

Annex 10: Thematic (Energy Efficiency and Renewable Energy) Sub-Evaluation

A10: 1 Introduction

Energy and infrastructure funding constitutes as significant part of the portfolio, and the major components of the climate mitigation portfolio. A special thematic evaluation was conducted to evaluate the activities in this area.

A10: 1.1 Objective of the evaluation

The objective of this review is to identify the aspects that are specific to the activities on energy efficiency and renewable energy and of relevance for the overarching programme evaluation.

A10: 1.2 Scope of the evaluation

The scope was predefined in the inception report. Based on the project list identified in the portfolio review, the projects were screened further. The evaluation questions were answered mainly on the basis of the country programmes, including evidence from the two thematic country sub-evaluations on Vietnam and Kenya.

A10: 1.3 Methodology

The methodological approach was laid out in the inception report. It started with an evaluability assessment that assessed the project documentation provided by the client. Initially, approximately 58 projects had been identified as contributing to climate mitigation (including projects from among others, industry, energy, agriculture, water, and forest sectors). Of these, 24 included energy components and were selected as related to energy efficiency and renewable energy on the basis of the project summaries. They were then scrutinized using the criteria set out in the inception report, leading to a description of the portfolio and an inventory of documentation.

The documentation available as a result of this assessment was used to find evidence for the assessment of the evaluation questions. The inception report had developed evaluation questions based on the OECD/DAC criteria. These were adjusted as evidence became available from the portfolio for some questions but not for others.

The basis for answering the evaluation questions consists of the country studies, project documentation as well as interviews with stakeholders in Copenhagen. Intensive desk review is the basis for the findings unless noted otherwise. It was built on documents that were available to the team from the side of the Danish agencies, either directly or through their websites.

A visit to Copenhagen to discuss some of the projects as well as the overall approach to programming with the Danish Government stakeholders was conducted by Pat Hardcastle and Christine Wörten in January 2015 and later supplemented through selected phone calls.

A10: 1.4 Limitations of the evaluation

Apart from the consultations with the stakeholders in Copenhagen, this is mainly a desk review. Evidence is limited to documents provided by the MFA (Ministry of Foreign Affairs), the Ministry of Climate, Energy and Buildings (MCEB), the Low Carbon Transition Unit (LCTU) and United Nations Environment Programme/Danish Technical University UNEP/DTU, through Internet research, through field visits by other evaluation team members as well as from general data sources on the Internet. As no consultation with local stakeholders could be conducted, the review is prone to reporting bias. Throughout the evaluation, the evaluators have engaged in an interactive and internal process of building and testing hypotheses as part of desk reviews and initial interviews. Where the written evidence and the stakeholder consultation resulted in inconclusive finding, these findings have been triangulated with additional effort and discussed in the project team.

A10: 2 The portfolio – Findings

Finding 1: The portfolio in renewable energy and energy efficiency encompasses a wide range of different activities, and can be split into four distinct groups of modalities: climate-financing mechanisms, co-financing of multilateral projects, institutional financing, and bilateral projects.

Table 1 highlights the number of projects in the sub-portfolio by type of implementation modality. In terms of funding volume, the amounts are about evenly distributed between the three major groups: Climate Funds, Institutional Financing, and Bilateral Initiatives. The first type is composed of multilateral climate funds, which are larger climate-financing mechanisms and where the MFA is one donor. In the third group of funding modalities, institutions concerned with the implementation of programmes on climate change mitigation are supported by funding. The fourth group comprises bilateral initiatives between the Danish authorities and ministries or other authorities of partner countries. The smallest group consists of larger projects or programmes which are co-financed by the MFA – in this case the small island developing states (SIDS-DOCK) initiative of United Nations Development Programme and the World Bank.

Table A10:1 Project count by type of support

Type of finance	Climate Funds	Co-financing	Institutional funding	Bilateral initiatives
Number of projects	5	2	8	9
Funding commitments	251.000.000	80.000.000	263.710.000	245.500.000

More detail on the four groups in the portfolio is provided in Annex A10:3.

Finding 2: The overall young age of the portfolio limits the evaluability in terms of the relative success and efficiency of the project types as well as impact and sustainability.

In 2015 many of the projects of the portfolio are still under implementation (see Table 2). In the cases of country projects, such as the Fast Start Climate Change Programme (FSCCP) for Kenya and the Maldives as well as in the cases of the Vietnam National Energy Efficiency Programme project or Energy Sector Programme for South Africa, fixed implementation periods are defined. Hence, for country projects it is clearly observable whether they still are under implementation or not. Other programmes, like the funds administered by the financing mechanisms have not been fully placed.

Table A10:2 Implementation Progress

Danida File No.	Grant Title in Short	2010	2011	2012	2013	2014	2015	2016	2017
104.G.15-6.	Indonesia - Environment, energy and climate program III			funds	imp.	imp.	imp.	imp.	imp.
104.G.13-5	Kenya FSCCP 2011 - CEF/CDTF		funds + imp.	imp.	imp.				
104.G.13-5	Kenya FSCCP 2011 - AECF/ REACT		funds + imp.	imp.	imp.				
104.G.13-5	Kenya FSCCP 2011 - KAM		funds	imp.	imp.				
104.G.15-5.	Kenya - FSCCP 2012 - CEF/CDTF			funds + imp.	imp.	imp.			
104.G.15-5.	Kenya - FSCCP 2012 - CEEC/KAM			funds + imp.	imp.	imp.			
104.G.13-1	SIDS DOCK Support Programme - UNDP		funds + imp.	imp.					
104.G.13-1-1.	SIDS DOCK Support Programme - WB		funds + imp.	imp.					
104.G.15-19.	South Africa - Energy Sector Programme			funds	imp.	imp.	imp.		
104.G.15-20.	South Africa - Wind Atlas			funds + imp.					
104.G.15-18	Vietnam - VNEEP			funds	imp.	imp.	imp.		
104.O.14-3.	DCIF 2012			funds					
104.O.14-3-1.	DCIF 2013				funds				
104.G.13-3	GCPF 2011		funds						
104.G.17-1.	GCPF 2014					funds			
104.G.3-3-1	Egypt - RCREEE	funds							
104.G.17-3	SE4ALL Energy Efficiency Hub					funds + imp.	imp.	imp.	imp.
104.G.12-29-3.	WB Strategic Climate Fund - SREP	funds + imp.							
104.G.3-3-3	ESMAP				funds + imp.	funds + imp.	funds + imp.	funds + imp.	
104.G.12-29-6.	UNEP-Risoe - Green Facility - Pilot activities 2010	funds + imp.							
104.G.15-15.	LCTU - Energy Authority			funds	imp.	imp.			
104.G.17-2	LCTU and China-Cooperation 2014-2016					funds + imp.	imp.		
104.G.13-2	GGGI					funds			
104.G.15-10.	PMR			funds	imp.	imp.	imp.		

funds imp.	Year Funded and start of implementation
funds	Year Funded
imp.	Implementation Time

Overall, those projects that are embedded in existing MFA country programmes have progressed faster than projects that have been initiated on the grounds of the existence of the Climate Envelope. This is a typical of new innovations – where you have established relationships with the stakeholders and where you can build on a local implementation structure, like in Vietnam or Kenya, projects can be

implemented faster. The MCEB representatives identify the longevity of the China programme as one of the main reasons for its current success.

A10: 2.1 Activities and themes supported

Finding 3: Projects emphasise policy frameworks, capacity building, and awareness raising for sustainable energy use and generation, including grid integration of renewable energy, wind energy, building energy efficiency, and energy efficiency in manufacturing.

There are a number of typical activities supported. Projects under direct implementation (i.e. not through international organisations or financing mechanisms) mostly focus on technical assistance. A strong emphasis is put on close collaboration with policymakers, governmental institutions, and NGOs in partner countries, supporting them in their climate mitigation efforts and building their capacity on energy efficiency and renewable energy issues. In six projects, assistance is provided on energy planning and modelling. Six projects support the development and/or implementation of policy frameworks. Nine projects emphasise awareness raising and/or technical training and capacity building. Few projects provide financial assistance, and most of them are implemented by multilateral organisations. The projects in Kenya, Vietnam, and Indonesia have financing and investment components that are executed by the MFA.

Regarding the thematic focus of these projects, 18 projects deal with the energy generation by renewables and/or their integration into grid infrastructure, 19 projects also focus on the implementation of specific energy efficiency measures, *e.g.* in businesses or buildings. The “other” section includes projects that focus on one or more of the following themes: green growth, policy on climate change mitigation, combined heat-and-power generation (CHP), and district heating. A number of projects, for example, the Partnership for Market Readiness (PMR), the Global Green Growth Institute, and the private sector funds, pursue technology-neutral mitigation activities.

Finding 4: The Global Frame and the Poverty Frame both support energy efficiency and renewable energy projects, but make different strategic and operational choices, in line with their mandates and core objectives.

It was only in 2012 that the envelope was split in two frames, resulting in project management responsibility at the MCEB only for projects from that year onwards. Therefore, most of the initiatives of the analysed were funded and managed by the MFA and follow MFA modalities and form. All of the earlier projects of the portfolio, from 2010 and 2011, are supervised by the MFA.

The two ministries have different objectives. For example, while the MFA focuses its work on developing countries, for example, Kenya, Maldives, and SIDS, the MCEB provides funding for middle-income countries such as China, Mexico, Vietnam, and South Africa. These are part of the declared intentions of the Global Frame, which seeks to capitalise on the greater greenhouse gas (GHG) mitigation potential.

Similarly, different partnership strategies can be observed between the MFA and the MCEB. In the MFA portfolio, non-governmental partners, like the Kenya Association of Manufacturers, play a strong

role, whereas the MCEB relies fully on the agency-to-agency approach in its bilateral engagements. The MCEB projects most often do not include financing components. Technical facilities are included in the MCEB projects only in the form of pilot projects, for example, in China.

Box A10:1 MCEB country programmes and country programme components on renewable energy and energy efficiency

The China programme was initiated in 2009. Since 2009, the Danish supported Renewable Energy Development Program (RED) that supported the establishment of the Chinese National Renewable Energy Center (CNREC) at the Energy Research Institute (ERI) and 12 pilot projects for cooperation between Danish and Chinese companies. The CNREC, amongst others, developed the competence for modelling power sector scenarios that include renewable energy and thus supports the planning processes at National Energy Administration (NEA) China directly (Source: China Program Brochure from DEA website). A team of Danish advisors and representatives from DEA facilitate the implementation of this support. Further, a number of memoranda of understanding (MOUs) between the MCEB and five Chinese institutions were signed in 2012 and 2013: the National Development and Reform Commission (NDRC), the National Energy Conservation Centre (NECC), the National Energy Administration (NEA), the Ministry of Housing and Urban-Rural Development (MOHURD), and the Ministry of Science and Technology (MoST). In addition, An energy attaché at the Danish embassy in Beijing supports the political dialogue. Within CNREC a senior expert supports the thematic and strategic development of the centre. In addition, five technical staff of the DEA work on China issues full time, spending around 30% of their time in China. The work programmes are compiled annually in China, driven by local needs and revised semi-annually at the steering committee meetings.

The Vietnam programme focuses exclusively on energy efficiency. Specific projects on energy efficiency in enterprises and buildings build on an existing cooperation between Denmark and Vietnam in the longer-term development frame of the MFA (2008-2015), which also has a climate change adaptation and mitigation focus. This frame provides budget support among other things for the VNEEP programme of the Ministry of Industry and Trade (MOIT). Part of the USD 12 million engagements are a Green Investment Facility (USD 6 million) for small- and medium-sized enterprises, energy efficiency pilot projects with Danish technology, and an improvement of the Vietnamese building code.

The Mexico programme can also build on a longer-term engagement: “Since 2005, Denmark and Mexico have cooperated on climate and energy, and since 2011 the Danish Energy Agency (DEA) has cooperated with the Mexican Ministry of Environment and Natural Resources (SEMARNAT) on energy modelling, assessing national baselines, and potentials for reduction of carbon emissions.” In January 2014, a new cooperation on mitigation and energy was started, for which a budget of DKK 45 million (USD 8 million) has been set aside until 2017, in cooperation with the Mexican ministries for environment and energy; SEMARNAT and SENER. The activities under this programme follow requests from the Mexican side, and cover a wide range of topics, from biomass and wind resource base assessments to a workshop on the flexible operation of conventional power plants, energy management at the national oil company, and efficient public buildings.

The South Africa country programme was initiated in 2013 and builds on a memorandum of understanding between the Governments of South Africa and Denmark signed in 2011. A sum of DKK 40 million (USD 7 million) has been set aside for three components: one is

working with the Department of Energy on capacity building, energy planning and policy design; one is supporting the ministries' research institute SANEDI on the further development of the South African wind atlas; and the third component seeks to support the South African grid operator utility 'ESKOM' on issues of wind integration. The set-up is similar to China: an energy attaché at the Danish embassy in Pretoria is collaborating with a project manager and an MFA-funded energy advisor in the Department of Energy as well as a technical expert in ESKOM.

These four programmes all follow a similar setup in that they draw on the support from the Low Carbon Transition Unit (LCTU) of the Danish Energy Agency. Some of the programmes have very detailed outcome management systems (*e.g.* Vietnam). Others, such as South Africa, are lacking clear indicator frameworks.

Finding 5. The indicator frameworks of the projects and programmes in the portfolio are not harmonised and sometimes incomplete.

Only 16 projects contain detailed indicator frameworks. Even though all of these have a climate mitigation focus, only seven of the projects consider GHG-emission reductions as an indicator for the success of the project. This might seem surprising, but calculating and reporting GHG-emission reductions is only possible with any degree of certainty for investment projects. As the focus of most projects is on technical assistance, in these cases GHG-emission reductions typically take place a long time after project implementation. In addition, attribution of GHG reductions to technical assistance activities is difficult. While some of the projects, like the China programme, have a specific project development component and it would be possible to monitor GHG reductions for this activity, using GHG alone as an indicator would not be reflective of the full breadth of activities of the project.

Project level indicators are almost exclusively formulated on the output level (*e.g.* "Number of technical analyses carried out and number of policy development activities undertaken. The targets are at least one technical analysis and two policy development activities" in Vietnam) or directly linked to outputs (*e.g.* "Analysis of reserves required for efficient integration of RE" in South Africa or "25 suitable research products published and openly accessible through peer review literature" for ESMAP).

Not all of these indicators are defined according to international best practice (*e.g.* the SMART-principle). In some cases, means of verifications are undefined and it is often unclear whether budgets are available for their assessment, which can be costly. There was no evidence of efforts to harmonise the indicators in this portfolio, although some efforts have been undertaken for the follow-up projects and programmes.

A10: 2.2 Summary of portfolio characteristics

The programme utilises a wide range of approaches that can be grouped to generate clusters of similar projects. There are two types of support to multilateral organizations, roughly divided into climate finance and budgetary support of regional and global technical assistance (TA) institutions. Unlike many other donors, the MFA also provides institutional funding from the Climate Envelope. Among

the country programmes, the MFA sub-portfolio supports energy efficiency and renewable energy aspects in existing country partnerships with a focus on poverty and development while the MCEB sub-portfolio is focussing on middle-income countries with higher GHG-mitigation potential, focusing on technical assistance, *e.g.* on policy frameworks, regulation, planning, implementation of energy efficiency and renewable energy projects, programmes and policies.

In terms of the activities, strong emphasis is put on technical assistance projects. But this is not exclusive: overall, many interesting aspects coming out of the Copenhagen discussions are supported with funds and intellectual contributions, ranging from the Green Growth Agenda to innovative private-financing mechanisms.

Of the 24 projects, only 16 had complete indicator frameworks. A lack of indicator frameworks makes programme evaluation difficult. Even among the projects that were executed bilaterally, standards for reporting are not always fully enforced. Reports, whether progress, final, and/or evaluation in terms of achievements of outcomes and impacts, were only available for seven projects at the outset of this review. At the comments stage of this review, the MCEB asserted that all DEA programmes have indicator frameworks so some issues may have been resolved.

Most of the indicator frameworks of the projects – and in particular of the programme – are not very developed. With the lack of programme-level indicators for the Climate Envelope, it is difficult to generate aggregate results reporting for the portfolio. This hampers the assessment and demonstration of the success of the portfolio. At the time of the review, a programme-indicator framework was being discussed between the MCEB and the DEA but, according to the interviews, not yet finalised and implemented. Once this is finalised and implemented, more systematic monitoring will be possible.

A10: 3 OECD/DAC Findings

A10: 3.1 Relevance

In the country programmes, the projects were aligned with the areas in which Denmark demonstrates leadership ‘at home’ (*e.g.* building energy efficiency, grid integration of wind energy, and others). This alignment is determined in the memoranda of understanding that form the basis for the programmes. This is one part of the specific Danish contribution. The other is the ‘government-to-government’ system of complementing long-term in-country experts with long-term technical experts splitting their time between Denmark and the country.

Finding 6: The areas of priority for Danish energy assistance are clearly specified in the policy documents and remain consistent over the programming period. The MCEB projects all reflect these strengths very specifically. The MFA projects have small energy components that also work in similar areas, so that overall the match between the Danish leadership areas at home and abroad is very good.

By all standards, Denmark is one of the leading nations (if not the leading nation) in several domains of sustainable energy policy. The IEA (2011) explicitly acknowledges its role, pointing to the consistent decoupling of energy consumption and growth and the long-term consensus-based consistency and vision for a low carbon society. Denmark has grown its economy by 78% at more or less constant energy consumption while reducing CO₂ emissions (MCEB 2012a). The consistent promotion of co-generation of heat and electricity, public awareness campaigns and appliance labels, energy savings agreements with industry, and taxes on energy consumption are highlighted as part of the Danish role model in energy efficiency.

The MCEB (2012a) and the IEA (2011) attest to specific strengths in the area of building energy efficiency, where “Denmark is a world leader in energy efficiency standards and requirements” as it has one of the most stringent building codes. In addition, the leadership in fluctuating renewable energy – Denmark has the highest penetration of wind power at 39% in 2014, combined with high grid stability – is acknowledged throughout the global renewable energy community.

Apart from this role as a global leader in its commitment to a zero-GHG power sector in 2050, energy efficiency and renewable energy policies have allowed Denmark to become a major exporter of clean energy technologies with “a strong commercial advantage”. They constituted almost 10% of total Danish goods exports in 2010, “supplying about one third of the global wind turbine market”.

In the interviews, this assessment of the typical Danish strengths was confirmed and narrowed to specific topics renewable energy and energy efficiency competence:

- building energy-efficiency standards;
- wind integration in power grids;
- biomass-based energy provision, including co-combustion;
- combined heat-and-power generation (CHP);
- district heating; and
- SMART systems.

These strengths are also in line with Danish domestic strengths, as well as with policy documents like the *Greener World for All* (2013), which highlight these strengths consistently.

In particular the MCEB portfolio has an almost exclusive primary focus on the topics identified as specifically Danish in the previous section. For example, the projects in China and Vietnam were both active in the field of building energy efficiency, while the projects in China, Mexico, and South Africa all have a strong emphasis on wind deployment and the grid integration of renewable energy. This alignment is also ensured through the MOUs that are the basis for these country programmes. The MFA programmes in Vietnam, Kenya, and Indonesia focus on industrial energy efficiency and renewable energy broadly. While the Kenya projects are more focused on directly supporting energy-related investments and behavioural change, the Vietnam and Indonesia programmes are more focused on capacity building, information, and regulation. Therefore, both parts of the portfolio rely on Danish strengths.

Finding 7: A second specific Danish aspect is the characteristic set-up of local presence in the country and technical support from Copenhagen.

Knowledge management and demand-driven sharing is at the core of the Danish model. The technical competence is concentrated in the LCTU at the DEA, serving all country programmes from Copenhagen, while they travel to the countries on a regular basis. While the details vary for each country, generally, there are officers located in-country to provide direct expertise; for example, to the Chinese CNREC, to the South African grid operator ESKOM, or to the Mexican ministries for environment and energy. In addition, energy advisors in the Danish embassies support the policy.

A10: 3.2 Efficiency

Finding 8: The agency-to-agency collaboration approach is associated with additional costs but also additional benefits. For example, building partnerships takes time; on the other hand, the direct support can be much more effective than typical aid procedures.

This specific ‘Danish’ setup is potentially associated with some additional costs, for example, through travel costs and significant staff inputs. In addition, the in-country demand for the Danish expertise needs to be generated, and this process tends to take significant time and resources. While the Danish expertise is highly specialised, but so rich that sooner or later a topical niche can be found, the process up until this point typically takes much longer than anticipated in the narrow programming schedule of the Climate Envelope (this is the experience from both the South Africa and the Mexico cases).

The analyses indicate that developing support infrastructure for sustainable energy in middle- income countries is a long-term process – it takes time to understand the challenges and sector set-ups in the countries, to build up relationships with the relevant stakeholders in the country, and to define the area where Danish expertise would be most useful. The most successful example, the CNREC was initiated within the Sino-Danish Renewable Energy Development (RED) program in 2008. Its business plan was approved in 2011, and in 2014, a review mission attested to considerable influence in China.

There is no reason to believe that this process can be done in half the time in other countries, particularly if taken into consideration that the RED programme itself built on the successes of the “WED” program on wind, and that the CNREC was a request from the Chinese side (a claim that is not evidenced for the Mexico or Republic of South Africa programmes). However, each of these countries will encounter issues with the technical aspects of grid integration of renewable electricity, of biomass energy, and of building energy efficiency. In these fields, and potentially some others (*e.g.* private capital flows for climate finance), Denmark is in a position to provide important and unique knowledge and can do so on the basis of trust-bearing relationships. It is important to acknowledge that this process is by necessity one that requires a long-term engagement.

On the upside, as mentioned, there are specific benefits to this approach, for example that it allows for credible transfer of sustainable energy practices, can avoid “reinventing the wheel”, and can provide entries for collaboration in other dimensions, for example, in policy or trade. On the basis provided,

the efficiency of this approach cannot be assessed. Also, this model is very specific, and a comparative analysis would be difficult.

A10: 3.3 Effectiveness

Many projects do not specify outcome indicators so that effectiveness on an outcome level is hard to measure. Projects and programmes are often one-of-a-kind, either in terms of approach or because they are closely aligned to the local context. The specific government-to-government approach has been effective but there is room for improvement in order to optimise the effectiveness, for example, by codifying lessons and facilitating cross-country learning but also by more active influence on the local agenda. Success factors include consistency, long-term partnerships and credibility; in essence, Denmark is leading by example.

Finding 9: the agency-to-agency model has demonstrated some promise for effective transfer of lessons and synergies between country programmes.

In fact, one of the findings of the evaluation study on the CNREC (Visti & Wennerberg 2014) is that “technical cooperation between peers is a strong driver for performance”. In this case, the technical experts from government agencies developed a very productive relationship over the years of their cooperation. Again, the report emphasises that personal relationships and staff continuity over “a longer time period” are important.

If long-term relationships are built, Danish projects have the opportunity to effect catalytic change and can support endogenous scaling-up of energy efficiency and renewable energy activities. For many countries, renewable energy and energy efficiency can provide multiple benefits in terms of public health, energy security, and jobs, but significant capacity on research and technical levels is necessary to do this in the right way.

Finding 10: In some cases, a more proactive forward-looking selection of topics could have supported management of some of the local challenges even more effectively.

Danish leadership in energy-systems transformation is strong and significant experience of sustainable energy-system management is available in Denmark. This means that Danish assistance is particularly well suited for helping with the challenges of renewable energy and energy efficiency, and the model discussed above is well suited to the transfer of these lessons.

Still, in the partner countries a number of well-known challenges persist. For example, wind turbines in China suffer from a relatively high curtailment rate due to challenges with grid management. These challenges are well known in both Denmark and Germany, and there was an opportunity to anticipate these challenges earlier on the basis of the European experience. Nevertheless, the CNREC did not engage in a discussion with the national grid operator in a timely fashion. Instead, the CNREC work programme initially focused on specific details rather than systems transformation. The reasons for that are unknown – potentially the Chinese partners were not open to these topics, or potentially the Danish partners did not voice that concern. According to the evaluation report of the RED program (Visti and

Wennerberg 2014), the priority-setting process within CNREC was not very explicit and has been somewhat reactive.

While country- and demand-driven interventions is positive, it would also have been in the interest of the partners if the Danish advisors had influenced the priority setting on the basis of research and the Danish experience more actively.

On the other hand, more active agenda-setting can also fail, requiring a firm basis of cooperation and trust and entails potentially high costs (in terms of time and money). In the South Africa programme, for example, the work programme for engagement with the national utility ESKOM was outlined in very broad terms in the project document of 2012. The review aide memoire of 2014 still attests to a lack of progress in terms of finding entry into that institution. Only the interview with the DEA in 2015 implied that now a more promising point of entry has been found: after some search time, the Danish-funded advisor now supports the distribution grid arm of ESKOM and technical assistance is planned on renewable energy integration at the transmission level during 2015.

The government-to-government system of the country programmes can be an effective means to keep the knowledge transmitted effectively between Denmark and the partner country. However, whether or not the opportunities for synergies through knowledge management are already fully exploited could not be fully understood during this review. Determining this is difficult for a number of reasons: firstly, there are no (publicly available) benchmarks for this model, so that neither effectiveness nor efficiency can be fully assessed at this point. Secondly, the implementation of two out of the four projects is still in too-early stages to assess this. Thirdly, these experiences do not seem to be codified. But from the discussion with LCTU officers, there seems to have been considerable thinking within the LCTU on how the experiences in Vietnam and China compare and what can be learned from this so that practical learning seems to take place within the LCTU. A workshop to that effect has taken place recently.

Finding 11: A lack of clear outcomes indicators hampers the description of successes and the analysis of potential flaws.

In many cases, the programme logic of these country programmes is by necessity indirect. For example, according to its objective statement for component 1, the South Africa project strives among other things to “facilitate the development of a less carbon intensive electricity sector by assisting the DoE (to) develop more comprehensive energy planning capabilities that encompass the efficient deployment and integration of renewable energy and energy efficiency technologies”. Even if the project succeeds in building such capabilities, the ultimate impact is not a given as many other aspects for the development of a less carbon-intensive electricity sector might remain in place.

Finding 12: Due to the long-term objectives and the high level of country-drivenness, relative effectiveness is not necessarily determined by the approach taken but depends more on the quality of the partnership.

The lack of a consistent indicator framework in most projects is an additional complication. Both the Kenya as well as the Vietnam programme evaluations have also found that the effectiveness of the

portfolio is hard to assess. But qualitative factors and conditions of success can be inferred from the storylines of the projects.

For example, the agency-to-agency-cooperation approach will work well if the corresponding task in the partner country is taken on by an agency that has the flexibility to utilise the knowledge transferred from Denmark. This is not necessarily the case (see previous section or ESKOM).

The energy programmes that have achieved some level of effectiveness rely on partnerships. The centrepiece of this programme is the Chinese National Renewable Energy Centre (CNREC), a research unit embedded in the national energy research and decision-making infrastructure. The partnership with the Centre has been grown over a long period of time, and the Centre was well placed to be the basis for impactful policy work. Over the years, it has built up a reputation, which also relied on the support from the Chinese government. While its impact is difficult to assess, it is notable in third-party-documents: for example, the World Bank's China Renewable Energy Scale-up Programme was asked to collaborate with this programme (World Bank, 2012).

Similarly, the relationship with the Energy Sector Management Assistance Programme (ESMAP) is time-tested and characterised by an atmosphere of collaboration. The Danish influence on the respective partner institution will vary from case-to-case. Whether the support is effective or not depends to a large degree on the effectiveness of the supported institution.

Finding 13: There are other factors that enhance the effectiveness of the Danish support, which are specific to how Denmark is perceived abroad: a small country, committed to reliable high-tech and green growth, a living and functioning lab of the energy transition.

In interviews, it was speculated that some of the changes that Denmark was able to effect in China would not have been possible if Denmark were a larger economy, perceived as a major competitor on global markets. The example that Denmark provides is extremely powerful: reducing energy consumption per capita in a growing economy and a wind energy share of 39% is very powerful.

A10: 3.4 Impact

It was possible to contribute to scaling-up of sustainable energy in at least one case, i.e. the case of renewable energy in China. Here, significant changes were influenced through research efforts supported by Denmark. In other cases, the initiatives are too young or too weakly linked to impacts to prove scale-up at this point in time but the approach is suited to generate them in the future.

Finding 14: Through influencing research agendas and providing funds and tools for energy policy research and energy planning, Danish support is or has been able to influence in a catalytic and comparatively lean manner.

The role model project China National Renewable Energy Centre (CNREC) can be cited as a case. After the cooperation with Denmark, CNREC now has the capacity to conduct international quality long-term scenario modelling (according to CNREC annual report 2013). This means that it can analyse and compare renewable energy deployment paths with more conventional scenarios informing

national policy. The CNREC has been able to deliver contributions to the National Development and Reform Commission's (NDRC) work on the 12th and 13th Five-Year-Plans (*e.g.* in Visti and Wennerberg, 2014) and the recent changes in feed-in tariff. While, scaling up renewable energy requires a number of other factors to be in place – beyond policies or studies that have not all been influenced by the CNREC – there is certainly an interesting contribution, as in the Chinese case these policies were preconditions to the observed expansion.

Another example where the MFA was able to influence the agenda at a relatively early point in the debate is the case of support to the Energy Sector Management Assistance Programme (ESMAP) on subsidy reform. While many other actors, including the IMF but also NGOs are working on understanding the environmentally and fiscally detrimental effects of fossil fuel subsidies, the ESMAP is important, as it links it to the energy access and energy security discussions. The ESMAP audience are development professionals and energy ministries, and if these groups can be given tools to manage fossil fuel subsidy reform, there is potentially a significant impact on deployment of renewable energy and energy efficiency.

On the other hand, there are a number of very interesting initiatives that have not yet led to large-scale impact, for example the fossil fuel subsidy initiative. In this initiative, various institutions, including the ESMAP, the IEA and NGOs have conducted research on the effects of fossil fuel subsidies (*e.g.* detrimental lock-in effects) and potential alternatives. While this support has strengthened discussions in affected countries like Egypt, which need to take action for the sake of their own political stability, no such action has been observed so far – and if it will, the attribution to the MFA support will be difficult.

Finding 15: Weak outcome frameworks make it hard to provide evidence for impacts on the level of sustainable energy deployment and GHG emission reductions, but where barriers to sustainable energy could be effectively removed (like in China) it can be argued that the Danish support contributed to GHG mitigation.

As discussed above, the CNREC had influenced at least two Five-Year-Plans in China. However, it is very difficult to prove that these plans would not have included renewable energy without the Danish support. In fact, from the World Bank (2012) there are other players active in China who could have influenced China in the same direction – and it cannot be assessed whether they could also have been successful or not.

A10: 3.5 Sustainability

Sustainability is hard to assess as the project portfolio is comparatively young. But at least one of the initiatives is now able to attract significant funding from other sources.

Finding 16: At least one initiative has 'graduated' from Danish support into being a self-sustaining research and technical assistance institution, but this was funded already before 2010.

This year, the CNREC has graduated from direct budgetary support. For the next five-year work programme it has now been able to leverage financing from other sources, including from the UK-based Children Investment Fund Foundation; but also receives significant funds from its contract work including for the NEA and the NDRC. This is certainly an exceptional case and not all institutions are in a position to reach this type of financial sustainability. There are at least two more projects (Regional Center for Renewable Energy and Energy Efficiency, GGGI) where the MFA provided (or still provides) institutional funding that might be able to exhibit similar success, under favourable conditions.

A10: 4 Conclusions

This initial scoping review of the energy efficiency and renewable energy portfolio identified some interesting findings on the Danish portfolio: it is a broad and ambitious portfolio of projects that balances innovation with the intention to effect change on a larger scale through the support to the negotiation process. Catalytic change has been initiated but cannot be guaranteed.

Due to the mixed nature of the portfolio (bilateral and multilateral; financial and technical assistance; long-term and short-term perspective), the standard results frameworks will not be able to capture the impacts attained through Danish climate funding. Nevertheless, this review has shown, that the Danish funding in renewable energy and energy efficiency domains have distinctive qualities – in line with the Danish domestic expertise sector. Most, if not all, interventions are systems-oriented, focussing on the integration of fluctuating renewable electricity on systems, on buildings overall energy consumption, and on industrial production processes. All projects are flexible and comprehensive enough to accommodate transition to a systems transformation. Next to the ‘technical’ systems aspects, there are also other examples for systemic approaches in the portfolio. A particularly noteworthy example of this encompassing approach is the leadership in the area of fossil fuel subsidies.

This review has identified that there is a specifically Danish approach to sharing Danish expertise on energy efficiency and renewable energy. It combines leading by example with being a competent partner and advisor to interested and relevant countries. Domestically, Denmark has developed a number of technical, regulatory, and capacity-related tools and approaches that accommodate large amounts of flexible generation on the grid and are very energy efficient. Among them are grid technologies, smart meters, strict building codes and systems planning based on well-informed scenarios. All countries with ambitions to decarbonize their power systems, and in particular emerging economies, can benefit from this example.

For bilateral projects and programmes, the approach is defined fundamentally as agency-to-agency collaboration with the LCTU at the DEA providing direct support to country representatives. It works well where partnerships can be formed which can take a lot of time and search costs. These partnerships provide the basis for targeted and effective support, as has been demonstrated in China where the CNREC is now directly influencing policy setting after 10 years of collaboration.

In addition, global influence is exerted. By identifying the major challenges and supporting research and innovation to challenges, like fossil fuel subsidies or climate finance, it can catalyse interesting and important changes. Overall, the bi-pronged approach has the potential to support long-term achievement of decarbonised global energy systems.

The lack of an overarching results framework is impeding the analysis of the effectiveness and impact of this portfolio. The MCEB have provided a draft criteria framework in order to start a process of focusing the portfolio in the realm of climate mitigation (MCEB 2014). This framework is appropriate for projects selection, as it emphasises the high relevance of potential GHG savings, and thus leads to a prioritisation of projects in relevant sectors and geographies.

A10: 5 Indicative recommendations

This systemic approach of the portfolio might not be obvious, but it is definitely one of the more progressive and forward-looking aspects and a trait worth conserving and promoting. As energy sectors in all relevant countries transform towards sustainability, systemic changes will become more important. It is recommended to use systems transformation with Denmark as a role model more explicitly as the overarching paradigm for the energy sector work.

Indicative Recommendation 1: Develop indicator frameworks and report on impact

As discussed above, an overarching indicator framework is still under consideration.

Many international bodies use GHG indicators for monitoring climate mitigation programmes. This is not necessarily a recommended practice (see Woerlen, 2012). More than 50% of the portfolio (in terms of funding) is disbursed through various (multilateral) intermediaries so that GHG accounting would be very difficult methodologically, as the reporting standards of these intermediaries vary widely (*e.g.* reporting of accumulated GHG savings over assumed lifetimes of the investments; accounting for replication effects; use of inconsistent emission factors).

While accounting for GHG savings to investment-related activities (*e.g.* investment in renewable energy or energy efficiency purposes) is manageable after methodological harmonisation, it is very difficult to include the impact of technical assistance measures in this indicator. Challenges arise not only from attribution, but also from the time between the intervention and the GHG emission reduction. Therefore, measuring impact in GHG emission reductions would give a rather incomplete picture of the portfolio. Not using a GHG indicator is a deviation from international practice but might be a smart choice. It is not possible to adequately reflect the quality of the systemic change that is at the core of the energy portfolio.

In light of the challenges discussed above, it is doubtful that GHG emission reductions for even the country programmes can be meaningfully attributed to the Danish support. Rather, an indicator framework for this portfolio should include and emphasise indicators that measure the systemic changes that sit at the core of the projects and programmes. To reflect systemic change in indicators is

not necessarily easy but recently approaches have been developed. The basis for this needs to be a model for the systems that need to be transformed.

One such approach is provided by the ‘Theory of No Change’ (Woerlen 2011) that offers a conceptual framework for barriers that need to be removed in order to achieve systemic transformation. An interesting alternative is highlighted in the appraisal document on the GCPF document: a significant impact pathway of this fund is the de-risking of investment. De-risking investments attracts private financing and puts climate friendly alternatives at a competitive advantage over traditional investment. It should be investigated what measures can be used for the effectiveness of the MFA climate funding in the de-risking of specific investments or types of investments in a particular country.

It is highly recommended to embark on the development of systemic indicators. For example, it might be possible to develop a risk index and a transformation index as portfolio indicators. This could not be only a contribution to the evaluability of the Danish climate funding, but could set new standards for all climate finance.

Indicative Recommendation 2: Conduct a detailed portfolio evaluation focusing on impacts and pathways to impact to guide further planning

This review has barely been able to scratch the surface. Due to its brevity and limited database it was unable to clearly identify the pathways to impact, and the respective strengths and success factors of how these pathways can be exploited most efficiently. To analyse the mechanics and limits of the two-pronged approach of bilateral technical assistance and global agenda setting in theory and practice, it is highly recommended to embark on a formative evaluation that helps identify how outputs and impacts are related and what are the necessary conditions for success. Important expected results from this evaluation would be a formal theory of change for sustainable energy that helps identify important trigger points and relevant systems changes. It will also support the development of the indicator framework for example by distilling the most relevant indicators. Among other things this would allow the re-reduction of the current indicator sets to a manageable level that would permit portfolio-level impact descriptions.

Indicative Recommendation 3: Generate acceptance for the preconditions for success: a long breath, a systems approach and a broad perspective

While the portfolio was able to demonstrate significant success, for example in China and with the private sector financing mechanisms, all impacts have taken longer than scheduled and have been supported by factors outside of Danish control. It is useful to embrace this and adjust the portfolio strategies to match these truths: necessary ingredients for successful initiatives are patience, systemic approaches, and flexibility.

Still, even a systemic transformation takes place in small steps, and each step along the way can be impacted by barriers. Denmark should support transfer of lessons from its own domestic changes. It would be wise, therefore, for Danish projects in the energy efficiency and renewable energy arena to

spend significant resources on the analysis of the barriers and hurdles of systemic transformation. Staff continuity on both sides is also useful to support the process.

The third ingredient for systems transformation is time. The need for time and patience is particularly high for the agency-to-agency approach. This approach requires a deep understanding of the functioning of the agencies and the establishment of a strong relationship. Even if the counterpart agencies might be government agencies or government-owned, their set-up, responsibilities, roles, and interests might differ from their Danish counterparts. To understand other agencies' structures and cultures and establish working relationships and trust takes time and this should be acknowledged in the programming. It is important and highly recommended that these three aspects – long-term perspective, long-term funding, and systems approach are accepted by all relevant decision makers as the necessary preconditions for this model to work.

A10: Annex 1: References (not including project documentation)

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World Bank (2012): Implementation Completion and Results Report (IBRD-47920, IBRD-48160, TF-54833) on two loans in the amount of USD 87 million and USD 86.33 million and a grant from the Global Environment Facility Trust Fund in the amount of USD 40.11 million to the People's Republic of China for the First Phase of the Renewable Energy Scale-up Programme and the follow-up project to the First Phase of the China Renewable Energy Scale-up Programme. June 24, 2012, 95 p.

A10: Annex 2: List of Interviewees

MFA: Jakob Rogild Jakobsen, Jens Lorentzen, Michael Linddal. MCEB: Rasmus Abildgaard Kristensen, Hans Jakob Eriksen, Nina Egebjærg Clausen, Mia Sulsbrück

Danish Energy Agency: Anton Beck (by phone), Edward James-Smith (by phone), Nikolaj Lomholt Svensson, Hendrik Breum

UNEP Risø Centre/UNEP DTU Partnership: John Christensen (by phone)

A10: Annex 3 Portfolio composition and description

Among the five projects which support climate financing mechanisms is the World Bank SREP, as one of the Climate Investment Funds. The Climate Technology Fund, the largest energy-oriented Climate Investment Fund is not supported by the MFA. The funding for the only operating entity of the Financial Mechanism of the UNFCCC that was operational in 2010-2012, the Global Environment Facility, was part of the main budget and is not subject to this review. In addition to the SREP, and in line with the Mandate of the Copenhagen Accord, the MFA has co-financed a German-British Initiative, the GCPF. This is a private sector financing modality focusing on energy efficiency and renewable energy projects primarily in cooperation with local financial institutions.

All of these engagements, as well as the co-financed projects, are managed by other entities. This means the influence of the MFA is limited to providing guidelines to the fund or programme managers, while the specific activities and financing amounts are determined by a larger board without or with limited Danish influence. Even in the purely Danish climate investment fund, the government pursues a hands-off approach as the objective is to pilot private sector climate financing which is expected to constitute a significant share of the overall funding volume.

On the other hand, the appraisal note for the Danish contribution to the World Bank's CIFs notes that the participation in the steering committees and/or subcommittees should help ensure effective operation of the SCF. In this note the MFA's technical advisory services suggest that the MFA should "play an active role in the further development of the PPCR, ensuring that the programme builds on good resilience and adaptation practices and experiences and is consistent with the aid effectiveness agenda." In that sense, the rationale behind supporting climate finance mechanisms is not to give up control over these funds but to make them as useful as possible for leveraging international support for a climate change agenda and the UNFCCC.

Table A10:3 Support of climate funds

Danida File No.	Grant Title in Short	Funding Commitment (Mill DKK)	Funding Disbursement (Mill DKK)	Disbursement rate
104.G.12-29-3.	World Bank Strategic Climate Fund - SREP	61.000.000	61.000.000	100%
104.G.13-3	GCPF 2011	40.000.000	40.000.000	100%
104.G.17-1.	GCPF 2014	25.000.000		
104.O.14-3-1.	DCIF 2013	50.000.000	50.000.000	100%
104.O.14-3.	DCIF 2012	75.000.000		
Sum		251.000.000		

A number of global or regional technical assistance institutions receive budgetary support from the MFA. Table A10:4 lists the eight institutions that provide regional or global services to promote green growth and sustainable energy. Most of these institutions are internationally founded and supported by other donors as well. Budgetary support is increasingly difficult to come by for these institutions, as more and more donors prefer project-based support. For some of these, for example the ESMAP and

the GGGI, Danish support constitutes a very significant share. For example, for the ESMAP, the MFA has provided shares of between 15% and 39% of the total donor contributions in the financial years 2010 to 2014.

For GGGI, the MFA provided about 20% of the core funds and 16% of the total funds in 2013. With these comparatively large contributions, the MFA could have comparatively more influence over the activities of these institutions than over the financing for the multilateral climate finance mechanisms. In addition, for some of these (*e.g.* ESMAP), support from the climate envelope complements support from the general MFA budget. Some of these organisations, for example, the UNEP Risø-Centre have also received project-specific funding from the Climate Envelope.

A special case among these is the Low Carbon Transition Unit (LCTU), which is a unit within the Danish Energy Agency (DEA). This unit has the specific mandate to support the MCEB in project development and with the implementation of the country programmes with specialised technical competence. Within that agency it serves as the main segue to leverage Danish expertise for the Climate Envelope. Other contributors of Danish technical competence to the Climate Envelope are the Danish transmission system operator Energinet and the Meteorological Service. However, none of these receives separate funds, so the LCTU is a major competence centre for the activities of the Global Frame.

Table A10:4 Support of funding for multilateral technical assistance institutions

Danida File No.	Grant Title in Short	Funding Commitment (Mill DKK)	Funding Disbursement (Mill DKK)	Disbursement rate
104.G.3-3-1	Egypt - RCREEE	12.750.000		
104.G.17-3	SE4ALL Energy Efficiency Hub	30.000.000		
104.G.3-3-3	ESMAP	53.000.000		
104.G.12-29-6.	UNEP-Risoe - Green Facility - Pilot activities 2010	5.700.000	5.700.000	100%
104.G.15-15.	LCTU - Energy Authority	20.000.000	20.000.000	100%
104.G.17-2	LCTU and China-Cooperation 2014-2016	22.760.000	5.090.000	22%
104.G.13-2	GGGI	90.000.000		
104.G.15-10.	PMR	29.500.000	29.500.000	100%
Sum		263.710.000		

More targeted support is given through two initiatives co-financing larger mechanisms, namely, the SIDS DOCK Support programme of UNDP and World Bank (Table A10:5). As these projects have readily developed and internationally standardised project documents, implementation modalities and monitoring and evaluation plans, they are in theory better harmonised and much more comparable than all the other groups.

Table A10:5 Co-financing of projects

Danida File No.	Grant Title in Short	Funding Commitment (Mill DKK)	Funding Disbursement (Mill DKK)	Disbursement rate
104.G.13-1	SIDS DOCK Support Programme - UNDP	41.600.000	41.600.000	100%
104.G.13-1-1.	SIDS DOCK Support Programme - WB	38.400.000	38.400.000	100%
Sum		80.000.000		

The largest group of engagements includes eight bilateral projects (Table A10:6). With the exception of the South Africa activities, they form part of a more significant and strategic country programme. This includes broad cross-sectoral engagements in Kenya, Indonesia, and Vietnam (MFA).

Table A10:6 Bilateral initiatives

Danida File No.	Grant Title in Short	Funding Commitment (Mill DKK)	Funding Disbursement (Mill DKK)	Disbursement rate
104.G.15-6.	Indonesia - Environment, energy and climate program, Phase III 2012	50.000.000		
104.G.13-5	Kenya - FSCCP 2011 - CEF/CDTF	15.000.000	12.636.395	84%
104.G.13-5	Kenya - FSCCP 2011 - AECF/REACT	20.000.000	15.000.000	75%
104.G.13-5	Kenya - FSCCP 2011 - CEEC/KAM	15.000.000	14.999.207	100%
104.G.15-5.	Kenya - FSCCP 2012 - CEF/CDTF	25.000.000		
104.G.15-5.	Kenya - FSCCP 2012 - CEEC/KAM	15.000.000	4.233.331	8%
104.G.15-19.	South Africa - Energy Sector Programme	40.000.000	302.227	1%
104.G.15-20.	South Africa - Wind Atlas	500.000	500.000	100%
104.G.15-18	Vietnam - VNEEP	65.000.000	734.040	1%
Sum		245.500.000		