

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

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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.¹ 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 Ugglå, n.d.; Helby, 2002), Taiwan’s Energy Auditing Program, and the U.S. ClimateVISION program (U.S. Department of Energy, 2004).²

¹ 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).

² 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 Addtl Regs/ Exempt from Regs/ Taxes	Reduced/Avoided Energy/GHG Tax	More stringent env. Permitting	Increased regulations	Penalty fee	Energy or CO2 tax	
Completely Voluntary															
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									
Threatened Regulations or Taxes															
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						
Energy/GHG Taxes or Regulations															
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.³ 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; Ressing, 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 (CO₂) Law Voluntary Measures (Swiss Federal Office of Energy, 2001), and the United Kingdom’s Climate Change Levy and Agreements (DEFRA, 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.

³ 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).

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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ capture and storage (NRCan, 2004). Ireland's voluntary program of the 1990s has been replaced by a program that includes a CO₂ 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.⁴ 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 policy mechanism will provide more lessons learned and alternative models for realizing significant energy savings or GHG emissions reductions from industry.

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⁴ 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).

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