



Complementary measures for decarbonisation

Looking beyond pricing and
regulation to motivate
private businesses
and state-owned
enterprises



Discussions about measures to promote energy sector decarbonisation have traditionally focused on carbon pricing mechanisms and government regulations. But other measures to reduce greenhouse gas (GHG) emissions are also being used with businesses to complement these more traditional policy approaches, notably voluntary programmes and government directives to state-owned enterprises (SOEs). These “complementary measures” can play a key role in motivating businesses to decarbonise.

Businesses and governments around the world – in China, Japan, Europe, the United States and elsewhere – are taking various actions, beyond pricing and regulations, to promote decarbonisation. In some countries, imposing a robust carbon price or stringent regulations has not been feasible due to institutional and/or political constraints. In others, the presence of SOEs in emitting industries may impede effective implementation of a carbon price, in part because SOEs do not always respond to economic incentives the way that profit-maximising enterprises do. A range of complementary measures exists to motivate decarbonisation actions by businesses. This brief highlights two distinct sets: voluntary actions by businesses, and government shareholder influence over SOEs.

Voluntary programmes to drive action by businesses

Voluntary programmes involving business and government

These programmes often result from negotiations between government and industry associations or other business groups (often undertaken within the context of a national emissions reduction policy). The programmes typically set out explicit targets on emissions or indirectly address emissions through energy efficiency goals. Although these arrangements lack the force of law, their voluntary nature supports business-government collaboration in decarbonisation efforts.

Individual and collaborative business programmes

Businesses of all sizes across a range of sectors are adopting programmes to reduce GHG emissions. Some of these actions are taken by businesses individually, for example by retailers to decarbonise their supply chains. In other cases, businesses collaborate with one another (e.g. through business coalitions) as well as with civil society organisations. These programmes reflect the convergence of commercial interests with climate change action.

Government control of SOEs: Wielding public shareholder power

Perhaps one of the most important – and overlooked – means by which governments promote decarbonisation action is through their capacity as public shareholders in state-owned energy and energy-intensive enterprises, and their attendant ability to direct or otherwise influence SOE actions.

In China, India, Latin America, Europe and elsewhere, many electric utilities and oil and gas producers, as well as large energy users, are state-owned. The International Energy Agency (IEA) estimates that approximately 50% of electricity generating capacity worldwide is under government control. The decarbonisation actions of these SOEs have often been driven by formal and informal directives or other incentives from their government shareholder.

Government shareholder power can also encourage greater engagement in emissions trading systems and more active responsiveness to other measures such as technology support programmes.

Because SOEs are heterogeneous in terms of the market structure and corporate culture in which they operate, the ability and willingness of governments to wield this type of shareholder power will vary.

Given the depth of decarbonisation required for a low-carbon future and the central role that businesses will need to play, strengthening complementary measures that target business engagement can increase emissions mitigation. Businesses are increasingly recognising that commercial and profit interests can converge with decarbonisation efforts, and this helps drive voluntary actions. For SOEs required to respond to non-financial mandates (such as national development goals), government shareholder power is particularly relevant.

1. Voluntary programmes by businesses to decarbonise

Businesses, working with governments or on their own, have developed a variety of programmes to encourage decarbonisation. These programmes target emissions directly, or indirectly, for example through energy efficiency goals. They fall into two main categories: partnerships between businesses and government, and those in which businesses act on their own. To promote learning and disseminate information about these approaches, the IEA organised workshops in January and June 2015 that brought together speakers and participants from the private sector, government, non-governmental organisations (NGOs) and the research community.¹

1.1 Voluntary business programmes involving government (joint public-private approaches)

Governments and businesses are working together on voluntary programs in several principal forms:²

- **Government-sponsored voluntary programmes.** These are purely voluntary as there is no requirement for private entities to join and no penalty for non-participation. Participation is incentivised through government support such as rewards and recognition, technical assistance and training, and information sharing.
- **Voluntary agreements as a major complement to mandatory government regulations.** Participants in these agreements (widely used in Europe) can use them as a mode of partial compliance with the larger mandatory policy, for example to gain carbon tax or levy reductions, or exemptions from binding energy regulations.
- **Voluntary agreements as a policy instrument in government mitigation plans.** These types of agreements involve a wide range of companies and industries (as in Japan and Taiwan).

In some cases, voluntary programmes are developed with the potential for firmer government regulation if the voluntary approach is unsuccessful.

Table 1: Voluntary programmes and negotiated agreements

Type of programme/agreement	Examples	Defining attributes
Government-sponsored voluntary programmes	US EPA-led programmes (e.g. Energy Star, CHP Partnership) ³	Public agencies define eligibility, rewards, obligations, etc.; low-cost incentives encourage participation
Voluntary agreements as a major complement to mandatory government regulations	UK Climate Change Agreements; Dutch Long-Term Agreements	Terms of agreement are negotiated; a mix of positive incentives and penalties for participation and compliance is used
Voluntary agreements as a policy instrument in government mitigation plans	Japanese Voluntary Action Plan (Keidanren); Chinese Taipei voluntary GHG reduction agreements	Terms of agreement are negotiated; consultation between government and industry associations is ongoing

What motivates this action and approach?

Businesses and governments may adopt voluntary programmes for distinct reasons. By participating in government-sponsored voluntary programmes, businesses can play a more active role in determining the scope and direction of their decarbonisation actions. Industry association agreements can help raise the profile of leading companies within a sector. Such programmes may also defer mandatory government regulation, providing an avenue for businesses to participate in the design of future regulation. Governments may see such partnerships as a way to achieve results quickly, keep administrative costs low

and advance their objectives, including in situations in which regulatory or pricing mechanisms are not feasible; these agreements can also be useful for data gathering. Furthermore, these partnerships may build regulatory capacity and trust, which can benefit both governments and businesses.

How effective have these measures been?

Assessments of the effectiveness of voluntary programmes (including those with negotiated agreements) show mixed results. For example, one set of selected voluntary programmes in the United States, Europe and Japan was found to have reduced energy use or emissions between 0% and 10% over the programme period.⁴ Other examination of international experience with voluntary programmes has found them to be an innovative and effective means to improve energy efficiency and reduce emissions, particularly programmes that combine participation incentives and non-compliance penalties with the prospect of future regulation or taxation.⁵ In general, the prospect of regulatory action can be important in spurring participation in, and subsequent compliance with, a programme. Other elements that increase the likelihood of success are the existence of capable and influential industrial associations, government involvement in implementation review, and accompanying measures such as technical and financial assistance for energy audits and equipment. A tradition of close co-operation between government and industry provides a foundation upon which to build voluntary programmes,⁶ and peer pressure among companies can increase programme effectiveness.

Japan's Voluntary Action Plan

The Keidanren Voluntary Action Plan (VAP) was initiated in 1997 by the Japan Business Federation (Keidanren), and has played an important role in Japan's strategy to meet Kyoto Protocol commitments. Under the VAP, industry-wide targets are set by the respective industry associations, and collaboration and peer pressure are used to motivate action. A recent evaluation of the VAP shows that while some industries have increased energy intensity and consumption, CO₂ emissions per unit of output during the first Kyoto commitment period (2008-12) was 14% below 1990 levels.⁷ This evaluation highlights the importance of effective target-setting and evaluation mechanisms – specifically through the Plan-Do-Check-Action (PDCA) cycle – in reducing emissions. This process led 29 of 61 participating industry associations to raise their targets in 2012.

1.2 Individual and collaborative action by businesses – without government involvement

Businesses are increasingly pursuing emissions reduction actions. These programmes vary in scope, from measuring and reporting GHG emissions to actual emissions reduction goals. Some actions are pursued by individual businesses acting alone, while others are accomplished through business coalitions. A third set involves partnerships with NGOs. Many businesses are targeting their own operational emissions, while others may be promoting decarbonisation along their supply chains.^a Various business coalitions and non-profit organisations encourage companies to commit to climate-friendly initiatives. In some sectors, such as retail, upstream supply sources and downstream end uses can account for the bulk of a firm's emissions; influencing partners along the supply chain can therefore achieve larger emissions reductions than simply focusing on direct emissions. Business collaboration can be especially important for research and development (R&D) of low-carbon technologies; for example, the European Cement Research Academy (ECRA), established by the European cement industry in 2003 exclusively with industry funding, researches low-carbon cement-making technologies.

^a Emissions can be classified as: (i) direct emissions from business operations (Scope 1); (ii) indirect emissions from purchased electricity and heat (Scope 2); and (iii) other indirect emissions from upstream materials/fuel production and downstream end uses (Scope 3).

Table 2: Examples of voluntary actions by businesses

Actions and examples	
Operational emissions	<ul style="list-style-type: none"> • Measuring and reporting emissions (e.g. CDP, formerly the “Carbon Disclosure Project”). • Tracking performance (e.g. the “climate strategy” component of Dow Jones Sustainability Index) • Setting targets: reducing absolute emissions, reducing emissions intensity, renewable energy targets (e.g. RE100 pledge to use 100% renewable energy) • Developing strategies and tools: internal carbon price (e.g. Shell USD 40/tonne CO₂ project screening value) • Implementing actions: energy efficiency, fuel switching, recycling and renewable energy (e.g. BMW’s use of solar photovoltaic [PV], biogas and hydrogen fuel cells)
Supply chain	<ul style="list-style-type: none"> • Measuring and reporting supply chain emissions (e.g. GHG Protocol Product and Supply Chain Initiative) • Setting targets: reducing supply chain emissions (e.g. Diageo reducing supply chain emissions 30% by 2020)
Investments	<ul style="list-style-type: none"> • Fossil fuel divestment and positive investment in green companies and projects (e.g. AXA selling EUR 500 million of coal assets and tripling green investments to EUR 3 billion by (2020)

What motivates action?

Voluntary actions appear to be driven by two primary motives: increasing competitiveness and stakeholder pressure.⁸ Individual companies can improve competitiveness through cost-saving reductions in energy use and emissions, which can in turn reveal further operational improvements and support innovation. Improved climate action can strengthen a company’s appeal to customers or other partners, and stakeholders such as investors and insurance companies are looking increasingly at climate response as an indicator of good governance and risk management. Anticipating and influencing future environmental regulation can also improve competitiveness (e.g. through the growing use by major corporations of an internal carbon price). Outside the supply chain, think tanks and other NGOs are adept at translating science and policy into actionable business language and framing it within business interests.

The role of investors in influencing corporate action on climate change

Investors are increasingly aware of and concerned about exposure to climate risks. Investor groups such as the United Nations (UN)-supported Principles for Responsible Investment (PRI) initiative, with nearly 1 500 signatories managing USD 59 trillion in assets, are driving action on climate change. In 2014, the PRI initiated the Montreal Carbon Pledge under which signatories commit to conduct and disclose portfolio carbon footprints annually. Investors are also keen to understand the effect, if any, of corporate carbon performance on financial performance and firm value. A recent meta-analysis of over 20 corporate carbon and financial performance studies found that corporate carbon performance is positively related to financial performance.⁹

How effective are voluntary actions?

Understanding of the incremental impact that voluntary corporate actions have on emissions is limited, because of numerous methodological challenges (including a lack of high-quality data) and uncertainty over how to measure their effectiveness. Few empirical studies have analysed the effectiveness of voluntary actions at an aggregate level; one such study of retailers in the United Kingdom, the United States and Japan found that while unilateral commitments can deliver significant reductions in energy use and emissions intensity, delivering absolute emissions reductions is extremely difficult without strong incentives or regulation.¹⁰ More analysis in this area is required to better assess the impact of these programmes.

2. Government control of state-owned enterprises: Wielding public shareholder power

SOEs account for a significant share of the energy sector. The IEA estimates that state and national oil companies own about 70% of global oil and gas reserves. In the power sector, which accounts for about 40% of energy sector emissions and in which emissions are growing (Figure 1a), SOEs own about 42% of fossil fuel power generation capacity (Figure 1b). Given the weight of SOEs in emissions-intensive sectors, they are important actors in the decarbonisation challenge.

Figure 1a: Emissions from electricity in absolute terms and as a share of total energy sector emissions, 1990-2013

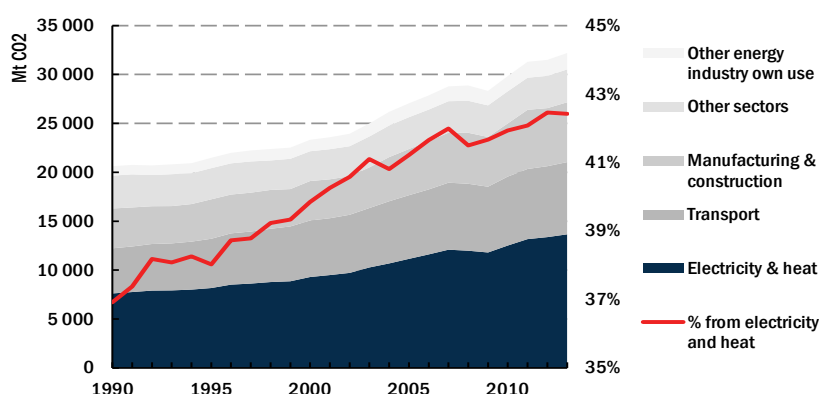
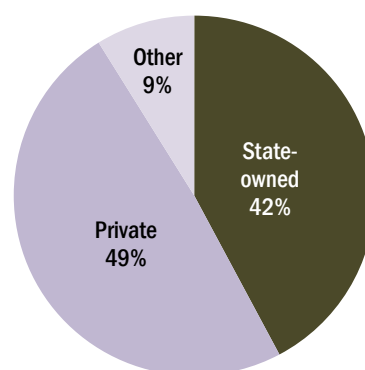


Figure 1b: Ownership of fossil fuel generation capacity, 2012

3 702 gigawatts (GW)



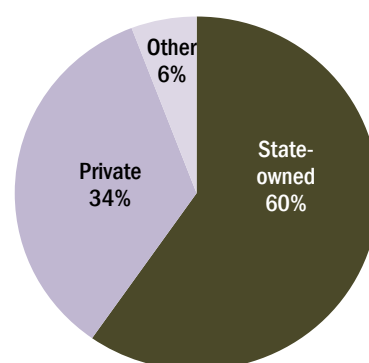
In emerging economies, SOEs are sometimes responsible for a high share of gross domestic product (GDP) and emissions. For example, China's SOEs comprise between 30% and 50% of the economy and are concentrated in energy and heavy industry.¹¹ Half of China's CO₂ emissions come from the power sector,¹² predominantly from state-owned utilities and other enterprises. Looking ahead, it is in emerging economies that the IEA forecasts the largest energy demand increases, and that therefore the most low-carbon investment is needed if global climate goals are to be achieved. Much of the financing for this investment will likely come from domestic state-owned financial institutions.¹³ Given the weight of SOEs in these economies, it is important to consider how they can be incentivised to advance low-carbon objectives.

Even in Organisation for Economic Co-operation and Development (OECD) member countries, in which the size of the state-owned sector has declined following decades of privatisation, SOEs remain concentrated in energy-intensive sectors including oil and gas, power, transportation and extractive industries.¹⁴ For example, France's electricity sector is dominated by Électricité de France (EDF), 85% owned by the French government.¹⁵ Similarly, state-owned Comisión Federal de Electricidad (CFE) is the principal electric utility in Mexico, serving over one hundred million people.

Decarbonisation not only requires reduced investments in fossil fuel generation, but additional investments in clean energy technologies – once again, an area in which SOEs are active. For example, Chinese SOEs have been major developers of wind and solar power, spurred in part by government mandates requiring that a certain percentage of SOEs' new generating capacity come from wind. Globally, 60% of zero-carbon generation capacity (in hydropower and other utility-scale renewables and nuclear) is state-owned (Figure 2).

State ownership is also important in other energy-intensive industries such as steel and cement. From the Steel Authority of India Limited (SAIL) and the Emirates Steel Industries (ESI) to PT

Figure 2: Ownership of zero-carbon generation capacity, 2012 (1 980 GW)



Semen Indonesia Tbk (SMGR) and China's Anhui Conch Cement Company, SOEs are important actors across industries that consume large quantities of energy or generate CO₂ emissions as part of their industrial processes (the case for cement). When SOE industry emissions are added to those of the energy supply sector, total GHG emissions attributed to SOEs grow.

Actions of SOEs are frequently motivated by factors that extend beyond profit maximisation, such as consideration of state goals regarding the promotion of economic activity, energy security, social development, employment and other strategic objectives. In addition to SOEs facing a potentially broad set of objectives, the context in which they operate is generally characterised by greater political access, softer budget constraints, and various financial support mechanisms.

Governments, as sole or primary shareholders, may control or influence decarbonisation of SOEs through a number of direct and indirect channels:

- Adopting and implementing clear, consistent and predictable policy directives to influence short-term operations (e.g. shifting electricity dispatch patterns to favour low-carbon sources) and long-term planning. These policies can be supported with informal dialogue to reinforce policy messages.
- Exercising authority to appoint (and change) senior management, which can provide an important means to influence SOE action (balanced with the need to avoid excessive political interference).
- Leveraging cadre evaluation systems that can apply to various levels of management within SOEs.¹⁶
- Influencing investment patterns in specific energy technologies as a supplier/facilitator of funding for SOEs (including funding through state-owned financial institutions).
- Providing both formal and informal signals to SOEs, which are more likely than private enterprises to follow government signalling because of their shareholding structure.

An important role for China's SOEs in environmental reform

Since the 11th Five Year Plan (2006-10), a shift in priorities has elevated environmental reform as key to growth and social stability. This has taken the form of consolidating the market share of large SOEs in energy and heavy industry, while increasing state support of SOE investment in clean energy technologies and less-polluting industries. Commentators have noted that these objectives have been implemented through ordered shutdowns of small, inefficient power and steel plants, as well as through selective investment approvals, credit controls and cadre evaluation systems.¹⁷

The ability and willingness of governments to influence and direct the corporate actions of individual SOEs often depends on the market structure and prevailing business culture in which an SOE operates – notably, the extent to which the SOE is expected to operate in a profit-driven manner subject to market forces. SOEs in different sectors often face different social and economic mandates beyond profitability objectives, particularly in the power sector in which electricity supply has both national economic and social dimensions.

Given the central role of SOEs in generating energy sector GHG emissions and their expected role in decarbonisation (reducing emissions and providing clean energy alternatives), further analysis of how complementary measures can influence SOE action is needed. These complementary measures are especially relevant because many SOEs – particularly in various emerging economies that are central to decarbonisation – operate in contexts in which government shareholder direction may outweigh liberalised market signals. While there are common elements that characterise SOEs, their heterogeneity across sectors and countries requires a variegated approach.

Conclusions

Voluntary programmes and public shareholder power are two forms of complementary measures that have the potential to encourage decarbonisation actions by businesses. These measures are being actively pursued in a variety of country, market and institutional contexts as part of the modern policy mix for energy sector decarbonisation. Strengthening complementary measures that engage businesses can increase mitigation effectiveness by both encouraging a decrease in high-carbon activities and also an expansion of renewables and other low-carbon investment. These measures can also serve to strengthen business participation in emissions trading systems and technology development programmes.

SOEs are particularly important to decarbonisation efforts because of their strong presence in the energy sectors of many emerging economies and other countries. The exercise of public shareholder power may be a more pertinent influence on SOEs than the use of price signals alone, as the influence of financial drivers on these enterprises is sometimes diluted by non-financial mandates (such as expanding energy access and other national development goals). For traditional private sector businesses, the growing recognition that commercial and profit interests can converge with decarbonisation efforts can help to drive participation in voluntary programmes.

Next steps

A better understanding of the impacts and effectiveness of ongoing voluntary actions by businesses, and of the options available to governments to exercise shareholder influence over SOEs, will enrich the dialogue around the development of stronger climate change mitigation action. Further innovation is also needed to refine and strengthen these measures so that policy makers and other stakeholders can more effectively stimulate decarbonisation efforts by businesses, whether private sector or state-owned, as a complement to pricing and regulatory approaches.

Contact:

Environment and Climate Change Unit, Directorate of Sustainable Energy Policy and Technology, International Energy Agency
Telephone: +33 1 40 57 66 08

This publication reflects the views of the IEA Secretariat but does not necessarily reflect those of individual IEA member countries. The IEA makes no representation or warranty, expressed or implied, in respect of the publication's contents (including its completeness or accuracy) and shall not be responsible for any use of, or reliance on, the publication. Unless otherwise indicated, all material presented in figures and tables are derived from IEA data and analysis.

Printed in France by IEA, December 2015

¹ Agendas and workshop presentations available at www.iea.org/workshops/industrybusiness-use-of-complementary-measures-for-decarbonisation.html and www.iea.org/workshops/technical-workshop-on-climate-energy-policy-approaches-for-the-industrial-sector.html.

² Somanthan, E., T. Sterner, T. Sugiyama et al. (2014), "National and sub-national policies and institutions", in M. Jänicke, R. Seroa da Motta and N.M.A. Suliman (eds.), *Climate Change 2014: Mitigation of Climate Change*, 5th edition, Cambridge University Press, Cambridge and New York, pp. 1141-1206.

³ US EPA (US Environmental Protection Agency) (2015), "Voluntary energy and climate programs", <http://www3.epa.gov/climatechange/EPAactivities/voluntaryprograms>.

⁴ Morgenstern, R. and W. Pizer (2007), *How Well Do Voluntary Environmental Programs Really Work?* Resources for the Future, Washington, DC.

⁵ Price, L. (2005), "Voluntary agreements for energy efficiency or GHG emissions reduction in industry: An assessment of programs around the world", Lawrence Berkeley National Laboratory, Berkeley, California.

⁶ See footnote 2.

⁷ Tezuka, H. (2015), "The Japanese Business Community's Initiative to Tackle Climate Change", presentation at IEA workshop on industry/business use of "complementary measures" for decarbonisation, Paris, 22 June.

⁸ Boiral, O. (2006), "Global warming: Should companies adopt a proactive strategy?" *Long Range Planning*, Vol. 39, No. 3, pp. 315-330.

⁹ Busch, T. (2015), "Corporate Carbon and Financial Performance: A Meta-analysis", presentation at IEA workshop on industry/business use of "complementary measures" for decarbonisation, Paris, 22 June.

¹⁰ Sullivan, R. and A. Gouldson (2013), "Ten years of corporate action on climate change: What do we have to show for it?", *Energy Policy*, Vol. 60, Issue C, pp. 733-740.

¹¹ Szamosszegi, A. and C. Kyle (2011), *An Analysis of State-owned Enterprises and State Capitalism in China*, CreateSpace Independent Publishing Platform, Washington, DC, p. 116.

¹² IEA (2014), *CO₂ Emissions from Fuel Combustion*, OECD/IEA, Paris.

¹³ Benoit, P. (2012), "State-owned enterprises and their domestic financial base: Two keys to financing our low-carbon future", in *Electricity in a Climate-Constrained World*, OECD/IEA, Paris, pp. 25-32.

¹⁴ OECD (2014), *The size and sectoral distribution of SOEs in OECD and partner countries*, OECD Publishing, Paris, France.

¹⁵ EDF (Électricité de France) (2014), *2014 Facts and Figures*, www.edf.fr/sites/default/files/documents/faits_et_chiffres/2015/F%26F_EDF_2014_VA.pdf.

¹⁶ Wang, A. (2013), "The search for sustainable legitimacy: Environmental law and bureaucracy in China," *Harvard Environmental Law Review*, Vol. 37, pp. 366-440.

¹⁷ Bergsager, H. and A. Korppoo (2013), *China's State-Owned Enterprises as Climate Policy Actors: The Power and Steel Sectors*, Nordic Council of Ministers, Copenhagen.