

Chapter 7

A Process of Scaling Up: Initiatives for Energy Conservation by Turkey and Neighbouring Countries

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1. Introduction

As triangular cooperation (TrC) is increasingly recognised as an important vehicle of international development cooperation in the twenty-first century, there is a greater requirement for development practitioners to devise methods to implement it effectively and also to scale up its development impact. However, although successful case studies have been reported in recent international meetings and in publications, the processes and mechanisms that have led to success do not seem to have been adequately examined. To reduce the gap, this paper attempts to illustrate a case of scaling up TrC activities across national boundaries and to identify the factors that lie behind them. Specifically, this paper examines how Turkey, in cooperation with external actors such as Japan, developed their knowledge and skills in relation to energy conservation in order to improve their levels of energy efficiency, and to share them among its neighbouring countries. This paper focuses, in particular, on how Turkey fostered the capacity of the National Energy Conservation Centre (NECC), to which it assigned responsibilities for enhancing energy efficiency, with the aim of becoming a regional centre of excellence (COE).

Section 2 outlines the major TrC activities (for example, international training and workshops) that have been implemented by Turkey and its neighbouring countries, with the support of Japan and some international organisations. It then looks back at the development of bilateral cooperation between Turkey and Japan, which has formed the basis for the evolution of current TrC activities. Sections 3 and 4 identify the most successful TrC activities, and draw lessons learned from the TrC activities, respectively. Finally, section 5 concludes by discussing the importance of COEs for effective TrC.

2. Cross-Border Cooperation for Energy Conservation and its Origin

Currently, advanced knowledge and skills in the area of energy conservation are being transferred from Turkey to its neighbouring countries. Overcoming their social, economic, and cultural differences, these countries are working together in pursuit of the enhancement of energy efficiency through the promotion of energy conservation. Energy conservation, particularly in the industrial sector, which is a huge consumer of energy, is becoming one of the main areas of concern for those countries who do not possess abundant energy resources and who have been dependent on imported energy. The global trend towards environmental concerns has also become a push factor for many countries. The knowledge and skills transfer is being carried out through international training courses and workshops in collaboration with Japan and some international organisations.

2.1 Transferring knowledge and skills through triangular cooperation

The beginning of the 2000s saw the introduction in Turkey of international TrC training courses involving three distinct participants: Turkey, which had the capacity to conduct training courses on energy conservation; its neighbouring countries, which needed to improve their levels of energy efficiency; and Japan, which had experience and advanced knowledge as well as skills in the area of energy conservation, together with some international organisations. In parallel with the commencement of the TrC training courses, during the current decade Turkey has also organised international workshops for the member countries of the Black Sea Economic Cooperation (BSEC). These international training courses and workshops have involved countries in Western and Central Asia, the Black Sea Region, and Eastern Europe. The training participants were engineers who held engineering degrees and who had worked for energy-related ministries and/or state-owned companies in their respective countries for a period of at least three years.

Several key actors were involved in the TrC activities. In Turkey, this involved three principal actors: two involved in the implementation and one in the coordination. For the implementation, the General Directorate of Electrical Power Resources Survey and Development Administration

(EIE),¹ under the control of the Ministry of Energy and Natural Resources, was in charge of the country's energy sector and had been playing a key role in overseeing the TrC activities. Similarly, the responsibility for the implementation of the training courses was given to NECC. It was established within EIE to provide training on energy management to engineers from both Turkey and other countries (GDRE 2012a, 4). The coordinating role was played by the Turkish International Cooperation and Coordination Agency (in Turkish the Türk İşbirliği ve Koordinasyon Ajansı Başkanlığı or TİKA). Established in 1992, TİKA is an agency that, through its projects and activities, provides development assistance to partner countries. In this instance, its coordinating role with participating countries has facilitated the effective and smooth implementation of the training courses and workshops. Japan, through the Japan International Cooperation Agency (JICA), supported Turkey's activities by allocating complementary Japanese experts and making financial contributions. TİKA and JICA had formed a good partnership, and this was consolidated through the signing, in February 2012, of a Memorandum of Understanding (MOU) for Joint Development Cooperation particularly in the countries of the Middle East, Central Asia, the Caucasus, the Balkans and Africa.

As at the time of writing in August 2013, EIE/NECC has organised several international training courses and workshops for energy managers in cooperation with Japan and some international organisations, which are summarised in Table 1. These courses and workshops have taken full advantage of the fruits of the bilateral technical cooperation project between Turkey and Japan, such as the knowledge and skills of energy conservation, the know-how about how to conduct training, and the establishment of training facilities (for example, a mini-plant).

1. IE was founded in 1935. It was abolished through the implementation of the Decree Law issued on 2 November 2011, being renamed the General Directorate of Renewable Energy (GDRE) under the Ministry of Energy and Natural Resources (GDRE 2012a, 4).

Table 1. International training courses and workshops implemented by EIE/NECC

Year (JFY)	Training Courses/ Workshops	Target Countries	No. of Participants	Actors
2002	International Practical Training Course for Energy Managers	Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Georgia, Iran, Azerbaijan, Turkey	32	EIE/NECC, UN-ESCAP (JICA experts)
2003	International Practical Training Course for Energy Managers of Industry from Countries in Western and Central Asia and Black Sea Region	Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Georgia, Bulgaria, Romania, Iran, Turkey	18	ECO ² , TIKA, JICA
2004-2006	Practical Training Course for Energy Managers of Industry	About 20 countries from the Middle East, Eastern Europe, Central Asia, the area of the Black Sea	57	EIE/NECC, JICA
2007-2009	Energy Efficiency and Management Industry	About 20 countries from the Middle East, Eastern Europe, Central Asia, the area of the Black Sea	55	EIE/NECC, JICA
2011	Workshops on How to Implement Energy Management Standards in Black Sea Economic Cooperation (BSEC) Countries	Albania, Azerbaijan, Georgia, Moldova, Rumania	5	EIE, JICA, TIKA
2012	Workshops on How to Implement Energy Management in Black Sea Economic Cooperation (BSEC) Countries	Azerbaijan, Georgia, Moldova, Albania, Ukraine, Serbia	9	EIE, TIKA, JICA
2010-2012	Energy Efficiency and Management in Industry	Central Asian countries	35	EIE, TIKA, JICA

Source: Compiled from various reports (JICA 2005; GDRE 2012a; GDRE 2012b) by the author.

2. The Economic Cooperation Organization (ECO) is an intergovernmental organisation established in 1985 to promote economic, technical and cultural cooperation among Iran, Pakistan and Turkey. It has subsequently expanded ten member countries, incorporating seven additional members (Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan).

The aim of the training courses was to provide opportunities for participants from the neighbouring countries to acquire knowledge and techniques in the areas of energy conservation and the reduction of carbon dioxide emissions, as well as to foster good relationships among them. For the participants the greatest interest was in the practical



Practical training
in an international training course

part of these courses (GDRE 2012a, 8). Using training units for steam boilers, combustion furnaces, steam traps, compressed air systems, lighting, fans, and pumps, the participants learned how to implement and evaluate various energy conservation measures. This allowed them to distinguish between efficient and inefficient ways of using energy-consuming equipment (GDRE 2012a, 7). Japanese experts provided lectures and shared knowledge and experience related, for instance, to energy saving measures and energy conservation policies in Japan (Yoshida et al. 2005, 16, 19). At the end of each training course, participants presented action plans to formulate activities at their organisations employing the knowledge and skills they had acquired during training.

Over the years various efforts have been made to improve the quality of the training courses. Course contents were well prepared, combining classroom lectures (lasting about one week) at NECC and on-site practical training (again about one week) through a range of field trips. The contents of the international training courses were structured in



Practical training
in an international training course

a similar manner to the national training courses, which EIE/NECC would offer to Turkish participants. EIE/NECC made special arrangements for participants on the international training courses: the period of the practical training was extended; new subjects were added,

including industrial energy efficiency, engineering change order,³ the environment, the International Organization for Standardization (ISO), and conservation; external lecturers were invited, including those from universities and the private sector, who could teach both new and conventional subjects (for example, management, heat insulation, audit, air pressure, lighting); and finally the courses included field visits to leading factories in the area of energy conservation (JICA 2003, 137). Although the main training language was English, training manuals were provided in both Russian and English, and arrangements were also made for Russian–English–Turkish simultaneous interpretation during lectures. EIE/NECC took the initiative in introducing these arrangements.

The two workshops carried out in 2011 and 2012 were intended to promote the introduction of energy management standards in the BSEC region (GDRE 2012b). The workshops permitted participants could acquire both experience and knowledge from the Turkish Standards Institution (TSE) and the real world example of



The 2012 Workshop

a Turkish ceramic factory with a certification of the Energy Management Standard (TS EN 16001). They also benefitted from the input of a lecturer dispatched from the Netherlands' Energy Agency. In addition, field visits were organised to teach the participants to learn how to implement training and certification programs for energy managers. The participants observed ways to prepare to obtain an Energy Management System certificate (TS EN ISO 50001) in a washing machine factory, which had taken some energy conservation measures following an energy audit conducted by EIE/NECC in 2004 (Yoshida et al. 2005, Annex 21).

The workshops were introduced in response to the needs of the member countries of the BSEC, which had been established in 1992. This organisation saw energy efficiency as one of the key areas for cooperation, and set up a working group to deal with the issue (BSEC n.d.). In the second meeting of the Ministers of Energy of the BSEC

3. It is to change specifications, components, assembly, and/or documents related to processes and work instructions in order to, for instance, correct errors and adapt to some changes in customers' requests and materials.

countries in 2010, a Task Force was established to “explore ways to promote Green Energy investments with an emphasis on energy efficiency, renewable energy sources and environmentally friendly energy technologies” (GDRE 2012b, 7). At the end of the 2012 workshop, the participating countries drafted the “Declaration on the Promotion of the Implementation of Energy Management Standard”, which identified some barriers to the promotion of energy efficiency and the implementation of energy management standards in the region, and went on to make some recommendations for the future. This declaration would support each country’s efforts to promote the improvement of energy efficiency across the region.



Site visit during the 2012 Workshop

Through the training courses and workshops outlined in this section, EIE/NECC has been able to prove their ability to play a leading role as a core regional institution in the promotion of energy conservation in the region.

2.2 Process towards the improvement of energy efficiency in Turkey

As shown above, in recent years Turkey has been actively transferring its knowledge and skills to its neighbouring countries, in service of their shared development agenda—energy efficiency. However, Turkey’s capacity in this respect did not emerge overnight. It has been fostered gradually as the result of its long-term efforts, supported by external partners. This section considers the ways in which Turkey has been making efforts to improve energy efficiency.

Turkey is highly dependent on imported energy,⁴ and consequently it has adopted policies to prioritise the enhancement of energy efficiency. Specifically, it aimed to: 1) establish energy security, 2) reduce the risks posed by import dependence, and 3) take effective measures against climate change (ETKB n.d., 20). The intention behind the introduction of all these measures was for Turkey to become a regional leader in the energy field (ETKB n.d., 10).

4. Turkey’s dependence on imported energy resources is expected to reach 80% of its total energy consumption by 2020 (JICA 2005).

Turkey has been actively promoting energy conservation since the two energy crises in the 1970s. Since 1981, EIE has played a key role in energy conservation. In December 1992, the Energy Resources Supply Department,⁵ under the auspices of EIE, was institutionalised as NECC. In 1982 the country also inaugurated an Energy Conservation Week to enhance the awareness of energy conservation among the general public (Yoshida et al. 2005, 8).

Turkey's attempts to enhance energy conservation were supported by international organisations and donors. The United Nations Industrial Development Organization (UNIDO) in 1980 and the World Bank in 1982–1984 and 1988–1991 helped EIE purchase vehicles (buses) with the necessary equipment for implementing energy efficiency audits and providing mobile energy conservation training courses in the industrial sector (for example, textiles, steel making) (JICA 2000, 15; Yamaguchi & Sakoda 2008, 16–17).

As a bilateral donor, Japan has been a principal partner, giving active support to Turkey for almost a quarter of a century. This cooperation began in 1989, when the Energy Conservation Center, Japan (ECCJ) organised a seminar in Ankara with the aim of disseminating energy conservation techniques. Since then, JICA has also been extending technical cooperation to Turkey in various forms, such as providing international training courses in Japan, dispatching experts, and conducting research activities.⁶

The implementation of the Regulations on Measures to Be Taken to Increase Energy Efficiency in Industrial Establishments in 1995 accelerated the movement of energy conservation. It regulated the establishment of an energy management system by either setting up an energy control committee or assigning an energy manager with an 'Energy Manager Certificate' in those factories with an annual energy

5. The Energy Resources and Survey Development was formed after a request from the State Planning Organization (SPO) and the Ministry of Energy and Natural Resources (MENR) in 1981 (Yoshida et al. 2005, 9).

6. In the period from 1990 to 2001 EIE staff members attended training courses related to energy conservation in Japan on 13 separate occasions (JICA 2005, the summary of the evaluation).

consumption equal to 2,000 ton oil equivalent (toe) or more.⁷ EIE/NECC was mandated to support about 500 factories, which were obligated to follow the regulations.

However, it proved difficult for Turkey to achieve the levels of energy conservation it was expected to as a result of domestic and international obligations in such a short period. Despite the efforts of EIE/NECC to promote energy conservation and enhance public awareness mentioned above, the country had not reached its expected goal due to the current weakness of its structure and techniques for implementation (JICA 2005). Therefore, in 1997, they requested support from Japan, a country which had reached one of the highest levels of energy conservation in the aftermath of the energy crises of the 1970s.

2.3 Strengthening the capacity of EIE/NECC through bilateral cooperation between Turkey and Japan

The Turkey–Japan Project on Energy Conservation began in August 2000 after a careful study of energy usage in the industrial sector in Turkey. This project aimed to strengthen the function of EIE/NECC. It consists of three main activities: 1) providing training courses, 2) conducting energy audits, and 3) making and promoting policies to enhance energy conservation. Turkey's initiative was supported by Japan through the despatch of a number of Japanese long- and short-term experts, the provision of a mini plant and equipment⁸ for training and energy audits, and the organisation of training courses in Japan (Yoshida et al. 2005, 10).

The construction of the mini-plant allowed EIE/NECC to conduct practical training courses without disturbing the production processes

7. There were no penalties for factories that did not have energy managers (Yamaguchi & Sakoda 2008, note 13). The legal structure of this regulation is similar to that of Japan's energy conservation law, reflecting the fact that staff members of EIE, who had participated in the ECCJ field trip and training course(s) in Japan, collected information and prepared the draft (Yoshida et al. 2005, 8).

8. This mini-plant consisted of, for instance, an industrial furnace, boiler, steam-trap training unit, rotating machinery (fan and pump), compressed-air training unit, and lighting training unit. These units were well adjusted to fit the purpose of energy conservation training (Yoshida et al. 2005, 14).

in real factories.⁹ It made it possible to implement and place the emphasis on various practical training subjects; from the operation and maintenance of equipment and the organisation of training programs to the collection/processing of data, the methods of case selection/analysis for audit, and simulation.¹⁰ The mini-plant became the location for the international training courses that were run for the benefit of Turkey's neighbouring countries.

Through the combination of these three main activities, EIE/NECC was able to help factories to develop their capacities for energy conservation. First, EIE/NECC became able to provide a number of energy conservation training courses for energy managers of factories, as well as short-term training courses for energy technicians. A post-training evaluation survey indicated the improvement and value of the training courses (Yoshida et al. 2005, 32–33). In the eight-year period from 1997, when EIE/NECC began to provide energy manager training courses, managers in 410 factories have been awarded certificates by EIE/NECC. This represented 78% of the 520 factories with an annual energy consumption equal to 2,000 toe or more, which were obliged to have energy managers following the passing of the 1995 regulation, marking a substantial contribution to the reduction of their energy consumption (Yoshida et al. 2005, 14).

9. Before the construction of the mini-plant, the EIE/NECC's training course was mainly conducted in classrooms. Although practical training was conducted by using operating machines in real factories, it took a long time for the preparation of training and transportation of participants (JICA 2003, 20). As a result of this experience, staff members of EIE/NECC fully understood the validity of introducing the mini-plant and actively learnt the operation and maintenance of the mini-plant (JICA 2003, 21).

10. Training equipment of the mini-plant was limited to that which had versatility. For instance, the types and functions of production-related equipment were diverse, which tended to cause arguments about the selection of equipment (JICA 2003, 133–136).

11. *Monthly JICA*, December 2006.

Box. Reduced energy consumption in a sanitary ware factory in Turkey¹¹

VitrA is a sanitary ware factory that produces wash and lavatory bowls. The factory, which is a very heavy consumer of energy, had been undertaking energy conservation activities for a considerable period. To further their efforts, their energy managers participated in the national training courses offered by EIE/NECC, which proved an eye-opener for the managers. In the words of one of the participants: "We became able to see things that we had not realised." They improved energy efficiency by making improvements in 24 separate areas; for instance, the improvement of the waste heat recovery of a heating furnace, the introduction of partial lighting, and the utilisation of the waste heat of a compressor for a shower in a company dormitory. In total, they could successfully reduce 25.4% of their energy consumption over the last five years.

Second, through the provision of on-the-job training, EIE/NECC developed their knowledge and acquired the techniques required for various industries to adopt more comprehensive and detailed energy audits and consultations. They visited factories throughout the country, concentrating in particular on the textile, iron and steel, food, ceramics, and paper and pulp industries. They made recommendations to managers in these plants about the areas in which they could undertake and implement effective energy efficiency measures. These experiences, with support from Japanese experts, allowed them to acquire practical know-how on energy audits and consultation by utilising actual processes and equipment in individual factories.

In their energy audits, EIE/NECC's central principle was to teach ways in which factories would be able to improve energy efficiency at either 'no or low cost' (involving, for example, actions such as replacing electricity-consuming fluorescent lighting with higher-efficiency lighting, and preventing the leakage of both water and electricity). During the project, EIE/NECC conducted energy audits in around 130 factories throughout the country. In their follow-up survey, of the 23 factories they had previously visited, it was found that 19 had taken the necessary measures to improve energy efficiency following their advice, contributing to a reduction in energy consumption of 46,295.1 toe/year, equivalent to 9.52% of the total energy consumption of all factories with

annual energy consumption levels of 2,000 toe or more (JICA 2005, 18). EIE/NECC's energy audits contributed to an increased awareness of energy conservation in factories (JICA 2008, 3–5).

Third, the project helped EIE/NECC develop their own capacity to make and promote the policy for enhancing energy conservation throughout society. For example, the General Director of EIE in 2001, and the Assistant General Director in 2003 and 2004, have each participated in training courses in Japan. This allowed them to obtain the latest information on energy conservation and to understand energy conservation policies and laws, through visits to ECCJ and other governmental organisations. A Japanese energy expert who was invited to the 2003 international training in Turkey gave lectures and exchanged views about strengthening the energy conservation system with the General Director of EIE (JICA 2005, 11). Later, these activities indirectly contributed to the enactment of their Energy Efficiency Law¹² in 2007. This Law was part of the fulfilment of energy-related legal systems required for membership of the European Union (EU) (JICA 2008, 3-6). Under the Law, factories with annual energy consumption of 1,000 toe or more, which accounted for the consumption of more than 80% of the energy in the industrial sector, were obliged to allocate energy managers and submit annual reports detailing their energy consumption information and assessments (GOT 2007; Yamaguchi & Sakoda 2008, 18). The introduction of the Law emphasised EIE's responsibility for the promotion of energy efficiency and accelerated the increase of training participants by penalising defaulting factories, that did not allocate certified managers (Yamaguchi & Sakoda 2008, 18).¹³

The governmental policy of energy conservation was also promoted among the wider general public. Some of the outputs of the Energy Conservation Week (for example, a painting competition among schoolchildren) were disseminated throughout the country in the form

12. The Energy Efficiency Law aimed to reduce energy costs and implement climate control by enhancing the awareness of energy conservation, constructing an administrative system for its promotion, and promoting renewable energy. EIE became a secretariat of the Energy Conservation Coordination Board formed under the 2007 Energy Efficiency Law (Yamaguchi & Sakoda 2008, 17-18).

13. Not only JICA, but also the French Environment and Energy Management Agency (ADEME) and the Netherlands Agency for Energy and Environment (NOVEM) have supported the development of a legal system for energy conservation since 2005 (Yamaguchi & Sakoda 2008, 18).

of calendars. A promotional video highlighting the energy conservation activities of the project was distributed to local media, and the public relations activities of EIE/NECC were strengthened by a Japanese expert.

It is worth noting that several training courses in Japan also provided them with good opportunities to acquire experience, knowledge, and skills in both the public and private sectors. These courses in Japan were specifically arranged for counterparts of EIE/NICC from director to engineer level.

As a result of all of these measures, bilateral cooperation between Turkey and Japan developed EIE/NECC's capacity to the extent that they became confident at transferring knowledge and skills to Turkey's neighbouring countries. In particular, experience and knowledge related to energy conservation and audits, which had been gained through the first and second activities, were incorporated in the international training courses and workshops.

3. Success Factors

As seen above, the steady development of EIE/NECC's capacity laid the foundation for the successful implementation of the international training courses and workshops under TrC among the three participants: Turkey, its neighbouring countries, and Japan. This capacity development of EIE/NECC, however, would not have been sufficient to ensure the success of the TrC activities. It was helped by several additional favourable factors. Among them, the following three seem to be particularly prominent: common motivation, the leadership of Turkey, and the support of external actors.

Common target and motivation under similar socio-political circumstances

The participants in the TrC activities all shared a similar target of and motivation for improving energy efficiency through enhancing energy conservation. For all of the participating countries, energy conservation is an important issue. Turkey was affected by the energy crises and its energy dependency on other countries had been a significant incentive in pursuing energy efficiency. Many of its neighbouring countries were in a similar situation and have had little choice but to promote and tackle the issue of energy conservation.

What assisted these countries in harmonising and crystallising their shared will towards the promotion of energy efficiency was the existence of political frameworks that directly addressed the issue. Of the utmost importance in this regard was the BSEC, which has identified energy as one of the important issues in the region, identifying the enhancement of energy efficiency as an agenda of its member countries. The membership of the EU might also have worked as a driving force for those who were seeking it. As the EU requires incoming member states to have an energy policy and law that is in line with the EU environmental standards in each country, it was the responsibility of each of the prospective member countries to deal with energy issues and take some concrete steps towards improving energy efficiency to fulfil EU's requirements. These socio-political circumstances motivated Turkey and its neighbouring countries to respectively organise and participate in the TrC training courses and workshops to obtain knowledge and skills related to energy conservation in order to improve their levels of energy efficiency.

The leadership of Turkey and the existence of a regional centre of excellence

Turkey had a strong sense of leadership in the energy area, which is clearly expressed in a recent political statement.¹⁴ Since the experiences of the two energy crises in the 1970s, the country had been tackling the issue of improving energy efficiency in order to increase energy security. Their practical activities had accelerated through cooperation with a series of external partners, including Japan. Their long-term efforts towards the improvement of energy efficiency enhanced their confidence that they could provide training courses and workshops for neighbouring countries. The establishment of TIKA indicated their strong commitment to support other countries, although its activities were not limited to the energy sector. In fact, the effective support from TIKA made it possible to facilitate communication among EIE/NECC, participating countries, and JICA, which contributed to the smooth implementation of the training courses.

The combination of Turkey's sense of leadership and the accompanying and well-developed capacity of EIE/NECC enabled them to act as a COE in the region by the time the neighbouring countries became motivated

14. The mission stated in the Ministry of Energy and Natural Resources Strategic Plan 2010–2014 (ETKB n.d. 10) is 'to make our country the leader of its region in energy and natural resources'.

to improve their energy efficiency. With support from Japan and other external partners over a number of years, EIE/NECC had been equipped with appropriate capabilities to provide effective practical training based upon the accumulated experience and advanced knowledge and skills required in the industrial sector. Their impacts are starting to be observed, for instance, in the reduction of energy consumption in the factories, whose staff members participated in the EIE/NECC training courses, like the ceramic factory in Turkey illustrated in the above box.

As a regional COE, EIE/NECC made great efforts to conduct international training courses effectively through employing its acquired experience and knowledge. As explained earlier, adjustments were made to the contents of the international training courses and the length of practical training, in accordance with the needs of the overseas participants and the training experience of the Turkish organisations. Where necessary, translation and interpretation for Russian, English, and Turkish languages was also arranged for those from different cultural backgrounds. The successful implementation of the TrC activities has fostered EIE/NECC's confidence in its ability to act as a COE, which motivates them to continue providing international training courses.

Long-term support from external actors

The existence of external partners played an indispensable role in the realisation of the training courses and workshops for its neighbouring countries, as well as the development of Turkey's capacity as a regional COE in the energy area. For instance, in recent decades international organisations such as UNIDO, the World Bank, UN-ESCAP, and ECO have all provided assistance to Turkey to allow it to improve its energy efficiency.

Japan has also been a significant external partner. Japan's advanced knowledge and skills were transferred indirectly to the neighbouring countries through Turkey, which had benefitted from bilateral cooperation. The participants in the 2012 international training course benefited in particular from the operations of a practical training unit, the Energy Efficiency Training Unit. This unit provided them, for instance, with audit techniques by using measuring devices and taking measurements on energy-consuming equipment. In their course feedback participants stated that the training course had helped them

develop their knowledge on energy efficiency and the ways in which they could identify and realise feasible reductions in energy costs (GDRE 2012a, 8). Such cost-effective energy reduction techniques were in part the fruits of the bilateral technical cooperation project outlined above, in which EIE/NECC had acquired the techniques for improving energy efficiency at either 'no or low cost'. In 2012, TIKA and JICA signed a Memorandum of Understanding (MoU) on the joint development cooperation for the former's neighbouring countries. This MoU enables the two countries to cooperate more smoothly and effectively.

The above cooperation has both directly and indirectly contributed to raising the capacity of Turkey and its neighbouring countries to improve energy efficiency. Thus, the long-term commitments of the external partners were one of the keys for the success of the TrC activities.

4. Lessons Learned

This case suggests some lessons learned for future TrC.

The importance of nurturing the capacity of pivotal countries/COEs

While TrC could take a variety of forms, one effective way to design it is to identify a capable pivotal country/organisation. Such countries/organisations could be nurtured, for example, by focusing on and providing assistance to those who had the potential to become key institutions and countries in a region. This case study of Turkey and its neighbouring countries illustrates just such an example. The international training courses, on which this paper has focused, were made possible by the robust body of knowledge and skills accumulated in EIE/NECC, a result of the long-term commitment of Turkey and supported by the cooperation from external partners including Japan, who found EIE/NECC an organisation that was capable of being a regional COE. Through years of efforts to develop its capacity, Turkey, through EIE/NECC, which had raised the level of their knowledge on energy efficiency, assumed the leadership role to support their neighbouring countries in their efforts to improve energy efficiency.

Not missing the right moment

Finding the right timing for emerging appropriate social, economic, and political environments among stakeholders, which would be appropriate to deal with common issues, is important for the implementation of

effective TrC. The time when the BSEC placed emphasis on energy efficiency for 'green energy' was, for instance, rightly matched with the development of Turkey's capacity for conducting regional cooperation. For other neighbouring countries, energy consumption had been an important agenda. Turkey (EIE/NECC), as a leader, also desired to expand their activities to neighbouring countries and contribute to the development of energy efficiency in the region. The needs and demands of development partners were well linked with each other. What was vital was the existence and role of 'catalysts' (Hosono et al. 2011, 184-185), namely external partners, who timely could extend support for their attempts and efforts towards the enhancement of energy efficiency in the region.

The utilisation of existing networks

It is effective to utilise existing networks, which have been connecting countries and individuals based upon geographical locations and/or areas of common interest. Members of such networks had already formed bonds with each other regarding their common aims and have often fostered mutual trust among themselves, which would provide a foundation for the formation of cooperative activities. For instance, the 2011 and 2012 workshops were organised for BSEC member countries, which had determined to cooperate with each other in order to improve, for instance, their energy efficiency.

5. Conclusion

This paper has demonstrated the ways in which Turkey, in cooperation with its external partners, has been supporting its neighbours to improve energy efficiency in the region by disseminating the experience, knowledge, and skills it has developed in relation to energy conservation. As stated, common motivation, the leadership of Turkey, and the support of external partners combined to make their regional cooperation successful. Of these factors, the strong leadership of Turkey, and the capacity of EIE/NECC as a regional COE, might have been the most significant. The development of EIE/NECC's capacity was partly a result of Turkey's continuous, long-term efforts to develop its human resources capacity, and partly the fruit of its cooperation with international partners, including Japan, over the past few decades. The TrC activities presented in this case are an entry point for regionally scaling up energy conservation activities across national boundaries.

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