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# Cooperation Structure: The Growing Role of Independent Cooperation Networks

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# Chapter 3

## Cooperation Structure: The Growing Role of Independent Cooperation Networks

By Stephanie Ohshita, Steve Wiel and Gørild Heggelund

Existing cooperation on energy efficiency in East Asia involves a variety of organizations, from large multilateral institutions to small think-tanks and foundations. Cooperation mechanisms range from exchanges of experts and trainees, to the sharing of policy information at regional forums, to multi-million dollar technology installations. A variety of sectors have been targeted, from appliances to buildings to industry and electricity. Some cooperation efforts emphasize measurement of resulting energy savings, while others undertake less quantifiable routes to promoting energy conservation. Cooperation activity on energy efficiency has increased substantially over the past 10 to 15 years, yet those engaged in the cooperation emphasize that even more is needed.

In this chapter, we identify existing energy efficiency cooperation activities in East Asia and examine the organizational structure of those activities. While cooperation on renewable energy, as well as projects under the Clean Development Mechanism, can contribute to a sustainable economy, energy security and environmental protection, only cooperation efforts focused on energy efficiency are analyzed here. Similarly, East Asian countries have engaged in cooperation on various aspects of energy security, but only activities aimed at energy efficiency are discussed here.<sup>1</sup> Cooperation activities on energy efficiency and conservation are presented in four groups, based on the type of organizations that participate:

1. bilateral cooperation;
2. multilateral cooperation;
3. regional cooperation; and
4. independent international cooperation networks.

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1 Because this scope focuses only on energy efficiency cooperation, the following types of cooperation efforts are **not** included:

- energy infrastructure built with official development assistance (ODA) or through energy security cooperation, unless the emphasis is on energy efficiency and conservation;
- projects that focus solely on renewable energy;
- general cooperation on climate change strategies;
- CDM projects, unless they emphasize energy efficiency;
- non-CO<sub>2</sub> greenhouse gas reduction projects (e.g., CFC destruction);
- carbon sequestration; and
- fuel switching to lower carbon fuels, unless the switch involves upgrading to a more energy-efficient process.

The types of organizations engaged in bilateral and multilateral cooperation are fairly well-defined. Bilateral energy efficiency cooperation may occur between the energy agencies of two countries, or it may involve official development assistance (ODA) from the government of one country to another. Multilateral cooperation involves ODA from multiple countries or a development bank, such as the World Bank or the Asian Development Bank, to the government of a recipient country. Similarly, regional cooperation involves the organizations of several East Asian governments. What requires some explanation is the fourth category of organizations—independent international cooperation networks. In contrast to government organizations engaging in cooperation on a bilateral, multilateral or regional level, independent cooperation networks are non-governmental. Rather than use the term non-governmental organization (NGO), we want to highlight organizations that are not limited to small-scale projects within a single country, but are international in scope and involve groupings of individuals with substantial expertise, i.e., international networks. We highlight these international network-based NGOs because we have observed their effectiveness in promoting energy efficiency and conservation.

The rest of this chapter describes the activities each type of organization is engaged in and provides a detailed example of each. Tables summarize key parameters of the cooperation: the program or project; lead organizations; time frame; and type of cooperation. (The types of cooperation, or cooperation mechanisms, are defined and examined in Chapter 4.) The analysis below shows the strengths and weaknesses of different cooperation agreements and their organizational structures, and points to the growing role of independent international cooperation networks.

### **3.1 Experience from Bilateral Cooperation**

Bilateral cooperation activities in East Asia focused on energy efficiency and conservation are summarized in Table 3.1. Nearly all East Asian countries have participated in some form of bilateral cooperation, with most activities occurring since the 1990s. China has been the most active participant, engaging in cooperation across several sectors (industry, government, buildings and appliances) with a number of countries (Japan, the U.S., Canada and the U.K.). Japan has been the most active donor, providing funds and expertise in various forms since the 1980s (e.g., technical assistance, training programs and technology demonstration). Because Japan has been particularly active on a bilateral level, we examine its experience and lessons learned in more detail here.

**Table 3.1. Bilateral cooperation on East Asian energy efficiency.**

Cooperation activity	Type of cooperation <sup>2</sup>	Target sector	Lead organizations	Timeframe
<b>Japan-China</b>				
JICA Energy Efficiency Training	TA, CB, PR/Ed	Industry, government	JICA; various overseas partners	1980s–present
Green Aid Plan: Energy Efficiency Projects	TD, TA	Industry (steel, cement, chemical), electric power	Japan: METI, NEDO, others; China: NDRC, industrial agencies	1992–present
Dalian Energy Center	TA, CB	Industry	Japan: MOFA, JICA, ECCJ; China: MOST, SETC, Dalian city	1992–1998
<b>Japan-SE Asia</b>				
JICA Energy Efficiency Training	TA, CB, PR/Ed	Industry, government	JICA; various overseas partners	1980s–present
Green Aid Plan: Energy Efficiency Projects	TD, TA	Industry (steel, cement, chemical), electric power	Japan: METI, NEDO, JETRO; Thailand, Indonesia, Philippines, Malaysia, India, Vietnam: various agencies	1992–present
Energy Conservation Center, Thailand: Energy Manager System Development	CB, TA, PD	Government, industry	Japan: METI, NEDO, JICA, ECCJ; Thailand: DEDE	1999–2005
<b>U.S.-China</b>				
Green Buildings	TA, PD	Buildings	U.S.: LBNL, NRDC, Energy Foundation, U.S. DOE; China: CBECA, MOC	1998–2000
China Motor Systems Energy Conservation Program <sup>3</sup>	TA, PD	Industry	U.S.: LBNL, ACEEE, U.S. DOE; UNIDO; China: MOFTEC, CECIC, Shanghai, Jiangsu	2001–2004
Beijing Energy Efficiency Center (BECon) <sup>4</sup>	CB, PD	Government, industry	U.S.: PNNL, LBNL; China: ERI, NDRC	1993–present
U.S.-China Energy and Environmental Technology Center	TA, MD	Industry	U.S. DOE, Tulane Univ.; China: Tsinghua Univ.	1997–present
<b>Canada-China</b>				
CIDA Energy Efficient Buildings Project	TA	Buildings	Canada: CIDA China: MOC	1996–2002

2 See Chapter 4 for definitions and discussion on the type of cooperation.

3 A report by McKane *et al.* (2003) provides an overview of the China industrial motors program. See also: <http://eetd.lbl.gov/ea/indpart/china.html>

4 For further information about the Beijing Energy Efficiency Center (BECon), see: <http://www.beconchina.org/>

Cooperation activity	Type of cooperation	Target sector	Lead organizations	Timeframe
<b>U.K.-China</b>				
Implementation Support for Initiative on Top 1,000 Energy-Using Enterprises	PD	Industry	U.K.: DEFRA; U.S.: Energy Foundation; China: NDRC, National Energy Leading Group, SOASAC, NBS	2006–present

**Key: Form of Cooperation:** CB = Capacity Building, PD = Policy Development, MD = Market Development, PR/Ed = Public Outreach/Education, TA = Technical Assistance, TD = Technology Development.

## Japanese Bilateral Energy Efficiency Cooperation in East Asia

Based on its experience of developing a strong industrial economy with limited domestic energy resources, Japan emphasizes energy efficiency and conservation in policy and practice. Expanding its domestic efforts overseas, Japan has engaged in energy efficiency cooperation activities in East Asia since the 1980s. Lacking a central aid agency, Japanese cooperation activities involve multiple agencies, overseen by multiple ministries.

### Japan International Cooperation Agency (JICA)

Japan's longest-running cooperation activity in energy efficiency is the provision of technical assistance, funded by grants from the Japan International Cooperation Agency (JICA), as a part of Japanese official development assistance (ODA). Technical assistance has involved sending Japanese energy experts to neighboring countries to share Japanese energy management practices and experience with energy-efficient technologies. Between 1980 and 2004, 96 projects were conducted. Of those, 26 involved missions to Thailand; 17 to Malaysia; 12 to China; and 11 to Indonesia. JICA also provides grants to bring foreign managers and technicians to Japan for study tours and training. Between 1980 and 2004, 63 training projects were hosted, of which 16 projects involved technical staff from Thailand; 12 from China; four from Malaysia; three from Indonesia; and two from the Philippines.<sup>5</sup>

### Japan Bank for International Cooperation (JBIC)

The other main Japanese agency involved in ODA is the Japan Bank for International Cooperation (JBIC, formed from a merger of OECF and JEXIM), which manages concessional lending. Since the 1990s, the Japanese government has asked JBIC to provide special lending terms for projects that involve environmental protection and energy efficiency.<sup>6</sup> Following the third Conference of the Parties (COP-3) to the Framework Convention on Climate Change (FCCC) in Kyoto in December 1997, Japan announced new loan

5 Data from the Japanese Agency of Natural Resources and Energy (2006).

6 For a brief history of Japan's environmental lending and further details on Japan's aid bureaucracy, see Ohshita 2003: Chapter 3.

terms for environmental projects and an expanded range of activities to be included under the new terms. Energy conservation projects qualify for special environmental loan terms—terms with the lowest interest rate and longest payback period. For most developing countries, special environmental loans were made available at an interest rate of 0.75 per cent with a repayment period of 40 years.<sup>7</sup> The resulting grant element for special environmental loans, 40.6 per cent, is a huge increase from that of standard loans, and represents Japan's effort to make environmental aid projects as appealing as possible. Thailand was the first country to request a loan under the new environmental terms, followed by Vietnam and China. While JBIC staff are eager to provide increased lending on energy efficiency, and while total environmental lending amounts to roughly 20 per cent of the total aid budget, they have not yet seen a substantial increase in requests for energy efficiency loans from borrowers.<sup>8</sup> According to Japan's aid policy, all loans are request-based, meaning that the agency can only direct more financing toward energy efficiency if they receive requests for those kinds of projects.

### Ministry of Economy, Trade, and Industry (METI)

Parallel to ODA, Japan has engaged in another major effort to promote energy efficiency: the Green Aid Plan (GAP). Japan's Ministry of Economy, Trade and Industry (METI, formerly MITI) launched its Green Aid Plan in 1992 to promote the introduction and dissemination of cleaner energy technologies in the industrial sector of Asian developing countries. Two main types of technology are targeted: energy-efficient technologies and clean coal technologies. Under the Green Aid Plan, METI engages in government-to-government policy dialogue with their counterpart agencies in the recipient countries to determine the host country's technology preferences. The selection of specific technologies and projects is based on host-country policies and priorities, and the availability of technologies from Japanese industry.<sup>9</sup> The organizational structure of the GAP is illustrated in Figure 3.1, showing China as the host country. The New Energy and Industrial Technology Development Organization (NEDO), a quasi-governmental group affiliated with METI, is the main implementing organization for the GAP.

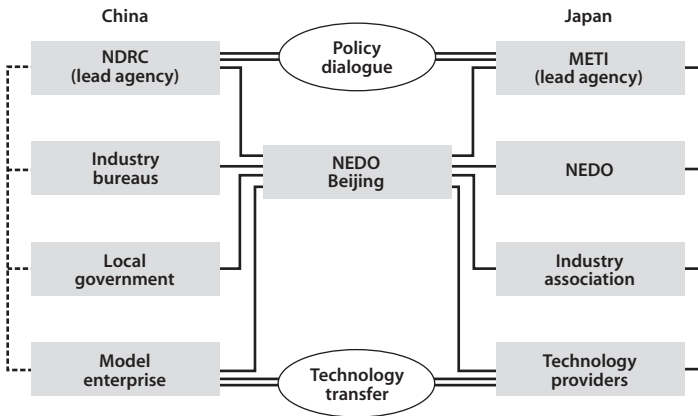
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7 For middle-income countries, special environmental loans were made available at an interest rate of 1.8 per cent with the repayment period remaining at the standard term of 25 years. The 1.8 per cent interest rate for middle-income countries was further reduced from the 2.5 per cent rate announced earlier in September 1997.

8 Interviews with JBIC staff; Tokyo, 2004; Beijing, 2006.

9 For more information on the GAP, see Ohshita 2003; Ohshita and Ortolano 2003; and Ohshita 2002.

Figure 3.1. Organizational structure of cooperation under Japan's Green Aid Plan.



The Green Aid Plan provides public funds to Japanese firms to modify and demonstrate their technologies in enterprises in recipient countries. The funds come mainly from Japan's Special Energy Account over which METI has some discretion. Because GAP operates in large part outside Japan's official development assistance, METI is able to take a more proactive stance in promoting cleaner energy technology, engaging in policy dialogue rather than waiting for requests for energy efficiency aid. A smaller proportion of GAP funds (~20 per cent) come from Japan's General Account and are considered part of Japanese ODA; these funds are typically directed toward training activities. METI also provides funds to Japanese industrial associations and training organizations to conduct feasibility studies and training on the operation of the Japanese technologies. Recipient enterprises are granted ownership of the equipment and training, but are responsible for necessary on-site modification of their facilities and for ongoing operation and maintenance costs. Little money goes directly to the recipient government or enterprises.

To date, 35 industrial energy efficiency projects have been carried out under METI's Green Aid Plan. Of those, 18 were in China; five in Indonesia; four in Thailand; two in Vietnam; two in Myanmar; two in India; one in Malaysia; and one in the Philippines. Achievements of the GAP include demonstration of the technical feasibility of various industrial energy efficiency technologies under local conditions, and increased awareness and enhanced government relations between Japan and the host countries through GAP policy dialogue. However, the Green Aid Plan's goal of wider technology diffusion has not been realized; for the most part, technologies have not spread and have not led directly to wider energy efficiency gains in the host countries.

Based on these results, METI has been considering other approaches toward energy efficiency cooperation, including the development of energy manager programs and greater activity on the development of policies in East Asian countries to encourage the spread of energy-efficient industrial technologies.

In terms of organizational structure, Japanese bilateral cooperation on energy efficiency is characterized by the involvement of multiple agencies and ministries, rather than a single aid agency. Compared to the size of its ODA budget, Japan has relatively few staff in its aid agencies. Although staff are directed to work on energy efficiency and pay attention to particular countries (such as China), frequent rotation of staff means that few staff have an in-depth knowledge of a particular country's situation, unless they continue to be involved with the same country in their different posts. The Green Aid Plan was, in part, a reaction to the limitations of Japan's ODA system, with METI emphasizing and promoting energy efficiency, consistent with its mission.

### 3.2 Experience from Multilateral Institutions

Multilateral efforts to promote energy efficiency in East Asia have been carried out primarily through the Global Environment Facility (GEF) as measures to promote sustainable development and mitigate climate change (see Table 3.2). The GEF projects have targeted multiple sectors, especially industry, appliances and the electricity utility effort at demand-side management (DSM). GEF projects have frequently used multiple cooperation mechanisms, combining technical assistance and technology development with policy development cooperation and public outreach to promote markets for more efficient technologies. Because most multilateral activity has come under the GEF, the structure of that activity is discussed further below.

Table 3.2. Multilateral cooperation on East Asian energy efficiency.

Cooperation activity	Type of cooperation	Target sector	Lead organizations	Timeframe
<b>GEF-World Bank-China</b>				
China Energy Conservation Project: EMCs	CB, MD	EMCs (ESCOs), industry	GEF, World Bank; China: SETC, provincial ETCs	1998–2006
Industrial Boiler Project	TA, TD, MD	Boiler manufacturers, industry	GEF, World Bank; China: SETC, others	1995–2004
<b>GEF-World Bank-Thailand</b>				
Electricity Energy Efficiency: DSM	TA, TD, CB, MD, PR/Ed	Electric power, appliance manufacturers; consumers	GEF, World Bank; Thailand: EGAT (national electricity utility)	1993–1998
Building Chiller Replacement Program	TA, TD, CB, MD, PR/Ed	Chiller manufacturers, consumers, government	GEF, World Bank; Thailand: IFCT, DIW	1998–2003



## Cooperative Climate: Energy Efficiency Action in East Asia

Cooperation activity	Type of cooperation	Target sector	Lead organizations	Timeframe
<b>GEF-UNDP-China</b>				
Commercialization of Energy-efficient Refrigerators	TA, TD, PD, CB, MD, PR/Ed	Manufacturers; distributors; consumers	GEF, UNDP; China: SEPA, State Light Industry Bureau	1999–2004
End-Use Energy Efficiency Program (EUEEP)	TA, TD, PD, CB, MD, PR/Ed	Industry, buildings ERI, MOC	GEF, UNDP; China: NDRC,	2005–present
<b>GEF- IFC - multiple countries (in Asia: China, Philippines)</b>				
Efficient Lighting Initiative (ELI)	TA, TD, PD, CB, MD, PR/Ed	Lighting manufacturers, consumers	GEF, IFC, ELI Quality Certification Institute, multiple countries	1998–2003 (under GEF); ongoing
<b>ADB-China</b>				
Energy Conservation and Resource Management Project	TA, PD	Government, electric power, industry	ADB, others to be determined	2005–present
Industrial Energy Efficiency	TA, TD	Industry (chemical, cement, steel)	ADB; China: SETC	1996–2001
<b>ADB-Asia</b>				
Energy Efficiency Fund	TA, TD	To be determined	ADB, others to be determined	2006–present
ESCO Fund	TA, CB, MD, PR/Ed	ESCOs, industry, buildings, public/ government	ADB; India, Malaysia, Philippines, Thailand	2003–present
REACH Program	TA, CB, MD, PR/Ed	Government, finance	ADB; Dutch, Canadian, Danish, Finnish funds; 15 member countries	2002–present
<b>EU-China</b>				
Energy and Environment Program (EEP)	TA, TD, PD, CB, MD	Industry, EMCs, residential, public/ government	EU; AEA Technology Integration Environment and Energy, Dansk Energi Mngmt; China: MOFCOM, NDRC, MOST, CNPC	2003–2008

**Key: Form of Cooperation:** CB = Capacity Building; PD = Policy Development; MD = Market Development; PR/Ed = Public Outreach/Education; TA = Technical Assistance; TD = Technology Development.

### Asian Development Bank (ADB)

The Asian Development Bank (ADB) has sponsored several activities with an energy efficiency focus. In the 1990s, the largest ADB effort in this regard was a program on industrial energy efficiency in China. That ADB effort involved technical assistance and technology cooperation, and it targeted three energy-intensive industrial sub-sectors: chemical, cement and metallurgical. The ADB industrial energy efficiency program had some similarities to Japan's Green Aid Plan, in that it focused on technology installations at existing industrial enterprises and required some degree of co-financing from the recipient government and enterprises. Lessons learned include the importance of facilitating local financing, and the need for policies that encourage investment in more efficient technologies.

More recently, ADB has been exploring demand-side management in the form of an “efficiency power plant” or energy conservation activities that replace the need for a new electric power plant. ADB has also been exploring options to promote Energy Service Corporations (ESCOs), watching national efforts and World Bank experience (under GEF), as well as holding workshops. ADB launched its own ESCO program in 2003 and has begun ESCO activities in India, Malaysia, the Philippines and Thailand.<sup>10</sup>

In March 2006, ADB announced it will launch a new energy efficiency fund within the year. ADB president Haruhiko Kuroda stated that the US\$1 billion initiative will support energy efficiency measures being developed by its member countries. With the demand for energy in Asia expected to increase “exponentially” in the next 10 to 15 years, the agenda of ADB’s 39th annual meeting in Hyderabad (May 2006) included the matter of ADB’s role in assisting countries to achieve energy efficiency improvements.<sup>11</sup>

In addition to GEF and ADB activities, the European Union launched a large energy efficiency program (EEP) in China in 2003. The EU efforts involve several member states and three main private firms: AEA Technology (U.K.); Integration Environment and Energy (Germany); and Dansk Energi Management (Denmark). The Ministry of Commerce and the National Development and Reform Commission lead the effort on the Chinese side. The EU EEP targets multiple sectors and is discussed further in Chapter 5.

### Lessons from GEF in China

The Global Environment Facility (GEF) was launched in 1991 under a joint program run by the United Nations Development Program (UNDP); the United Nations Environment Program; (UNEP) and the World Bank (WB). These agencies are the implementing agencies (IAs) of the GEF.<sup>12</sup> Each of the three implementing agencies has its own GEF organizational unit based at their respective headquarters. The World Bank is a GEF trustee. The UNDP plays a primary role in capacity building and technical assistance; UNEP in technical and scientific analysis; and the World Bank in managing investment projects (Werksman, 2004 in Heggelund *et al.*, 2005). The GEF provides new and additional grants and concessional funding to meet the *incremental*

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10 For more information on ADB ESCO activities, see <http://www.adb.org/Documents/News/2003/nr2003176.asp>

11 “ADB to launch \$1 bn energy efficiency fund,” Regional Bureau, *Business Standard Online*. Hyderabad, March 9, 2006. Available online at <http://www.business-standard.com/bsonline/story-page.php?bKeyFlag=BO&auto=14515>

12 GEF’s Council and Assembly have approved Asian Development Bank (ADB) for direct access to GEF full project resources. This enables ADB to prepare and implement GEF projects on behalf of GEF; to submit project proposals directly to GEF rather than through an implementing agency; and to receive project grants directly from the GEF Trustee and be directly accountable for their use.

costs<sup>13</sup> of measures to achieve *global environmental benefits* in six focal areas listed as Biodiversity, Climate Change, International Waters, Land Degradation, the Ozone Layer<sup>14</sup> and Persistent Organic Pollutants (POPs). In China, the Ministry of Finance (MOF), with its Department of International Cooperation, is the political and operational focal point for the GEF (in addition to being the funding window for the WB and ADB). The State Environmental Protection Administration (SEPA) is the technical support department for GEF projects. Its responsibility is to support the Ministry of Finance by supplying GEF policy studies, project management and professional consultants. SEPA coordinates actions with the relevant ministries. The GEF Secretary Office (joint office of MOF and SEPA) was set up in 2000 in order to boost GEF funding and project management efficiency.<sup>15</sup>

China has benefited more from GEF money than any other country, and more than 50 projects have been launched with Chinese participation. GEF has allocated nearly US\$467 million to China (Good, 2004). This amount has gone to 44 Chinese-based projects, of which 23 are climate policy related (such as energy efficiency, renewable energy projects, etc.).<sup>16</sup> During the first decade of GEF operations, the GEF and its implementing agencies have contributed to increased awareness and technology development as well as boosted institutional capacity through participation in project activities and training, particularly at the central level, but to some extent at provincial and local levels as well. Domestic institutional capacity through the establishment of the GEF Office—and other more narrowly defined institutions connected to the projects—have been established.<sup>17</sup> Technological innovations and job creation have also resulted from some GEF projects. The GEF has provided China with technical assistance, hardware upgrades and maintenance, and has promoted environmentally-friendly technology.

One example is the UNDP-implemented project for the commercialization of energy-efficient CFC-free refrigerators in China, launched in 2000.<sup>18</sup> Several forms of cooperation were utilized: technical assistance; technology

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13 Incremental costs are additional costs associated with transforming a project with national benefits into one with global environmental benefits. See [http://www.gefweb.org/Operational\\_Policies/Eligibility\\_Criteria/Incremental\\_Costs/incremental\\_costs.html](http://www.gefweb.org/Operational_Policies/Eligibility_Criteria/Incremental_Costs/incremental_costs.html)

14 The GEF funds projects that enable the Russian Federation and nations in Eastern Europe and central Asia to phase out their use of ozone-destroying chemicals.

15 See Heggelund, Andresen and Sun (2005) for a discussion of the implementation of GEF projects in China.

16 For more details on GEF projects in China, see the GEF Web site: [http://www.gefchina.org.cn/assembly/file/Projects in china.doc](http://www.gefchina.org.cn/assembly/file/Projects%20in%20china.doc) and <http://www.gefonline.org/projectList.cfm>.

17 See, for example, Project Management Office (PMO), World Bank/GEF China Energy Conservation Project, State Economic and Trade Commission, Progress Report 2002.

18 For more information on the GEF China refrigerators project, refer to the PMO's *Information Center on China Efficient Refrigerator Project*. Available online at: <http://www.r-gefchina.org.cn/news/index.htm>

development; capacity building; and public outreach and education. The project addressed both the supply and demand sides of the market for efficient refrigerators. The project was viewed as important for increasing pressure on the market for more efficient refrigerators and assisted in establishing national energy efficiency standards for refrigerators (Birner and Martinot, 2005). The project received considerable attention in the media and exposure through establishing an information dissemination center, as well as initiating a design price to encourage innovation. The negative aspects of the project include the lack of transfer of technical know-how, and access to foreign manufacturers. Also, changes in the market for price competition were not envisioned in the project design.

A new programmatic approach is applied in the UNDP-implemented China End-Use Energy Efficiency Project (EUEEP). The programmatic approach modality<sup>19</sup> would provide longer-term financial support through country-based programs, “which would go beyond the scope of an individual project to support an integrated set of projects” (Christoffersen *et al.*, 2002). The EUEEP project supports the first phase of a four-phase, 12-year strategic plan developed by the Chinese government to dramatically improve the efficiency of its major end-use sectors, buildings and industry. The objectives of the project are to outline a strategic approach to developing, implementing and enforcing a comprehensive and effective energy conservation policy and regulatory system in line with the objectives of the Energy Conservation Law of 1998. The principal elements of the project include: policy and regulatory issues; institutional/capacity issues; technical barriers; financial resources; and information dissemination. Developing policies, standards, codes, labels and taking other actions to implement the Energy Conservation Law are important aspects of the project:<sup>20</sup>

- issuing guidelines for energy-efficient end-use products;
- amending energy efficiency design codes for new industrial facilities;
- adopting incentive policies to introduce new/advanced technologies and to encourage compliance with energy efficiency standards and codes;
- promotional policies for energy-efficient appliances and equipment (e.g., Energy Star certification);
- new and revised standards and codes for new residential/commercial buildings and new codes for existing buildings;

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19 The *programmatic* approach aims to provide “phased and sustained support for the implementation of a multi-year (medium- to long-term) program that serves to better integrate global environmental objectives into national strategies and plans,” (e.g., biodiversity strategies, sustainable energy plan, etc.) (GEF 2002).

20 See the GEF project document on the China End-Use Energy Efficiency Project: <http://gefonline.org/projectDetails.cfm?projID=966>

- technical specifications for building materials and equipment (e.g., doors/windows, insulation, heat pumps, district heating, materials);
- building rating and labeling systems;
- certification and labeling of energy-efficient industrial products;
- policies for retrofit of existing commercial and residential buildings;
- voluntary agreements with enterprises to reduce their energy consumption by taking energy efficiency measures; and
- assessing and preparing guidelines for building EE equipment (A/C, heat meters, building envelop).

GEF provides US\$17 million for the first three-year period (US\$31 million in co-financing from the Chinese government and US\$32 million from the Chinese business sector for technical renovation). The EUEEP project aims to promote energy efficiency in the building and industry sectors—key energy consuming sectors in China—and began implementation in 2005. It is a 12-year program to improve energy efficiency while reducing emissions; carbon emissions reductions of approximately 12 million tons will be reduced on a cumulative basis (equivalent to over 42 million tons of CO<sub>2</sub>). This will be achieved by reducing energy consumption in the targeted sectors by nearly 19 million tons of coal equivalent (Mtce) over this three-year period. The project is still in an initial phase and it is therefore premature to draw conclusions about achievements. The programmatic approach ensures long-term support.

Lessons from implementation of GEF projects in China illustrate that there are some international and domestic challenges to be overcome in the application processes and procedures, and in implementation. The GEF structure and process are viewed by Chinese stakeholders as highly political; they believe that ways should be explored to insulate the new fund from political tensions. Moreover, they consider the GEF project development cycle to be far too long, e.g., three years in the case of the UNDP EUEEP. The Country Assessment of GEF Activities in China, prepared for MOF by the China GEF office in 2004, concluded that GEF projects have not contributed as much to technology transfer as anticipated. In the above-mentioned two projects (boilers and refrigerators) foreign suppliers of technical know-how were not eager to provide Chinese manufacturers with information. Moreover, institutional problems occurred on the Chinese side during central government administrative reforms, which included the abolishment of several industrial ministries, including the Ministry of Machinery Industries (Birner and Martinot, 2005). In addition, in the China industrial boiler project, the long process of license procurement for technology had a negative impact on the project (more on this project in Chapter 4).

Implementation of GEF projects in China depends on Implementing Agencies as well as domestic agencies. The World Bank is the dominant implementing agency, contributing more than 70 per cent of all GEF funding in China. UNDP is the most active player in terms of number of projects, but they are much smaller than the World Bank projects. Chinese actors view the World Bank and UNDP differently.<sup>21</sup> The World Bank is viewed as more effective and action-oriented, albeit less receptive to Chinese demands. UNDP scores lower in terms of effectiveness but higher in terms of legitimacy. Both are viewed as bureaucratic; the World Bank to a lesser extent, although burdensome procurement rules and procedures were a barrier in the boiler project.

On the domestic side, the Chinese bureaucratic system seems more streamlined than it actually is, and there are serious coordination problems both horizontally and vertically. Lack of cooperation, problems of information-sharing, and institutional turf battles among the numerous actors are common and could impact negatively on the implementation of GEF projects.

### **3.3 Possibilities for Regional Cooperation**

Given the nature of regional institutions—designed to coordinate at a high level among governments of multiple countries—it is not surprising that energy efficiency cooperation at a regional level in East Asia has focused mainly on policy discussions and coordination. Compared to economic issues, and even energy issues, energy efficiency appears as a relatively small agenda item in regional dialogue. Among energy issues, energy security in the region receives the most attention, particularly how to secure stable supplies of oil and natural gas. Thus strategies for oil stockpiling, coordination of expanding natural gas pipeline infrastructure and expanding facilities for transport of liquefied natural gas (LNG) are major topics for discussion.<sup>22</sup> There is common interest in energy efficiency, as reflected in regional agendas and plans, but supply-side aspects of energy security have thus far received much more attention.

The two main regional organizations are the Association of Southeast Asian Nations (ASEAN)—with various permutations involving the three large economies in Northeast Asia (Japan, China and South Korea)—and the Asia Pacific Economic Cooperative (APEC), an even larger grouping of countries around the Pacific Rim. Energy efficiency cooperation activities carried out under the auspices of these organizations are summarized in Table 3.3. Selected cooperation efforts are described in further detail below, emphasizing the organizational structure of the cooperation.

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21 The third IA, UNEP, is not involved in climate change or energy projects in China; UNEP GEF projects focus mainly on nature conservation and biodiversity.

22 Based on dialogues of the APEC EWG, ASEAN ACE and Northeast Asia.

**Table 3.3. Regional cooperation on East Asian energy efficiency.**

Cooperation activity	Type of cooperation	Target sector	Lead organizations	Timeframe
ASEAN Plans of Action for Energy Cooperation (APAEC)	PD, CB	Government, industry, appliances, ESCOs, transport	ASEAN Center for Energy (ACE) and EE&C-SSN	1999–2004; 2004–2009
ASEAN +3	PD	Government (National Energy Policies)	ASEAN +3 Energy Policy Governing Group	2002–present
ASEAN-EC Cogen Program Phase 3	TD, TA, MD	Co-generation power	ASEAN: Asian Institute of Technology (Thailand); EC: Carl Bro International (Sweden)	January 2002–December 2004
ASEAN-Japan (SOME-METI)	PD, TA	Buildings, industry	Japan: METI, EJCC; ASEAN: EE&C-SSN, SOME	2000–present
ASEAN Energy Policy and System Analysis Project	TA, PD	Government, transport, electric power, fuel supply	ASEAN; Australia: AusAID	2000–2005
APEC EWG Operational Plan	PD, CB	Government (National Energy Policies)	APEC Energy Working Group (EWG)	2003–present

**Key: Form of Cooperation:** CB = Capacity Building; PD = Policy Development; MD = Market Development; TA = Technical Assistance; TD = Technology Development.

The Association of Southeast Asian Nations (ASEAN) was established in 1967 by five original member countries. Today there are 10 members.<sup>23</sup> The aims and purposes of ASEAN are to accelerate the economic growth, social progress and cultural development in the region, and to promote regional peace and stability. Some of the earliest economic cooperation schemes of ASEAN were aimed at increasing intra-ASEAN trade, including the launching of an ASEAN Free Trade Area, or AFTA.

At present, ASEAN economic cooperation covers 12 areas, one of which is energy. An ASEAN Center for Energy (ACE) was established as an intergovernmental organization to serve as a catalyst for the economic growth and development of the ASEAN region. This is achieved by initiating, coordinating and facilitating regional, as well as joint and collective, activities on energy that promote the environmental sustainability of the region. ACE now facilitates and coordinates the work of the Energy Efficiency and Conservation Sub-sector Network (EE&C-SSN), a body established in 1997 to coordinate ASEAN's energy efficiency activities. Funding for the ACE is provided by an Energy Endowment Fund established from equal contributions of the 10 member countries.

Since its establishment, ACE has been instrumental in preparing two ASEAN Plans of Action for Energy Cooperation: one for the period 1999–2004, and one for 2004–2009. The 1999–2004 plan includes four strategies. The 2004–2009 plan includes six strategies and 25 actions.

<sup>23</sup> ASEAN members are Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.



One example of ASEAN energy strategies is the development of a voluntary standard endorsement label for energy-efficient products, starting with magnetic ballasts for lighting (see Figure 3.2). Since 1997, with the Philippines as the project leader, the ACE and EE&C-SSN have held workshops, conducted study tours, and shared national information among member countries. They have conducted an appraisal of the ASEAN lighting ballast market, coordinated comparative testing of magnetic ballasts, developed a common testing procedure for magnetic ballasts and evaluated alternative endorsement label designs in support of the ASEAN labeling system. Individual member countries will develop their own national guidelines to implement the label and to ensure that the label is properly used and attached to products made by manufacturers accredited by proper authorities in the member countries. When work on the label for magnetic ballasts is complete, ACE and EE&C-SSN are planning to turn their attention to labels for refrigerators and air conditioners, with Thailand leading the effort.

**Figure 3.2. Regional endorsement label adopted by ASEAN for energy-efficient products.**



### ASEAN+3 energy cooperation

In the Senior Officials on Energy Meeting (SOME) of the 20th ASEAN Ministers on Energy Meeting, ASEAN energy officials formally established closer energy cooperation with their counterparts from China, Japan and Korea. They held the First SOME + 3 Consultations in Bali in June 2002, which served as a venue for high-level policy discussions and exchanges of relevant information in the field of energy in East Asia. In September 2002, during the Eighth International Energy Forum held in Osaka, Japan, the ASEAN+3 Energy Ministers reached a common understanding on a five-point initiative for “Energy Cooperation among Japan, China, Korea and ASEAN,” which comprised the following: (a) creation of emergency network; (b) development of oil stockpiling; (c) joint studies on the ASEAN oil market; (d) improvement of natural gas development; and (e) improvement of energy efficiency and renewable energy.<sup>24</sup>

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<sup>24</sup> ASEAN Plan of Action for Energy Cooperation (APAEC) 2004–2009. Available online at: <http://www.aseansec.org/pdf/APAEC0409.pdf>



At another meeting in Manila in June 2004, the Energy Ministers of ASEAN+3 adopted a joint statement titled “Forging Closer ASEAN+3 Energy Partnership.” It consists of 14 paragraphs, with paragraph 13 being a statement on energy efficiency and conservation that says: “We acknowledge the vital importance of energy efficiency and conservation for our region where rapid increases in energy demand are expected in the future, and we share the view that greater effort for energy efficiency and conservation will be necessary.”<sup>25</sup>

### METI’s “Asian Energy Partnership Plan”

The Japanese Ministry of Economy, Trade and Industry (METI) associates ASEAN+3 cooperation with its Asian Energy Partnership plan. The plan is a major pillar of Japan’s international energy strategy toward the year 2030, as stated by the Minister’s advisory committee for natural resources and energy.<sup>26</sup>

### APEC Energy Working Group (EWG) and Expert Group on Energy Efficiency and Conservation (EGEE&C)

The 21-member Asia Pacific Economic Cooperative (APEC) was established in 1989 to further enhance economic growth and prosperity for the region and to strengthen the Asia-Pacific community.<sup>27</sup> Although APEC member economies represent vastly differing cultures and levels of economic development, members have worked together since APEC’s inception to reduce tariffs and other trade barriers across the Asia-Pacific region, creating efficient domestic economies and dramatically increasing exports.

In the years after its formation, APEC created an action agenda with 15 specific areas that needed to be undertaken including “Standards and Conformance,” which the agenda targeted with the following four goals:

1. ensure the transparency of the standards and conformity assessment of APEC economies;
2. align APEC economies’ mandatory and voluntary standards with international standards;
3. achieve mutual recognition among APEC economies of conformity assessment in regulated and voluntary sectors; and

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25 For more information on the 2004 ASEAN+3 Energy Ministers meeting, see: <http://www.aseansec.org/16144.htm>

26 For more information on METI-ASEAN activity, see: <http://www.enecho.meti.go.jp/english/new/040428.htm>

27 APEC’s 21 member economies are Australia; Brunei Darussalam; Canada; Chile; People’s Republic of China; Hong Kong, China; Indonesia; Japan; Republic of Korea; Malaysia; Mexico; New Zealand; Papua New Guinea; Peru; the Republic of the Philippines; the Russian Federation; Singapore; Chinese Taipei; Thailand; United States of America; Vietnam. See: <http://www.apecsec.org.sg/>

4. promote cooperation for technical infrastructure development to facilitate broad participation in mutual recognition arrangements in both regulated and voluntary sectors.

While APEC established an Energy Working Group (EWG) in 1990 as one of 10 sectoral groups, the Energy Ministers of the APEC economies met for the first time only in 1996. At this meeting, the Ministers embraced APEC's new action agenda and instructed officials from member economies to work together to achieve the benefits of increased cooperation on energy standards by:

- developing firm proposals for establishing a base on which mutual acceptance of accredited test facilities and standard test results obtained at these facilities (could) be achieved;
- working towards the establishment of bases for the direct comparison of the outcomes of testing to different standards so that the need for testing to multiple standards (could) be reduced or removed; and
- developing a general policy framework that would allow for progressive development and implementation on a bilateral or multilateral basis, product by product, as technical details (were) established and mutually agreed.

The EWG formed an Expert Group on Energy Efficiency and Conservation (EGEE&C) with a general mission “to advance economic and social well-being in the Asia-Pacific region through energy conservation and the application of energy-efficient technologies.” In 1996, EWG created a separate ad hoc APEC Steering Group on Energy Standards (SGES) to design a general policy framework to guide future energy efficiency standards related work within APEC economies.

In 2000, SGES submitted its report to EWG, completing its mandate and recommending that EGEE&C implement the proposed framework. The report concluded that the successful implementation of the general policy framework requires the active participation by member economies in future APEC workshops and international standards processes. It also requires the existence of an infrastructure that will create transparency of action on the development and use of energy efficiency testing procedures and that will monitor and coordinate related activities in the APEC region. The SGES concluded that in order for the framework to be implemented effectively, a Web-based Standards Notification Procedure needed to be established and an APEC Energy Efficiency Test Procedures Coordinator should be appointed (SGES, 2000).

At their second meeting in 1998, APEC Energy Ministers endorsed the establishment of a Standards Notification Procedure and agreed to consider other new programs related to energy efficiency testing procedures. The subsequent meetings of the energy ministers to date have all provided further encouragement and guidance to EGEE&C for its standards and labeling initiative.

Since 2000, EGEE&C has conducted workshops and seminars; prepared reports; shared information among members about the progress of S&L at its twice-a-year business meetings; and established the Web-based Energy Standards Information System (ESIS)<sup>28</sup> in partnership with CLASP (see discussion in Chapter 4). A series of vision workshops were sanctioned by EGEE&C and hosted by the Australian Greenhouse Office on three continents in 2003 and 2004 to develop a consensus vision reported in *A Strategic Vision for International Cooperation on Energy Standards and Labeling*. While its S&L activity has been predominant, EGEE&C has conducted activities in other aspects of energy efficiency, most recently focusing on financing for energy efficiency and on public sector procurement of energy-efficient products.

The progress in collaboration among its member economies that APEC has been able to achieve over the past decade is due to a combination of dedicated people and ongoing reliable funding. Just three high-energy individuals committed to S&L have provided expertise and enthusiasm to create and maintain the primary momentum for the energy efficiency initiative. Support from over two dozen dedicated and competent representatives from member economies has contributed to the initiative's viability. Importantly, the venture was facilitated by APEC's robust mechanism for funding such initiatives. By annually making ample project funds available from member economy contributions, and by sponsoring member economy self-funded projects, APEC provided funding for participant travel to the workshops and for the development and maintenance of the ESIS Web site. Without any one of these three components, much of the APEC support for S&L would not likely have happened. Also, without the initial mandate from the highest levels within the member economies and specifically from their Energy Ministers, the initiative would not likely have gained the traction that it has (Wiel and Lebot, 2006).

### **3.4 A New Model: Independent, International Cooperation Networks**

Independent international organizations leverage expertise by forming networks across countries and organizations, including government, industry, financial institutions, research institutions and non-profit organizations. The Energy Foundation's China Sustainable Energy Program (CSEP); the expanding network under the umbrella of the Renewable Energy and Energy Efficiency Program (REEEP, a spin-off of U.K. efforts); and the appliance-focused Collaborative Labeling and Appliance Standards Program (CLASP, a spin-off of the Lawrence Berkeley National Lab in the U.S.) are examples of these network-based organizations (see Table 3.4). International independent organizations favor cooperation in the form of capacity building and policy development, targeting their limited funds toward experts and organizations

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28 See the ESIS Web site at <http://www.apec-esis.org>

that can achieve large-scale energy efficiency improvements by promoting policy action. Below we describe the structure and accomplishments of two of these networks: CSEP and CLASP.

**Table 3.4. Independent international cooperation on East Asian energy efficiency.**

Cooperation activity	Type of cooperation	Target sector	Lead organizations	Timeframe
Energy Foundation: China Sustainable Energy Program (CSEP)	PD, CB, MD, TA	Buildings, transport, industry, appliances, electric power, finance	U.S.: Energy Foundation, LBNL, others; China: NDRC, ERI, CATARC, CNIS, others	1999–present
CLASP-China	TA, PD	Appliances	CLASP; China: CNIS, others	2002–2005
CLASP-ASEAN	TA, PD	Appliances	CLASP, ASEAN EE&C-SSN	2004–2005
CLASP-APEC	TA, PD	Appliances	CLASP, APEC EWG	2002–2004
PePS-China	TA, PD	Appliances, government/public	PePS, LBNL; China: CECP, NDRC	2002–2007
REEEP-China: Innovative (Energy) Project Fund, ESCOs and others	PD, CB, MD, PR/Ed	Electric power, government, buildings, industry, banks	REEEP, GEI, Rabobank (Netherlands), LaGuardia Foundation; China: CECIC, Chongqing University; U.K.: Cambridge University	2003–present
Alliance to Save Energy: China Energy Efficiency Industry Partnership	PR/Ed, MD	Industry, residential, hotels, hospitals, utilities	Alliance to Save Energy; China: CECA, various Chinese agencies	1997–2004

**Key: Form of Cooperation:** CB = Capacity Building; PD = Policy Development; MD = Market Development; PR/Ed = Public Outreach/Education; TA = Technical Assistance; TD = Technology Development.

### Energy Foundation – China Sustainable Energy Program (CSEP)

Launched in 1999, the China Sustainable Energy Program (CSEP) is a grants initiative for the promotion of energy efficiency and renewable energy that focuses on policy development cooperation. Managed by the Energy Foundation, a non-profit organization with offices in San Francisco and Beijing, CSEP awards ~US\$7.5 million in grants annually. By funding Chinese institutes and international policy practitioners to work together, CSEP fosters the sharing of international best practices and the development of policies suited to local conditions. CSEP promotes the development of policies and implementation mechanisms in six program areas: buildings; transportation; industry; electricity utilities; renewable energy; and low-carbon development paths.<sup>29</sup>

One key reason for the effectiveness of CSEP's policy development cooperation is that guidance is provided by two high-level Chinese advisory groups: a Senior Policy Advisory Council composed of minister-level officials; and a group of Dialogue Partners composed of directors-general of pertinent ministries. These advisory groups set the direction of CSEP, such that policy

<sup>29</sup> For further details, see the Energy Foundation CSEP 2005 brochure, the Energy Foundation's 2004 Annual Report and the program's Web site at <http://www.efchina.org>

development activities are politically salient. CSEP funding is then channeled to the ministry-affiliated research institutes that typically do the work of developing national policies. Since Zhu Rongji's administrative reforms in the late 1990s, which dramatically reduced the number of officials in China's central government agencies, research institutes have played an increasingly important role in policy development in China. The "top-down" national policy efforts are then complemented by "bottom-up" pilot initiatives at the provincial and local levels, where implementation mechanisms can be tested and strengthened.<sup>30</sup>

Another organizational aspect that contributes to the success of the China Sustainable Energy Program is its Beijing office. Staffed with full-time Chinese energy experts, the office facilitates close connections to policy developments in Beijing and elsewhere in China. While many organizations have set up Beijing offices to have a presence in China, they often hire local support staff but send managers or technical staff from home offices; as a result, they may be less involved with local developments. The Energy Foundation Beijing office also provides a place to meet decision-makers and work cooperatively with international practitioners.

Achievements of the China Sustainable Energy Program include the (Energy Foundation, 2004):

- Development of residential and commercial building codes for Central and South China, which were launched in 2005 and are estimated to save as much as 49 million tons of carbon by 2020, reducing the need for 23 large (1,000 MW) coal-fired power plants.
- Development of vehicle fuel economy standards, which were launched in September 2004 and are estimated to save 212 million barrels of oil—the equivalent of removing 25 million cars from the road—and save 23 million tons of carbon by 2020 (see further discussion in Chapter 6).
- Development of efficiency standards for appliances, including refrigerators, air conditioners, washing machines and televisions. Put into law over the past five years, these standards are estimated to cut 30 million tons of carbon emissions and displace 17 large (1,000 MW) coal-fired power plants by 2020.

In choosing the cooperation efforts it will fund, the Energy Foundation requires that applicants identify decision-makers who will be targeted by the effort. Applicants must also spell out the typical information required for a proposal: the problem to be addressed, strategy, timeline, budget and expected results. In addition, applicants must indicate how the success of their efforts

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30 Discussion with Doug Ogden, Director of Energy Foundation's CSEP, San Francisco, December 2005.

will be measured. The Foundation’s Board of Directors meets three times a year to review applications and select efforts to fund. The Energy Foundation’s emphasis on targeting specific decision-makers and on measuring success has led to impressive results. Through the approach just described, CSEP turns US\$7 million per year into savings of hundreds of millions of tons of carbon and other air pollutants. The program’s emphasis on joint policy development also serves to strengthen the capabilities of staff in Chinese institutes and agencies, which further assists in “China’s transition to a sustainable energy future” (Energy Foundation, 2004).

### Collaborative Labeling and Standards Program (CLASP)

The Collaborative Labeling and Standards Program (CLASP) was founded as a partnership in 1999 to consolidate the separately-funded USAID projects of its three founding organizations: the Lawrence Berkeley National Laboratory; the Alliance to Save Energy; and the International Institute for Energy Conservation. It has evolved as originally planned into a global network, a collection of standards and labeling (S&L) experts, a business opportunity for implementing partners, an information clearinghouse, and an aide to donor organizations—and it performs many other functions as well. In 2005, CLASP became a non-profit corporation and enhanced its capability to provide S&L assistance through an innovative partnership structure described below. It is open to all organizations and individuals who have the ability and interest to serve CLASP’s mission and are willing to abide by CLASP’s “Guiding Principles.”<sup>31</sup>

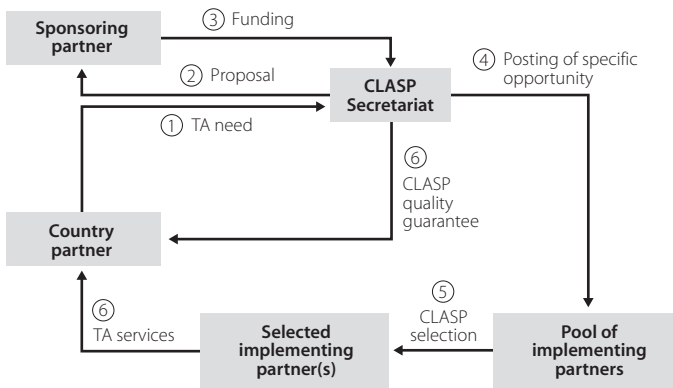
CLASP provides the world’s best experts in every aspect of S&L. They, in turn, collaborate with partner governments to apply the world’s best S&L practices to assure these country partners a lower national energy bill and large amounts of low-cost carbon reductions over the next several decades. CLASP management guarantees technical quality and innovation to its sponsors and country partners.

Organizationally, CLASP is comprised of a small secretariat and a worldwide assembly of: sponsoring partners who fund CLASP activities; country partners who are the recipients of CLASP services; implementing partners who provide CLASP services; and interested stakeholders and affiliates. CLASP is governed by a Board of Directors comprised of 12 voting members from eight countries on four continents who are responsible for all aspects of the partnership. CLASP’s operational model is illustrated in Figure 3.3. When funding is received, CLASP surveys its implementing partners to assemble the best team of experts possible. Rather than hiring organizations to conduct the project’s tasks, CLASP assigns individuals to project teams—an organizational approach that differs from most others’.

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31 CLASP’s Guiding Principles are available at: <http://www.clasponline.org/partnership.php?nnx=2&no=5>

Figure 3-3. Operational flow of the Collaborative Labeling and Standards Program (CLASP).



Since its inception, CLASP’s most significant activities and accomplishments have been its support for:

- labels and Minimum Energy Performance Standards (MEPS) for a range of products in China;
- a first-ever MEPS in India (for refrigerators);
- label development and labeling program launch in India for several products, but particularly support for launching endorsement labeling of consumer electronics;
- label development and labeling program launch in South Africa;
- an assessment of the energy and carbon savings from MEPS for four products in Mexico;
- regional initiatives in APEC, ASEAN, Andean and Central America;
- development of the CLASP S&L Guidebook (available in four languages);
- development of the CLASP Web site (<http://www.clasponline.org>); and
- development of CLASP’s policy analysis calculator (PAMS).

CLASP is registered as a UN Sustainable Development Partnership which enhances: (1) its ability to co-fund and leverage projects; (2) its ability to assemble quality teams of S&L experts; and (3) the cooperative relationship it establishes with its partner country governments. CLASP is also a co-sponsor of the APEC Energy Standards Information System (ESIS) Web site (<http://www.apec-esis.org>), which further enhances its relations with APEC economies and its ability to provide comprehensive information on the world’s S&L programs.

### **3.5 Conclusions: The Growing Role of Independent Cooperation Networks**

This overview of the organizational arrangements of East Asian energy efficiency cooperation shows the strengths and weaknesses of each kind of organization and the role that each can play.

From bilateral cooperation—especially Japan-China interaction—we find that two countries can sometimes move quickly and find specific things upon which to agree. But bilateral cooperation on energy efficiency can also be side-tracked by other political issues in the relationship. For example, the Green Aid Plan policy dialogues were stopped due to high-level political tensions and disagreement over the connection between the GAP and the CDM. In addition, the form of cooperation is influenced by the overall shape of relations between the two countries. For Japan and China, the focus has been on technology transfer and technical assistance, while policy and market cooperation activities have been avoided.

From cooperation experience with multilateral institutions, we find that these institutions have well-established organizational connections and command significant resources. As a result, multilateral cooperation can support large projects. However, the process is often slow and inflexible, making it difficult for recipient countries to seize windows of opportunity and sustain their participation.

From regional energy efficiency cooperation through ASEAN and APEC, we learn that some energy efficiency issues have more widespread appeal than others. It can be hard to get something on the agenda unless many countries consider it a high priority. For example, several countries are involved in manufacturing appliances and all are large markets for appliance sales; thus cooperation on appliance energy efficiency is appealing from a regional perspective. In contrast, interest in steel industry energy efficiency is limited to a smaller group and may be better addressed through bilateral or multilateral dialogues. For those efficiency efforts that are given attention by ASEAN and APEC, three important factors for success were identified: high-level mandate and support; ongoing reliable funding; and dedicated people.

Finally, we learned several lessons from independent international cooperation networks. These networks, including CSEP, CLASP and REEEP, can work around political sensitivities since they are not representing governments. Their focus is on problem-solving with dedicated experts who have more flexibility than those in larger, government institutions. With limited budgets, independent organizations have sought to maximize their impact by focusing on policy development cooperation. These independent networks also interact with bilateral, multilateral and regional organizations to build on each other's strengths and to accomplish more.