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Development and transfer of technologies:
Poznan strategic programme on technology transfer

Updated evaluation of the Poznan strategic programme on technology transfer

Report by the Technology Executive Committee*

Summary

The TEC was mandated by the SBI to update the evaluation of the Poznan strategic programme on technology transfer with the aim of enhancing the effectiveness of the Technology Mechanism. This report contains the outcomes thereof, including key messages and recommendations.

* This document was scheduled for publication after the standard publication date owing to circumstances beyond the submitter's control.

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Contents

Abbreviations and acronyms

ACTFCN	African Climate Technology Finance Center and Network
ADB	Asian Development Bank
AfDB	African Development Bank
COP	Conference of the Parties
CO_2	carbon dioxide
CSP	concentrated solar power
CTCN	Climate Technology Centre and Network
CTNFC	Asia-Pacific Climate Technology Network and Finance Centre
EBRD	European Bank for Reconstruction and Development
EST	environmentally sound technology
FINTECC	Finance and Technology Transfer Centre for Climate Change
GCF	Green Climate Fund
GEF	Global Environment Facility
GEF-4/5/6	fourth/fifth/sixth replenishment of the Global Environment Facility
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
IADB	Inter-American Development Bank
IFAD	International Fund for Agricultural Development
LDCF	Least Developed Countries Fund
MTR	midterm review
NDE	national designated entity
PPP	public–private partnership
PSP	Poznan strategic programme on technology transfer
REDD-plus	reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70)
SBI	Subsidiary Body for Implementation
SCCF	Special Climate Change Fund
SEforALL	Sustainable Energy for All
SMEs	small and medium-sized enterprises
TA	technical assistance
TEC	Technology Executive Committee
TNA	technology needs assessment
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization

I. Introduction

A. Mandate

1. SBI 43 invited the TEC to update the evaluation report[1] on the PSP for consideration, through the SBI, no later than at COP 23. The SBI invited the TEC to draw on experience and lessons learned from the PSP pilot regional climate technology transfer and finance centres and pilot projects under GEF-4.[2]

2. SBI 47 noted the ongoing work of the TEC on updating the report and invited the TEC to submit the updated evaluation report as part of its annual report to the COP for consideration at SBI 49.[3]

3. SBI 49 agreed that consideration of this matter would continue at SBI 50 to enable the TEC to continue its work with a view to completing the updated evaluation report at its 18th meeting for consideration at SBI 50.[4]

B. Scope

4. This report, prepared in accordance with the relevant terms of reference,[5] presents the updated evaluation of the PSP undertaken by the TEC with the aim of enhancing the effectiveness of the Technology Mechanism. The structure of the report is based on the elements of the scope of work set out in the terms of reference.

5. The updated evaluation covers two PSP windows:

(a) The pilot regional climate technology transfer and finance centres;

(b) The pilot projects under GEF-4.

6. The methodology used to evaluate the PSP is also consistent with the above-mentioned terms of reference, which outline the aim, scope, process, activities, information sources, outputs and time frame for the update of the evaluation.

7. As the PSP was in an early stage of implementation in 2015, when the previous evaluation report was prepared, MTRs had not yet been carried out, which hampered the evaluation of the effectiveness and efficiency of the PSP and the identification of lessons learned. Since 2015, most PSP projects have undergone an MTR. The MTR reports were the main source of information for updating the evaluation. In addition, up-to-date information on project progress was requested, where appropriate.

C. Possible action by the Subsidiary Body for Implementation

8. The SBI is invited to consider this report with a view to determining further action, as appropriate.

II. Background

A. Poznan strategic programme

9. COP 13 requested the GEF to elaborate a strategic programme for scaling up the level of investment for technology transfer with the aim of helping developing countries to address their needs for ESTs.[6]

[1] FCCC/SBI/2015/16.
[2] FCCC/SBI/2015/22, paragraph 79.
[3] FCCC/SBI/2017/19, paragraph 92.
[4] FCCC/SBI/2018/22, paragraph 74.
[5] Contained in the annex to TEC document TEC/2017/14/8, available at https://bit.ly/2LBn45b.
[6] Decision 4/CP.13, paragraph 3.

10. In 2008 the GEF Council approved a strategic programme on technology transfer[7] with three funding windows for:

(a) TNAs;

(b) Pilot priority technology projects linked to TNAs;

(c) Dissemination of GEF experience and successfully demonstrated ESTs.

11. COP 14 renamed the programme the PSP and requested the GEF to, inter alia, consider the long-term implementation of the PSP and report thereon to COP 16.[8] The GEF submitted to COP 16 a plan for the long-term implementation of the PSP comprising five elements:[9]

(a) Supporting climate technology centres and a climate technology network;

(b) Piloting priority technology projects to foster innovation and investment;

(c) Public–private partnership for technology transfer;

(d) Supporting TNAs;

(e) The GEF as a catalytic supporting institution for technology transfer.

12. The GEF noted that the elements referred to in paragraph 11(b), (d) and (e) above represented a direct continuation and upscaling of the original programme approved in 2008.[10]

13. The GEF initially funded the PSP under GEF-4 and submitted the plan for the long-term implementation of the PSP to COP 16 under GEF-5. Initial funding for the PSP totalled USD 50 million, with USD 30 million from GEF Trust Fund country allocations, USD 5 million from the GEF Trust Fund set-aside and USD 15 million from the SCCF. The GEF reported the co-financing to be USD 228.8 million.[11]

14. GEF-5 funding for the elements of the long-term implementation of the PSP was primarily from a combination of country allocations under the system for the transparent allocation of resources (for mitigation projects) and global and cross-focal area set-asides (for TNA global projects and public–private partnerships). The SCCF and LDCF provided funding adaptation pilot projects. The GEF reported that all mitigation and adaptation projects under GEF-5 with technology-related objectives were part of the PSP.[12] Funding for TNAs continued under GEF-6 through a focal area set-aside for the least developed countries and small island developing States.

15. The GEF does not set aside funding for the PSP in its replenishment periods, nor is the PSP included in the replenishment period strategies. Rather, technology transfer is embedded in the GEF programming strategy, along with elements of the PSP, which are funded from country allocations or set-asides in each funding period. Those elements are then reported together under technology transfer in the reports of the GEF to the COP. Further information on the GEF and the PSP can be found in annexes I and II.

B. Technology Mechanism

16. Two years after the PSP was created, COP 16 established the Technology Mechanism with the objective of facilitating enhanced action on technology development and transfer. [13] It mandated the TEC and the CTCN, in accordance with their respective functions and under the guidance of the COP, to facilitate the effective implementation of the Technology

[7] See GEF document GEF/C.34/5.Rev.1, available at https://www.thegef.org/sites/default/files/council-meeting-documents/C.34.5.Rev_.1_4.pdf.

[8] Decision 2/CP.14, paragraphs 1 and 2.

[9] See document FCCC/SBI/2010/25, annex.

[10] FCCC/CP/2013/3, annex, paragraph 140.

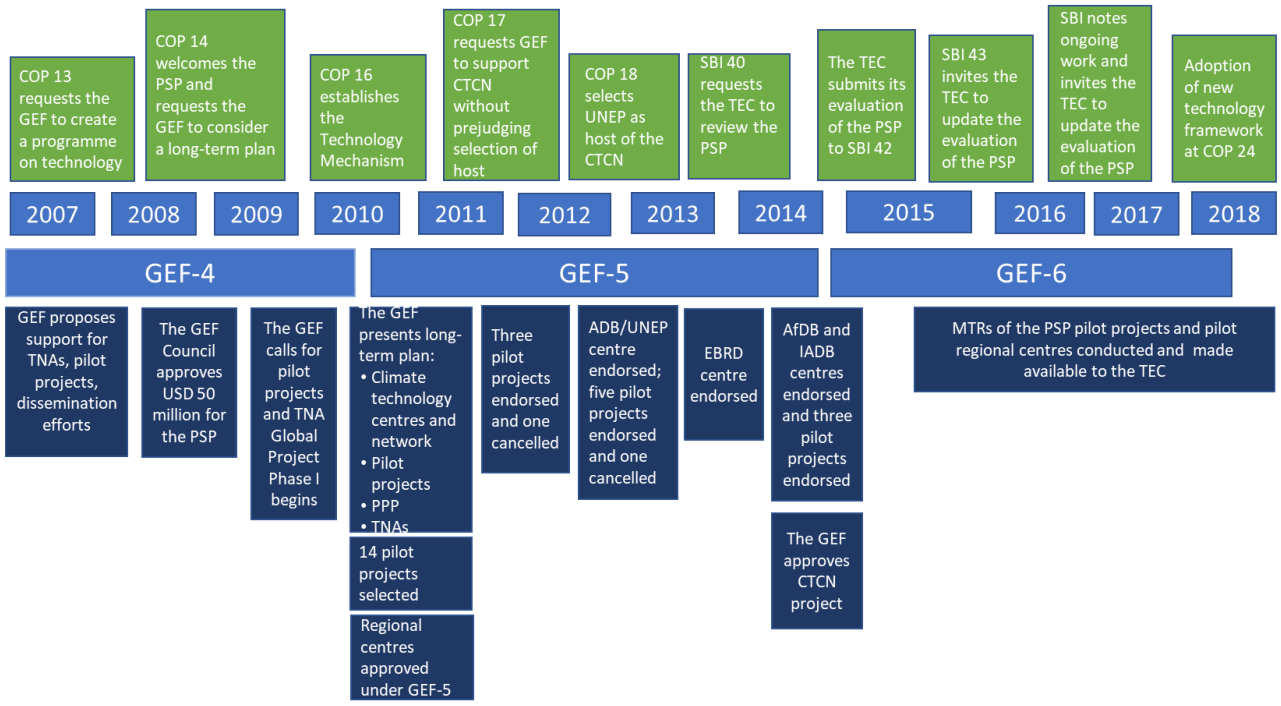
[11] See document FCCC/SBI/2015/INF.4, appendix 3.

[12] See document FCCC/CP/2014/2, annex, paragraphs 136 and 137.

[13] Decision 1/CP.16.

Mechanism. The figure below illustrates key milestones of the PSP and the Technology Mechanism.

Milestones of the Poznan strategic programme and the Technology Mechanism



III. Effectiveness and efficiency of the Poznan strategic programme

17. This chapter summarizes the review of the individual and overall effectiveness and efficiency of the pilot regional centres and pilot projects of the PSP and describes how they have contributed to scaling up the level of investment in climate technologies in accordance with the overall objective of the PSP.

18. Effectiveness refers to the extent to which objectives have been achieved, while efficiency refers to how efficiently available resources (human, material and financial) have been used to reach stated goals and whether objectives have been achieved on time. It would be premature to assess impacts at this stage, but contribution to scaling up investment is an indicator of impact. Challenges faced have also been briefly discussed under effectiveness. A summary and analysis of the contribution of the PSP to upscaling and replicating projects is presented in chapter V below.

A. Pilot regional climate technology transfer and finance centres

19. The four pilot regional centres differ in terms of their implementation modalities, scope and thematic emphasis. The IADB centre places strong emphasis on creating networks and working through national and regional executing agencies to achieve its objectives, which is mostly outside regular IADB operations. In contrast, the EBRD centre (FINTECC) offers incentive grants for introducing climate technologies with low market penetration rates that are complementary to EBRD financing, as well as TA. Meanwhile, the ADB centre (CTNFC), jointly implemented with UNEP, provides mainly TA services to its operational departments, as a way of mainstreaming new climate technologies in its regular public sector operations. It also has a significant private sector investment component. UNEP provided TA for strengthening stakeholder networks and centres of excellence, and developing and implementing policies and programmes for transferring ESTs. Lastly, the AfDB centre follows a dual approach: mainstreaming in its regular operations its adaptation activities,

which focus on water projects and policy reform, and supporting the SEforALL initiative for its mitigation activities.

20. The centres are at different stages of implementation, with the ADB centre nearing project closure. The IADB centre was the last to start operations and is the least advanced. All four have undergone an MTR, with the exception of the UNEP component of the ADB centre.

21. Overall, the effectiveness of the centres was rated as satisfactory, with the exception of some components assessed as being unlikely to achieve their targets. It would be premature to assess outcomes at this stage, as the centres have not yet leveraged any investments.

22. In addition to supporting the centres under the PSP, the GEF supported with USD 1.8 million under GEF-5 a TA programme for promoting the accelerated transfer and scaled-up deployment of climate change mitigation technologies through the CTCN,[14] which enabled the CTCN to take a number of key steps in addressing technology transfer needs, including providing TA on climate technologies in a pilot project involving seven to nine developing countries.

1. European Bank for Reconstruction and Development Finance and Technology Transfer Centre for Climate Change[15]

(a) Description

23. FINTECC was designed to kick-start the market for climate technology investment in early transition countries by addressing existing market barriers by (1) establishing regional technology transfer networks, with the primary purpose of fostering knowledge-sharing on policies and practices that support climate technology transfer; (2) providing investment finance and support for financing pilots, with capital grants covering 5–25 per cent of the project costs; and (3) establishing a TA and capacity-building component to support the development of innovative financing mechanisms, including methodology development and associated needs assessment, project identification, and preparation and implementation assistance. GEF funding is intended to be used to deliver activities that are additional to the baseline activities of EBRD.

(b) Effectiveness and efficiency

24. The effectiveness and efficiency of FINTECC were rated as satisfactory. As at December 2016, signed FINTECC projects had mobilized USD 3.54 million of GEF funding and USD 46.4 million of EBRD funding for climate technologies. Projects signed under FINTECC to date are expected to yield 248,000 t lifetime CO_2 equivalent emission reductions, representing an average abatement cost of over USD 14/t CO_2. Adaptation has been challenging because many potential investments involve water, which is consistently underpriced in FINTECC countries, making investment in water technology a low priority for businesses.

25. A network for policymakers is under development and studies were carried out in three pilot countries (Belarus, Kazakhstan and Morocco), supported by the International Energy Agency and the Food and Agriculture Organization of the United Nations. As a result, a clean energy technology assessment methodology was developed for assessing clean energy technology investment opportunities in the Southern and Eastern Mediterranean region and early transition countries. A financing mechanism has been developed and is operational, with 19 projects signed so far, covering a wide range of mitigation technologies, including three with an adaptation component.

(c) Contribution to scaling up investment

26. FINTECC is operational in 16 countries (including the early transition countries, Southern and Eastern Mediterranean region, Kazakhstan and Ukraine), which creates opportunities for extended outreach and hence increases the possibility of replicating and

[14] Project has not undergone an MTR and is therefore not covered in further detail here.

[15] See the 2017 FINTECC MTR report.

upscaling its results. The actual potential for scaling up investment is hard to gauge as there is no information on the projects or technologies that received grant support, nor have any insights been shared on the conditions for upscaling and replicating supported projects.

2. Inter-American Development Bank Climate Technology Transfer Mechanisms and Networks in Latin America and the Caribbean project[16]

(a) Description

27. The aim of the project is to reduce greenhouse gas emissions and vulnerability to climate change in Latin America and the Caribbean in the forestry, transport, renewable energy and energy efficiency sectors for mitigation, and the agriculture sector for adaptation. A sequential approach to implementation was adopted: (1) developing institutional capacities and analytical tools to address EST-related issues in national and sectoral policies and plans; (2) strengthening EST transfer through technology networks and centres; (3) piloting more specific cases; and (4) promoting public and private investment in order to ensure sustainability. The IADB centre aims to mobilize USD 50 million in investment in EST, mainly through country-led activities carried out under component 4 above. The project is designed to be participatory by engaging regional stakeholders in identifying priority areas within the sectors.

28. The centre's project executing agencies that lead the EST thematic networks include CTCN consortium partners the Bariloche Foundation and the Tropical Agricultural Research and Higher Education Center.

(b) Effectiveness and efficiency

29. Overall, the effectiveness and efficiency of the project were rated as moderately satisfactory, because it exceeded targets for some output indicators but did not meet others. The project executing agencies generally met or exceeded the target number of TA projects, programmes, strategies and technical studies. The project is cost-effective in its design due to its partnerships with regional institutions that are forerunners in specific areas covered by the project and its mobilization of private and public investment, among other measures that promote synergies between the different regional initiatives.

30. The centre's capacity-building activities focus on the role of NDEs, and methodologies and best practices for mainstreaming EST in climate change planning. It is on track to achieving its target number of thematic networks in the region that have incorporated the promotion of EST into their missions or workplans. The target number of feasible mechanisms for EST transfer showcased by the project executing agencies has been exceeded.

31. In terms of impact, measured in terms of investment enabled by project activities (for example through feasibility assessments, preparation of funding proposals and market research studies), no specific investments had been made at the time of the MTR. Activities that will support policymaking have started.

(c) Contribution to scaling up investment

32. The centre's instruments for scaling up investment include analytical tools, institutional capacity development, creation of synergies through networks, recommendations for policy frameworks, climate innovation systems, climate technology transfer mechanisms and pre-feasibility studies and project proposals. It effectively acts as a project accelerator, simultaneously strengthening and leveraging EST and climate networks and engaging policymakers. Obtaining investment and upscaling are contingent upon having access to climate finance and adopting incentives and supportive policy frameworks.

[16] See the 2019 mid-term evaluation "Climate Technology Transfer Mechanisms and Networks in Latin America and the Caribbean Project".

3. African Development Bank Africa Climate Technology Finance Centre and Network[17]

(a) Description

33. The African Climate Technology Centre supports sub-Saharan African countries in scaling up the deployment of low-carbon and climate-resilient technologies for climate change mitigation and adaptation. It achieves its objective by enhancing networking and knowledge-sharing on climate technology transfer and financing; facilitating the upscaling of technology transfer through policy, institutional and organizational reforms of the national and regional enabling environments through TA; and integrating climate change technologies into investment programmes and projects. The centre was established in July 2014 and is managed by the SEforALL Africa Hub team in the Energy, Environment and Climate Change Department of AfDB.

34. The centre responds to national institutions' TA requests and promotes knowledge creation and exchange. In addition, TA services can be provided for integrating adaptation technologies into AfDB water projects. There is no direct transfer of funds (grants) or procurement other than consulting services.

35. The centre focuses on the water sector for adaptation and the energy sector for mitigation. It supports the SEforALL initiative and collaborates closely with the Sustainable Energy Fund for Africa, hosted by AfDB, which supports Africa's sustainable energy agenda. ACTFCN is able to support early-stage actions required to prepare projects for large TA packages provided by the Sustainable Energy Fund for Africa.

36. Knowledge products, focused on off-grid renewable energy, clean cooking solutions and water adaptation technology, are developed through calls for proposals targeting research institutes, universities, national climate centres and other relevant academic institutions.

(b) Effectiveness and efficiency

37. The project's implementation was found to be very effective, whereas the conclusions on the effectiveness of its design varied. The establishment of a climate technology network hosted and managed by ACTFCN was no longer considered worthwhile in view of the various existing well-functioning climate change networks that emerged between the project's conceptualization and implementation.

38. On support and advice provided to countries on national policies and programmes, the project received a low score for national/regional clean energy policies and strategies adopted, with a low probability of achieving its target. Activities for providing direct support for the adoption of policy and regulatory strategies have advanced more slowly than others.

39. The centre has mainly supported the mainstreaming of low-carbon and clean technologies through SEforALL Action Agendas and Investment Prospectuses. It has also provided project facilitation ('last-mile support'), supporting viable projects in obtaining a final investment decision and approval, which can involve providing advice on and support for the resolution of any remaining outstanding issues, addressing project risks and developing a risk mitigation strategy, finalizing the project documentation required for the project to be ready for financing, and mobilizing financing.

40. For adaptation the water department was intended to proactively identify projects, as all adaptation activities are to be directly linked to AfDB water sector activities. However, this did not take place until an expert was hired to engage with the water department. At the time of the MTR there were six projects in the pipeline.

41. So far, no investment projects have been directly supported by the centre, although efforts have been made to assess the potential for setting up dedicated financing options for energy efficiency and renewable energy projects. There is a moderate probability that the target for this indicator will be achieved.

[17] See the report on the 2016 MTR of ACTFCN, available at https://www.african-ctc.net/fileadmin/uploads/actc/Documents/Final__ACTFCN_Mid-term_Review_Report_20161011.pdf.

42. The implementation of ACTFCN was found to require a wider variety of roles and more resources than expected. Some institutions had difficulty formulating requests and required support for conceptualizing requests. Moreover, a more active approach to acquiring new projects may be necessary, as well as organizing capacity-building and outreach events, following up on countries receiving TA, and monitoring, co-shaping and checking the quality of activities on the ground.

(c) Contribution to scaling up investment

43. Upscaling will require a more active support structure and network for generating requests that can also support activities and long-term engagement with policymakers and government agencies as well as facilitate access to finance. This will be key to ensuring financing for the implementation of the Action Agendas and Investment Prospectuses in the short to medium term. A study was conducted to assess the potential for setting up a fund to provide credit lines for small and medium-sized investments in energy efficiency and the renewable energy sector.

4. Asian Development Bank Asia-Pacific Climate Technology Network and Finance Centre[18]

(a) Description

44. CTNFC was endorsed by the GEF Chief Executive Officer in May 2012 and launched in October 2012 under the joint coordination of UNEP and ADB. The objective is to pilot a regional approach to facilitating the deployment of climate technologies (mitigation and adaptation), combining capacity development, enhancement of enabling environments for market transformation, financial investment and investment facilitation. CTNFC has six components, three of which managed by ADB: integrating climate technology financing needs into national development strategies, plans and investment priorities (component 4); catalysing investment in EST deployment (component 5); and establishing a pilot 'marketplace' of owners and buyers of low-carbon technologies to facilitate transfer (component 6). CTNFC offers consulting services and funds workshops, meetings and training. The other three components are implemented by UNEP: regional network facilitation; strengthening the capacity of national and regional climate technology centres; and supporting policy formulation for EST transfer and related capacity development.

45. The MTR only covered the ADB components. Prior to CTNFC, ADB had initiated knowledge TA, which was subsequently integrated into CTNFC. Four regional dialogues were established to facilitate knowledge-sharing among national climate change institutions in ADB developing member countries and four knowledge products.

(b) Effectiveness and efficiency

46. Under component 4, climate technology was mainstreamed in the national development plans of ADB member countries through country partnership strategies and country operations business plans. Agreements were reached with developing member countries, through the regional departments, on receiving TA for integrating climate technologies into national and subnational investment plans, including pre-feasibility studies. Seven countries (Bangladesh, Bhutan, China, Mongolia, Pakistan, Papua New Guinea and Viet Nam) received assistance. For Bangladesh the assistance resulted in the inclusion of a number of projects with climate technology focus investment. China received assistance for designing a climate technology promotion mechanism for Hunan province. However, without conducting an ex post evaluation, it is not possible to assess whether the assistance provided and inclusion in the country operations business plan led to any actual investment projects.

47. Component 5 includes a public and private sector investment window. The public sector investment window works with the regional departments to determine which projects in the ADB investment pipeline would benefit from additional technology input, including

[18] See the report on the 2015 MTR, available at https://www.adb.org/sites/default/files/project-documents/45134/45134-001-tacr-en.pdf.

through technology assessment, pre-feasibility assessment, best practices, and comparison of technology options. Assistance was provided for 20 investment projects. As the ADB subproject was not designed to originate its own projects outside the ADB investment pipeline, the achievable outcomes are limited. Adjusting projects after they have begun is virtually impossible because loans are locked in and cannot suddenly be changed, expected achievements are usually strictly defined, and budgets cannot be altered. Making substantial technology changes during the project cycle is incompatible with the processes of ADB. Given the long lead time usually required to develop ADB public sector investment projects, it is not yet clear to what extent technology inputs will be translated into the final project designs, particularly since decisions to be taken by ADB and the respective governments on design, choice of technology and prioritization of investment projects to be supported are subject to a number of factors.

48. The private sector investment window was intended to catalyse climate technology investment via venture capital funds. However, during implementation of the subproject, the market for venture capital, especially early stage, for clean technology in developing Asia was found to be limited. Hence, it was decided to add private equity and other investment ecosystem actors as target clients. The private equity fund supported is Asia Climate Partners, established by ADB. Consequently, the focus shifted to four core areas: supporting accelerator and incubator programmes for high-potential clean technology entrepreneurs; supporting venture capital and private equity funds and investors focused on clean technology; enabling knowledge-sharing on best practices and market trends; and creating a regional clean technology network. The project has assisted clean technology accelerators in mentoring clean technology start-ups in China, India and the Philippines. It has also provided support for various events promoting knowledge-sharing and collaboration in the region and facilitated the creation of a clean technology network of investors, providers, start-ups and other stakeholders.

49. Component 6 was designed on the basis of a recommendation from a feasibility study conducted by McKinsey in 2010. A key indicator of the effectiveness of the assisted broker model for transferring low-carbon technologies was its ability to operate as a commercial platform for brokering technology transfer from owners of technologies within and outside Asia-Pacific to technology buyers in developing Asia. The ‘marketplace’, launched in December 2014, was operated by Singapore-based IPEx Cleantech Asia, a consortium of DNV GL in Singapore and ReEx Capital Asia. IPEx closed in December 2017, having brokered one technology transfer deal to a project developer in India involving a water technology for industrial effluents owned by a Singaporean firm, which paid for the services provided. While the marketplace generated strong interest from technology owners both within and outside the region seeking to penetrate the market in developing Asia, the profile and interest of potential buyers, and their willingness and ability to pay for new technologies and brokerage services, was not researched prior to the project’s development and appraisal. Moreover, while the feasibility study purported that this kind of platform can only be financially viable and sustainable after five years of operation, the marketplace operator was expected to be self-sustaining after 18 months. The project’s progress was rated as moderately satisfactory to satisfactory in the MTR.

B. National pilot projects under the fourth replenishment of the Global Environment Facility

50. Of 11 projects, 10 have undergone an MTR. For more than half of the projects, effectiveness and efficiency were not or not consistently evaluated in the MTR, thus hindering the assessment for this evaluation. Five projects (Cambodia (biomass energy), Mexico (wind), Senegal (Typha), Sri Lanka (bamboo), Thailand (cassava ethanol) and Senegal (Typha)) were not sufficiently advanced at the time of the MTR for a meaningful assessment of their effectiveness. For four of those projects, updated information on implementation was received thereafter and is reflected in this evaluation. In any case, an assessment of effectiveness was carried out for all projects on the basis of their achievements. The effectiveness and efficiency of many of the pilot projects were found to be moderately

unsatisfactory. The main reasons for this, other than those outside the projects' control, are outlined in chapter IV below.

51. The projects can be categorized as technology transfer through demonstration projects. GEF grants were used for TA, studies, institution-building, capacity development and, often, reducing the cost of technology adoption and development for users and firms. Only for the SolarChill project was the full cost of demonstration covered by grants.

52. In general, the project objectives tended to be overambitious, such as the adoption of supportive policy frameworks, the establishment of supply chains, and goals related to technology transfer and development and upscaling investment. At best the projects successfully demonstrated and piloted climate technologies in a new context and laid the foundation for further investment and upscaling. Only the green freight demonstration project, for which a terminal evaluation is available, fully achieved its objectives. In terms of efficiency, most projects scored poorly on the timely achievement of objectives, owing to delays in start of implementation and consequent difficulties. The effectiveness of projects was affected by engagement with governments during their development, government leadership and support during implementation, and project management.

53. Further information on the effectiveness and efficiency of each of the reviewed pilot projects, particularly in terms of their achievements and contribution to scaling up investment, is provided in annex III.

IV. Experience and lessons learned from the pilot regional centres and projects relevant to the Technology Mechanism

54. The PSP projects are a rich source of experience and lessons learned relevant to designing and implementing climate technology projects. Meanwhile, the piloting of the regional centres has generated experience of different modalities for originating climate technology projects, different TA instruments of support, technology transfer mechanisms, and the regional centres being builders of a climate innovation system by developing and strengthening networks, establishing synergies and links, and connecting projects and technologies with climate finance and investors.

A. Lessons learned from the pilot regional centres

1. Project origination

55. Understanding project origination modalities and their impact on the potential for and means of scaling up investment is crucial for enhancing the effectiveness of the Technology Mechanism. For example, the IADB modality of origination from regional institutions that are CTCN consortium partners has implications for the Technology Mechanism. However, the EBRD investment pipeline origination modality has not prevented the CTCN from providing TA.

56. Four project origination modalities were identified: origination in the investment pipeline of a regional development bank, without capital grant support (ADB); origination in the investment pipeline with capital grant support to reduce the cost of technology adoption (EBRD); origination from public and private sector entities (AfDB); and origination from preselected regional and national institutes with thematic expertise that are executing partners in the project (IADB). More information is needed on the impact of the modalities on climate technology outcomes.

57. Project origination in investment pipelines without capital grant support would be expected to have the least impact, as indicated by the experience of ADB, because loans are already written in and projects are too strictly defined for any significant changes to be made. A report on follow-up TA approved in October 2018[19] states that the MTR of the regional TA cluster for establishing a pilot centre to facilitate climate change technology investment

[19] Available at https://www.adb.org/sites/default/files/project-documents/52041/52041-001-tar-en.pdf.

in Asia-Pacific identified the need to determine technology options through country-specific analyses more strategically; create a more direct link to ADB operations and the lending pipelines; and discuss early assistance for projects with ADB (as either stand-alone projects or components of larger projects) to ensure developing member country ownership and commitment, and country relevance, and to increase the likelihood of upscaling the project. The need for more pilot projects to demonstrate the ability to standardize solutions and support and scale up opportunities for promising technologies was also referred to.

58. It is not possible to evaluate the FINTECC approach to project origination as there is no information on the entry point of the assistance in the project cycle the conditions for and likelihood of upscaling, how the technology options were determined or which technologies were supported.

59. ACTFCN follows two approaches: origination in the investment pipeline for adaptation, and origination from public and private sector entities for mitigation. However, public sector entities struggled to formulate requests and ACTFCN had to take on a broader role and dedicate more time to providing support than anticipated. Experience shows the need for more proactive project origination and follow-up, for example more active acquisition of new projects, on-the-ground engagement, and co-shaping and quality control of activities on the ground. This is an important insight into the effort that is necessary to originate projects that meet requirements, and therefore the need for engagement and capacity development.

2. Technical assistance modalities

60. To enhance the effectiveness of the Technology Mechanism, it is essential to improve understanding and differentiation of the TA modalities as early-stage project acceleration instruments for scaling up investment in climate technologies, particularly in view of the role of the CTCN as a technical service provider. However, there have been very few specific opportunities for the CTCN to provide TA services in the context of the pilot regional centres.

61. For the ADB centre pre-feasibility studies proved valuable in the early stages of identifying potential projects to be included in the country operations business plans. Other forms of TA were also provided, such as best practice information, technology comparisons and country-specific data. Similarly, IADB employs a range of TA modalities, including technology road maps and analytical tools.

62. Less information is available on TA related to policy support. The work on policy support at the IADB centre has just started and the results of the UNEP component of the ADB centre have not yet been reviewed.

3. Financing

63. A better understanding of the financing needs of climate technology projects generated by the pilot regional centres and of the different modalities for facilitating access to finance is essential for scaling up investment.

64. While FINTECC offered capital grant support of up to 25 per cent for investment projects, none of the other centres offered financial instruments; at most they facilitated access to finance. It is not yet possible to gauge how successful this will be as, at the time of the MTRs, no investments had been made as a result of the projects generated by the AfDB and IADB centres. It will be important to ensure financing for the implementation of the AfDB Action Agendas and Investment Prospectuses in the short to medium term and for the projects generated by the project executing agencies of IADB.

65. Without access to finance, project generation will lose momentum and their added value from their ability to function as project accelerators risks being called into question. In the case of AfDB, a study was conducted to assess the potential for setting up a fund to provide credit lines for small and medium-sized investments in energy efficiency and the renewable energy sector. Alternatively, regional development banks could absorb some of the projects into their investment pipelines and facilitate access to climate funds such as the Climate Investment Funds, GCF, GEF, SCCF, LDCF and Adaptation Fund. Both IADB and AfDB need to establish a more direct link with Bank operations and the lending pipelines.

4. Long-term engagement, ownership and capacity development

66. The need for and benefits of long-term engagement with national focal points, including NDEs, institutions and stakeholders overall, and the importance of capacity development support, identified in relation to three of the pilot regional centres, suggests the need for continued engagement and a role for the CTCN through its support of NDEs. In line with the new technology framework, enhanced country-driven technical support is necessary, including for enabling environments and capacity-building, and engagement and collaboration with relevant stakeholders.

67. The AfDB centre needs to provide long-term engagement and support to enhance the likelihood of strategies and policies being successfully implemented, as opposed to financing isolated activities. Through longer-term engagement, the centre will be able to build strong relationships with local institutions, identify capacity development needs and other support required and provide tailored TA.

68. The UNEP-implemented components of CTNFC demonstrate the challenge of assessing how long it will take for TA to be translated into policies, larger programmes or demonstration projects, or for investments to be made. Furthermore, maintaining strong ties with focal points and stakeholders is crucial for exploring options for scaling up TA through collaboration with ADB, the CTCN and the GCF. The current focus of CTNFC is on providing TA to partner countries for designing and developing programmes to facilitate technology use for implementing nationally determined contributions. Coordination among the various focal points on climate change and interaction with stakeholders are still being developed.

69. The experience of the IADB centre shows that engaging with national and local governments and making them project owners is critical to making those projects, including private sector projects, legitimate and sustainable in the long term.

5. Timescales

70. Experience in operationalizing the centres and of the ADB-led marketplace for low-carbon technology demonstrates the need for realistic time frames for testing, developing and fine-tuning the operating procedures and modalities of the technology development and transfer acceleration centres, and for establishing a track record. All of the centres, conceived as three-year projects, took longer to be designed, established, become operational and achieve their expected outcomes than anticipated.

B. Lessons learned from the pilot projects

71. The lessons learned from the pilot projects are centred around the importance of engaging with and obtaining the support of governments and of enabling environments for the successful design and implementation of demonstration projects, rather than on the support modalities of project agencies. However, pre-feasibility and other technoeconomic, market and socioeconomic studies are needed to inform project design, which is what the centres and the CTCN can provide. The other common lesson is that access to finance is key to both demonstration and upscaling.

1. Government leadership

72. Strong government leadership is key to successful implementation and should be a prerequisite for demonstration projects, according to the terminal evaluation of the green freight demonstration project.[20] In that regard, the local Government in Guangdong spent much time coordinating among line departments and resolving any issues encountered during preparation and implementation. This was also the case for the HCFC phase-out and HFC-free technology promotion project, in which the project management unit worked closely with the Government on an implementation strategy. Government leadership is also linked

[20] The terminal evaluation report is available at http://documents.worldbank.org/curated/en/105411467614051818/pdf/ICR2510-P119654-Box396252B-PUBLIC-disclosed-6-29-16.pdf.

to the government ownership of projects. Projects lacking government leadership were much less effective. Government leadership not only plays a key role in removing barriers to and incentivizing the adoption of new technologies, but is also key to helping to resolve coordination and implementation problems encountered in first-of-their-kind initiatives.

2. Engagement and dialogue with government

73. The imperative of key stakeholder engagement is key from the project development stage, and dialogue with government is also important, even for private investment projects. Projects that featured active dialogue with the government and public sector agencies from development to implementation were more successful. For the South–South technology transfer project on ethanol production from cassava in Thailand it can be argued that dialogue with government was as important as private sector engagement, and that weak engagement with the Governments of Myanmar and the Lao People's Democratic Republic during project development affected the results in those countries.

3. Enabling environments

74. For all PSP demonstration projects, enabling environments, that is supportive policy and regulatory frameworks, are key to achieving private sector investment and therefore upscaling. In Chile the introduction of a net billing scheme facilitated the upscaling of rooftop photovoltaic systems, albeit its full potential has not yet been exploited owing to lack of access to financing. The Russian Federation's HCFC phase-out and HFC-free and energy-efficient refrigeration project is being hampered by a lack of legal and financial imperatives to enact change. The lack of a policy instrument for selling excess power to the grid was one factor affecting the success of the Cambodian agricultural residue biomass project. In Thailand government policy and pricing transparency across all value chains were key to mobilizing private sector involvement in ethanol production. While the strategy for upscaling the Mexican wind turbine project will be based on the Government's national plans for developing renewable energy.

4. Flexibility in project design

75. The need for flexibility in project design was identified in the GEF report to COP 24.[21] Project activities should not be rigidly defined at appraisal stage so as to allow flexibility to adopt a phased approach, add new activities and fine-tune the design. A number of projects were redesigned in response to changing circumstances, new policy instruments and market developments.

5. Access to finance

76. In half of the pilot projects, capital grant funding was offered to private investors, farmers and other technology actors to cover part or the full cost of demonstration, or, in the case of Chile, to lower the loan cost for rooftop photovoltaic systems. The capital grants played a crucial role in getting firms and farmers to invest in new technologies and in developing the wind turbine project in Mexico. Upscaling will be dependent on the availability of suitable financing instruments, including climate finance and commercial financing.

6. Outreach

77. According to the green freight project, the design of a demonstration project should include a strong outreach component. The innovative nature of most of the technologies demonstrated means that there is little awareness of them among potential technology users and government agencies, and therefore an outreach component targeting at least potential users is needed. Reaching out to farmers in Jordan and industry in the Russian Federation, for example, was essential for raising awareness and generating broader interest, and outreach will continue to be important for upscaling.

[21] Available at https://unfccc.int/sites/default/files/resource/6e.pdf?download.

7. Pre-feasibility and market studies

78. A number of projects were hampered by lack of data, information and understanding of the potential demand and conditions for technology adoption, resulting in implementation delays and not meeting objectives and targets. This could have been avoided by conducting technoeconomic pre-feasibility and market studies, including on potential target user profiles and conditions for investment. Such studies can be critical for making strategic choices and for successful project implementation. The CTCN and pilot regional centres play a role in providing TA for such studies that can be used to inform project development.

8. Intermediate metrics

79. While the goal of the projects is to reduce CO_2 emissions or increase resilience for adaptation, their value in and contribution towards building a climate innovation system for specific technologies is not being measured. Intermediate metrics are needed that can capture and measure the value of knowledge created, spillovers and de-risking future investment.

9. Technology transfer models and mechanisms, and good practices

80. Experience from implementing the pilot centres and projects highlights the need to better understand which technology transfer models and mechanisms and good practices should inform project design and implementation. Technology transfer was supported in various ways by the projects, although information on support beyond pilot demonstration and training is vague. There is even less information on the technology transfer mechanisms being considered by the centres, with the exception of the assisted broker model of CTNFC, which failed to establish a replicable business model.

10. Project objectives

81. A general finding was that project objectives tended to be overambitious, such as adopting supportive policy frameworks, establishing supply chains, and goals related to technology transfer and technology development or upscaling investment. At best the projects successfully demonstrated and piloted climate technologies in a new context and laid the foundation for further investment and upscaling under strong government leadership, including stakeholder engagement and dialogue.

V. Operations of the Poznan strategic programme

82. This chapter addresses the operations of the PSP at programme level, providing analysis of the PSP in terms of the upscaling and replication of projects; its relevance to addressing global and regional issues; and its effectiveness as a model of change.

A. Upscaling and replication of projects

83. PSP projects are demonstration projects that foster innovation and support the testing and first-time deployment and transfer of new technologies. The pilot projects themselves are unlikely to be scaled up. It is only where they are succeeded by projects with a public or commercial financing component and other support, upscaling is a realistic outcome. A demonstration project should build a foundation for upscaling and replication and contribute towards de-risking technology adoption, but upscaling will not happen automatically without follow-up projects or access to climate finance. In the context of enhancing the effectiveness of the Technology Mechanism, this demonstrates the contribution of pilot projects and the follow-up required to ensure that successful pilots are scaled up.

84. At best the pilot projects have laid the foundation for upscaling and replication. The green freight demonstration project, for example, has led to a number of other initiatives in the sector, including a similar green freight initiative in Brazil, and the Chinese green freight initiative led by the Ministry of Transport, Clean Air Asia and the China Road Transport Association.

85. During the preparations for the start-up of the Jordan irrigation project, IFAD embarked on designing the USD 15.18 million Rural Economic Growth and Employment Project in Jordan. It will act as a platform for upscaling, whereby all technologies tested during the PSP pilot project that were proven successful and accepted by farmers will be upscaled immediately.

86. Implementing South–South technology transfer projects entails some risk due to their complex nature. Success stories and examples of projects that can be replicated are needed.

87. According to the CTCN, scalability and replicability will be key over the next four years. The CTCN has indicated that it will develop regional TA in order to spread the impact of a single intervention across countries facing similar challenges.

88. According to the information reported on the progress of the global UNIDO project for promoting accelerated transfer and scaled-up deployment of climate change mitigation technologies through the CTCN in the GEF report to COP 24, there is significant demand from developing countries for CTCN-type services. Indeed, the CTCN is increasingly receiving requests for TA:

(a) There is a demonstrated appetite for CTCN-type services as a complement to other mechanisms and initiatives. In particular, the CTCN can provide early-stage support;

(b) The CTCN has a wide range of ready-to-use resources and a network of international expertise and technologies;

(c) There are many opportunities for upscaling and replication, and the demand-driven CTCN is well positioned to gauge needs and priorities.

B. Addressing global and regional issues

89. Regarding the relevance of the PSP to addressing global and regional issues, it should be emphasized that the establishment of the PSP and the efforts of the GEF in this regard have significantly raised awareness on the important role that climate technology development and transfer play in supporting countries in meeting the objectives of the Convention.

90. Some stakeholders have stressed the importance of GEF–PSP collaboration for creating a global climate technology institutional architecture that enhances support and highlights climate technology issues.

91. The thematic emphases of the pilot centres generally reflect regional priorities. A major focus of the AfDB centre is energy access and the SEforALL initiative. In Latin America and the Caribbean, agriculture is a major focus. Adaptation projects are lacking among the pilot projects: although all the centres have an adaptation component, there has been less emphasis on and more difficulty addressing adaptation.

92. The centres demonstrate the benefits of a regional approach through enhanced learning and opportunities for South–South and North–South technology transfer while responding to country-driven priorities. The EBRD MTR pointed out the acceleration to market transformation that could result from networking activities that support both South–South and North–South knowledge transfer. For example, the introduction of energy performance certificates for buildings in Kyrgyzstan and the Republic of Moldova followed a similar path and faced similar challenges, which are being experienced again in Ukraine. The proposed networking on technology transfer, if focused on specific opportunities, promises to accelerate market transformation.

93. The IADB centre promotes and supports regional collaborative efforts, specifically by establishing partnerships with regional institutions that are forerunner in the areas covered by the regional project. Strong emphasis has been placed on linking with and contributing to existing regional networking initiatives with a view to ensuring the continuation of the network activities beyond the project lifetime. Links between the technology transfer and climate change communities are lacking in the region, however, which the centre is addressing through its network and project activities.

94. The venture capital and incubator component of the ADB centre supports regional and global network development and has established connections with the clean technology innovation and climate change communities.

C. Effect a model of change

95. The evaluation of the PSP pilot projects has demonstrated, with few exceptions, the need for a more strategic and consistent approach informed by preparatory, foundational and case study work, which the regional centres and the CTCN are well positioned to deliver.

96. The regional centres and the CTCN in effect operate as climate technology project accelerators and, more broadly, as builders of a climate innovation system, connecting technology, climate, finance and policy actors, creating synergies, supporting capacity development and catalysing learning and knowledge.

97. It is essential that they continue to exist in some form after the GEF funding comes to an end, in particular in view of the new technology framework, which strongly emphasizes innovation, collaborative efforts, enhanced TA and enhanced stakeholder engagement at the national, regional and global level.

98. According to the GEF report to COP 24, there is significant demand for CTCN-type of services. The CTCN can complement other mechanisms and, in particular, provide early-stage support.

VI. Overlap, complementarity and synergies between the centres and pilot projects of the Poznan strategic programme and those of the Technology Mechanism

99. The GEF submitted a plan for the long-term implementation of the PSP to COP 16 and provided funding for the pilot regional centres under GEF-5. Regarding the Technology Mechanism, COP 16 established the CTCN and decided that the Climate Technology Centre would facilitate a network of national, regional, sectoral and international technology networks, organizations and initiatives with a view to engaging Network members in agreed functions. Therefore, while there are no overlaps or complementarities between the COP mandates for the centres and the CTCN, there are overlaps, complementarities and possible synergies between the activities of the PSP centres and those of the CTCN, which are described in this chapter.

A. Global Environment Facility support for the Climate Technology Centre and Network

100. The COP requested the GEF to provide support to the CTCN. Under the PSP, the GEF supported with USD 1.8 million under GEF-5 a specific TA program for promoting accelerated transfer and scaled-up deployment of climate change mitigation technologies through the CTCN.

101. In Asia-Pacific, UNEP, co-host of the CTCN, established a capacity-building component of CTNFC, which accelerated demand for CTCN services as soon as the CTCN began operations.

102. The GEF has endeavoured to facilitate coordination and collaboration between the CTCN and the regional banks on the PSP regional centres, but this has generally been ad hoc and limited to information-sharing. No specific efforts to collaborate on TA or capacity-building programmes have been made. Furthermore, it is unclear whether PSP TA services have been readily available to NDEs.

B. Collaboration and coordination of the pilot regional centres and the Climate Technology Centre and Network

103. The CTCN has approached ACTFCN to comment on incoming requests for TA. The centres started their activities at a similar time and initially the scope for collaboration was limited; however, now that both are in full operation closer coordination and collaboration is being established. For instance, pipelines have been shared, and ACTFCN will forward TA requests in areas that it does not cover to the CTCN. The possibility of providing joint support to some countries is also being assessed.

104. The CTNFC (through component 4) should have been able to take advantage of the activities supported by UNEP. However, the management of the activities of UNEP and ADB needed to be better coordinated. The partnerships and coordination on climate technology promotion and implementation, and information-sharing, coordination and communication between ADB and UNEP, should be enhanced in order to address implementation gaps and leverage each other's strengths in dealing with governments to ensure greater support during project implementation.

105. Good collaboration has been established between FINTECC and the CTCN. EBRD was represented at the CTCN regional NDE forum in Armenia in 2015, and it reviews all requests received by the CTCN from EBRD countries of operation and provides input where possible.

106. The association of IADB with CTCN consortium partners the Bariloche Foundation and the Tropical Agricultural Research and Higher Education Center contributes to its objective of supporting the operations of the CTCN and facilitates coordination of their efforts and activities.

107. There has been some collaboration between the CTCN and the regional banks, such as the CTCN providing TA to EBRD for preparing a financial proposal for fuel-switching in Bosnia and Herzegovina, organizing capacity-building workshops with AfDB, and supporting project preparation for IADB (the latter by CTCN consortium partners). However, these are most likely isolated cases and not necessary linked to PSP programming.

108. In its report to COP 24, the GEF reported in detail on the organization of virtual meetings and the collaboration and communication established between the regional centres and the CTCN.

109. However, beyond attending meetings and exchanging ideas on project proposals, and a few cases of the CTCN providing TA for a bank project, synergies were not explored more systematically. To ensure greater coherence, synergy and complementarity, the regional centres should be working with the CTCN. This could have been the case for CTNFC had the project not started before the CTCN was operational.

VII. Responsiveness of the Global Environment Facility to the Technology Executive Committee's recommendations on the Poznan strategic programme relevant to enhancing the effectiveness of the Technology Mechanism

110. In the report on its evaluation of the PSP in 2015, the TEC provided recommendations on the PSP relevant to enhancing the effectiveness of the Technology Mechanism. Annex IV provides an assessment of the responsiveness of the GEF and other actors to those recommendations.

VIII. Key messages and recommendations regarding the Poznan strategic programme relevant to enhancing the effectiveness of the Technology Mechanism

111. The TEC drew on the evaluation described in this report to provide the following key messages and recommendations regarding the PSP relevant to enhancing the effectiveness of the Technology Mechanism.

A. Key messages

112. Except those related specifically to the modalities of the pilot centres, the messages apply to both the pilot centres and projects. The TEC has the following key messages:

(a) The PSP has significantly raised awareness on the important role that climate technology development and transfer play in supporting countries in achieving their climate mitigation and adaptation goals, including among multilateral development banks;

(b) Piloting the regional centres has generated experience and a better understanding of different modalities for originating climate technology projects; different TA instruments of support; technology transfer mechanisms; financing needs; the importance of long-term engagement, ownership and capacity-building; and the need for realistic timescales for technology transfer mechanisms to become operational and self-sustaining;

(c) The pilot regional centres and the CTCN are in effect operating as climate technology project accelerators and, more broadly, as builders of a climate innovation system, connecting technology, climate, finance and policy actors, creating synergies, supporting capacity development, and catalysing learning and knowledge;

(d) Project origination both in the pipelines of regional development banks and externally from public or private entities is resource intensive and requires strategic and expert engagement, as well as capacity development and support during development of externally originated projects;

(e) Better understanding of the implications and limitations of different project origination modalities and their effect on accelerating the adoption of new climate technologies and scaling up investment, and on addressing regional and national priorities and country-drivenness, is needed;

(f) Facilitating access to finance is key to scaling up investment in climate technologies. Investment and therefore upscaling are contingent upon access to climate finance, including blended finance. It is too early to determine the success of the centres at mobilizing finance for the projects they originated but lessons can be learned. Climate technology financing needs could be integrated into regional multilateral banks' country partnership strategies and the country operations business plans of member countries;

(g) The implementation of the regional centres and the CTCN have drawn attention to the need for long-term engagement with policymakers and government agencies, including NDEs, in particular on policy issues, to ensure upscaling, and the need for capacity development at the national level;

(h) The time frames for testing and operationalizing new technology transfer mechanisms (and, where applicable, ensuring they are self-sustaining) need to be realistic. It takes time to establish a track record, develop business or cooperative models and fine-tune operating procedures;

(i) The PSP pilot projects are a rich source of experience and lessons learned relevant to designing and implementing climate technology projects, highlighting the need for strong government leadership, the importance of engagement and dialogue with government, the importance of enabling environments, the importance of outreach, the need for flexibility in project design, the need for access to finance, the importance of pre-feasibility and market studies, and the need for intermediate metrics;

(j) Enabling environments are key to scaling up investment in climate technologies. In line with the new technology framework, enhanced technical support for creating enabling environments should be provided. Although some of the centres provide policy-related TA, there is insufficient information thereon to foster any insights or recommendations;

(k) Experience from the pilot projects and regional centres shows that TA instruments, including pre-feasibility studies, technology assessments and road maps, are essential as early-stage support for scaling up investment. Some analytical tools were also used to support decision-making on technologies. An analysis is needed of the different instruments and how and at what stage they can be utilized to support countries and projects;

(l) Experience also highlights the need to better understand which technology transfer models and mechanisms and good practices should inform project design and implementation;

(m) Intermediate metrics are needed that can capture and measure the value of knowledge created, spillovers and de-risking future investment as well as of building a climate innovation system;

(n) Adaptation was addressed to a limited degree in the PSP projects and has proven challenging for the centres.

B. Recommendations

113. With a view to enhancing the effectiveness of the Technology Mechanism, the TEC:

(a) Encourages the GEF, the CTCN and the regional centres to consider the experience and the lessons learned detailed in this report;

(b) Encourages further learning and sharing of experience between the centres and the CTCN and with Parties and NDEs;

(c) Encourages the GEF to consider options for continuing the role of regional centres and the CTCN in scaling up the level of investment in climate technologies;

(d) Encourages the GEF to explore how it can continue to support the CTCN in providing enhanced TA;

(e) Encourages the GEF, in consultation with the CTCN and regional centres, to consider options for enhancing its cooperation with the CTCN on the activities undertaken by regional centres;

(f) Recommends that a dialogue be organized between the GEF, regional centres and the CTCN to identify lessons learned and options for continuing the work of the centres;

(g) Notes the need to enhance understanding of and further analyse some elements highlighted in the key messages, which it could take into consideration when developing its future workplans.

Annex I

Global Environment Facility support for Poznan strategic programme climate technology centres and networks

[English only]

Project	*Region*	*Agency*	*GEF financing (USD million)*		*Co-financing (USD million)*	*Status*
			GEF Trust Fund	*SCCF*		
Promoting accelerated transfer and scaled-up deployment of mitigation technologies through the CTCN	Global	UNIDO	1.8	0	7.2	Under implementation
CTNFC	Asia-Pacific	ADB/ UNEP	10.0	2.0	74.7	Under implementation
ACTFCN	Africa	AfDB	10.0	5.8	89.0	Under implementation
FINTECC	Europe and Central Asia	EBRD	10.0	2.0	77.0	Under implementation
Climate Technology Transfer Mechanisms and Networks in Latin America and the Caribbean	Latin America and the Caribbean	IADB	10.0	2.0	63.4	Under implementation

Source: FCCC/CP/2018/6.

Annex II

Pilot projects of the Poznan strategic programme under the fourth replenishment of the Global Environment Facility

[English only]

Table 1
Pilot projects of the Poznan strategic programme under the fourth replenishment of the Global Environment Facility

Project	*Country*	*Counterpart*	*Technology*	*Approach*	*GEF funding endorsed by the Chief Executive Officer*
Climate change related technology transfer: using agricultural residue biomass for sustainable energy solutions	Cambodia	UNIDO	Agrowaste biomass energy systems	TA and investment to assist transfer of biomass plants to two pilot firms; capacity-building for national suppliers and relevant government departments	USD 1.9 million GEF grant; USD 4.6 million co-financing
Promotion and development of local solar technologies	Chile	IADB	Solar: photovoltaic and CSP	Development of standards and monitoring protocols for solar panels and solar systems; training of public and private stakeholders on CSP and photovoltaic systems; public awareness campaign to promote solar technology projects for solar water heating and power generation	USD 3.0 million GEF grant; USD 31.8 million co-financing
Green truck demonstration	China	World Bank	Energy-efficient trucks	Investment in retrofitting of 150 trucks, purchase of 150 new trucks, driver training, purchase and transfer of intellectual property rights; TA for all key partners, for example on greenhouse gas measurement and verification, policy and institutional frameworks for upscaling	USD 4.9 million GEF grant; USD 9.8 million co-financing
SolarChill: commercialization and transfer	Colombia, Eswatini, Kenya	UNEP	Solar refrigeration (for rural medical application)	Testing of two SolarChill technologies; investment in procurement and installation of 100 units in each country	USD 3.0 million GEF grant; USD 8.0 million co-financing
Construction of 1,000 t/day municipal solid waste composting unit	Côte d'Ivoire	AfDB	Municipal solid waste composting unit	Investment in construction and operation of pilot 1,000 t/day industrial composting unit in the city of Abidjan	USD 3.0 million GEF grant; USD 36.9 million co-financing
Dutyion root hydration system irrigation technology pilot project to address climate change impacts	Jordan	IFAD	Innovative irrigation system	Investment in pilot demonstration of irrigation technology; TA to train local farmers and stakeholders	USD 2.4 million GEF grant; USD 5.5 million co-financing
Promotion and development of local wind technologies	Mexico	IADB	Wind	TA to increase capacity for local development and implementation of wind power technology; investment in	USD 5.5 million GEF grant; USD 33.7 million co-financing

Project	*Country*	*Counterpart*	*Technology*	*Approach*	*GEF funding endorsed by the Chief Executive Officer*
				developing and testing prototype wind turbine built using high-quality national technology and manufacturing components	
Phasing out of HCFCs and promotion of HFC-free energy-efficient refrigeration and air conditioning systems through technology transfer	Russian Federation	UNIDO	Energy-efficient refrigeration and air conditioning systems	TA to build institutional capacity for phasing out ozone-depleting substances; investment to support phase-out and destruction; TA and investment to stimulate market growth in non-HFC options	USD 20.0 million GEF grant; USD 40.0 million co-financing
Production of Typha-based thermal insulation material	Senegal	UNDP	Organic building insulation (using invasive plant material)	TA and investment for basic evaluation and research, transferring technology and know-how, establishing local production, adapting the material for local application, a demonstration project and dissemination	USD 2.3 million GEF grant; USD 5.6 million co-financing
Bamboo processing	Sri Lanka	UNIDO	Bamboo cultivation (as land rehabilitator and sustainable energy resource)	Scientific and technical analysis, TA and investment to develop policy framework, laboratory for bamboo tissue reproduction, 10,000 ha bamboo plantation, machinery for producing wood flooring and biomass pellets, and the capacity and know-how for sustainable operations	USD 2.7 million GEF grant; USD 21.3 million co-financing
Overcoming policy, market and technological barriers to support technological innovation and South–South technology transfer: pilot case of ethanol production from cassava	Thailand	UNIDO	Bioethanol production	Aimed at removing barriers to and promoting technology transfer for the production of ethanol, enhancing South–South cooperation, increasing fermentation efficiency in ethanol production, promoting private sector engagement and transferring associated technologies to other countries in South-East Asia; includes technology demonstration to enhance and motivate full-scale technology investment (e.g. offer to establish demonstration plants in collaboration with interested partners); in order to remove policy and financial barriers, training provided to policymakers, banks and entrepreneurs	USD 3.0 million GEF grant; USD 31.6 million co-financing

Source: FCCC/SBI/2015/INF.4, appendices 2 and 3, and information provided by the GEF secretariat.

Table 2
Cancelled pilot projects of the Poznan strategic programme under the fourth replenishment of the Global Environment Facility

Project	*Country*	*Agency*	*GEF PSP funding (USD million)*	*Total GEF funding (USD million)*	*Co-financing (USD million)*	*Status*
Renewable CO_2 capture and storage from sugar fermentation industry in São Paulo State	Brazil	UNDP	3.0	3.0	7.7	Cancelled in February 2012 at the request of the agency; at the project preparation stage, investment costs far higher than expected, exceeding available financing, were identified
Introduction of renewable wave energy technologies for the generation of electric power in small coastal communities	Jamaica	UNDP	0.8	0.8	1.4	Cancelled in October 2011 at the request of the agency
Realizing hydrogen energy installations on small islands through technology cooperation	Cook Islands, Turkey	UNIDO	3.0	3.0	3.5	Cancelled in March 2012 at the request of the agency following changes to the concerned Governments' priorities

Source: FCCC/SBI/2015/INF.4, appendix 3.

Annex III

Midterm review of the effectiveness and efficiency of Poznan strategic programme pilot projects

[English only]

I. Promotion and development of local wind technologies in Mexico[1]

A. Description

1. The objectives of the IADB project are to consolidate human capacities for the design of state-of-the-art wind turbines for distributed generation; structure a value chain for the production of goods and services at the national level in the wind energy sector; consolidate technical capabilities for manufacturing, assembling, operating, testing and certifying wind turbines for distributed generation with a high share of national technology; and support the development of a 1.2 MW class 1A wind turbine for distributed generation and provide capacity-building to promote the application of wind power through distributed generation by small power producers.

2. The Mexican wind turbine is designed for distributed generation and will be constructed, commissioned and operated at the public Regional Wind Technology Centre in Mexico with the support of the GEF. The main benefit of the project is the know-how that will be developed and owned by the consortium of companies and organizations executing the project. A working and certified wind turbine prototype will be developed. This is a technological innovation project with complex specifications, which is not typical of bank projects.

B. Effectiveness and efficiency

3. Owing to the limited progress in its implementation, with disbursements of money of less than 2.4 per cent at the time of the MTR, the project was given a low rating for effectiveness. Although executed by a technically competent entity, the National Institute for Electricity and Clean Energy (formerly the Electrical Research Institute), the project has been marred by procurement and contracting regulation difficulties, by a lack of coordination between the Secretariat of Energy and the National Council for Science and Technology to access the Energy Sustainability Fund, and by a management disconnect between the GEF and the project component that is manufacturing the wind turbine.

4. However, since the MTR, the main sections of the wind turbine have been designed and manufactured and most are ready for assembly, including most of the components inside the nacelle, the tower and the basement. The tower, which was designed and manufactured by Trinity, has already been transported to where the wind turbine will be erected. The final design of the blades will be completed in April 2019, and the process for manufacturing five blades will be initiated in the first half of 2019. The blades will be manufactured at the Regional Wind Technology Centre. Work is already under way to construct the industrial plant.

5. The main priority of the National Institute for Electricity and Clean Energy is to complete the design and manufacture of the wind turbine, using grant resources and counterpart financing. Owing to recent changes within the Government of Mexico, the counterpart budget needs to be presented for authorities' approval. The strategy for scaling up the project once certified will be based on the Government's plans for the development of

[1] See the report on the 2015 MTR. available at http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=EZSHARE-357744178-7.

renewable energy in the country. Both the counterpart resources and the new strategy will be confirmed by the National Institute for Electricity and Clean Energy in the first half of 2019.

II. SolarChill development, testing and technology transfer outreach in Colombia, Eswatini and Kenya[2]

A. Description

6. The objectives of the UNEP project are to procure, install and field test 198 SolarChill-A vaccine cooler units (in three countries (66 in each)); laboratory test prototypes, and procure and field test 45 SolarChill-B units for food preservation for domestic and small commercial applications (15 in each country); and disseminate information (e.g. via marketing campaigns and awareness-raising) and transfer technology. The intention of the project is to stimulate the global market uptake of the SolarChill direct drive technology, especially in off-grid areas, for both health and food security applications. The project will also provide transparent field test data that can be used for outreach activities and technology transfer.

B. Effectiveness and efficiency

7. At the time of the MTR, the field tests of SolarChill-A units were ongoing in the three countries. The SolarChill-B project component was delayed, with units expected to be tested in 2018–2019. The technology transfer effort is exclusively focused on the work led by Habitat, Energy Application & Technology with The Fridge Factory (trading as Palfridge) in Eswatini. The prototypes were to be built at Palfridge and be ready for testing by the end of 2018. Production of 100 units as agreed between the German Agency for International Cooperation and Palfridge is expected to start in 2019. Kenya does not have a fridge manufacturer and in Colombia local manufacturers are not interested due to the low annual production volumes foreseen.

8. SolarChill direct drive is a niche technology with a very low annual production volume and a limited number of suppliers, but with a high level of technical requirements (especially for SolarChill-A) related to quality, reliability and temperature performance. The result is a high initial purchase price, ranging from USD 2,585 to USD 5,762 for SolarChill-A units. Price is even more of a barrier with the SolarChill-B units as they are targeted at remote communities with limited purchasing power but no financial plan is in place to help end users afford the initial high price. Manufacturing and purchase costs are expected to decrease as more units are produced. Currently, the lifetime cost of SolarChill refrigerators normally break even with that of kerosene units after 5–10 years, depending on the price of equipment and fuel.

9. The current project plan seems to be limited to field testing. There is no commercial or financial strategy in place for the period after the field testing, for example regarding who will take over the market penetration and commercialization work. It is not clear how the units' initial price will be reduced to allow for mass adoption, production and commercialization. The project's effectiveness and efficiency were not assessed in the MTR.

[2] See the 2018 MTR report on the GEF–UNEP project "SolarChill Development, Testing, and Technology Transfer Outreach".

III. Overcoming policy, market and technological barriers to support technical innovation and South–South technology transfer: the pilot case of ethanol production from cassava in Thailand, the Lao People's Democratic Republic, Myanmar and Viet Nam[3]

A. Description

10. The main objective of the UNIDO project is to prepare Thailand as the regional hub for the South–South technology transfer of ethanol production from cassava. The project was delayed because the National Science and Technology Development Agency, the government agency that developed the concept with UNIDO, was unable to execute the project and another executing partner had not yet been found. King Mongkut's University of Technology Thonburi took up the role of executing partner at the end of 2013. Although the technology transfer involved three countries (Lao People's Democratic Republic, Myanmar and Viet Nam), there was no involvement of institutional partners from the first two countries in the project development phase. The major share of co-financing from a private company in Myanmar did not materialize as the company decided not to go ahead with the ethanol production plant owing to lack of policy support from the Myanmar Government.

11. Key barriers to investment in ethanol production are the lack of policy and price incentives for the promotion of bioethanol, the low technical efficiency of processing ethanol, and the lack of advanced technological know-how within the private sector. During the project formulation stage, it was recognized that the new bioethanol production technology package developed by the National Science and Technology Development Agency in Thailand could be transferred to neighbouring countries, as it consists of know-how for increasing the yield of cassava and fermentation technology for increasing the level of efficiency of ethanol plants. It should be noted that fermentation technology has to date not been tested at full scale.

12. The main project components are (1) institutional capacity-strengthening for the dissemination of very high gravity saccharification and fermentation (advanced fermentation) technology, with King Mongkut's University of Technology Thonburi being a regional hub for supporting South–South technology transfer; (2) South–South technology transfer, including capacity-building and policy dialogue with participants from the Lao People's Democratic Republic, Myanmar and Viet Nam, including improved pricing practices and policy environments; and (3) demonstration and commercialization of the technology and private sector development.

B. Effectiveness and efficiency

13. At the time of the MTR, approximately one year after the project activities started, the project had not achieved any of the expected outputs. However, at the terminal evaluation stage, the project outcomes had been partially achieved. The outcomes under component 1 had mostly been achieved, including the technology transfer package and the recognition of King Mongkut's University of Technology Thonburi as a regional hub for fermentation technology and technology transfer. The outcome under component 2 had not been achieved. Under component 3, a demonstration plant was established in Thailand with an ethanol production capacity of 200 l/day. The Thai manufacturer of ethanol from cassava, Sapthip Co. Ltd, agreed to integrate the pilot plant of the new technology into its production line, with an ethanol production capacity of 200 l/day. A demonstration plant was established, on the basis of TA from the university and expert advice from the Food Industries Research Institute in Viet Nam, with an ethanol production capacity of 50 l/day.

[3] See the report on the 2015 MTR, available at https://www.unido.org/sites/default/files/2015-10/GFTHA100264_MTR-2015_Rep-F_0.pdf.

IV. Bamboo processing in Sri Lanka[4]

A. Description

14. The objective of the UNIDO project is to develop a bamboo supply chain and product industry in Sri Lanka, leading to reduced greenhouse gas emissions and a sustainable industry base. Components range from developing a policy framework for growing, harvesting, transporting and processing bamboo, producing bamboo tissue and supporting the establishment and operation of plantations, to supporting bamboo processing.

B. Effectiveness and efficiency

15. At the time of the MTR, a range of preparatory activities had taken place, such as consultant reports, analyses and studies, but these had not yet been acted upon, and most expected outputs and outcomes had not yet been delivered. The project was affected by political upheaval and the challenge of developing a supply chain from scratch. Furthermore, lack of coordination, including between government entities, unclear project ownership and project management issues affected the project's implementation.

16. However, by 2018 some progress had been made, albeit none of the anticipated co-financing had materialized. Relevant government departments had become more engaged in the project, and the project steering committee had resumed its functions and meetings. Recommendations on a national strategy and on including bamboo in REDD-plus had been formulated. Although 700 ha are planned for bamboo planting, land availability is still hampering project progress. Three models of plantation set-up were either realized or prepared. Some private investments in bamboo processing technology were made, and, independently of the project, a 10 MW dendro power plant is being set up in the city of Vavuniya using high-yielding bamboo chips as biomass.

17. It was decided in 2018 to discontinue the revolving loan-based fund for financing bamboo processing proposals as most of the proposals received would most likely not succeed commercially without support. Instead, the project will provide direct grant-based support to communities and SMEs along the bamboo value chain, as originally envisioned in the project document.

V. Climate change related technology transfer for Cambodia: using agricultural residue biomass for sustainable energy solutions[5]

A. Description

18. The objective of the UNIDO project is to achieve a sustained transfer of cost-effective and efficient biomass energy technology systems derived from agricultural waste (to replace fossil fuels for powered generators and boilers) for power generation and thermal energy applications. The five envisaged outcomes are to (1) transfer clean and energy-efficient low-carbon technologies; (2) supply of national service providers in technology evaluation and technology transfer; (3) Stronger institutional framework in place to ensure long-term support for renewable energy biomass promotion; (4) Increased adoption of biomass energy generation technologies by Cambodian businesses and private investors, creating a market for biomass technologies; and (5) Establishment of policy, legal and regulatory frameworks that sustainably promote and support renewable energy generation.

[4] See the report on the 2016 MTR, available at https://open.unido.org/api/documents/5859540/download/Mid%20Term%20Evaluation%20Report%20-%20Final%20Sri%20Lanka%20100043%20GEF4114.pdf.

[5] See the report on the 2015 MTR, available at https://www.unido.org/sites/default/files/2015-10/GFCMB12002-100223_MTR_Report-F_151022_0.pdf.

B. Effectiveness and efficiency

19. The project suffered a setback in mid-2014 when three co-financing enterprises withdrew their commitment to invest in pilot biomass energy systems. During the project's implementation, it was found that biomass-based technologies in captive power or cogeneration projects were not technoeconomically feasible for the originally targeted rubber and rice sectors. Lack of understanding and of disclosure of the energy load profiles of many enterprises in these sectors led to an overoptimistic projection of the feasibility of their use of biomass energy systems (because of their energy demand being for fewer than 10 hours a day and the seasonal availability of feedstock). Furthermore, there is no mechanism for selling excess power to the grid. Only a 24-hour biomass energy operation would be technoeconomically viable, but then the availability and cost of biomass would become an issue.

20. At the time of the MTR, efforts were ongoing to identify SMEs with more favourable conditions for biomass cogeneration, such as those with expansion plans and that are using diesel oil for steam generation. To meet the conditions for a technoeconomically feasible pilot project, however, SMEs need to have a 24-hour demand for thermal and electrical energy. Such a pilot project would be able to successfully demonstrate lower production costs for industrial enterprises.

21. Since the MTR, the project has screened industrial enterprises with a 24-hour demand for thermal and electrical energy for which cogeneration with biomass would be technoeconomically feasible. The focus was mostly on the food processing sector. Several feasibility studies were conducted and presented to the companies. UNIDO signed a contract with Amru Rice Cambodia Co., Ltd to implement a biomass gasifier cogeneration plant of approximately 40 kWe and 60 kWth. Other technologies that use biomass for heat or cooling energy were investigated, such as absorption chillers for beer processing and cooling. Several factories for which implementation would be both economically and technically viable are potential candidates for biomass cogeneration. However, several companies did not go forward with the implementation of the suggested technologies for various reasons, including the high upfront investment cost and their lack of access to appropriate finance.

VI. Production of Typha-based thermal insulation material in Senegal[6]

A. Description

22. The goal of the UNDP project was to facilitate the local production in Senegal of a thermal insulation material based on Typha. It aimed to improve the energy efficiency of both rural and urban building techniques. A research and development component was to create the conditions for transferring thermal insulation material production technologies: products would be tailored to the local building context, materials and constraints; pilot projects would demonstrate the usability of the products; awareness would be raised among relevant national stakeholders in the construction industry; training courses would be provided for the nationwide dissemination of the product; and measures for the diffusion of the technology and the use of the products, such as regulatory and incentive frameworks, would be analysed.

23. The project was expected to contribute to improving thermal comfort in housing in Sahelian countries, reduce electricity consumption from air conditioning and related CO_2 emissions and generate decentralized employment opportunities.

[6] See the report on the 2016 MTR, available at https://erc.undp.org/evaluation/evaluations/detail/7334.

B. Effectiveness and efficiency

24. None of the objectives had been achieved at the time of the MTR. The project ended in 2017. Tests carried out by project partners showed that Portland cement, widely used in Senegal, did not respond well to the addition of Typha and could not be used. Therefore, it was decided to use materials with a Typha–earth mix only.

25. Samples of panels and bricks made of earth–Typha material had been prepared, but still had to be tested in different Sahelian conditions at the time of the MTR. An ecopavilion was built from compressed Typha panels by the project in the city of Diamniadio, but it did not represent the reality of the housing found in urban and rural areas in Senegal. Training modules were developed and technical training activities conducted. Some studies were also carried out. The project still required funding for the establishment of small-scale Typha-based building material production facilities at the time of the MTR.

26. However, research carried out by the GEF and the first pilot demonstrations of the Typha–earth building materials made it possible to establish the insulating properties of the plant as a building material and to demonstrate the advantage of using it in energy-efficient buildings. A follow-up project funded by the French Facility for Global Environment started in 2017.

VII. Irrigation technology pilot project to face climate change impacts in Jordan[7]

A. Description

27. The aim of the IFAD project is to promote innovative and technically reliable irrigation technologies to reduce the vulnerability to climate change of the agricultural system in Jordan and, in particular, the impacts on water resources by testing innovative, environmentally friendly and efficient water use technologies.

28. The project has two components: (1) identification, implementation and expansion of irrigation technologies in Jordan; and (2) training, capacity-building and awareness-raising. The main target group is rural farmers. Two of the eight technologies originally identified, buried diffuser and reuse of grey water, were excluded. The six technologies implemented are fertigation, solar energy water pumps, aquaponics, hydroponics, water desalination and computerized irrigation technology. While the technologies are technically appropriate, the poorest farmers cannot afford to invest in and maintain heavy technology (e.g. desalination technology costs more than USD 70,000). A call of interest was made to select farmers willing to contribute 25 per cent of the investment.

B. Effectiveness and efficiency

29. The project was significantly delayed in starting up owing to the complex selection of technologies; the need to mobilize farmers; lack of confirmation of target beneficiaries' contribution; and extensive consultations with beneficiaries on the appropriate irrigation technologies. Fertigation technology is the most affordable of the six technologies and is therefore reaching more of the farmers. The solar energy water pump is the second most affordable technology and is in high demand. Owing to the need to contribute to the cost of the technology, the project cannot reach the most vulnerable farmers; but the cost-sharing aspect was put in place both to promote ownership and to reach a larger target group.

30. At the time of the MTR, about 34 farmers had benefited from the project. In the second stage, 72 farmers are expected to benefit. The target of 300 ha area of use of the irrigation technology should be reached at the end of the project: (34 farmers in the first phase + 72

[7] See the 2017 MTR report on the project "Irrigation Technology Pilot Project to Face Climate Change Impact in Jordan".

farmers in the second phase) x 3 ha average area = 318 ha. Component 1 of the project was rated moderately satisfactory, while Component 2 was rated moderately unsatisfactory.

VIII. Phase-out of hydrochlorofluorocarbons and promotion of hydrofluorocarbon-free energy-efficient refrigeration and air conditioning systems through technology transfer in the Russian Federation[8]

A. Description

31. The primary aim of the UNIDO project is to phase out 600 t ozone-depleting HCFCs (for the most part HCFC-21, HCFC-22, HCFC-141b and HCFC-142b) in sectors engaged in the production of foam and refrigeration equipment to achieve the 2015 target values under the Montreal Protocol on Substances that Deplete the Ozone Layer. The greenhouse gas emission reduction resulting from the phase-out of HCFCs will be approximately 15.6 million metric tonnes of CO_2. The secondary objective of the project is to incorporate more energy-efficient designs through technology transfer in the conversion of refrigeration and air conditioning manufacturing facilities.

32. The components of the project are institutional capacity-building; a HFC and HCFC life cycle performance analysis; phase-out of HCFC consumption in the key consuming sectors of foam and refrigeration; development of an ozone-depleting substance destruction facility and supporting recovery network; stimulation of market growth for energy-efficient refrigeration and air conditioning equipment; technology transfer; and a feasibility study to determine the best and most integrated strategy for dealing with the closure of HCFC production.

B. Effectiveness and efficiency

33. The project started effectively, with both public and private stakeholders actively engaged in both the technical and institutional activities. Legislation is in place at the federal level, and government and project stakeholders were working to develop the detailed regulations that will form the mechanism for the enforcement of the appropriate federal laws.

34. The progress in implementing a legal framework for the control of HCFCs significantly accelerated the prioritization of phasing out HCFCs across the foam and refrigeration sectors, and some foreign-owned enterprises had already voluntarily converted to non-ozone-depleting substance technology ahead of the legal obligations. By January 2015, 490 t ozone-depleting products had been phased out.

35. The implementation strategy is to bypass the adoption of HFCs by encouraging and facilitating the adoption of solutions with low global warming potential. Emphasis is being placed on natural refrigerants such as ammonia and hydrocarbons, used in appropriate applications, supplemented by the use of hydrofluoroolefins, which are currently in the development phase. This strategy appears to be supported by the chemical manufacturing sector, which does not currently produce the most common HFC refrigerants or foam-blowing agents and is keen to avoid a widespread adoption of technology dependent on foreign imports.

36. Some progress has been made in stimulating the adoption of more energy-efficient refrigeration technology. Refrigeration technicians and designers are highly engaged and a technical training centre has been established in Moscow with support from leading industry players to train technicians and promote energy-efficient refrigeration technology. However, the nature of the market has made it more difficult to get stakeholders to prioritize energy

[8] See the report on the 2013 MTR, available at https://www.unido.org/sites/default/files/2014-05/RUS_GFRUS11001_MTR_Dewpoint_0.pdf.

efficiency without any legal or financial imperative to change. The overall progress of the project was rated highly satisfactory. Its effectiveness and efficiency were not rated.

IX. Promotion and development of local solar technologies in Chile[9]

A. Description

37. The general objective of the IADB project is to support the Government of Chile and the Chilean Ministry of Energy in developing a solar energy industry for solar water heating and power generation in Chile (photovoltaic panels and CSP). The specific objectives are to promote technology transfer, institutional strengthening and capacity-building in solar technologies; develop pilot projects using solar technologies (solar water heating and power generation); and support the design of incentives, financial mechanisms and a public awareness campaign to promote solar projects with solar water heating and power generation technologies.

B. Effectiveness and efficiency

38. The project was launched in 2014 when rooftop solar systems had begun to flourish in Chile as a result of the introduction of a net billing scheme, making it easier to connect small and medium-sized (< 0.1 MWe) photovoltaic systems to the distribution network.[10] By the end of 2016, 5 MWe and 714 systems had been installed. GEF funding was used for three public solar rooftop demonstration projects totalling 150 kW in 2017, the contribution of which to the overall programme is not clearly articulated in the MTR. More importantly, the project contributed to building capacity for the design and development of public tenders associated with the installation of photovoltaic projects in the public solar rooftop programme, which reduced costs.

39. As a result of the fast-changing market, a large part of the budget for pilot solar rooftop projects was reallocated to designing a credit line for SMEs to obtain photovoltaic systems at preferential rates and tenures (grant subsidies to reduce credit and interest rates). A reassessment of the market also led to support for solar water heating being dropped from the project.

40. At the time of the MTR, the CSP component (the construction of a CSP plant in the Atacama Desert) was delayed owing to challenges associated with the corporate crisis of Abengoa, the contractor that was publicly awarded the construction, operation and maintenance of the plant. The project produced a technical study, which provided the means to design, prepare and successfully tender the first CSP plan in Chile. The Government of Chile asked that the project meet the specific demands related to the monitoring of the CSP plant being implemented by Abengoa, and provide expert advice and enable exchange of experience.

[9] See the report on the 2017 MTR, available at http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=EZSHARE-18023953-5.

[10] Haas et al. 2018. Sunset or sunrise? Understanding the barriers and options for the massive deployment of solar technologies in Chile. *Energy Policy.* 112: pp.399–414.

X. Green freight demonstration project in China[11]

A. Description

41. The development objectives of the World Bank project were to demonstrate the global and local environmental benefits of the application of energy-efficient vehicle technologies and operating techniques, and to support improving energy efficiency and reduce greenhouse gas emissions in the road freight transport sector in Guangdong.

42. The project had three components. First, green truck technology demonstration facilitated communication and cooperation among energy-efficient vehicle technology suppliers, freight carriers, freight shippers and other key stakeholders, and provided project participants with access to government and commercial financing, including green freight technology rebates and performance-based payments. Six energy efficiency technologies verified by the United States Environmental Protection Agency SmartWay programme were demonstrated (low-resistance tyres, roof fairing, side skirt, gap fairing, tyre pressure monitor, and energy-efficient driving system). Second, a green freight logistics demonstration established two pilot logistics brokerage platforms, which helped to demonstrate the provision of financing through green freight technology rebates and performance-based payments. The grant was used to subsidize half of the truck driver's payment (USD 16/trip) in order to attract more users. Third, capacity-building and outreach programmes were designed. The Project Management Office organized a series of training programmes, workshops and symposiums to advertise and promote green freight concepts. By the end of the project, training had been provided to over 3,200 truck drivers and over 200 government officials and project management officials.

B. Effectiveness and efficiency

43. The effectiveness and efficiency of the project were both rated as substantial. The short-term net benefits from fuel savings were worth about USD 61.2 million, almost three times the total project cost. The project led to 161,430 t CO_2 emission reductions at a GEF grant cost of USD 23/t, which was much higher than the USD 3.5/t estimated at the time of appraisal. This was due to the fact that the technologies verified by the United States Environmental Protection Agency SmartWay programme were unable to produce the same benefits in Guangdong. In addition, the grant leveraged USD 8.02 million in private sector investment (eight times the estimated amount at appraisal), the majority of which came from two logistics companies that implemented the pilot logistics platforms and a trucking company that implemented the drop-and-hook pilot. This achievement is mostly due to the increased awareness about the benefits of energy efficiency technologies and operating techniques, as well as Guangdong's efforts to mainstream energy-efficient practices in the freight and logistics sectors.

[11] The 2016 terminal evaluation report is available at http://documents.worldbank.org/curated/en/105411467614051818/pdf/ICR2510-P119654-Box396252B-PUBLIC-disclosed-6-29-16.pdf.

Annex IV

Responsiveness of the Global Environment Facility to the Technology Executive Committee's recommendations on the Poznan strategic programme relevant to enhancing the effectiveness of the Technology Mechanism

[English only]

1. In the report on its evaluation of the PSP in 2015, the TEC provided a number of recommendations on the PSP relevant to enhancing the effectiveness of the Technology Mechanism. The following is an assessment of the responsiveness of the GEF and other actors to those recommendations.

2. **The GEF was encouraged to further catalyse the upscaling of good practices under the PSP and the sharing of experience and lessons learned among PSP elements and with relevant stakeholders:**

(a) The GEF has continued to approve projects with technology transfer objectives. In the reporting period leading up to COP 24, from July 1, 2017, to June 30, 2018, for climate change mitigation, 27 projects with technology transfer objectives were approved with USD 108 million in GEF funding and USD 402.9 million in co-financing. For climate change adaptation, eight projects promoting technologies for adaptation were approved with USD 48 million from the LDCF, USD 1.1 million from the SCCF and USD 177.9 million in co-financing;

(b) The PSP pilot regional centres and pilot projects are ongoing, with mixed outcomes so far. It would be premature to start upscaling specific practices before their results and potential have been assessed. In the follow-up to the ADB/UNEP centre that is nearing project closure, a different project origination approach is being adopted, namely developing innovative low-carbon technology projects in close collaboration with the operational departments rather than supporting projects that have already entered the investment pipeline. There is currently no assessment and insufficient information on the replicability of some of the technology transfer mechanisms and support models. However, as PSP experience has proven, there is an urgent need to learn from experience and better understand the conditions, modalities and processes for successfully demonstrating, transferring and scaling up new technologies;

(c) The CTCN has proven itself as a model, having established a track record of providing early-stage support to potential projects, for which there is much demand from countries;

(d) In its report to COP 24, the GEF highlighted that a constructive dialogue had been established with its respective agencies. It has attended a number of meetings to raise awareness about the PSP. In addition, it organized a side event at the forty-sixth sessions of the subsidiary bodies to share experience and lessons learned from the PSP.

3. **The GEF was invited to share the midterm evaluations of the PSP pilot centres and GEF-4 pilot projects with the TEC as soon as available to enhance the sharing of PSP experience.** As at February 2019, 14 of the 16 PSP projects had reached the midterm evaluation stage. All available MTR reports were made available by the GEF for input to the updated evaluation of the PSP.

4. **The PSP regional centres and the CTCN were encouraged to strengthen their institutional linkages with a view to strengthening coordination, enhancing information-sharing and creating synergies to accelerate regional climate technology development and transfer.** The GEF has convened a number of dialogues among the regional centres and UNEP and the CTCN outside of GEF Council and other meetings to share information. Other than convening meetings, no other institutional linkages have been supported by the GEF.

5. **Countries were recommended to enhance the coherence and effectiveness of their national climate technology efforts by strengthening links between national entities, and encouraged to explore how they may strengthen links between their NDE, GEF focal point, regional centre focal point, GCF national designated authority or focal point, and other UNFCCC national focal points:**

(a) The Climate Technology Centre requested from NDEs information on their collaboration with the GEF operational focal points on matters relating to the development and transfer of climate technologies. In total, 69 NDEs responded to the survey: 64 per cent noted that they have information on the GEF portfolio in their respective countries; 49 per cent indicated that they meet regularly with the GEF operational focal points to support coordination at the national level, of which 50 per cent meet every three months or less; 60 per cent stated that they did not participate in the GEF portfolio formulation exercise in their countries and thus did not contribute to defining priority sectors for GEF funding. Finally, the survey highlighted that four subregional meetings organized by the CTCN provided a good opportunity for NDEs, GEF operational focal points and GCF nationally designated authorities to meet to discuss matters of common interest and share experience;

(b) The survey highlighted the need to strengthen country coordination mechanisms, in particular the participation of NDEs in GEF portfolio formulation exercises.

6. **The GEF was invited to structure its report on the PSP under the areas of regional and global climate technology activities, national climate technology activities, and TNAs with a view to enhancing the clarity of its reporting, strengthening coherence and building synergies between the activities of the PSP and the Technology Mechanism.** The GEF has addressed this recommendation, as reflected in the structure of its reports to the COP: the chapter on technology transfer has been structured around these areas.

7. **The GEF was recommended to report annually to the COP through the SBI on progress in carrying out its activities under the PSP, including its long-term implementation, instead of twice per year as stipulated in document FCCC/SBI/2011/7, paragraph 137.** The GEF submits annual reports to the COP on progress in carrying out its activities under the PSP, including its long-term implementation.