

# Lawrence Berkeley National Laboratory

## Lawrence Berkeley National Laboratory

### **Title**

Voluntary Agreements for Energy Efficiency or GHG Emissions Reduction in Industry: An Assessment of Programs Around the World

### **Permalink**

<https://escholarship.org/uc/item/67c4x06h>

### **Author**

Price, Lynn

### **Publication Date**

2005-06-01

## **Voluntary Agreements for Energy Efficiency or GHG Emissions Reduction in Industry: An Assessment of Programs Around the World**

*Lynn Price*  
*Lawrence Berkeley National Laboratory*

### **ABSTRACT**

Voluntary agreements for energy efficiency improvement and reduction of energy-related greenhouse gas (GHG) emissions have been a popular policy instrument for the industrial sector in industrialized countries since the 1990s. A number of these national-level voluntary agreement programs are now being modified and strengthened, while additional countries -- including some recently industrialized and developing countries -- are adopting these type of agreements in an effort to increase the energy efficiency of their industrial sectors. Voluntary agreement programs can be roughly divided into three broad categories: 1) programs that are completely voluntary, 2) programs that use the threat of future regulations or energy/GHG emissions taxes as a motivation for participation, and 3) programs that are implemented in conjunction with an existing energy/GHG emissions tax policy or with strict regulations. A variety of government-provided incentives as well as penalties are associated with these programs. This paper reviews 23 energy efficiency or GHG emissions reduction voluntary agreement programs in 18 countries, including countries in Europe, the U.S., Canada, Australia, New Zealand, Japan, South Korea, and Chinese Taipei (Taiwan) and discusses preliminary lessons learned regarding program design and effectiveness. The paper notes that such agreement programs, in which companies inventory and manage their energy use and GHG emissions to meet specific reduction targets, are an essential first step towards GHG emissions trading programs.

### **Introduction**

Voluntary agreements for energy efficiency improvement and reduction of energy-related GHG emissions by industry have been implemented in industrialized countries since the 1990s. A number of these national-level voluntary agreement programs are now being modified and strengthened, while additional countries, including some recently industrialized and developing countries, are adopting these type of agreements in an effort to increase the energy efficiency of their industrial sectors.

Voluntary agreements are “essentially a contract between the government and industry, or negotiated targets with commitments and time schedules on the part of all participating parties” (IEA, 1997a). These agreements typically have a long-term outlook, covering a period of five to ten years, so that strategic energy-efficiency investments can be planned and implemented. A key element of voluntary agreements is that they focus the attention of all actors on energy efficiency or emission reduction goals.

The essential steps for reaching a voluntary agreement are the assessment of the energy-efficiency potential of the industrial facility as well as target-setting through a negotiated process. Participation by industries is motivated through the use of both incentives and disincentives. Supporting programs and policies, such as facility audits, assessments, benchmarking, monitoring, information dissemination, and financial incentives all play an important role in assisting the participants in understanding and managing their energy use and GHG emissions in order to meet the target goals. Some of the more successful voluntary agreement programs are based on the use of a mechanism to reduce environmental regulations or taxes for participants.

## **Characterizing Voluntary Agreement Programs**

Voluntary agreement programs can be roughly divided into three broad categories: 1) programs that are completely voluntary, 2) programs that use the threat of future regulations or energy/greenhouse gas emissions taxes as a motivation for participation, and 3) programs that are implemented in conjunction with an existing energy/GHG emissions tax policy or with strict regulations.<sup>1</sup> A variety of government-provided incentives as well as penalties are associated with these programs.

Table 1 provides an overview of 23 voluntary agreement programs found around the world, identifying in which of the three broad categories they fit and indicating which incentives and penalties are included in each program. The incentives are generally listed from left to right in order of degree of both cost to the government and benefit to the company, while the penalties are generally listed in order of strength from left to right.

## **Completely Voluntary Programs**

Voluntary agreements that are completely voluntary – meaning that participation in the agreements is solely at the discretion of the participating entity and there is no serious pressure exerted by the government to compel the entity to join – have been used in Australia’s Greenhouse Challenge (Australian Greenhouse Office, 2003), Canada’s Industry Program for Energy Conservation (Natural Resources Canada, 2002), Finland’s Action Programme for Industrial Energy Conservation (Lahti-Nuuttila, 1998) and Agreements on Industrial Energy Conservation Measures (International Energy Agency, 2001), France’s Voluntary Agreements on Carbon Dioxide Reductions (Chidiak, 2002), Ireland’s Self Audit Scheme (Brabazon et al., 2003), South Korea’s Voluntary Agreement System For Energy Conservation and Reduction of GHG Emissions (Korean Energy Management Corporation, n.d.), Sweden’s EKO-Energi Programme (Avasoo and Uggla, n.d.; Helby, 2002), Taiwan’s Energy Auditing Program, and the U.S. ClimateVISION program (U.S. Department of Energy, 2004).<sup>2</sup>

---

<sup>1</sup> Other analysts have characterized VAs differently, as negotiated agreements, public voluntary programs, and unilateral industrial initiatives (Krarup and Ramesohl, 2002), as voluntary or mandatory (Starzer et al., 2003), or as falling within a four-quadrant scheme that distinguishes between the regulatory and non-regulatory bargaining power of government and industry (Welch and Hibiki, 2003).

<sup>2</sup> Shandong Province, China recently established a pilot voluntary agreement with two steel mills that falls within the “completely voluntary” definition (Price et al., 2003).

**Table 1. Overview of Industrial Sector Voluntary Agreement Schemes**

Country	VA Scheme	Program Years	Incentives								Penalties				
			Government and Public Recognition	Information	Assistance and Training	Energy Audits and Assessments	Financial Assistance and Incentives	Emissions trading	Relief from Adtl Regs/ Exempt from Regs/ Taxes	Reduced/Avoided Energy/GHG Tax	More stringent env. Permitting	Increased regulations	Penalty fee	Energy or CO2 tax	
<b>Completely Voluntary</b>															
Australia	Greenhouse Challenge	1996-present	X	X	X										
Canada	Industry Program for Energy Conservation	1975-2003	X	X	X	X	X								
Finland	Action Programme for Industrial Energy Conservation	1992-1997	X				X								
Finland	Agreements on the Promotion of Energy Conservation in Industry	1997-present	X	X	X	X	X								
France	Voluntary Agreements on CO2 Reductions	1996-2002	X	X	X		X								
Ireland	The Self Audit Scheme	1994-1997	X	X	X										
Korea (S.)	VA System For Energy Conservation & Reduction of GHG Emissions	1998-present	X	X	X		X								
Sweden	EKO-Energi Programme	1994-2002	X	X	X	X									
Taipei (Taiwan)	Energy Auditing Program	2002-2020	X	X	X	X									
US	ClimateVISION	2003-present	X	X	X	X									
<b>Threatened Regulations or Taxes</b>															
France	AERES Negotiated Agreements	2002-present	X		X				X					X	
Germany	Declaration of German Industry on Global Warming Prevention	1995-2000	X												
Germany	Agreement on Climate Protection	2000-2012							X	X					
Japan	Keidanren Voluntary Action Plan on the Environment	1997-present	X												
Netherlands	Long Term Agreements on Industrial Energy Efficiency	1989-2000	X	X	X	X	X		X		X				
Netherlands	Benchmarking Covenants	2001-2012	X	X			X		X		X				
New Zealand	VAs to Limit Carbon Dioxide Emissions	1995-2000	X		X				X						
<b>Energy/GHG Taxes or Regulations</b>															
Canada	Large Final Emitters Program	2003-2012		X	X	X		X	X				X	X	
Denmark	Agreements on Industrial Energy Efficiency	1993-present		X	X	X	X				X				X
Ireland	Negotiated Energy Agreements Pilot Project	2002-2003		X		X	X				X				X
New Zealand	Negotiated Greenhouse Agreements	2003-2012						X			X				X
Switzerland	CO2 Law Voluntary Measures	2000-2012						X			X				X
UK	Climate Change Agreements	2001-2013	X	X	X	X	X	X			X				X

These “completely voluntary” programs are characterized by the use of relatively low-cost incentive programs for participating entities. Typically, these include government and public recognition, provision of information on energy-efficient technologies, and government assistance and training in energy management. Some programs also provide financial assistance and incentives such as free or low-cost energy audits or tax exemptions for the purchase of energy-efficient equipment.

## **Voluntary Agreements with Implied Future Threat of Regulation or Taxation**

Voluntary agreement programs that are based on an implied threat of future regulations or future energy and GHG emissions taxes have also been used in the industrial sector.<sup>3</sup> Such agreements include the recently-enacted AERES Negotiated Agreements in France (Nollet, n.d.), Germany’s Declaration of German Industry on Global Warming Prevention which was strengthened as the Agreement on Climate Protection (Ramesohl and Kristof, 2001; Rensing, 2001), and Japan’s Keidanren Voluntary Action Plan on the Environment (Shoichiro, 1997) which was formulated in response to the implied threat of regulation. The Dutch Long-Term Agreements on Energy Efficiency of the 1990s were recently modified and the new agreements with energy-intensive industries are called Benchmarking Covenants (Kerssemeeckers, 2002; Gerrits and Oudshoff, 2003). New Zealand’s Voluntary Agreements to Limit Carbon Dioxide Emissions program was in place from 1995 to 2000 (New Zealand Climate Change Project, 2001).

These programs are characterized by the use of further incentives (in addition to those commonly used in completely voluntary programs) such as easier environmental permitting procedures, promise of relief from additional regulations, and avoided implementation of energy or GHG emissions taxes. The new French program has also introduced the ability to use emissions trading to reach targets.

## **Voluntary Agreements Within Energy or GHG Tax Programs**

Voluntary agreement programs implemented in conjunction with energy or greenhouse gas emissions taxes or with strict regulations are found in Canada’s recently-introduced Large Final Emitters Program (Natural Resources Canada, 2004), Denmark’s Agreements on Industrial Energy Efficiency (Danish Energy Authority, 2002), Ireland’s new Negotiated Energy Agreements Pilot Project (Brabazon et al., 2003), New Zealand’s new Negotiated Greenhouse Agreements (New Zealand Climate Change Project, 2002), Switzerland’s new carbon dioxide (CO<sub>2</sub>) Law Voluntary Measures (Swiss Federal Office of Energy, 2001), and the United Kingdom’s Climate Change Levy and Agreements (DEFRA, 2004).

---

<sup>3</sup> In addition to the national-level agreements discussed above, two regions of Belgium (Flanders and Wallonia) have established voluntary agreements that fall within this category (Ministry of the Flemish Community, 2003; Odyssee, 2004).

These voluntary agreement programs rely on a combination of some of the incentives used in the previously described programs and also includes the use of penalties for non-compliance such as increased regulations or the application of energy or GHG emission taxes. Many of the more recently established programs allow the use of emissions trading in order for participants to reach their targets.

## **Voluntary Agreement Program Results: Level of Industry Participation**

Industry participation in voluntary agreement programs is motivated by a variety of factors including a desire to influence or pre-empt regulatory policy and to respond to “green” consumer or investor demand, as well as the belief that non-participation and non-performance will lead to more costly regulatory or legislative actions (Welch and Hibiki, 2003).

This review of 23 industrial voluntary agreement programs found that completely voluntary agreement programs typically cover a smaller share of industrial sector energy use or GHG emissions. For example, the completely voluntary Australian Greenhouse Challenge, New Zealand Voluntary Agreements to Limit Carbon Dioxide Emissions, Swedish EKO-Energi program, and U.S. Climate Vision programs all cover less than 50% of their national industrial sector GHG emissions (Australian Greenhouse Office, 1999; Jamieson and Pool, 1999; Berg, 2003; Helby, 2002). In contrast, voluntary agreement programs that are enacted under the threat of future regulation or within energy or GHG tax programs show higher participation levels. For example, companies representing about 90% of industrial GHG emissions participate in the French AERES Negotiated Agreements, Japan’s Keidanren Voluntary Action Plan on the Environment, the Long-Term Agreements on Energy Efficiency and the Benchmarking Covenants in The Netherlands, and the U.K. Climate Change Agreements (Gerrits and Oudshoff, 2003; Keidanren, 2003; Nollet, n.d.; Kerssemeeckers, 2002; Huddleston, 2003a; Huddleston, 2003b).

## **Voluntary Agreement Program Results: Energy Savings and GHG Emissions Reductions**

Many of the completely voluntary programs either did not meet their target emission reduction goals or could not sufficiently evaluate their savings to determine if the goals were met. For example, the results of Sweden’s program could not be measured (Linden and Carlsson-Kanyama, 2002). In Finland, it was reported that the program “did not lead to desired activation” and that it was impossible to evaluate the result of the program in terms of energy savings due to poor monitoring (Hansen and Larsen, 1999; Lahti-Nuutila, 1998). The targets in the French Voluntary Agreements on CO<sub>2</sub> Reductions program are generally believed to have been only modestly ambitious and evaluations found that “...the observed reduction in specific emissions appears to correspond to industry's business-as-usual behavior” (Chidiak, 2002.). Participants in Australia’s Greenhouse Challenge achieved emissions 14% below business-as-usual, but did not reach their stated target (Australian Greenhouse Office, 1999). Among completely voluntary agreement programs, Canada’s Industry Program for Energy

Conservation stands out as one that was more successful, possibly due to the extensive coverage of its various program components (The Canadian Chamber of Commerce, 2002).

In contrast, the programs that threatened to or did implement regulations or taxes were in general more successful in meeting their stated goals. In The Netherlands the Long Term Agreements achieved an energy efficiency improvement of 22.3% between 1989 and 2000, surpassing the 20% goal (Gerrits and Oudshoff, 2003). In the UK, actual savings were almost three times above the target in 2002 (DEFRA, 2003). In Denmark's Agreements on Energy Efficiency, the industrial sector is projected to meet its target of reducing emissions by 4.6% (from the 1988 level) in 2005 (Togebly et al., 1998). Ireland's 18-month long pilot program was considered successful with an annual CO<sub>2</sub> emission reduction of 640,000 tonnes (Brabazon et al., 2003).

## **Summary and Conclusions**

This survey shows that voluntary agreement programs that are completely voluntary have less government pressure for participation, along with fewer incentives and no penalties. As a result, most programs that fall within this category show lower participation rates and weaker results. In contrast, programs that threatened to or did implement regulations or taxes often included additional incentives such as the ability to participate in emissions trading, relief from additional regulations or exemption from existing regulations, and reduced or avoided energy or GHG taxes. Some of these programs also included penalties such as a fee, more stringent environmental permitting requirements, increased regulations, and energy or GHG taxes for those companies that failed to meet their targets. As a result of this combination of incentives and penalties, these programs had higher participation rates and generally were more successful at meeting their energy or GHG emissions reduction goals.

It is interesting to note that a number of countries that first established strictly voluntary agreements have strengthened their programs in a second or follow-on phase. In France, for example, the completely voluntary program enacted in 1996 was replaced in 2002 with a program that includes a penalty fee for non-compliance and allows for emissions trading (Nollet, n.d.). Similarly, the voluntary Canadian program evolved into a new program for the larger CO<sub>2</sub> emitters that also has a penalty fee, allows for emissions trading, and includes financial support from the government for investments in wind energy, audit programs, benchmarking, and CO<sub>2</sub> capture and storage (NRCan, 2004). Ireland's voluntary program of the 1990s has been replaced by a program that includes a CO<sub>2</sub> tax (Brabazon et al., 2003). Other countries that have a second generation of agreements, including Finland, Germany, The Netherlands, and New Zealand, all either increased the number of incentives or added penalties to strengthen the programs.

Overall, evaluations of experience with voluntary agreements show that results have been varied, with some programs appearing to just achieve business-as-usual savings (Chidiak, 2002; OECD, 2002) or to have weak targets (Butterman and Hillebrand, 2000). However, the more successful programs have seen significant energy savings

(Bjørner and Jensen, 2002), even doubling historical autonomous energy efficiency improvement rates (Reitbergen et al., 2002) and can be cost-effective (Phylipsen and Blok, 2002). These agreements have important longer-term impacts including changes of attitudes and awareness of managerial and technical staff regarding energy efficiency, addressing barriers to technology adoption and innovation, establishing greater potential for sustainable energy-efficiency investments, promoting positive interactions between different actors involved in technology research and development, deployment, and market development, and facilitating cooperative arrangements that provide learning mechanisms within an industry (Delmas and Terlaak, 2000; Dowd et al., 2001). The most effective agreements are those that are legally binding, set realistic targets, include sufficient government support – often as part of a larger environmental policy package, and include a real threat of increased government regulation or energy/GHG taxes if targets are not achieved (Bjørner and Jensen, 2002; Karup and Ramesohl, 2002).

Voluntary agreements have a further benefit that is not often discussed in evaluations. These programs, through their requirements for companies to measure, monitor, and manage energy use or GHG emissions, lay the foundation for eventual participation in emissions trading programs. Companies that understand and have experience managing energy use or emissions are more likely to feel comfortable with emissions trading programs.<sup>4</sup> The European Union's Emissions Trading Scheme (EU-ETS) that went into effect in January 2005 includes nine countries whose industries already had experience managing their emissions through voluntary agreement programs and these were some of the first countries to submit their national allocation plans (Europa, 2005). There are issues, however, related to the connection between the EU-ETS and voluntary agreements. The EU-ETS does not include all equipment within the industrial sector (e.g. only boilers over 20 MW are included in the chemical and food industries) and does not include electricity efficiency measures within the industrial sub-sectors (Bertoldi et al., 2003). The goals in the Dutch Benchmarking Covenants are more aggressive than the EU-ETS (Worrell, 2005). In Belgium, the voluntary agreements are linked to the EU-ETS (Phylipsen, 2005), but in Germany it appears that the voluntary agreements may be dissolved (Wartmann, 2005).

International experience shows that voluntary agreements are an innovative and effective means to motivate industry to improve energy efficiency and reduce related emissions, if implemented within a comprehensive and transparent framework (IEA, 1997a; IEA, 1997b). This survey demonstrates that it is possible to obtain experience initially with voluntary agreement programs that are completely voluntary and that do not require significant supporting policies from the government, but that if real results are desired the agreement programs must be strengthened, as was done in a number of countries in the early 2000s. This survey also shows that there is interest in voluntary agreements in Chinese Taipei (Taiwan) as well as mainland China and that the U.S. has recently implemented a completely voluntary agreement program. The spread of this

---

<sup>4</sup> Many of the companies participating in emissions trading through the Chicago Climate Exchange, such as Dow, DuPont, and IBM, have been measuring, monitoring, and managing their company GHG emissions for a number of years (CCX, 2005; Margolick and Russell, 2001).



policy mechanism will provide more lessons learned and alternative models for realizing significant energy savings or GHG emissions reductions from industry.

## Acknowledgments

I would like to thank the Energy Foundation's China Sustainable Energy Program for providing on-going support for my research on voluntary agreements (called energy efficiency agreements in China) as well as my summer student intern, Annalise Blum, for her helpful assistance on this paper.

## References

- Australian Greenhouse Office. 1999. *Greenhouse Challenge Evaluation Report*. Canberra. <http://www.greenhouse.gov.au/challenge/about/pubs/evaluation.pdf>
- Australian Greenhouse Office. 2003. *Greenhouse Challenge: Implementation Plan 2003*. Canberra. <http://www.greenhouse.gov.au/challenge/about/index.html>
- Avasoo, D. and Ugglå, U. n.d. *EKO-Energi – Successful Voluntary Agreements on Energy Efficiency and Environmental Control in Swedish Industry*. [http://www.eceee.org/library\\_links/proceedings/2001/pdf2001/panel1/01p1\\_1\\_216ak.pdf](http://www.eceee.org/library_links/proceedings/2001/pdf2001/panel1/01p1_1_216ak.pdf)
- Berg, D. U.S. Department of Energy, 2004. Personal communication.
- Bertoldi, P. 1999. "The Use of Long Term Agreements to Improve Energy Efficiency in the Industrial Sector: Overview of the European Experiences and Proposal for a Common Framework" *Proceedings of the ACEEE 1999 Summer Study on Energy Efficiency in Industry*. Washington, D.C.: American Council for an Energy-Efficient Economy.
- Bertoldi P., Starzer O., Sattler, M. 2004. "Combining Long Term Agreements with Emissions Trading: An Overview of the Current EU Energy Efficiency Policies for the Industrial Sector and a Proposal for a New Industrial Efficiency Policy," *Proceedings of the ACEEE 2003 Summer Study on Energy Efficiency in Industry*. Washington, DC: American Council for an Energy-Efficient Economy.
- Bjørner, T.B. and Jensen, H.H. 2002. "Energy Taxes, Voluntary Agreements and Investment Subsidies - A Micro Panel Analysis of the Effect on Danish Industrial Companies' Energy Demand." *Resource and Energy Economics* 24(3): 229-249.
- Bjørner, T.B. and Togeby, M. 1999. "Industrial Companies' Demand for Energy Based on a Micro Panel Database – Effects of CO<sub>2</sub> Taxation and Agreements in Energy Savings," in *Energy Efficiency and CO<sub>2</sub> Reduction: The Dimensions of Social Change: 1999 European Council for an Energy-Efficient Economy Summer Study*, May 31-June 4, Mandelieu, France.

- Brabazon, P., Parish, A., Greer, H., Motherway, B., Hughes, C., Gaughan, K., and Connor, W. 2003. *Negotiated Energy Agreements Pilot Project – Final Report*. Dublin: Sustainable Energy Ireland.
- Butterman H. G. and Hillebrand B. 2000. *Third Monitoring Report: CO2 Emissions in German Industry 1997-1998*, RWI Papiere 70. <http://www.rwi-essen.de>
- Canadian Chamber of Commerce. 2002. *Canadian Industry Program for Energy Conservation*. <http://www.chamber.ca/cmslib/general/E021.pdf>
- Chicago Climate Exchange (CCX). 2005. *Members of the Chicago Climate Exchange*. <http://www.chicagoclimatex.com/about/members.html>
- Chidiak, M. 2002. “Lessons from the French Experience with Voluntary Agreements for Greenhouse Gas Reduction” *Journal of Cleaner Production* 10(2).
- Danish Energy Authority. 2002. *Voluntary Agreements on Energy Efficiency- Danish Experiences*. Copenhagen: DEA.  
[http://www.ens.dk/graphics/publikationer/energibesparelser\\_uk/EnergyEfficiency/voluntary\\_agreements.pdf](http://www.ens.dk/graphics/publikationer/energibesparelser_uk/EnergyEfficiency/voluntary_agreements.pdf)
- Department for Environment, Food, and Rural Affairs (DEFRA). 2003. “Big CO2 Cuts Beat Industry Climate Change Targets,” *News Release*, 7 April, 2003. <http://www.defra.gov.uk/news/2003/030407a.htm>
- Delmas, M. and Terlaak, A.. 2000. “Voluntary Agreements for the Environment: Innovation and Transaction Costs,” *CAVA Working Paper* 00/02/13, February.
- Dowd, J., Friedman, K, and Boyd, G. 2001. “How Well Do Voluntary Agreements and Programs Perform At Improving Industrial Energy Efficiency,” *Proceedings of the 2001 ACEEE Summer Study on Energy Efficiency in Industry*. Washington, DC: American Council for an Energy-Efficient Economy.
- Europa. 2005. *Emissions Trading – National Allocation Plans*. Climate Change Homepage. [http://europa.eu.int/comm/environment/climat/emission\\_plans.htm](http://europa.eu.int/comm/environment/climat/emission_plans.htm)
- Gerrits, R. and Oudshoff, B. 2003. *Energy Efficiency through Long-Term Agreements: Broadening the Horizon in the New LTA Approach*. [http://www.lta.novem.org/download/aceee\\_2003\\_72\\_lta.pdf](http://www.lta.novem.org/download/aceee_2003_72_lta.pdf)
- Hansen, K. and Larsen, A. 1999. "Voluntary Agreements in Industry: A Comparative Description of the Process and a Normative Analysis," *Proceedings of the 1999 ACEEE Summer Study on Energy Efficiency in Industry*.

- Helby, P. 2002. "EKO-Energi - a Public Voluntary Programme Targeted at Swedish Firms with Ambitious Environmental Goals" *Journal of Cleaner Production* 10(2).
- Huddleston, J. 2003a. Personal communication, December 9, 2003.
- Huddleston, J. 2003b. *Climate Change Agreements – Results of the First Target Period Assessment*. Harwell, Oxfordshire, UK: AEA Technology.
- International Energy Agency. 1997a. *Voluntary Actions for Energy-Related CO<sub>2</sub> Abatement*. Paris: OECD/IEA
- International Energy Agency. 1997b. *Voluntary Approaches for Mitigating Greenhouse Gas Emissions*. Conference Proceedings, Bonn, Germany 30-31 October 1995. Paris: OECD/IEA.
- International Energy Agency. 2001. *Industry Cooperation to Improve Energy Efficiency Through Voluntary Action: Programme Fact Sheet- Finland*. <http://spider.iea.org/workshop/gov/govppf.pdf>
- Jamieson, T. and Pool, F. 1999. *Voluntary Agreements to limit Carbon Dioxide Emissions*. Wellington, New Zealand: The Institution of Professional Engineers New Zealand. <http://www.ema.org.nz/webDocuments/papers/jamieson1996.pdf>
- Krarup, S. and Ramesohl, S. 2000. "Voluntary Agreements in Energy Policy-- Implementation and Efficiency." Kobenhavn: AKF Forlaget.
- Keidanren. 2003. "Results of the Fiscal 2003 Follow-up to the Keidanren Voluntary Action Plan on the Environment." <http://www.keidanren.or.jp/english/policy/2003/113/report.pdf>
- Kerssemeeckers, M. 2002. *The Dutch Long Term Voluntary Agreements on Energy Efficiency Improvement in Industry*. Utrecht, The Netherlands: Ecofys.
- Korean Energy Management Corporation. n.d., *Guide to Voluntary Agreement System For Energy Conservation and Reduction of Greenhouse Gas Emission*. Gyeonggi: KEMC, [http://www.kemco.or.kr/kemco\\_plaza/pds\\_eng/pdsfile/VAbrochure.doc](http://www.kemco.or.kr/kemco_plaza/pds_eng/pdsfile/VAbrochure.doc)
- Lahti-Nuutila, T. 1998. "Long Term Agreement System - Finnish Model for a Voluntary Measure of Energy Efficiency in Industry". *European Conference on Industrial Energy Efficiency: Success Stories*, Vienna, 8-10 July 1998.
- Linden, A. and Carlsson-Kanyama, A. 2002. "Voluntary Agreements—a Measure for Energy-Efficiency in Industry? Lessons from a Swedish programme." *Energy Policy* 30 (10).

- Margolick, M. and Russell, D. 2001. *Corporate Greenhouse Gas Reduction Targets*. Washington, DC: Pew Center on Global Climate Change.
- Ministry of the Flemish Community, Administration Economy, Division Natural Resources and Energy. 2003. *Energy Policy in Flanders*. Brussels. [http://www.nrg4sd.net/Download/SD/Energy\\_Policy.pdf](http://www.nrg4sd.net/Download/SD/Energy_Policy.pdf)
- Natural Resources Canada. 2004. *Large Final Emitters Policy Framework*. Calgary, Canada: NRCAN. [http://www.ieta.org/Members\\_Section/Working\\_Groups/WG\\_Canada/NRCAN\\_Calgary\\_0504.PDF](http://www.ieta.org/Members_Section/Working_Groups/WG_Canada/NRCAN_Calgary_0504.PDF)
- Natural Resources Canada. 2002. *Canadian Industry Program for Energy Conservation 2000/2001 Annual Report*. Ottawa: NRCAN. [http://oee.nrcan.gc.ca/cipec/ieep/newscentre/AnnualReport00\\_01/AnnualReport00\\_01.pdf](http://oee.nrcan.gc.ca/cipec/ieep/newscentre/AnnualReport00_01/AnnualReport00_01.pdf)
- New Zealand Climate Change Project. 2002. *Negotiated Greenhouse Agreements Consultation Paper*. New Zealand Climate Change Office. <http://www.climatechange.govt.nz/resources/consultation/nga-projects/nga-consultation-paper.pdf>
- New Zealand Climate Change Project. 2001. *Climate Change Working Paper: The Use of Projects, Negotiated Greenhouse Agreements and Levies to Reduce Greenhouse Gas Emissions*. Wellington, New Zealand. <http://www.climatechange.govt.nz/resources/reports/projects-etc-oct01.pdf>
- Natural Resources Canada. 2004. *Large Final Emitters Policy Framework*. Calgary: NRCAN. [http://www.ieta.org/Members\\_Section/Working\\_Groups/WG\\_Canada/NRCAN\\_Calgary\\_0504.PDF](http://www.ieta.org/Members_Section/Working_Groups/WG_Canada/NRCAN_Calgary_0504.PDF)
- Mollet. n.d. AERES: *Association des Entreprises pour la Reduction de l'Effet de Serre*. [www.ceps.be/files/TF/NolletAERES.ppt](http://www.ceps.be/files/TF/NolletAERES.ppt)
- ODYSSEE. 2004. *Energy Efficiency Profile: Belgium*. <http://www.odyssee-indicators.org/Publication/country%20profiles%20PDF/bel.pdf>
- Organization for Economic Cooperation and Development. 2002. *Voluntary Approaches for Environmental Policy: Effectiveness, Efficiency and Use in Policy Mixes*, OECD, Paris.
- Phylipsen G. J. M. and Blok, K. 2002. "The Effectiveness of Policies to Reduce Industrial Greenhouse Gas Emissions" *AIXG Workshop on Policies to Reduce Greenhouse Gas Emissions in Industry – Successful Approaches and Lessons Learned*. 2-3 December 2002, Berlin.
- Phylipsen, D. 2005. Personal communication.

- Price, L. Jiang, Y., Worrell, E., Du, W., Sinton, J.E. 2003. *Development of an Energy Conservation Voluntary Agreement Pilot Project in the Steel Sector in Shandong Province: Report to the State Economic and Trade Commission, People's Republic of China*. Berkeley, CA: Lawrence Berkeley National Laboratory (LBNL-51608).
- Ramesohl, S. and Kristof, K. 2001. "The Declaration of German Industry on Global Warming Prevention—A Dynamic Analysis of Current Performance and Future Prospects for Development," *Journal of Cleaner Production* 9 (5).
- Ressing, W. 2001. *IEA Workshop on Government- Industry Cooperation Washington, DC – February 22, 2001*. Bonn, Germany: Federal Ministry of Economics and Technology. <http://spider.iea.org/workshop/gov/gobwrf.pdf>
- Reitbergen, M.J., Farla, J.C.M., Blok, K. 2002. Do Agreements Enhance Energy Efficiency Improvement? Analyzing the Actual Outcome of the Long-Term Agreements on Industrial Energy Efficiency Improvement in The Netherlands. *Journal of Cleaner Production* 10 (2002): 153-163.
- Shoichiro, T. 1997. *Outline of Keidanren Voluntary Action Plan on the Environment*. Japan Federation of Economic Organizations (Keidanren), <http://www.keidanren.or.jp/english/policy/pol058/intro.html>
- Starzer, O. 2000. *Negotiated Agreements in Industry: Successful Ways of Implementation*. Vienna: Austrian Energy Agency. <http://www.eva.ac.at/publ/pdf/eebw.pdf>
- Swiss Federal Office of Energy. 2001. *Guidelines on Voluntary Measures to Reduce Energy Consumption and CO2 Emissions*. Berne: SFOE.
- Togoby, M., Bjorner, T.B., and Johannsen, K. 1998. "Evaluation of the Danish CO2 Taxes and Agreements," in Martin et al., (eds.) *Industrial Energy Efficiency Policies: Understanding Success and Failure: Proceedings of a Workshop Organized by the International Network for Energy Demand Analysis in the Industrial Sector*. Utrecht, The Netherlands, June 11-12, 1998. (LBNL-42368).
- U.S. Department of Energy. 2004. *ClimateVISION: Voluntary Actions to Reduce Greenhouse Gas Emissions in the United States*, <http://www.climatevision.gov/>
- Wartmann, S. 2005. Personal communication.
- Welch, E. and Hibiki, A. 2003. "An Institutional Framework for Analysis of Voluntary Policy: The Case of Voluntary Environmental Agreements in Kita Kyushu, Japan," *Journal of Environmental Planning and Management*, 46(4): 523-543.
- Worrell, E. 2005. Personal communication.



# **Voluntary Agreements for Energy Efficiency and GHG Emissions Reduction in Industry: An Assessment of Programs Around the World**

Lynn Price  
International Energy Studies  
Energy Analysis Department  
Environmental Energy Technologies Division  
Lawrence Berkeley National Laboratory

ACEEE Summer Study on Energy Efficiency in Industry

20 July 2005

---

# Introduction

---



- Many types of voluntary agreements found around the world
    - Environmental voluntary agreements - over 300 have been negotiated between national governments and industry in Europe
    - NGO agreement programs – such as PEW’s Business Environmental Leadership Council, WWF’s Climate Savers
    - Government programs focused on individual companies – such as US EPA’s Climate Leaders
  - Focus of this talk is on:
    - National-level agreement programs
    - Agreements between industrial companies and/or associations and governments
    - Agreements that address energy consumption or greenhouse gas emissions
-

# Motivation

---



- Need for variety of policy mechanisms to address energy use and GHG emissions reduction in industrial sector
  - Much experience, but...
    - Mixed results, so need to understand characteristics of more successful programs
    - Limited comparative studies
  - Effective framework for understanding and managing energy and GHG emissions
    - Industries that have had such experience may be more likely to participate in emissions trading schemes
  - Agreement programs can be designed to meet specific country needs and conditions
-



# Current Situation

---



- Over 20 energy/GHG voluntary agreement programs around the world
  - First programs began in the early 1990s
  - Many different designs
  - Older programs have evolved; new programs still being introduced
- Countries designing voluntary agreement programs would like to learn from the experience, but...
  - Evaluations are typically just for a single program (some multi-program evaluations were done in Europe)
  - It is difficult to make comparisons due to different baselines, types of targets, program designs, etc.



# General Characterization

---



- Completely voluntary
    - Participation is at the discretion of the participating entity
    - No serious pressure exerted by government compelling the entity to join
    - No consequences for not reaching stated goals
    - Array of relatively “soft” supporting policies provided by the government
  - Voluntary, but...
    - Implied threat of future regulation
    - Implied or actual consequences for not meeting targets
    - Additional supporting policies offered by the government
  - Energy/GHG taxes or strict regulations
    - Participation is virtually mandatory
    - Penalties for not reaching stated goals
-

# Completely Voluntary

---



- Australia: Greenhouse Challenge
  - Canada: Industry Program for Energy Conservation
  - Finland: Action Programme for Industrial Energy Conservation and Agreements on Industrial Energy Conservation Measures
  - France: Voluntary Agreements on Carbon Dioxide Reductions
  - Ireland: Self Audit Scheme
  - South Korea: Voluntary Agreement System for Energy Conservation and Reduction of GHG Emissions
  - Sweden: EKO-Energi Programme
  - Republic of China (Taiwan): Energy Auditing Program
  - U.S.: ClimateVISION
-

# Voluntary, but...

---



- Germany: Declaration of Industry on Global Warming Prevention
    - Industries made a unilateral declaration with the expectation that government policy would give priority to voluntary initiatives over regulatory or fiscal climate instruments
  - Netherlands: Long-Term Agreements on Industrial Energy Efficiency
    - In exchange for a commitment to “improve energy-efficiency as far as practically and economically feasible,” the Dutch government agreed not to introduce new regulations on energy-efficiency
  - Netherlands: Benchmarking Covenants
    - If an enterprise fails to meet its obligations under the agreement, the authorities will terminate the agreement and begin the process to tighten the facility’s environmental license or to apply other instruments.
  - New Zealand: VAs to Limit Carbon Dioxide Emissions
    - Industries participated in the agreements in an effort to delay or defer a low-level carbon charge that was being proposed at the time
-

# VAs: Taxes or Regulations

---



- Canada: Large Final Emitters Program
    - Mandatory reporting of GHG emissions by Canada's largest emitters (mining and manufacturing, oil and gas, and thermal electricity sectors)
    - Emissions targets determined by the government – companies can reduce emissions through energy efficiency, domestic or international offsets, domestic emissions trading, or investment in energy efficiency technology fund
  - Denmark: Agreements on Industrial Energy Efficiency
    - CO<sub>2</sub> (fuel) tax – reduced tax rates for industries that enter into agreements (e.g. heavy process industries with no agreement = €3.40 per ton CO<sub>2</sub>, with agreement €0.40 per ton CO<sub>2</sub>)
  - Ireland: Negotiated Energy Agreements Pilot Project
    - Government plans to introduce an energy/GHG tax in 2005
    - Industries that sign agreements are exempt from tax, but must participate in energy audits and implement actions with 5 year or less paybacks (with a price cap of 20% of annual energy costs)
-

# VAs: Taxes or Regulations

---



- New Zealand: Negotiated Greenhouse Agreements
    - In exchange for entering a binding agreement between a firm and the Government that commits the firm to moving towards world's best practice in managing greenhouse gas emissions, the Government provides a full or partial exemption from the emissions charge that is to be introduced by 2008.
  - Switzerland: CO2 Law Voluntary Measures
    - CO2 law (2000) – if voluntary measures to reduce CO2 emissions are insufficient to meet the country's reduction goals, then a CO2 tax will be introduced
    - If tax is introduced, energy-intensive companies can be exempt if they reach specified reduction targets
  - UK: Climate Change Agreements
    - CO2 Climate Change Levy for industry
    - Companies can negotiate Climate Change Agreements – if they meet their targets, then they receive an 80% discount on the levy
-

# Government Incentives and Penalties

---



- Completely voluntary:
    - Government and public recognition
      - Use of logos for products and corporate information
      - Recognition of members through media coverage
    - Information on energy efficiency and GHG emissions mitigation measures
      - Newsletters, case studies, workbooks, web-based emissions calculators, reporting templates
      - Business networks that hold share information, hold workshops and conferences
    - Energy audits and assessments
    - Assistance in preparing inventories, identifying opportunities, developing energy-saving plans
    - Financial assistance and incentives
-

# Government Incentives and Penalties

---



- Voluntary, but...
    - Includes many of the incentives offered within the voluntary programs
    - Relief from additional regulations or exemptions from regulations
    - Penalties for non-compliance: stricter environmental permitting, penalty fees
  - Taxes and Regulations
    - Includes many of the incentives offered within the voluntary programs
    - Reduced or avoided energy/GHG taxes
    - Emissions trading – allowed for meeting targets (Canada, New Zealand, Switzerland, UK)
    - Penalties for non-compliance: energy or CO2 tax
-



# Participation Levels

---



- Completely voluntary:
    - Sometimes less than 50% of national industrial sector emissions
      - Australian Greenhouse Challenge (46%)
      - Swedish EKO-Energi program (10-15% industrial energy consumption)
  - Voluntary, but... and Taxes and Regulations
    - Often 90% or more of industry sector emissions
      - Netherlands Long-Term Agreements (90% industrial energy consumption), Benchmarking Covenants even higher
      - UK Climate Change Agreements (90% of industrial emissions)
-

# Energy Savings and GHG Emissions Reductions

---



- Completely voluntary:
    - Many did not meet target emission reduction goals
      - Australia Greenhouse Challenge – did not reach stated target
      - France Voluntary Agreements on Carbon Dioxide Reductions – “the observed reduction in specific emissions appears to correspond to industry’s business-as-usual behavior, suggesting that VA objectives were poorly ambitious”
      - Finland Action Programme for Industrial Energy Conservation – goals were not achieved
    - Others could not evaluate their savings to determine if goals were met
      - Sweden EKO-Energi Programme - Since reporting methods were never clearly defined, results of Sweden’s program could not be measured
-

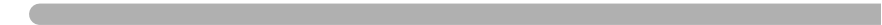
# Energy Savings and GHG Emissions Reductions

---

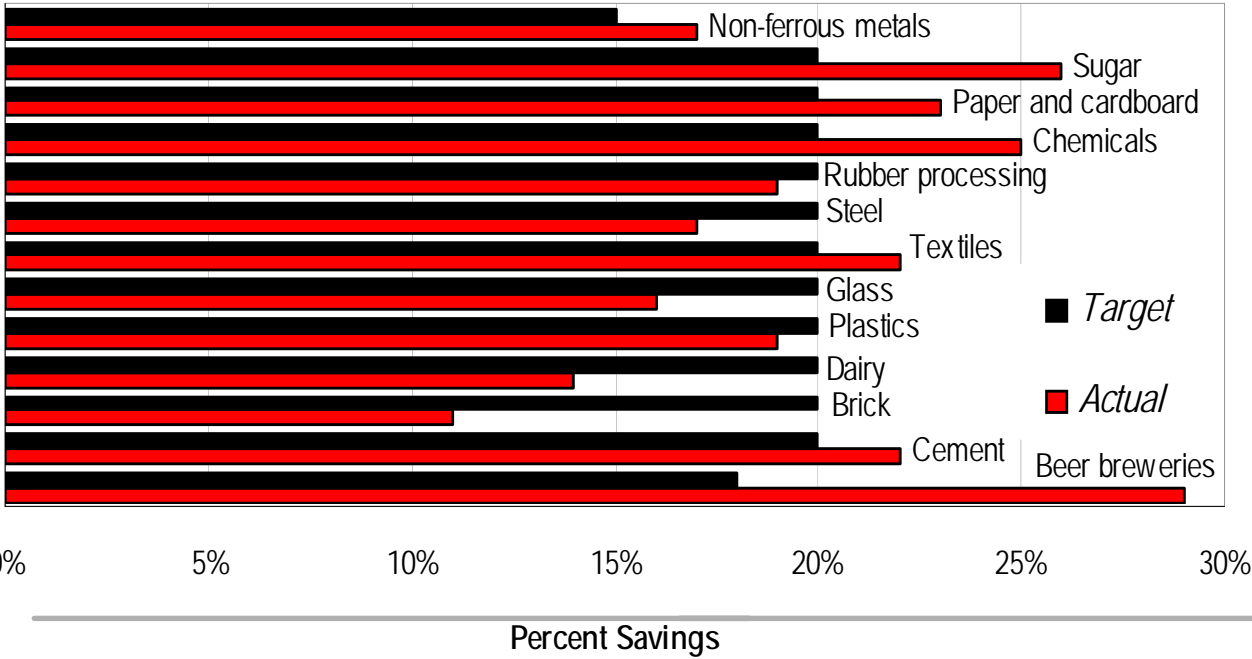
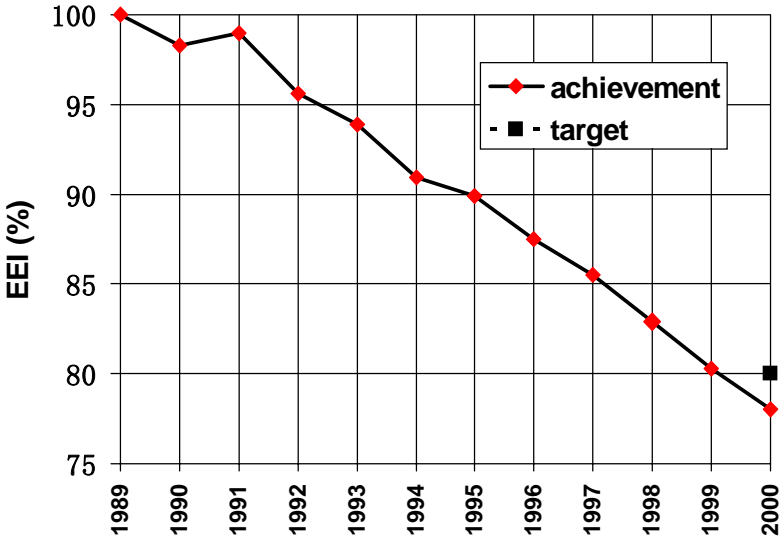


- Voluntary, but...
    - New Zealand VAs to Limit Carbon Dioxide Emissions: Industry signatories are on track to achieve their combined target of a 17% reduction in CO<sub>2</sub>, against a ‘frozen efficiency’ baseline, by 2000”
    - Netherlands Long-Term Agreements: Goal was to increase energy efficiency by 20% over a 10-year period; actual savings were 22.3%
-

# Voluntary Agreements: Netherlands Experience



22.3% savings over 10-year period  
 2x business-as-usual



29 sectors signed  
 Agreements

Many met or  
 exceeded the  
 target

# Energy Savings and GHG Emissions Reductions

---



- Taxes and Regulations
    - Denmark: Exceeded business-as-usual by about 1% per year
    - UK Climate Change Agreements:
      - During the first target period (2001-2002) total reductions of 4.3 MtC were realized, which was three times higher than the target for that period
      - Sectors did better than expected because industry underestimated what they could achieve via energy efficiency.
      - When negotiating the targets, most companies believed that they were already energy-efficient.
      - When they actually managed energy because of the CCA targets, companies saved more than they thought that they could, especially through improved energy management
-

## Voluntary Agreements: Trends

---



- 1990s: 12 initial VA programs in Australia, Canada, Denmark, Finland, France, Germany, Ireland, Japan, Netherlands, New Zealand, Republic of Korea, Sweden
  - 2000s: 8 strengthened VA programs in Australia, Canada, France, Germany, Ireland, Netherlands, New Zealand, Sweden
  - 2000s: 5 new VA programs in Belgium, Chinese Taipei, Switzerland, U.K., U.S.
  - Of these, most of the 1990s programs were primarily voluntary (exceptions are Netherlands and Denmark), while many of the 2000s programs ensure participation through implied or explicit threat of future regulation and/or association with energy or carbon taxes
  - Emissions trading is a component of 5 programs: Canada, France, New Zealand, Switzerland, and UK
-



# Voluntary Agreements: Developing Countries

---



- India: Bureau of Energy Efficiency has established Task Groups for textiles, cement, pulp and paper, fertilizer, chlor-alkali and aluminum sectors. Industry members participate in this project to share information about best practices, declare their voluntary targets and adopt benchmarks for their processes
  - Chile: 22 Acuerdos de Producción Limpia (Clean Production Agreements) focused on various environmental issues – interest expressed in establishing agreements on energy efficiency
  - China: pilot project with two steel mills in Shandong Province; being extended through a UNDP/GEF project to more steel mills, cement sector, petrochemical sector
-



# Voluntary Agreements: China

Voluntary agreements between Shandong Economic and Trade Commission  
and Laigang and Jigang were signed on April 24, 2003



# Summary

---



- Overall, results have been varied
    - Some programs just achieve business-as-usual or have weak targets
    - Some have significant energy savings, even doubling historical autonomous energy efficiency improvement rates
  - Important long-term impacts
    - Changes in attitudes and awareness of managerial and technical staff regarding energy efficiency
    - Remove barriers to technology adoption and innovation
  - Most effective programs
    - Are legally binding
    - Set realistic targets
    - Include sufficient government support
    - Include real threat of increased government regulation or energy/GHG taxes if targets are not achieved
-

## For More Information...

---



LBNL Industrial website:

<http://ies.lbl.gov/ieua/ieua.html>

Lynn Price

[LKPrice@lbl.gov](mailto:LKPrice@lbl.gov)

(510) 486-6519

---