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  A - Availability of energy efficient products	s in the standard:	No
a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness	s in the standard:	
a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design	s in the standard: Comments:	
a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design	s in the standard: Comments:	
a. In developing the standard:  - None  Standard is set at a level: Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design  C - Comfort	s in the standard: Comments:	
a. In developing the standard:  - None  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design  C - Comfort  a. Standard scheduled for regular review and revision?	s in the standard: Comments:	
a. In developing the standard:  - None  Standard is set at a level: Above current practice  Considerations influencing the inclusion or exclusion of measures  E - Cost effectiveness  A - Availability of energy efficient products  S - Similarity/difference to local design  C - Comfort	s in the standard: Comments:	

### 3 SINGAPORE

### IMPLEMENTATION AND COMPLIANCE - S 148/89, Div. 10 16. Entities involved in IMPLEMENTING energy standards: Existing agency: Building Control Division If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: **Buildings** 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Compliance forms Seminars, workshops, or conferences 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: No mechanism Certification/approval Certification/approval Percent designs checked: -Percent sites checked: Percent buildings checked: Comment: Comment: Comment: Random Random d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): 5 f. Explanation for effectiveness in part e; compliance with standard is made a responsibility of the professional 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: ASEAN-US cooperative program report b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Completed: ASEAN-US cooperative program report c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Completed: ASEAN-US cooperative program report d. COST EFFECTIVENESS based on ACTUAL COSTS: Completed: ASEAN Energy Conference Proceedings (1984) e. Other Assessments: -

Insulation	
Ballasts	
Thermal properties of materials	
Other programs or policies developed to increase	energy efficiency in buildings:
Information programs	Comment: Public Utilities Board
	•
Additional sources of information about energy	refficiency for huildings in: Singapore
	Charles of the definition in Carlos Posts
4.	
3 -	
Contact for written copy of energy standard spec	cified in Question 4:
Contact for written copy of energy standard spec	
Contact for written copy of energy standard spec Name: Address:	
Contact for written copy of energy standard spec Name: Address:	
Contact for written copy of energy standard spec Name: Address:	
Contact for written copy of energy standard specification.  Name: Address: Country: Tel:	cified in Question 4:
Contact for written copy of energy standard spec Name: Address: Country:	cified in Question 4:
Contact for written copy of energy standard specification.  Name: Address: Country: Tel:	cified in Question 4:
Contact for written copy of energy standard specificance: Address: Country:  Tel: Types of supporting information available:	cified in Question 4: Fax:
Contact for written copy of energy standard specification.  Name: Address: Country:  Tel: Types of supporting information available:	Fax:
Contact for written copy of energy standard specification.  Name: Address: Country:  Tel: Types of supporting information available:	Fax:
Contact for written copy of energy standard specification.  Name: Address: Country:  Tel: Types of supporting information available:	Fax:
Contact for written copy of energy standard specification.  Name: Address: Country:  Tel: Types of supporting information available:   Other energy standards for non-residential buil	Fax:
Contact for written copy of energy standard specification.  Name: Address: Country:  Tel: Types of supporting information available:	Fax:    Fax:
Contact for written copy of energy standard specification.  Name: Address: Country:  Tel: Types of supporting information available:	Fax:  Fax:  Dy: Ng Aik Huat the:
Contact for written copy of energy standard special Name: Address: Country:  Tel: Types of supporting information available:	Fax:  Fax:  by: Ng Aik Huat lle: Building Control Division 5 Maxwell Road; Tower Block , MND Complex
Contact for written copy of energy standard special Name: Address: Country:  Tel: Types of supporting information available:	Fax:  Fax:  by: Ng Aik Huat tle: Building Control Division



# SOUTH AFRICA



) Dramanad as estation t	ENERCY etendende eeuer i	be following building	0000000		
2. Proposed or existing t	ENERGY standards cover t	ne rollowing building	sectors: Non-R	esidential Only	
3. Status of Non-Resider a. National level:	ntial Building Energy Stan Voluntary	dards at the: b. Regional level:	Voluntary	c. Local level:	- None
	rd selected for further des				
Year: ?	Geographic Coverage:	Nation	Abbreviated Titl	e: BES-DF	
RIPTION OF SPECI	FIED ENERGY STAN	DARDS - BES-D	F		
5. The standard defined in	n Question 4 applies to the	following kinds of build	dings:		
a. Building types:		b. Building vin	tage:		
O - Offices		New bui	ldings		
G - Governme		c. Other chara	acteristics:		
D - Hospitals		1	nt of energy		
			<u></u>		<del></del>
6. Basic approach of the	estandard: Performar	rce-based			
	are included in the energy	standard:		•	
'. I ne tollowing subjects			. Building envelope	provisions:	
_	SUV LILUVISILII IS:	1 "	J		
a. Whole building ene			2		
_			?	<del></del>	
a. Whole building ene			?		
a. Whole building ene			?		
a. Whole building ene			?		
a. Whole building ene E- Energy amo	ount target		?	ons:	
a. Whole building ene	ount target		?	ons:	
a. Whole building ene E- Energy amo	ount target		?	ons:	
a. Whole building ene E- Energy amo	ount target		?	ons:	
a. Whole building ene E- Energy amo	ount target		?	ons:	
a. Whole building ene E- Energy amo	ount target	d	?	ons:	
a. Whole building ene E- Energy amo  C. Lighting provisions ?	ount target	d	?	ons:	
a. Whole building ene E- Energy amo	ount target	d	?	ons:	

	Iniversity of Pretoria	Manual Control of the	
Decision Process: Mandate	Comment		
Information used in developing t	he standard:		
a. PHYSICAL CHARACTERIS	TICS of existing buildings	b. ENERGY USE of existing buildings:	
Estimated using profes	ssional judoment	Estimated using professional judgment	
Dominated dolling profes	olorum juuginerii	Computer simulations used for estimates	
	<del></del>		
c. WEATHER data	-	d Other information	
C. WEATHEN GAIA		d. Other information	
Already available pri	or to standard	- None	
<del></del>	· · · · · · · · · · · · · · · · · · ·	=	•
Standards from a different coun	tre upod op pourop motoriali		
37		•	
- None		<del></del>	
<del></del>			
		<del></del>	
		<del></del>	
COMPUTER programs used:			
a. In developing the standard:	QUICK	, b. For complying with the standard: Yes	
1 0			
·			
	<u>:</u>		
Standard is set at a level: $Eq$	<u>:</u>		
<del></del>	ual to current practice	in the standard:	
Considerations influencing the inc	ual to current practice		
Considerations influencing the inc	ual to current practice	s in the standard: Comments:	
Considerations influencing the inc E - Cost effectiveness Similarity/difference t	ual to current practice clusion or exclusion of measures		
Considerations influencing the inc	ual to current practice clusion or exclusion of measures		
Considerations influencing the inc E - Cost effectiveness Similarity/difference t Comfort	ual to current practice clusion or exclusion of measures to local design		
Considerations influencing the inc E - Cost effectiveness Similarity/difference t	ual to current practice clusion or exclusion of measures to local design		
Considerations influencing the inc E - Cost effectiveness Similarity/difference t Comfort	ual to current practice clusion or exclusion of measures to local design		
Considerations influencing the inc E - Cost effectiveness Similarity/difference t Comfort  Standard scheduled for regular	ual to current practice clusion or exclusion of measures to local design review and revision?	Comments:	
Considerations influencing the inc E - Cost effectiveness Similarity/difference t Comfort  Standard scheduled for regular	ual to current practice clusion or exclusion of measures to local design	Comments:	

### 3 SOUTH AFRICA IMPLEMENTATION AND COMPLIANCE - BES-DE 16. Entities involved in IMPLEMENTING energy standards: Existing agency: Department of Works If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: **Buildings** 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: No mechanism No mechanism No mechanism Percent designs checked: 5 Percent sites checked: 0 Percent buildings checked: 0 Comment: Comment: Comment: d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): 1.5 f. Explanation for effectiveness in part e: Energy conservation not perceived as important; pollution (some) not perceived as important; coal produced; energy is cheap 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Completed: National Energy Council

b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard:

Completed: National Energy Council

In progress

c. COST EFFECTIVENESS based on engineering economic CALCULATIONS:

In progress: National Energy Council

d. COST EFFECTIVENESS based on ACTUAL COSTS:

In progress: National Energy Council

e. Other Assessments: Planned: National Energy Council

## FURTHER INFORMATION ON ENERGY CONSERVATION - South Africa 20. Efficiency testing facilities and procedures established: Insulation Thermal properties of materials 21. Other programs or policies developed to increase energy efficiency in buildings: Audit manual made available (1987) Comment: Audit manual free through Department of Public Works; high demand but few audits completed. Time of day pricing introduced (1991) Tariff introduced by Eskom on trial basis: but withdrawn withdrawn due to local authority electricity denartmente Additional sources of information about energy efficiency for buildings in: South Africa 1. Lewis, Basson, and Snow, "Efficient utilisation of electricity," NEC/Eskom Seminar on Electricity Strategy, April 1990. 2. Basson, "Energy Conservation R&D, Progress Report from South Africa," Building Research and Practice, Nov/Dec 1982. 3. Matthysen, "Energy Consumption in Large Buildings, a South Africa survey," South Africa Refrigeration and Air Conditioning, Nov. 1986. 22. Contact for written copy of energy standard specified in Question 4: Name: Address: Country: Tel: Fax: Types of supporting information available: Other energy standards for non-residential buildings: Survey completed by:

Title:

Director, Electricity and Energy Efficiency

Energy Branch, Department of Mineral and Energy

Private Bag X03

Lynnwood Ridge, Pretoria 0040

Country: South Africa

Tel:

27 12 348-9564

Fax: 27 12 348-9676

Date completed:

5/5/92



## **SOUTH KOREA**



2. Proposed or existing ENERGY standards cover the following building sectors:  Both Residential and Non-Residentia				
. Status of Non-Residential Building Energy Standards at the:				
a. National level:	Mandatory	b. Regional level:		c. Local level:
Single energy stand	ard selected for further desc	eription:		
Title, Organization:	Building Code, Minis	stry of Construction	on. Effective June 1	, 1992.
Year: 1992	Geographic Coverage:	Nation	Abbreviated Title:	BC-1992
PTION OF SPEC	IFIED ENERGY STAND	DARDS - BC-19	92	
	in Question 4 applies to the fo			
a. Building types:		b. Building vir	•	
O - Offices		New bui	•	•
H - Hotels				<u> </u>
G - Governm	ent Facilities	c. Other char	acteristics:	,
F - Restauran		P - Physic	al size: offices/sho	pping centers > 3000 sq. m
D - Hospitals		_	-	
	ial/retail stores			
	mily residential			
	mily residential			
	e standard: Both prescr	riptive and perfo	rmance	
a. Whole building en	s are included in the energy s ergy provisions: nount target (residential	t	Roof Wall system Fenestration syst	
The following subjects  a. Whole building en	ergy provisions:	t	Roof Wall system	
The following subjects  a. Whole building en	ergy provisions: nount target (residential	& office)	Roof Wall system Fenestration syst	em
The following subjects  a. Whole building en  E- Energy am	ergy provisions:  nount target (residential	& office)	Roof Wall system Fenestration syst Infiltration  Mechanical provisions	em
The following subjects  a. Whole building en  E- Energy am  c. Lighting provision  Control require  Power density	ergy provisions: nount target (residential	& office)	Roof Wall system Fenestration syst Infiltration  Mechanical provisions	em
The following subjects  a. Whole building en  E- Energy am  c. Lighting provision  Control requir	ergy provisions: nount target (residential	& office)	Roof Wall system Fenestration syst Infiltration  Mechanical provisions Load Calculation	em : : s for equipment sizing

	nistry of Construction	•	
Government agency: Min	nistry of Energy and Resou	ırces	
Research group: Korea	Institute of Energy Resear	ch	
. Decision Process: Consensus	Comment:	·	
. 50000011100000.			
0. Information used in developing th	ne standard:		
a. PHYSICAL CHARACTERIST		b. ENERGY USE of existing buildings	•
Estimated using profes		Estimated using professiona	
Gathered through aud		Computer simulations used	
Already available price	or to standard	Gathered through audits an Already available prior to	
,		Alleady available prior to	Sianuaru
c. WEATHER data		d. Other information	
Cash and the carb man		- None	
Gathered through mea Already available price			
Aneady available pri	or to Startuaru	•	
1. Standards from a different coun	irv used as source material:		
USA: BEPS	ay asser as source material.		
USA: ASHRAE 90.1		· · · · · · · · · · · · · · · · · · ·	•
	ade and oth stds		
Japan: PAL, Building Co	ode, and oth. stds.	4	
	ode, and oth. stds.		
	ode, and oth. stds.		
Japan: PAL, Building Co	ode, and oth. stds.		
Japan: PAL, Building Co			
Japan: PAL, Building Co	DOE-2	b. For complying with the standard:	Yes
Japan: PAL, Building Co	DOE-2 Trakload	b. For complying with the standard:	Yes
Japan: PAL, Building Co	DOE-2 Trakload TRNSYS	b. For complying with the standard:	Yes
Japan: PAL, Building Co	DOE-2 Trakload	b. For complying with the standard:	Yes
Japan: PAL, Building Co	DOE-2 Trakload TRNSYS	b. For complying with the standard:	Yes
Japan: PAL, Building Co	DOE-2 Trakload TRNSYS KIZRB1	b. For complying with the standard:	Yes
Japan: PAL, Building Co	DOE-2 Trakload TRNSYS KIZRB1	b. For complying with the standard:	Yes
Japan: PAL, Building Co  2. COMPUTER programs used: a. In developing the standard:  3. Standard is set at a level: Above	DOE-2 Trakload TRNSYS KIZRB1  ove current practice		Yes
Japan: PAL, Building Co  2. COMPUTER programs used: a. In developing the standard:  3. Standard is set at a level: Above the standard is set at a	DOE-2 Trakload TRNSYS KIZRB1 ove current practice	s in the standard:	Yes
Japan: PAL, Building Co  2. COMPUTER programs used: a. In developing the standard:  3. Standard is set at a level: Above the A	DOE-2 Trakload TRNSYS KIZRB1  ove current practice	in the standard: Comments:	
Japan: PAL, Building Co  2. COMPUTER programs used: a. In developing the standard:  3. Standard is set at a level: Above the standard is set at a	DOE-2 Trakload TRNSYS KIZRB1  ove current practice clusion or exclusion of measures	in the standard: Comments: Some of energy efficient pro	oducts are imported
Japan: PAL, Building Co  2. COMPUTER programs used: a. In developing the standard:  3. Standard is set at a level: About the A	DOE-2 Trakload TRNSYS KIZRB1  ove current practice clusion or exclusion of measures	in the standard: Comments:	oducts are imported
Japan: PAL, Building Co  2. COMPUTER programs used: a. In developing the standard:  3. Standard is set at a level: Above the standard is set at a	DOE-2 Trakload TRNSYS KIZRB1  ove current practice clusion or exclusion of measures	in the standard: Comments: Some of energy efficient pro	oducts are imported
Japan: PAL, Building Co  2. COMPUTER programs used: a. In developing the standard:  3. Standard is set at a level: About the A	DOE-2 Trakload TRNSYS KIZRB1  ove current practice clusion or exclusion of measures	in the standard: Comments: Some of energy efficient pro	oducts are imported
Japan: PAL, Building Co  2. COMPUTER programs used: a. In developing the standard:  3. Standard is set at a level: About the A	DOE-2 Trakload TRNSYS KIZRB1  ove current practice clusion or exclusion of measures	in the standard: Comments: Some of energy efficient pro	oducts are imported
Japan: PAL, Building Co  2. COMPUTER programs used: a. In developing the standard:  3. Standard is set at a level: About the A	DOE-2 Trakload TRNSYS KIZRB1  ove current practice dusion or exclusion of measures rgy efficient products the to local design	in the standard: Comments: Some of energy efficient pro	oducts are imported
2. COMPUTER programs used: a. In developing the standard:  3. Standard is set at a level: Ab. 4. Considerations influencing the inc E - Cost effectiveness A - Availability of ener S - Similarity/difference C - Comfort  5a. Standard scheduled for regular	DOE-2 Trakload TRNSYS KIZRB1  ove current practice dusion or exclusion of measures rgy efficient products the to local design  review and revision?	s in the standard:  Comments:  Some of energy efficient proforeign countries.	oducts are imported
2. COMPUTER programs used: a. In developing the standard:  3. Standard is set at a level: Ab. 4. Considerations influencing the inc E - Cost effectiveness A - Availability of ener S - Similarity/difference C - Comfort  5a. Standard scheduled for regular	DOE-2 Trakload TRNSYS KIZRB1  ove current practice dusion or exclusion of measures rgy efficient products the to local design	s in the standard:  Comments:  Some of energy efficient proforeign countries.	oducts are imported

#### 3 SOUTH KOREA

### IMPLEMENTATION AND COMPLIANCE - BC-1992 16. Entities involved in IMPLEMENTING energy standards: Existing agency: Ministry of Construction and Ministry of Domestic Affairs If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: **Buildings** 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Compliance forms Seminars, workshops, or conferences 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: c. AFTER construction: b. DURING construction: Certification/approval Certification/approval Certification/approval Other policy mechanism Penalty Percent designs checked: 50 Percent sites checked: 50 Percent buildings checked: 100 Comment: Comment: Comment: d. Other compliance procedures Yes: we have to receive the inspections for fire protection, utility hookups, etc. e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3 f. Explanation for effectiveness in part e: We don't have perfect one. 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Planned c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Planned d. COST EFFECTIVENESS based on ACTUAL COSTS: Planned e. Other Assessments: Planned

### FURTHER INFORMATION ON ENERGY CONSERVATION - South Korea

Motors		·
Insulation		
Air conditioners/chillers/other appliances	S	
Ballasts		· · · · <u>· · · · · · · · · · · · · · · </u>
Fixtures		
Thermal properties of materials		
· ·		
her programs or policies developed to increase energy	y efficiency in build	fings:
Government energy policy	Comment:	Electricity peak load reduction: Ministry of
Utility initiatives	_	Energy and Resources;
Information programs	_ ,	
Audits (free or subsidized)	_	
	— I	
Additional sources of information about energy efficie	ency for buildinas i	n: South Korea
	,	'
Energy Research and Development, Kor	rea insitute of l	energy Kesearch
<ol><li>Energy Management, Korea Energy Mar</li></ol>	nagement Corp	oration
· · · · · · · · · · · · · · · · · · ·		
3. Energy Economy (newspaper)		
	n Question 4:	
Address: Director, Building Energy Research Korea Institute of Energy Research	n Departmen	
Name: Sang Dong Park Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town	n Departmen	
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343	n Departmen	
Name: Sang Dong Park Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343 Country: Korea	n Departmen	6224
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200	n Departmen	6224
Name: Sang Dong Park Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343 Country: Korea	n Departmen	6224
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200	n Departmen	6224
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available:	n Departmen	6224
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available:  - None	n Departmen Fax: 82 42 861	6224
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available:  - None  Other energy standards for non-residential buildings	n Departmen Fax: 82 42 861	
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available:	n Departmen  Fax: 82 42 861	
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available:  - None  Other energy standards for non-residential buildings	n Departmen  Fax: 82 42 861	
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available:  - None  Other energy standards for non-residential buildings	n Departmen  Fax: 82 42 861	
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available: - None  Other energy standards for non-residential buildings Rational Energy Utilization Law, Minis	n Departmen  Fax: 82 42 861  Stry of Energy a	and Resources
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available: - None  Other energy standards for non-residential buildings Rational Energy Utilization Law, Minis  Survey completed by:	Fax: 82 42 861 stry of Energy a	and Resources
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available: - None  Other energy standards for non-residential buildings Rational Energy Utilization Law, Minis	Fax: 82 42 861 Sang Dong Par Director, Build	and Resources  rk ding Energy Research Department
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available: - None  Other energy standards for non-residential buildings Rational Energy Utilization Law, Minis  Survey completed by:	Fax: 82 42 861 Sang Dong Par Director, Build Korea Institute	and Resources  rk ding Energy Research Department e of Energy Research
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available:  - None  Other energy standards for non-residential buildings Rational Energy Utilization Law, Minis  Survey completed by:	Fax: 82 42 861 Sang Dong Par Director, Build Korea Institute	rk ding Energy Research Department e of Energy Research edeok Science Town
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available: - None  Other energy standards for non-residential buildings Rational Energy Utilization Law, Minis  Survey completed by: Title:	Fax: 82 42 861 Sang Dong Pail Director, Build Korea Institute P.O. Box 5, Da Daejeon 305-3	rk ding Energy Research Department e of Energy Research edeok Science Town 43 Country: Korea
Name: Sang Dong Park  Address: Director, Building Energy Research Korea Institute of Energy Research P.O. Box 5, Daedeok Science Town Daejeon 305-343  Country: Korea  Tel: 82 42 860 3200  Types of supporting information available: - None  Other energy standards for non-residential buildings Rational Energy Utilization Law, Minis  Survey completed by:	Fax: 82 42 861 Sang Dong Par Director, Build Korea Institute P.O. Box 5, Da	rk ding Energy Research Department e of Energy Research edeok Science Town



## **SWEDEN**



Denocard or aviation	dards exist at the following	-	National	., .,	
2. Proposed or existing ENERGY standards cover the following building sectors:  Both Residential and Non-Residential					
3. Status of Non-Reside a. National level:	ential Building Energy Stan Mandatory	dards at the: b. Regional level:	- None	c. Local level: _	- None
4. Single energy standard selected for further description:  Title, Organization: Nybyggnadsregler, BFS 1988; 18. Boverket, 1989-01-01					
Year: 1989	Geographic Coverage:	Nation	Abbreviated Title:	BFS 1988: 18	
HPTION OF SPECI	IFIED ENERGY STAN	DARDS - BFS 19	88: 18		
. The standard defined i	in Question 4 applies to the	following kinds of buil	dings:		
a. Building types:		b. Building vin	•		
A - All Build	ings	New bui	ldings	<u> </u>	
		c. Other chara	acteristics:		
			permanently use	d buildings	
		_	·		
: Racic annuach of th	e standard: Performa	aco bacad			
· Dasic applicación an	e standard. 1 errorma	ice-based			
	s are included in the energy	standard:			
. The following subjects				wisions:	
. The following subjects a. Whole building en	ergy provisions:	b	. Building envelope pr	TRIGIS.	
-		b	Roof		
a. Whole building en		b	Roof Wall system		
a. Whole building en		b	Roof Wall system Fenestration sys		
a. Whole building en		b	Roof Wall system		
a. Whole building en	nce building	· · · · · · · · · · · · · · · · · · ·	Roof Wall system Fenestration sys	stem	
a. Whole building en Other: referer  C. Lighting provision	nce building		Roof Wall system Fenestration sys Infiltration	stem	
a. Whole building en Other: referer  C. Lighting provision	nce building  ns: requirements: dayligh		Roof Wall system Fenestration sys Infiltration  Mechanical provision	stem	
a. Whole building en Other: referer  C. Lighting provision Illumination	nce building  ns: requirements: dayligh		Roof Wall system Fenestration sys Infiltration  Mechanical provision	stem	
a. Whole building en Other: referer  C. Lighting provision Illumination	nce building  ns: requirements: dayligh		Roof Wall system Fenestration sys Infiltration  Mechanical provision	stem	
a. Whole building en Other: referer  c. Lighting provision Illumination Other: daylig	nce building  ns: requirements: dayligh ghting		Roof Wall system Fenestration sys Infiltration  Mechanical provision	stem	
a. Whole building en Other: referer  C. Lighting provision Illumination	nce building  ns: requirements: dayligh ghting		Roof Wall system Fenestration sys Infiltration  Mechanical provision	stem	

Decision Process: Mandate Comment:	Boverket
0. Information used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
	Estimated using professional judgment
- 1 1 <del></del>	Computer simulations used for estimates
	Total and the second se
c. WEATHER data	d Other information
C. WEATHER Udid	d. Other information
Already available prior to standard	- None
4. Chandarda frans a d'Harret accorte con des accors materia	.
Standards from a different country used as source materia	
- None	
	<del></del>
<del></del>	
2 COMPLITED programs used:	· · · · · · · · · · · · · · · · · · ·
2. COMPUTER programs used:	
2. COMPUTER programs used:  a. In developing the standard: ENORM  ENORM	b. For complying with the standard: Yes
· -	b. For complying with the standard: Yes
· -	b. For complying with the standard: Yes
· -	b. For complying with the standard: Yes
· -	b. For complying with the standard: Yes
a. In developing the standard: ENORM	b. For complying with the standard: Yes
· -	b. For complying with the standard:  Yes
a. In developing the standard: ENORM	
a. In developing the standard: ENORM  3. Standard is set at a level: Above current practice  4. Considerations influencing the inclusion or exclusion of meas	
a. In developing the standard: ENORM  3. Standard is set at a level: Above current practice	sures in the standard:
a. In developing the standard:  ENORM  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of meas  E - Cost effectiveness	sures in the standard:
a. In developing the standard:  ENORM  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of meas  E - Cost effectiveness	sures in the standard:  Comments:
a. In developing the standard:  ENORM  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of meas  E - Cost effectiveness	sures in the standard:  Comments:
a. In developing the standard:  ENORM  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of meas  E - Cost effectiveness	sures in the standard:  Comments:
a. In developing the standard:  ENORM  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of meas  E - Cost effectiveness  Comfort	sures in the standard:  Comments:
a. In developing the standard:  ENORM  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of meas  E - Cost effectiveness  Comfort  5a. Standard scheduled for regular review and revision?	sures in the standard:  Comments:
a. In developing the standard:  ENORM  3. Standard is set at a level:  Above current practice  4. Considerations influencing the inclusion or exclusion of meas  E - Cost effectiveness  Comfort	sures in the standard:  Comments:

## IMPLEMENTATION AND COMPLIANCE - BFS 1988: 18 16. Entities involved in IMPLEMENTING energy standards: Existing agency: Boverket If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: **Buildings** 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations Seminars, workshops, or conferences Information or resource center 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Certification/approval Certification/approval Certification/approval Percent designs checked: 100 Percent sites checked: 1-100 Percent buildings checked: 100 Comment: Comment: Comment: d. Other compliance procedures - None e. Effectiveness of combined compliance mechanisms (scale of 1-5): 5 f. Explanation for effectiveness in part e: Why not? 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: d. COST EFFECTIVENESS based on ACTUAL COSTS: e. Other Assessments: -

	ion	
Air coi	nditioners/chillers/other appliance	es
Therm	al properties of materials	
		•
ther prog	rams or policies developed to increase ener	rgy efficiency in buildings:
-		Comment:
Addition	al sources of information about energy effic	ciency for buildings in: Sweden
		N 91-38-09758-3
** TATA	MEETING VERIET, DES 1300, 10, 1301	V.I. N. U. I. J. U. J. U
2.		
3		
·		
Name: Address:	Stephan Norrman Boverket	
	<del>-</del>	
Address:	Boverket Box 534 S37123 Karlskrona	
Address:	Boverket	
Address: Country:	Boverket Box 534 S37123 Karlskrona Sweden	Fax: 46 455 53221
Address: Country: Tel:	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215	Fax: 46 455 53221
Address: Country: Tel: Types of	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215 supporting information available:	
Address: Country: Tel: Types of	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215	
Address: Country: Tel: Types of	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215 supporting information available: egtjanst; S171 88 Solna, Sweden; tel:	: 46 8 734 5100; fax: 46 8 734 5098
Address:  Country:  Tel:  Types of  By:  Other en	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215 supporting information available: ggtjanst; S171 88 Solna, Sweden; tel:	: 46 8 734 5100; fax: 46 8 734 5098
Address:  Country:  Tel:  Types of  By:  Other en	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215 supporting information available: egtjanst; S171 88 Solna, Sweden; tel:	: 46 8 734 5100; fax: 46 8 734 5098
Address:  Country:  Tel:  Types of  By:  Other en	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215 supporting information available: ggtjanst; S171 88 Solna, Sweden; tel:	: 46 8 734 5100; fax: 46 8 734 5098
Address:  Country:  Tel:  Types of  By:  Other en	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215 supporting information available: ggtjanst; S171 88 Solna, Sweden; tel:	: 46 8 734 5100; fax: 46 8 734 5098
Address:  Country:  Tel:  Types of  By:  Other en	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215 supporting information available: ggtjanst; S171 88 Solna, Sweden; tel:	: 46 8 734 5100; fax: 46 8 734 5098
Address:  Country:  Tel:  Types of  By:  Other en	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215 supporting information available: agtjanst; S171 88 Solna, Sweden; tel: ergy standards for non-residential building	: 46 8 734 5100; fax: 46 8 734 5098  gs:  Stephan Norrman Boverket
Address:  Country:  Tel:  Types of  By:  Other en	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215 supporting information available: agtjanst; S171 88 Solna, Sweden; tel: ergy standards for non-residential building one Survey completed by:	Stephan Norrman Boverket National Board of Housing, Building and Physical
Address:  Country:  Tel:  Types of  By:  Other en	Boverket Box 534 S37123 Karlskrona Sweden 46 455 53215 supporting information available: agtjanst; S171 88 Solna, Sweden; tel: ergy standards for non-residential building one Survey completed by:	: 46 8 734 5100; fax: 46 8 734 5098  gs:  Stephan Norrman Boverket



## **SWITZERLAND**



		b. Regional leve	Mandatory	c. Local level:	Mandator
4. Single energy standard select Title, Organization: Energy		•	r Ingenieur und A	rchitekrenverein (SIA	A)
Year: 1988 Geog	raphic Coverage:	Nation	Abbreviated Title	: EH-SIA, 1988	
RIPTION OF SPECIFIED E	NERGY STAN	DARDS - EH-S	IA, 1988		
5. The standard defined in Question	on 4 applies to the 1	• *	=		
a. Building types:		b. Building v	<i>r</i> intage: ew and existing		•
A - All Buildings	'	<u>bourne</u>	ew and existing		
			aracteristics:		
			sical size ount of energy		<del></del>
			e of fuel: oil, gas,	electricity	<del></del>
	<del></del>	_			
6. Basic approach of the standar		riptive and perf	ormance		
a. Whole building energy prov	isions:		b. Building envelope p	rovisions:	
E- Energy amount tar	get		Roof		
		<del></del>	Wall system	rctom	
<u> </u>	<u> </u>		Fenestration sy Infiltration	SICIH	
		· ·			
c. Lighting provisions:			d. Mechanical provision	ns:	
- None	·			ons for equipment siz	ing
		·	Equipment effi	ciency	
				··········	

ND	

Government agency: Bundesant energiwirishaft	
Academic institution: SIA	
9. Decision Process: Consensus Comment:	
10. Information used in developing the standard:	
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Already available prior to standard	Estimated using professional judgment
	-
c. WEATHER data	d. Other information
Already available prior to standard	- None
11. Standards from a different country used as source material:	1
Germany: DIN France: AFNOR	· · · · · · · · · · · · · · · · · · ·
Haite. ATNOR	·
	<del> </del>
12. COMPUTER programs used:	
COMPUTER programs used:     a. In developing the standard: - None	b. For complying with the standard: ?
· · · · · · · · · · · · · · · · · · ·	b. For complying with the standard: ?
· · · · · · · · · · · · · · · · · · ·	b. For complying with the standard: ?
· · · · · · · · · · · · · · · · · · ·	b. For complying with the standard: ?
· · · · · · · · · · · · · · · · · · ·	b. For complying with the standard: ?
· · · · · · · · · · · · · · · · · · ·	
a. In developing the standard:  - None  - None  - Standard is set at a level:  Lower than current practice	
a. In developing the standard:  - None  13. Standard is set at a level:  Lower than current practice  14. Considerations influencing the inclusion or exclusion of measure	s in the standard:
a. In developing the standard:  - None  13. Standard is set at a level:  Lower than current practice  14. Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness	
a. In developing the standard:  - None  13. Standard is set at a level:  Lower than current practice  14. Considerations influencing the inclusion or exclusion of measure	s in the standard:
a. In developing the standard:  - None  13. Standard is set at a level:  Lower than current practice  14. Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness	s in the standard:
a. In developing the standard:  - None  13. Standard is set at a level:  Lower than current practice  14. Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness	s in the standard:
a. In developing the standard:  - None  13. Standard is set at a level:  Lower than current practice  14. Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  C - Comfort	s in the standard:
a. In developing the standard:  - None  13. Standard is set at a level:  Lower than current practice  14. Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness	s in the standard:
a. In developing the standard:  - None  13. Standard is set at a level:  Lower than current practice  14. Considerations influencing the inclusion or exclusion of measure  E - Cost effectiveness  C - Comfort	is in the standard:  Comments:
a. In developing the standard:  - None  13. Standard is set at a level:  Lower than current practice  Lower than current practice  E - Cost effectiveness  C - Comfort  15a. Standard scheduled for regular review and revision?	is in the standard:  Comments:

### 3 SWITZERLAND

W		
	ible for implementation, its former focus was	on buildings, energy, or another area:
	chitects, engineers and other professionals	
Example calculations		
Seminars, workshops, or confere Information or resource center	nces	
Hadrinador of resource certer	<u> </u>	
		·
Compliance mechanisms used at different	stages in construction process:	
a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
Certification/approval	<u>-</u>	<u>-</u>
Percent designs checked: 100	Percent sites checked:	Percent buildings checked: _
Comment:	Comment:	Comment:
	_	
d. Other compliance procedures -		•
e. Effectiveness of combined compliance	mechanisms (scale of 1-5):	
f. Explanation for effectiveness in part e:		<del></del>
f. Explanation for effectiveness in part e:		
f. Explanation for effectiveness in part ex ypes of assessments or audits of energy	·	
,	standards' impact:	
ypes of assessments or audits of energy	standards' impact:	
ypes of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based	standards' impact:	
ypes of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress	standards' impact: d on prototypical (not actual) buildings:	
ypes of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress b. MEASUREMENTS OF ENERGY SAVIN	standards' impact:	lard:
ypes of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress	standards' impact: d on prototypical (not actual) buildings:	lard:
ypes of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress b. MEASUREMENTS OF ENERGY SAVIN	standards' impact: d on prototypical (not actual) buildings:	lard:
ypes of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress b. MEASUREMENTS OF ENERGY SAVIN In progress	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with stand	lard:
ypes of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress b. MEASUREMENTS OF ENERGY SAVIN In progress c. COST EFFECTIVENESS based on eng	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with stand	lard:
ypes of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress b. MEASUREMENTS OF ENERGY SAVIN In progress	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with stand	lard:
ypes of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress b. MEASUREMENTS OF ENERGY SAVIN In progress c. COST EFFECTIVENESS based on eng In progress	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with standineering economic CALCULATIONS:	lard:
ypes of assessments or audits of energy a. ENERGY SAVINGS POTENTIAL based In progress b. MEASUREMENTS OF ENERGY SAVIN In progress c. COST EFFECTIVENESS based on eng	standards' impact: d on prototypical (not actual) buildings: GS in actual buildings complying with standineering economic CALCULATIONS:	iard:

#### FURTHER INFORMATION ON ENERGY CONSERVATION - Switzerland

	nces
Thermal properties of materials	
	and afficiency in built-in
Other programs or policies developed to increase en	
Building energy standards	Comment: SIA 380/4 Elektrische Energie im Hochbau
	· · · · · · · · · · · · · · · · · · ·
Additional sources of information about energy ef	ficiency for buildings in: Switzerland
1, =	
	P. Control of the Con
2 -	
2.	
3	
Name: -	
Address:	
Country:	
Tel:	Fac
	I DA.
Types of supporting information available:	
Other energy standards for non-residential building	nos:
• • • • • • • • • • • • • • • • • • •	
<del>-</del>	
<del>-</del>	
<u>-</u>	
<u>-</u>	
- Survey completed by:	0 11
- Survey completed by: Title:	: Dipl. Arch
	Dipl. Arch Schweizerischer Ingenieur und Architekrenverein
	Dipl. Arch Schweizerischer Ingenieur und Architekrenverein Postfach CH-8039
	: Dipl. Arch Schweizerischer Ingenieur und Architekrenverein Postfach CH-8039 Zürich Country: Switzerlan



## **THAILAND**



2 Proposed or existing	ENERGY standards cover th	e following building:	sectors: Non-Poo	idential Only	
Proposed or existing ENERGY standards cover the following building sectors:  Non-Residential Only					
<ol> <li>Status of Non-Reside</li> <li>a. National level:</li> </ol>	ntial Building Energy Stand Proposed	ards at the: b. Regional level:	Proposed	c. Local level: -	Proposed
				-	
4. Single energy standa	rd selected for further desc	ription:			
Title, Organization:	"Guidelines and Requ Office, Office of the P				
Year: 1987	Geographic Coverage:	Nation	Abbreviated Title:	ECNB, 1987	
RIPTION OF SPECI	FIED ENERGY STAND	MARDS - FONE	1987		
a. Building types:	n Question 4 applies to the fo	b. Building vin	-		
O - Offices		1	v and existing		
H - Hotels		— I ===================================			
G - Governme	ent Facilities	c. Other chara	acteristics:		
F - Restaurant		E - Amou	nt of energy: 1000	kilowatts	
D - Hospitals		-			· · · · · ·
	al/retail stores				
6. Basic approach of the	e standard: Prescriptive are included in the energy s	tandard:	<del></del>		
a. Whole building end	ergy provisions:	þ	. Building envelope pro	wisions:	
- None	<u></u>		Roof		
			Wall system		
			Fenestration sys	tem	
			Infiltration		
	•	d	. Mechanical provision	s:	
c. Lighting provision	<b>s</b> :			ns for equipment sizi	
c. Lighting provision			Load Calculation		
Control requir	ements		Load Calculation		11g
• • •	ements		Ventilation		
Control requir	ements				11g
Control requir	ements		Ventilation		
Control requir Power density	ements		Ventilation		
Control requir	ements		Ventilation		

Academic: Division of Energy Technology, Asiar	ice of Prime Minister
	i institute of Technology
cision Process: Mandate Comment:	
COMPRESS.	
formation used in developing the standard:	·
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Already available prior to standard	Already available prior to standard
c. WEATHER data	d. Other information
Already available prior to standard	The standards have been developed based on
	information compiled for central region. More information is being compiled to strengthen the
	Indomination is being combined to site inguier the
tandards from a different country used as source material:	1
Singapore USA: ASHRAE 90 A,B,C	· · · · · · · · · · · · · · · · · · ·
00.11.10.114.11.70.11,0,0	<u> </u>
	· ·
	•
OMPUTER programs used:	
a. In developing the standard: DOE-2	b. For complying with the standard: Yes
	-
	: · · · · · · · · · · · · · · · · · · ·
standard is set at a level: Above current practice	:
	in the standard:
onsiderations influencing the inclusion or exclusion of measures	in the standard:
onsiderations influencing the inclusion or exclusion of measures  E - Cost effectiveness	
onsiderations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products	
onsiderations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design	Comments:
onsiderations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products	Comments:
E - Cost effectiveness Availability of energy efficient products Similarity/difference to local design Comfort	Comments:
onsiderations influencing the inclusion or exclusion of measures  E - Cost effectiveness  Availability of energy efficient products  Similarity/difference to local design	Comments:
E - Cost effectiveness Availability of energy efficient products Similarity/difference to local design Comfort	Comments:

#### 3 THAILAND

### IMPLEMENTATION AND COMPLIANCE - ECNB. 1987 16. Entities involved in IMPLEMENTING energy standards: Existing agency: Dept. of Energy Affairs If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: Written guidelines to assist with compliance procedure Example calculations 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Penalty Penalty Penalty Percent designs checked: 100 Percent sites checked: -Percent buildings checked: 100 Comment: Comment: Comment: d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): f. Explanation for effectiveness in part e: = 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: In progress b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: Planned c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: Planned d. COST EFFECTIVENESS based on ACTUAL COSTS: None conducted e. Other Assessments: None conducted

### FURTHER INFORMATION ON ENERGY CONSERVATION - Thailand

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# U.S.S.R.



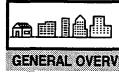
. I I OPOGOLI CI GABILITU E	NERGY standards cover to	he following buildin	g sectors: Roth Ros	idential and Non-I	Rosidential
2. Proposed or existing ENERGY standards cover the following building sectors:  Both Residential and Non-Residential  3. Status of Non-Residential Building Energy Standards at the:					
a. National level:	Proposed	dards at the: b. Regional leve	Proposed	c. Local level:	- None
Single energy standard	d selected for further des	cription:		•	
Title, Organization:	Building Thermophy	vsics (draft), The	Research Institute	for Building Physic	s (NIISF)
Year: 1991	Geographic Coverage:	Nation	Abbreviated Title:	BT-NIISF, 1991	
IPTION OF SPECIF	TED ENERGY STAN	DARDS - BT-N	msf. 1991		
	Question 4 applies to the f				
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A - All Buildin	ıgs	1	ew and existing		
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## IMPLEMENTATION AND COMPLIANCE - BT-NIISF, 1991 16. Entities involved in IMPLEMENTING energy standards: Existing agency: Research Institute for Building Physics If an existing agency was made responsible for implementation, its former focus was on buildings, energy, or another area: Buildings and energy 17. TRAINING & EDUCATION provided for architects, engineers and other professionals: 18. Compliance mechanisms used at different stages in construction process: a. PRIOR to construction: b. DURING construction: c. AFTER construction: Certification/approval Percent designs checked: Percent sites checked: Percent buildings checked: Comment: Comment: Comment: d. Other compliance procedures e. Effectiveness of combined compliance mechanisms (scale of 1-5): 3 f. Explanation for effectiveness in part e: \_ 19. Types of assessments or audits of energy standards' impact: a. ENERGY SAVINGS POTENTIAL based on prototypical (not actual) buildings: Planned b. MEASUREMENTS OF ENERGY SAVINGS in actual buildings complying with standard: In progress c. COST EFFECTIVENESS based on engineering economic CALCULATIONS: In progress d. COST EFFECTIVENESS based on ACTUAL COSTS: None conducted e. Other Assessments:

### FURTHER INFORMATION ON ENERGY CONSERVATION - U.S.S.R.

Thermal properties of materials	
Other: Thermal properties of envelope; a	ir-tightness; energy consumption
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ther programs or policies developed to increase ene	rgy efficiency in buildings:
Government energy policy	Comment: Energy policy of Russian Federation in new
	economic conditions, Russian Government
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	<del></del>
Additional sources of information about energy effi	iciency for buildings in: U.S.S.R.
1. "Methodology and Principles Involve	d in the Setting of Codes on Building Heat Engineering in the
U.S.S.R." Energy and Buildings (1990	1) 14: 401-409.
2. "Concepts of the Development of Bu: 25-33.	ilding Physics in the U.S.S.R." Energy and Buildings (1992) 13:
	nt of Energy Consumption in Buildings and Energy Efficiency riet Union." 15th Annual International Scientific Forum, "Mak
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entact for written copy of energy standard specified	d in Question 4:
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Address: Country:  Tel: Types of supporting information available:  Other energy standards for non-residential buildin	Fax:  Ogs:  Dr. Yu. A. Matrosov Head of Laboratory
Address: Country:  Tel: Types of supporting information available:  Other energy standards for non-residential buildin  Survey completed by:	Fax:  Dr. Yu. A. Matrosov Head of Laboratory Research Institute for Building Physics (NIISF)
Address: Country:  Tel: Types of supporting information available:  Other energy standards for non-residential buildin  Survey completed by:	Fax:  Ogs:  Dr. Yu. A. Matrosov Head of Laboratory



# USA



	ndards exist at the following g	overnmental levels:	National	Regional	Local
. Proposed or existing	ENERGY standards cover th	e following building	sectors: Both Res	idential and Non-	Residential
Chaire of Non Book	antial Duilding France Chand	lauda et tha.			
a. National level:	ential Building Energy Stand Mandatory	iarus at tne: b. Regional level:	Mandatory	c. Local level:	Mandator
a. Nauotiai ievei: _	Voluntary	u. negiuliai ievei:	Voluntary	C. LOCALIEVEI.	Voluntary
	Voluntary		voluntary		
. Single energy stand	ard selected for further desc	ription:			
Title, Organization	"Energy Efficient Des ASHRAE/IES, 1989.	ign of New Build	ings Except New 1	.ow-Rise Residenti	al Buildings,
<b>Year:</b> 1989	Geographic Coverage:	Nation	Abbreviated Title:	ASHRAE 90.1-89	
IPTION OF SPEC	IFIED ENERGY STAND	DARDS - ASHR	AE 90.1-89		
The standard defined	in Question 4 applies to the fo	ollowing kinds of buil	lings:		
a. Building types:		b. Building vir	tage:		
O - Offices	•	New bui	ldings		
H - Hotels					
F - Restauran	its .	c. Other char			_
D - Hospital:	S	O - Other	buildings designe	d for human occupa	ency (not stor
R - Religion-	related				
C - Commerc	cial/retail stores				
E Edward	nal facilities (schools)				
	Bldgs (non-process area	<u></u>			
		riptive and perfo	mance		
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	efrigeration, and Air-Condintioning Engineers
	ssn (GAMA); Air-Conditioning and Refrigeration Inst. (AR
Industry group: North American Insulation Manu	
Industry group: National Concrete and Masonry	Assn. (NCMA); Primary Glass Manuf. Council (PGMC);
Decision Process: Consensus Comment:	
	:
. Information used in developing the standard:	,
a. PHYSICAL CHARACTERISTICS of existing buildings	b. ENERGY USE of existing buildings:
Estimated using professional judgment	Computer simulations used for estimates
Listing professional judgment	Computer simulations used for estimates
c. WEATHER data	d. Other information
Already available prior to standard	- None
. Standards from a different country used as source material:	
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COMPUTER programs used:	
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a. In developing the standard:  DOE-2  Standard is set at a level:  Above current practice  Considerations influencing the inclusion or exclusion of measures  A - Availability of energy efficient products	
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a. In developing the standard:  DOE-2  Standard is set at a level: Above current practice  Considerations influencing the inclusion or exclusion of measures  A - Availability of energy efficient products  C - Comfort	in the standard: Comments:
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a. In developing the standard:  DOE-2  Standard is set at a level: Above current practice  Considerations influencing the inclusion or exclusion of measures  A - Availability of energy efficient products  C - Comfort	in the standard:  Comments:

### IMPLEMENTATION AND COMPLIANCE - ASHRAE 90.1-89

	y: Building code officials (ICBO, CAI	BO, SBCCI, BOCA)
If an existing agency was made respons	sible for implementation, its former focus was o	on buildings, energy, or another area:
Energy		
TRAINING & EDITCATION provided for any	chitects, engineers and other professionals:	
Written guidelines to assist with		
Example calculations	1 Computative procedure	
Seminars, workshops, or conferen	nces	
Compliance mechanisms used at different	· · · · · · · · · · · · · · · · · · ·	
a. PRIOR to construction:	b. DURING construction:	c. AFTER construction:
Certification/approval	Uncertain	Uncertain
Dament designs of the 1.2	Parant alter to de d	Barrando 11.8 albarra 1. 2
Percent designs checked: ?	Percent sites checked: ?	Percent buildings checked: ?
Comment:	Comment:	Comment:
	- '	
		<del></del>
d. Other compliance procedures - Non	ne	•
d. Other compliance procedures - None  e. Effectiveness of combined compliance		
e. Effectiveness of combined compliance	mechanisms (scale of 1-5): 5	the professional seal of a registered
e. Effectiveness of combined compliance		
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### FURTHER INFORMATION ON ENERGY CONSERVATION - USA

Insulation	·
Air conditioners/chillers/other appliance	es
Thermal properties of materials	
	•
her programs or policies developed to increase ene	rgy efficiency in buildings:
Utility initiatives	Comment:
Utility initiatives Government energy policy	
Additional sources of information about energy effi	ciency for buildings in: USA
1.	
2.	
3	
Name: Address: ASHRAE 1791 Tullie Circle, NE	
Atlanta GA 30329	
Country: USA	
Tel: 404-636-8400	Fax: 404-321-5478
Types of supporting information available:	
=	
Other energy standards for non-residential buildin	gs:
	_
Department of Energy Standards: Jean	n Boulin: 1000 Independence Ave.: Washington, D.C. 20585
Department of Energy Standards: Jean	n Boulin; 1000 Independence Ave.: Washington, D.C. 20585
Department of Energy Standards: Jean	n Boulin; 1000 Independence Ave.: Washington, D.C. 20585
Department of Energy Standards: Jean	n Boulin; 1000 Independence Ave.: Washington, D.C. 20585
Department of Energy Standards: Jean Survey completed by:	n Boulin; 1000 Independence Ave.: Washington, D.C. 20585  Merle McBride
	Merle McBride Research Associate
Survey completed by:	Merle McBride Research Associate Owens-Corning Fiberglass Corp.Bldg.; 72-1
Survey completed by:	Merle McBride Research Associate Owens-Corning Fiberglass Corp.Bldg.; 72-1 2790 Columbus Road, Rt. 16
Survey completed by:	Merle McBride Research Associate Owens-Corning Fiberglass Corp.Bldg.; 72-1

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