CEPS POLICY BRIEF
Thinking ahead for Europe

# Sector-specific Activities as the Driving Force towards a Low-Carbon Economy

## From the Asia-Pacific Partnership to a Global Partnership

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## Summary

From 2006 to 2011, the Asia-Pacific Partnership on Clean Development and Climate (APP) provided a non-legally binding framework based on a public–private partnership to support projects towards clean development and climate objectives in seven countries in the region. Three of the eight sectoral APP task forces (on power generation and transmission, cement and steel) are to continue their activities under the Global Superior Energy Performance partnership (GSEP), with a stronger focus on energy efficiency and environmental performance, and participation expanded to the global scale. This decision was based on the official view that the APP activities were successful and could lead to other successes in similar initiatives with similar working formats.

A recent CEPS study verified this official view. The study showed that a majority of participants viewed information exchange and networking in APP activities as valuable in themselves and access to existing technologies and know-how as beneficial. The APP has a mixed record on innovation and access to new technologies, depending on the relevant sector. Factors perceived as barriers included a lack of funding and a lack of capacity for data collection and management. This Policy Brief analyses the implications for EU policy-makers in embarking on such public–private initiatives and where EU involvement could be most effective.


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This paper builds on the key findings of the study, incorporates a recent update and provides some policy recommendations. The author is grateful to the European Commission and the Ministry of Economy, Trade and Industry, Japan, along with the participants of the Asia-Pacific Partnership on Clean Development and Climate for comments and additional information. This paper is not the deliverable of the study itself, and is solely attributable to the author.

## Introduction

The Asia-Pacific Partnership on Clean Development and Climate (APP) was an initiative by seven countries in the region to develop a non-legally binding and flexible cooperative framework to support projects geared towards clean development and climate objectives, with a strong emphasis on the role of low-carbon technologies as well as energy efficiency.[1] It aimed to build upon the foundations of existing bilateral and multilateral initiatives to enhance, expand and share with a broader group of countries the cooperative spirit of the APP in its work on clean development and the climate.

After five years in operation, the APP was formally wound up April 2011. It was decided that some of the APP task forces (on power generation and transmission, cement and steel) would continue their activities under a new initiative called the Global Superior Energy Performance Partnership (GSEP),[2] thereby taking sector-specific activities from the regional scale to the global scale.

This paper looks at the sector-specific activities undertaken through public–private partnerships as a driving force for technology transfer towards a low-carbon economy. It first sets out the policy context in light of the transition from the APP to the GSEP, introducing the respective formats for sector-specific activities. Against this background, the paper summarises the stakeholders' views of the APP as gathered through a recent CEPS online survey, indicating the levels of satisfaction with achievements, perceptions of specific benefits and interest in the continuation of activities. This summary is followed by key findings about the major characteristics of the APP and factors behind success, as well as possible barriers, transition from the APP to various international initiatives and implications for the EU. Based on an analysis of these findings, the paper finally discusses the ways forward for the EU, including the possibility of joining the GSEP.

[1] See Fujiwara (2007) for a full description of the initiative.

[2] See the Clean Energy Ministerial website (http://www.cleanenergyministerial.org/our_work/buildings_and_industry/index.html).

## What was the APP?

The APP was originally launched in January 2006 by six countries – Australia, China, India, Japan, Korea and the US – which were joined in 2007 by Canada. Together, the seven countries accounted for about 49% of the world's GDP, 45% of the world's population and 50% of the world's $CO_2$ emissions from combustion sources. By sector they produced about 65% of the world's coal, 62% of the world's cement, 52% of the world's aluminium and more than 60% of the world's steel.[3] On the basis of these grounds, partner countries argued that their initiative could complement the UN Framework Convention on Climate Change (UNFCCC)/Kyoto Protocol process.

The working method of the APP could be characterised as sector-specific activities driven by a public–private partnership in eight sectoral task forces. It launched three on energy supply sectors (cleaner fossil energy, power generation and transmission, renewable energy and distributed generation) and five on energy-intensive sectors (aluminium, buildings and appliances, cement, coal mining and steel). Each task force was led by a chair and a co-chair selected among partner countries. Task force members participated in various activities on a non-legally binding basis, ranging from meetings to specific projects, such as 'Flagship Projects', i.e. the highest profile or most expensive ones.

## Transition from the APP to the GSEP

The GSEP was launched as one of the key initiatives that came out of the Clean Energy Ministerial meeting in 2010 and has also been accepted as a task group under the International Partnership for Energy Efficiency Cooperation (IPEEC).[4] The objective of the GSEP is to reduce

[3] See the APP website (Canada) (http://www.climatechange.gc.ca/pap-app/default.asp?lang=En&n=FFB91B5D-1).

[4] IPEEC members include Australia, Brazil, Canada, China, the EU, France, Germany, India, Italy, Japan, Mexico, Russia, South Korea, the UK and US. They currently account for over 75% of global GDP and energy use (see the IPEEC website, http://www.ipeec.org/; on the same website see also "Global Superior Energy Performance Partnership (GSEP)" (http://www.ipeec.org/task_gsep.html).

global energy use by encouraging industrial facilities and commercial buildings to pursue continuous improvements in energy efficiency and promoting public–private partnerships for cooperation on specific technologies or in individual energy-intensive sectors.[5] In addition to the majority of the APP countries,[6] GSEP members will include Brazil, Denmark, the European Commission, Finland, France, Mexico, Russia, South Africa and Sweden.

Like the APP, the GSEP adopts a working method based on sector-specific working groups. In the GSEP, members do not have to participate in all the working groups. The aim is to provide a forum for public–private dialogue and cooperation, involving the public, private and academic/research sectors in order to exchange information on improved technologies and create practical projects through public–private partnerships in a bottom-up manner.[7] It started with six working groups, covering 1) certification, 2) power, 3) steel, 4) cement, 5) cool roofs and pavements and 6) combined heat and power and efficient district heating and cooling (see Figure 1). In June and September 2011, the GSEP working groups organised the first workshops to define strategic objectives and discuss work plans.[8]

Among others, the GSEP Working Groups on Power, Steel and Cement will build upon activities initiated through the corresponding APP task forces. The groups will concentrate more on energy efficiency and environmental performance and expand the scope of participation.

The participants of the Power Working Group were interested in continuing to work on improvements to coal-fired power plants while expanding the focus to other cleaner technologies. The scope of activities will include power generation, transmission, distribution, demand-side management, end-use efficiency and the incorporation of renewable energy sources into the grids. In this respect it is assumed that the GSEP Power Working Group will advance the work initiated by three APP task forces on energy supply sectors: power generation and transmission, cleaner fossil energy, and renewable energy and distributed generation.[9]

The participants of the Steel Working Group intend to undertake the following activities:

i) develop and implement an energy management framework that can be used in a wide range of steel plants;

ii) develop and implement techniques to utilise, update and verify performance indicators;

iii) identify and disseminate existing and breakthrough technologies to reduce energy usage, and consequently reduce $CO_2$ emissions from steel production;

iv) disseminate information on reducing the environmental burden and increasing recycling in the steel industry; and

v) share and exchange information on policy frameworks for the steel industry and financial mechanisms for technology deployment.

The Cement Working Group shared the view that the APP had led to significant outcomes (e.g. the publication of a cement technologies booklet[10] and a *Status Report*[11]) and capacity building programmes (e.g. "Establishment of a Center of Excellence in China" and "Performance Diagnosis in India and China"), which the GSEP should succeed.

The GSEP working groups intend to present work in progress at the third Clean Energy Ministerial meeting in London in April 2012.

[5] Duke (2011).

[6] Except China.

[7] See the GSEP Fact Sheet, "Global Superior Energy Performance Partnership", Clean Energy Ministerial 2011(a).

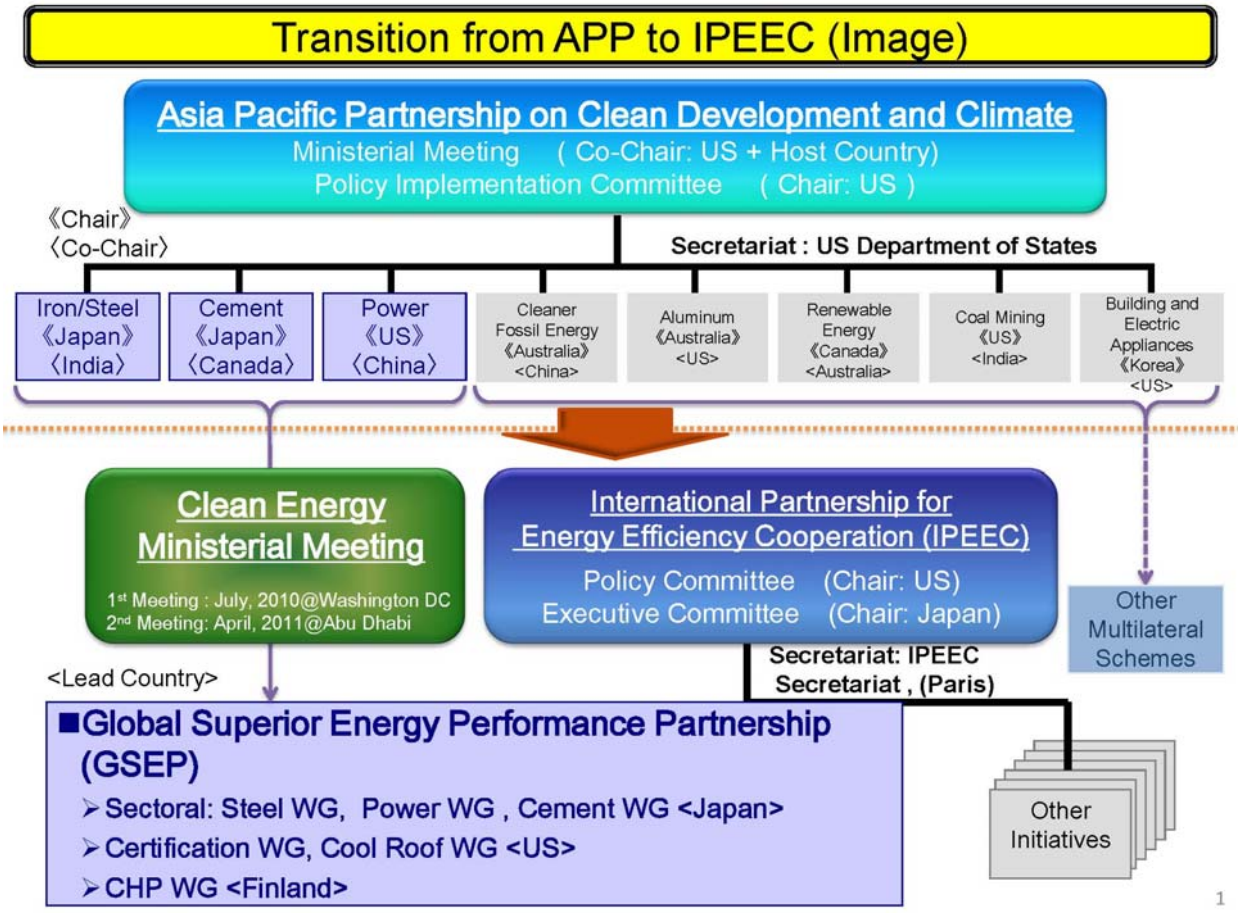
[8] Clean Energy Ministerial (2011b).

[9] Ibid. See also ANRE (2011).

[10] Asia-Pacific Partnership on Clean Development and Climate, *Energy Efficiency and Resource Saving Technologies in Cement Industry*, Cement Task Force, Washington, D.C. (undated).

[11] Asia-Pacific Partnership on Clean Development and Climate (2008).

*Figure 1. Transition from the APP to the GSEP*




*Notes:* WG refers to working group; CHP refers to combined heat and power.

*Source:* Kobayashi (2011).

## Stakeholders' views of the APP

The formal transition of sector-specific activities from the APP to the GSEP has been based on the official view that i) the APP activities turned out to be successful and ii) they could lead to other successes in future, similar initiatives with similar working formats. Yet this view, which might have stemmed from feedback from APP participants, has required further verification by independent research.

From March to May 2011, CEPS undertook an online survey concerning the APP's activities and their future. In total the survey gathered 50 responses. [12] Representatives of all the APP countries participated in the survey: Australia (5), Canada (8), China (3), India (3), Japan (4), Korea (6) and the US (7) as well as a number of European countries, including Belgium (2), Switzerland (2), Germany (2), France (2), the Netherlands (2) and the UK (1). In addition to APP representatives, European stakeholders were invited to answer questions about similar activities and the participation of the EU in related initiatives. The respondents were affiliated with government institutions (20) (41%), industry and trade associations (14) (29%), research and education (8) (16%) and NGOs (3) (6%). They represented the following sectors: energy-intensive industry (11) (22%), [13] energy supply (10) (20%), [14] end-users (3) (6%), [15] raw materials (2) (4%), coal mining (2) (4%), service

[12] The survey results were compiled by Monica Alessi and Noriko Fujiwara. The author would like to thank Monica Alessi for her contribution.

[13] Energy-intensive industry (11) (22%) includes cement (7) (14%), aluminium (2) (4%), steel (1) (2%), and chemicals (1) (2%).

[14] Energy supply (10) (20%) includes electricity (4) (8%) and renewable (6) (12%).

[15] End-users (3) (6%) include buildings/construction (2) (4%) and appliances (1) (2%).

providers (2) (4%) and others (2) (4%). The majority of the respondents who had participated in the APP were well informed – a quarter of them had participated since the start and most were engaged in the project activities of the task forces.

More than half of the respondents (55%) were satisfied with the results of their participation in APP activities, while more than a third (38%) thought the results were mixed and one was dissatisfied. A majority of respondents perceived major benefits from information sharing (90%) and networking (83%). Other perceived benefits were access to existing technology and know-how (31%), market access (21%), access to new technology (17%) and access to finance (14%).

A selection of the projects that participants perceived most successful is given in Table 1. A number of successful projects concern data collection, measurement, reporting and verification, best practices, performance diagnosis, peer reviews and capacity building.

Most of the respondents (88%) were willing to continue these successful projects regardless of the APP.[16] Some respondents mentioned as a main barrier the lack of funding. More than two-thirds of the respondents (71%) were planning to participate in similar activities. Some expressed frustration with discontinuity. A majority of the respondents (79%) also believed that the EU should participate in a similar initiative. The next few sections look at specific aspects of the APP, ranging from major characteristics, incentives, benefits and factors behind success to barriers and other key issues. Information was gathered through responses to the online survey, in-depth interviews with several participants (undertaken from January to July 2011) and interventions at the CEPS' side event at the UNFCCC Conference in Bonn in June 2011.[17]

## The major characteristics

The APP provided an international cooperative framework for a *public–private partnership* in implementing concrete projects. To date the APP has been the only framework able to bring together all these elements. There are five major characteristics.

First, the APP's activities in the cement, steel and power sectors produced clear evidence that a public–private partnership can work in a *bottom-up manner*. In the APP context, a bottom-up manner could mean that each task force, composed of both the public and private sectors (e.g. the representatives of the relevant sector), sometimes also involving such third parties as independent consultants, could set its goal, develop work plans with its own priorities and organise activities, including projects and meetings. This approach worked well in tackling technical and practical issues, but may have difficulty in addressing policy issues. The APP was structured in multiple layers (e.g. the Policy and Implementation Committee and the Ministerial meetings), but it was the sector-specific task forces that were considered particularly effective in the APP.

Second, the APP took a *project-based* approach: each task force agreed to support selected projects that were recorded on the project roster. While the time frame, size and budget of the projects varied, each task force had several 'Flagship Projects'.

Third, the APP highlighted the importance of *stability* in commitments, i.e. long-term commitments. To the first round of projects approved in 2006, more were added each year, with the last project selected in 2010. Among the projects implemented, many were completed while others were either cancelled or terminated prematurely.

Fourth, the APP was characterised by the *horizontal* nature of an international partnership: there was no distinction between developed countries and developing countries. Bottom-up interaction or exchange, and not a one-way transfer, was particularly important. Knowledge or technology transfer could take place in both directions.

Fifth and lastly, the APP was a non-legally binding initiative, as defined in its Charter.

[16] At the time of the survey (March-May 2011) the APP participants were informed of the end of the initiative.

[17] The author is most grateful to all participants in the online survey, interviews and the side event for valuable information.

*Table 1. List of the task force projects perceived to be most successful*

| Task Force | Projects perceived to be most successful |
|---|---|
| Aluminium | - Measuring and Benchmarking<br>- Management of PFC Emissions<br>- Management of Bauxite Residue<br>- Management of Fluoride Emissions |
| Buildings and Appliances | - International Net Zero Energy Home (NZEH) Coalition or an International NZEH Dialogue<br>- Building Certification<br>- Building Codes |
| Cement | - Centre of Excellence, e.g. the sharing of information, introducing the application of the CSI $CO_2$ Protocol<br>- Identifying legal/regulatory barriers<br>- Performance Diagnosis<br>- Benchmarking Development<br>- Publication of its *Status Report* and the cement technologies booklet, *Energy Efficiency and Resource Saving Technologies in Cement Industry* |
| Cleaner Fossil Energy | n.a. |
| Coal Mining | - Increasing Recovery and Use of Coal Mine Methane<br>- Coal Mine Health and Safety<br>- Leading Practice Sustainable Development Program for the Mining Industry<br>- Coal Mine Fires Prevention Control<br>- Integrated Coal and Methane Extraction |
| Power Generation and Transmission | - Wind Electric Generation and Grid Integration Events (Montreal, September 2010; San Francisco, March 2009)<br>- Coal-Fired Power Generation Peer Reviews<br>- Best Practices for Power Generation Activity Plan<br>- Best Practices for Demand Side Management Activity Plan<br>- Site Visit of Energy Conservation and Environment Protection Technology<br>- Application of Plasma Ignition Technology in Power Generation |
| Renewable Energy and Distributed Generation | - Flexible Biomass Gasification Technology for Distributed Power Generation<br>- Demonstration, Analysis and Market Transformation of Ground Source Heat Pump for India<br>- International Scholarships for Photovoltaics and Solar Energy Engineering at the University of New South Wales<br>- Collaborative Development and Demonstration of an Optimised Model for Remote Village Electrification Using Renewable Energy |
| Steel | - Status Review of Steel Industry Related Indicators for Energy Saving<br>- Performance Indicators Setting<br>- Performance Diagnosis |

*Source:* Results of the CEPS' online survey.

## Incentives for participation in the APP

Incentives for participating in the APP varied among the member countries and sectors. For governments, one incentive was addressing GHG emission reductions in energy-intensive sectors. The private sector generally did not find convincing incentives in terms of direct or short-term advantages, but could identify some incentives in terms of indirect or longer-term contributions. For instance, the latter may have included the abilities of the APP to attract wider participation, to improve resource or energy efficiency on a global scale, to create business opportunities in environmental technologies and to set up a cooperative framework for $CO_2$ emission reductions within the sector on a global scale.

## Benefits and factors behind success

The success of the APP in *information sharing* can be best attributed to its non-legally binding and horizontal framework. Key energy data are not necessarily available in some partner countries, for example on how much energy is used for production or how to measure energy use, energy efficiency or other performance indicators. The latter is not a simple task and requires know-how about measurement, which can be shared among partner countries. For instance, the Cement Task Force established a Center of Excellence as a mechanism to disseminate information on the $CO_2$ Protocol of the World Business Council for Sustainable Development Cement Sustainability Initiative (WBCSD CSI)[18] and the best available technologies. In practice, the Center of Excellence (located in China) organised six CSI $CO_2$ Protocol Training Workshops to enhance capacity building, energy saving and emission reductions. [19] Beyond data, other questions included what regulations partner countries put in place and what results they delivered. Site visits to individual facilities of major industry sectors organised by task forces enabled their members to see what was happening on the ground. Individual plants would not have shown the facilities to external experts under a legally-binding process.

Equally valuable to participants was *networking*. The primary value of the APP was to bring participants together at a technical level through direct business-to-business contacts. Site visits to individual facilities enhanced not only information exchange but also networking among engineers and scientists. Task force activities created good networks between public and private sectors and across countries. The APP provided government representatives with opportunities to join a forum where business representatives could get together, and especially to meet directly and talk with private-sector representatives of partner countries. Through task force activities, it was possible to understand how public and private sectors work together in each country. An increase in mutual understanding and trust among engineers and other experts might have helped to create confidence among participants in the APP process.

A further benefit was *access to existing technologies and know-how*. The state of technology and the transfer of know-how may vary across sectors.

One approach to technology access that was used across several sectors was the publication of a *handbook of technologies*, which was made available on the official APP website. [20] For example, as noted earlier the Cement Task Force published a booklet compiling information about energy efficiency and resource-saving technologies.[21] The Steel Task Force's *State-of-the-Art Clean Technologies (SOACT) Handbook* [22] shows the energy, environmental, cost and other benefits associated with selected steel-making technologies. [23] The task force calculated the theoretical [24] potential of the ten major

[18] See the WBCSD CSI website article, (http://www.wbcsdcement.org/).

[19] Horio (2011).

[20] The three sectors are subsequently identified for indicative purposes.

[21] Asia-Pacific Partnership on Clean Development and Climate, Energy Efficiency and Resource Saving Technologies in Cement Industry, Cement Task Force, Washington, D.C. (undated).

[22] Asia-Pacific Partnership on Clean Development and Climate (2010).

[23] It lists 23 environmental protection technologies and 63 energy-saving technologies (Kobayashi, 2011).

[24] 'Theoretical' in this context means all technologies are applied in all countries regardless of barriers.

technologies from SOACT to reduce energy, $CO_2$ and other pollutants. Based on data from 2005, the reduction potential for energy is estimated to be 1705.15PJ and the reduction potential for $CO_2$ at 129 million tonnes per year. The Power Generation and Transmission Task Force published its *Green Handbook*, compiling information about good examples of operational and maintenance activities.[25] To the power sector, know-how means how to run and manage the technology so that it can work efficiently. Even if an efficient power plant is built, without proper operation or maintenance the power plant's efficiency will quickly decline. It is estimated that there will be about 120 million tonnes of $CO_2$ emission reductions in APP countries, provided that the effect of avoiding an efficiency decline is 1%. [26] The task force promoted peer review activities to share these good practices, through exchanges among engineers for improvements in the thermal efficiency of existing coal-fired power plants. The *Green Handbook* was first used in India for the peer review of power plants.

Another common method was *performance diagnoses* on installations. For example, the Cement Task Force completed performance diagnoses on four cement plants respectively in China and India (i.e. eight in total), [27] and published its booklet on cement technologies and know-how. The difficult decision, from a business perspective, is how much cement producers in the lead will provide others with know-how about the operation, maintenance and utilisation of alternative fuels. The Steel Task Force implemented performance diagnoses on three steel plants respectively in China and India (i.e. six in total).[28]

In contrast, the APP has a mixed record on innovation and access to new technologies. In the power and industry sectors, the APP contributed to improvements in the production process and equipment, including operation and maintenance, but not necessarily innovation. In the power and steel sectors, the APP had a limited effect on access to new technologies. On the other hand, in the fields of cement, renewable energy and distributed generation, the APP contributed to new technology developments.

The APP's two features – bottom-up approaches and a public–private partnership – were considered factors behind its success. There was a view that the APP's success depended on individual sectors: the APP's working method was very effective in some sectors but not so in others. There are two possible pre-conditions for success in sector-specific activities. From a climate policy perspective, suitable sectors are those where the mitigation potential is concentrated in a few large emitters and can be easily identified, measured, reported and verified. Suitable sectors are also those where cooperative action at the international level has already started taking place, e.g. through the WBCSD CSI, worldsteel[29] and the International Electricity Partnership (IEP).[30] The three sectors in transition from the APP to the GSEP, namely the cement, steel and power sectors, appear to meet the above pre-conditions in their capacity for measurement, reporting and verification, and in the private sector's active engagement.

## Barriers

Factors perceived as barriers included a lack of funding, the demonstration of new technologies, implementation in host countries, insufficient political support, insufficient focus, failure to develop ideas into projects, technical issues (e.g. data collection and management) and communication policy. This section considers two major barriers – funding and the capacity for data collection and management.

One of the major barriers was the lack of funding based on the assumption of self-financing. The APP Charter contained the following statement:

> 5.1 Each Partner may, at its discretion, contribute funds, personnel, and other resources to the Partnership subject to the laws, regulations, and policies of the Partner.

[25] Federation of Electric Power Companies of Japan (2007).

[26] Federation of Electric Power Companies of Japan (2008).

[27] Horio (2011).

[28] Kobayashi (2011).

[29] See worldsteel (http://www.worldsteel.org/).

[30] See the eurelectric website, "International electricity partnership" (http://www2.eurelectric.org/content/Default.asp?PageID=1055).

> Any costs arising from the activities contemplated in this charter are to be borne by the Partner that incurs them, unless other arrangements are made.

While the APP set up a project roster for task force activities, this did not necessarily mean that the committee had its own funding and allocated it to individual projects according to pre-determined guidelines or criteria. In the APP context, a bottom-up approach meant that partner countries would bring along individual projects, which had been approved in the budget, to the APP and have them acknowledged under the Partnership. Then each task force could increase the number of projects or expand selected projects. There was a view that the APP remained at an initial stage of testing water: it did not have enough funding for big projects like carbon capture and storage, but had sufficient funding for small to mid-sized projects. Beyond testing water there is need for another framework to support bigger projects.

In particular, private-sector participants need access to cheap capital, as the World Bank or the Asian Development Bank only provides such resources to sovereign governments. Within the Steel Task Force, the Japan Bank for International Cooperation consulted on project finance. The funding issue was identified by the APP's own review of Flagship Projects. Some Flagship Projects secured private funding but not enough. The review stressed the need for greater engagement with the private finance and investment community (Atkinson et al., 2009).[31]

Despite success in completed projects, difficulties with data collection and management posed mounting challenges and cannot be underestimated. It is difficult to obtain data on actual emission reductions directly resulting from APP activities. Some projects required measuring and reporting GHG emissions but many others did not. Except for the steel and power sectors, it has not been possible to assess the effects of all the APP activities on GHG or $CO_2$ emissions because of a lack of data in all the partner countries. This means that it has not been possible so far to assess the effects of those activities that have been financed. Progress in data collection depends on the willingness and capacity of partner countries to provide data and make it available for international data management within the sector.

## Key issues

In the power and industry sectors there is no hard evidence to support the view that the APP has had an impact on competitiveness or productivity. Competitiveness depends on the state of technology and know-how, which varies across sectors. Companies in the sectors exposed to global competition do not hesitate to share technologies or know-how that do not directly influence competitiveness, but they do hesitate regarding those aspects that will have an impact on competitiveness. Productivity is closely linked to competitiveness and also depends on the state of technology and know-how, which again varies across sectors.

There was no need for sharing these technologies or know-how up to 100%, given that the APP was a non-legally binding initiative and the decision to provide knowledge or technology was up to its owners. The APP showed what and how much partners could achieve in energy savings or emission reductions if they had access to low-carbon technologies, in cases where sharing such information would have a negligible impact on competitiveness. For example, steel sector participants considered that there would be little effect on the level playing field even if they sold energy-efficient and environmental technologies that are listed in the SOACT. Partners also understood what they could deliver on a commercial or non-commercial basis. The bottom-up approach additionally meant that in communicating with the private sector at the project level, the government participants understood exactly what was required or needed to be done.

While it was not a priority of APP activities, a number of APP participants held that information sharing and networking activities might have generated commercial opportunities. Some large-scale projects focusing on the demonstration and deployment of technology might not have resulted in commercial opportunities in the short term but developed enabling conditions. The

[31] See also WSP environmental et al. (2009).

effect was positive, although the benefits may not seem too obvious during the project period.

There were mixed views about the relations between funding and the projects financed, which may have stemmed from where the participants were situated, in terms of country, sector, government or business. In principle, a government evaluated and selected projects and provided funding for those perceived to be realistic and meaningful. In practice, governments listed funding sources and potential mitigation actions respectively but stopped there without sufficiently matching the two. One suggestion for improvement was to bring financiers closer to future projects so they can assess whether a project is worthy of financial support. There was another suggestion for strengthening the *ex-post* assessment of individual projects financed under the APP: in principle, if projects are supported, they should deliver results. It is possible that projects in which they invested incurred more costs than what was calculated at the start. The timing of the end of the APP might have affected projects differently. Some projects had finished while others had begun delivering results only recently and could not complete all the tasks.

## Taking stock and moving ahead

As mentioned earlier, activities in three APP sectors – cement, steel and power – have been transferred to the GSEP as an IPEEC initiative. The Buildings and Appliances Task Force was going to consider the transfer of 16 activities in the Sustainable Building Network [32] and the Super-efficient Equipment and Appliances Deployment (SEAD)[33] under the IPEEC as well as the International Energy Agency (IEA) Implementation Agreement for a Cooperative Programme on Efficient Electrical End-use Equipment (4E).[34, 35] Some activities initiated by the Aluminium Task Force could continue in agreements with the International Aluminium Institute as an interim measure. In the longer term, the Task Force was going to look at an option for establishing a working group under the GSEP.[36] The Cleaner Fossil Energy Task Force intended to report ongoing activities at bilateral meetings (e.g. Australia–Japan and Australia–China).[37] The Renewable Energy and Distributed Generation Task Force considered eight existing initiatives for transfer, to the GSEP for example, but could not find a suitable mechanism before the end of the APP.[38]

Other frameworks or initiatives named in the CEPS online survey included the WBCSD CSI, International Electricity Partnership (IEP),[39] the IEA Implementation Agreement for Co-operation in the Research, Development and Deployment of Wind Energy Systems (IEA Wind),[40] the Global Methane Initiative (GMI) [41] and Energy Development in Island Nations (EDIN).[42] The survey also resulted in the listing of such key organisations or agencies as the International Renewable Energy Agency (IRENA)[43] and the US–China Clean Energy Research Center,[44] along with national governments and networks of cities on energy and climate change.

Some APP task forces had overlaps with these initiatives. For example, the Coal Mining Task Force overlapped with the GMI, and the Renewable Energy and Distributed Generation Task Force did so with the IRENA. This made it easier for the latter to succeed the former's activities.

In the sectors where existing or new international fora cannot be identified, some sort of project-delivery mechanism could be established. In

[32] See the IPEEC website, "Sustainable Buildings Network" (http://www.ipeec.org/task_sbn.html).

[33] See the IPEEC website, "Super-efficient Equipment and Appliance Deployment Initiative (SEAD)" (http://www.ipeec.org/task_sead.html).

[34] See the IEA Energy Technology Network website, "Efficient Electrical End-Use Equipment" (http://www.iea-4e.org/).

[35] Ginsberg (2011).

[36] Australian Government (2011a).

[37] Australian Government (2011b).

[38] De Boer (2011).

[39] Kyte (2011).

[40] See the IEA Wind website (http://www.ieawind.org/).

[41] See the GMI website (http://www.globalmethane.org/gmi/).

[42] See the EDIN website (http://www.edinenergy.org/).

[43] See the IRENA website (http://www.irena.org/).

[44] See the website of the US–China Clean Energy Research Center (http://www.us-china-cerc.org/).

parallel, there are continued efforts to secure funding for the extension of individual projects.

## Implications for the EU

The European energy suppliers and energy-intensive sectors maintained an interest in what the APP was doing and how the initiative was working in the relevant fields. The initiatives perceived to be most relevant to the EU in the CEPS survey were the GSEP, the IPEEC, the IEP, the GMI and cooperation with the IEA. In interviews, the EU was encouraged to participate in frameworks for sector-specific activities that are not limited to the GSEP but inclusive of other similar initiatives.

In a message to the EU, a number of participants emphasised that a non-legally binding framework based on a public–private partnership was crucial in the APP and similar initiatives for technology cooperation. Under a public–private partnership, it is essential for the government and business to participate together. This is not merely a merit or advantage of the APP, but considered its *raison d'être* among participants.

Another important point for the EU to consider is making long-term and stable commitments when deciding to join an initiative, and keeping its position consistent. Initiatives like the APP require a multi-year plan to support the framework with a multi-year funding commitment.

## Analysis of findings

There was some emerging consensus among participants on general success and the remaining challenges to sector-specific activities initiated by the APP and to be succeeded by the GSEP. Even though there was no financial or economic incentive for the private sector, participants from the private sector were largely satisfied with the tangible results. The APP's three main benefits – information sharing, networking and access to existing technologies and know-how – can be seen together as a win–win solution. The APP sectors in developing countries improved access to existing technologies and know-how, while those in developed countries gained access to data on energy consumption or GHG or $CO_2$ emissions and information about the state of technologies in the former. Through these benefits the APP achieved some progress in capacity building, which remains to be enhanced, especially in the field of data collection and management.

Among the major barriers, the lack of funding put constraints on progress in the demonstration of new technologies. Facilitating access by the private sector to international and regional financial institutions (e.g. the World Bank, Asian Development Bank and the European Investment Bank (EIB)) would be a possible solution to the funding problem. Difficulties with data collection and management could be overcome through improvements and capacity building activities. An increase in mutual understanding and trust among participants in the process could also make partner countries more willing to disclose their data.

There is no robust evidence to support the view that the APP has had an impact on competitiveness or productivity. The extent to which technology providers offered and shared advanced technologies or know-how in their possession was up to them. As some APP activities were terminated prematurely, they did not necessarily result in the creation of new commercial opportunities. Yet even though the majority of the private-sector participants did not find material incentives for participation, they were positive about the potential for their activities to generate commercial opportunities in the long term, especially through information sharing and networking.

A number of APP projects supported activities on data collection and management for the control of GHG emissions, not only $CO_2$ but also such non-$CO_2$ gases as methane and PFC. While recognising difficulties with data collection and management, some APP task forces attempted to analyse data and estimate the mitigation potential that could materialise through the adoption of advanced technologies in the relevant sectors. While this type of exercise is feasible in the sectors where emissions are easily measurable, reportable and verifiable, a different approach may be needed to estimate the mitigation potential in other sectors, such as buildings and appliances (in the APP) and heating and cooling (in the GSEP), where emitting sources are diffused.

## The way forward

This study has shown that a majority of participants viewed information exchange and networking in APP activities as valuable in themselves. A further benefit perceived by the participants was access to existing technologies and know-how. The APP task forces together aimed at improving such access, providing handbooks on technologies and performance diagnoses or promoting peer review activities. The APP has a mixed record on innovation and access to new technologies, depending on the relevant sector. Factors perceived as barriers included a lack of funding and a lack of capacity for data collection and management.

As successors, the GSEP Working Groups have been making progress in setting strategic objectives and developing work plans. The key to success in going beyond information exchange and networking to project development would be to establish a viable financing mechanism in the GSEP with some tools to match funding and projects, and to bring potential financiers closer to individual projects. At the same time, the EU would need to ensure consistency with the multi-annual financial framework 2014–20, factoring in the costs associated with participation in the GSEP or other cooperative activities.

Among the challenges for EU policy-makers would be how to ensure the compatibility of sector-specific activities under a non-legally binding international initiative based on a public–private partnership with the EU's existing legislative and institutional frameworks, policies and measures in the relevant sectors. Another would be how to minimise any possible overlap in the energy-efficiency actions expected in private sectors at the international and EU levels. In June 2011, the European Commission proposed a new energy-efficiency directive, a set of measures to enhance member states' efforts to improve energy efficiency towards 2020, which has been subject to discussion at the European Parliament and among member states. More recently, the EU launched an energy roadmap 2050 to provide a long-term framework for energy sectors, following the low-carbon economy roadmap 2050.[45] Potentially the EU could benefit from GSEP activities as a complement to the EU's own legislative frameworks on the energy roadmap and the proposed energy-efficiency directive. More specifically, the information sharing and networking undertaken through GSEP activities could lead to an increase in business opportunities, while the EU's new legislative frameworks could provide more direct incentives for long-term, low-carbon investment in energy and industry sectors.

If the EU expects to achieve tangible results in GHG emission reductions through GSEP activities, it could consider first targeting those sectors whose emissions have been monitored, reported and verified under the EU emissions trading scheme, e.g. cement, steel and power. These are also the sectors where European enterprises are already active and have established networks in Europe and beyond. Lastly, these enterprises have the capacity to work with the EIB or other financial institutions on the project finance required for large-scale initiatives on technology demonstration and deployment. An initial focus on the above three sectors would make it easier for the EU to maintain coherence, consistency and compatibility between its existing frameworks, policies and measures for mitigation actions on the one hand and GSEP activities on the other.

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