JUNE 2017
CIFF

Evaluation of CIFF's investments in 21CPP activities in the Mexican Energy Reform

FINAL REPORT

COWI

ADDRESS COWI A/S
Parallelvej 2
2800 Kongens Lyngby
Denmark

TEL +45 56 40 00 00
FAX +45 56 40 99 99
WWW cowi.com

JUNE 2017
CIFF

Evaluation of CIFF's investments in 21CPP activities in the Mexican Energy Reform

FINAL REPORT

PROJECT NO.	DOCUMENT NO.
A076298	4

VERSION	DATE OF ISSUE	DESCRIPTION	PREPARED	CHECKED	APPROVED
2	May 2018		Dinne Hansen, Pernille Sørensen, Lorenz Wähler, Iñigo Martinez Peniche	Birgitte Martens, Derek Light	Birgitte Martens

CONTENTS

APPENDICES

List of Abbreviations

AMDEE	Mexican Wind Energy Association
21CPP	21st Century Power Partnership
CEM	Clean Energy Ministerial
CEMDA	Mexican Centre for Environmental Law
CICC	Inter-ministerial Commission on Climate Change
CIFF	Children's Investment Fund Foundation
CFE	Federal Electricity Commission
CONEVAL	National Council for Evaluation of Social Development
CRE	Energy Regulatory Commission
CENACE	National Energy Control Centre
CESPEDES	Centre for Private Sector Studies for Sustainable Development
DEA	Danish Energy Agency
EC-LEDS	Enhancing Capacity for Low Emission Development Strategies
EIT	Electricity Industry Law
ETL	Energy Transition Law
DoE	US Department of Energy
GIZ	German Federal Enterprise for International Cooperation
GLCC	General Law on Climate Change
GoM	Government of Mexico

IEE	Electricity Research Institute
INDC	Intended Nationally Determined Contribution
INEEL	National Institute of Electricity and Clean Energy
INECC	National Institute of Ecology and Climate Change
ISGAN	International Smart Grid Action Network
LARCI/ICM	Latin American Climate Initiative / Mexican Climate Initiative
NARIS	North America Grid Integration Study
NARUC	National Association of Regulatory Utility Commissioners
NEON	Network of National Energy Ombudsmen
NREL	National Renewable Energy Laboratory
PRODESEN	Development Programme of the National Electric System
SEMARNAT	Secretariat of Environment and Natural Resources
SENER	Secretariat of Energy
SIA	Social Impact Assessment
ToC	Theory of Change
UNAM	National Autonomous University of Mexico
USAID	United States Agency for International Development
UVIG	Utility Variable-Generation Integration Group

Executive summary

Since 2013, the Children's Investment Fund Foundation (CIFF) has supported the energy sector reform and transition process in Mexico through grant financing to two main activities:

- The 21st Century Power Partnership (21CPP) which is a plurilateral technical support platform providing technical and regulatory advice through the US Government's National Renewable Energy Laboratory (NREL) on clean energy management and smart grid implementation.

- The 'Iniciativa Climatica Mexico' (ICM) which is a national philantropic organisation working to support climate change decision-making in Mexico through grant-making activities and advocacy.

An external evaluation has assessed CIFF's support to these initiatives focusing primarily on the effectiveness of 21CPP in supporting the Mexican energy reform process, but also considering the added value of combining technical assistance by 21CPP with the policy advocacy activities undertaken by ICM.

The evaluation found that 21CPP has been effective in supporting the Mexican energy reform process. Through the activities and outputs provided in the form of workshops, inputs to technical studies, and advice to the Mexican government, 21CPP’s technical assistance contributed to helping Mexico shape the regulatory and planning framework of the Mexican energy sector towards deployment of renewable energy, smart grids and distributed generation. 21CPP’s technical support and inputs are clearly visible in a selection of key regulatory and planning documents central to the reform process, including a Smart Grid Regulatory Roadmap, market rules for the electricity market, and others. Further, through these activities, the institutional capacity of key government institutions, notably the Secretariat of Energy (SENER), was increased putting them in a position where they are now more capable of planning and managing the energy sector transition process.

The strength of the 21CPP initiative has been the high quality of the technical assistance provided, which is based on the long-standing experience of NREL in assisting energy transition processes and their knowledge and expertise in the

technical and regulatory requirements to enable such processes. At the same time, CIFF's management of grant was sufficiently flexible to allow NREL to direct its support to fit with the needs of the dynamic process and the Mexican Government. Together, these two factors contributed to facilitating a high level of trust between the NREL team and the key Mexican Government stakeholders and a continued high level of relevance and utility of the outputs provided by 21CPP.

21CPP also included the establishment of a Steering Committee providing a useful forum for a wide range of stakeholders involved in the energy reform process to come together to discuss and coordinate on the support provided to the Mexican government. However, there is room for further improvement in interinstitutional coordination to ensure that key stakeholders in relation to Mexico's climate policy are fully integrated (notably the Secretariat of Environment and Natural Resources – SEMARNAT and the National Institute of Ecology and Climate Change – INECC).

The evaluation showed that there were synergies between CIFF's support to 21CPP and ICM. However, these synergies were achieved by chance rather than by design. The intentions of achieving the synergies were not made clear by CIFF to either of the parties and thus the potentials were not fully exploited.

At the time of the evaluation, 21CPP was still running but reaching its final year. While the programme has shown good results in terms of supporting the regulatory and planning framework, it still remains to be seen whether this will have the intended effects of increasing the investment going into renewable energy and smart grid deployment in Mexico – and ultimately, implementing such projects and thus reducing greenhouse gas emissions. There are several favourable indicators, most notably that Mexico ran two successful auctions for additional renewable energy capacities and clean energy certificates in 2016. When the corresponding investment projects are realised, they will constitute 25% of the planned additional renewable energy capacity in 2024. However, there are also challenges, in particular:

- There are concerns in relation to the social and environmental impacts of implementing projects for deployment of renewable energy. Concerns include inter alia how to ensure appropriate procedures for local involvement and appropriate mechanism for ensuring social benefits to the communities. Public opposition is already seen in some regions of Mexico – and managing the phase with actual site selection, project preparation and implementation is a challenging task. This is also an area where the central government needs to cooperate with State and local governments thus further adding to complexity. The 21CPP programme did not encompass activities to support such processes, but it would have benefitted from it. The design and development of the programme could have foreseen these issues and thus taken a more proactive role in supporting the Mexican government on this.

- While addressing the power sector is key to ensure achievement of Mexico's greenhouse gas reduction targets, it is also important to address other

sectors in this regard (agriculture, building, transport). A strategy aiming to assist the Mexican government in achieving the targets would need to consider other measures than those involved in CIFFs engagement in 21CPP and ICM.

The evaluation shows that 21CPP was a highly relevant and well-designed programme. It benefitted from the flexible management of CIFF allowing details in plans and programmes to be changed in course and in line with prevailing needs. However, more explicit consideration to the 'theory of change' in the design and follow-up phases could have helped in earlier detection of challenges and defining mitigation action. It could also have been used as a point of departure for defining a set of key performance indicators that was more useful for follow-up than was the case with the prevailing indicators applied by CIFF.

1 Introduction

This is the draft final report for the evaluation of activities supported by CIFF through ICM/LARCI and 21CPP in support of the Mexican energy reform. The report describes the findings, conclusions, and recommendations generated during the evaluation process. These were discussed, validated, and deepened at a validation seminar in Mexico in January, 2017. Subsequently, the report was amended and finalised based on the conclusions of the seminar.

1.1 Purpose of the evaluation

The aim of the evaluation is to assess the relevance, effectiveness, impacts, coherence, and sustainability of CIFF's investments in 21CPP activities in the Mexican Energy Reform. Referring to the subject of coherence, the evaluation has a special focus on coherence between CIFF's support to 21CPP and to ICM/LARCI. The scope of the evaluation covers the period of the CIFF grant to 21CPP: 2014-2016.

1.2 Structure of the report

The report consists of four chapters in addition to this introduction:

- Chapter 2 provides an overview of the energy sector reform process in Mexico and 21CPP and ICM/LARCI to give the key background and context of the evaluation
- Chapter 3 consists of a short description of the evaluation methodology, with relevant details found in the appendices
- Chapter 4 presents the findings, with supportive evidence in the Appendices
- Chapter 5 outlines the conclusions and recommendations arising from the evaluation and highlights main issues for further debate at the validation seminar

2 Overview of 21CPP in Mexico

2.1 Energy sector reform in Mexico

Scope of the Energy Sector Reform

A substantial Mexican energy sector reform, which included a constitutional amendment, was enacted in December 2013. President Peña Nieto submitted a package of nine new laws and amendments to twelve existing laws in April 2014 to restructure the energy industry in Mexico and to open up power sectors to private participation. The Energy Sector Reform is still in the process of being fully implemented. Among the new laws were:

- The Electricity Industry Law, effective in August 2014, establishing the legal framework for competition and private sector participation in all aspects of the Mexican electrical power industry. The law transforms *inter alia* the previously state-owned Federal Electricity Commission (CFE) into a productive state enterprise; lays down that the functions of generation, transmission, distribution and marketing must be carried out independently and with strict legal separation from other functions; and establishes a wholesale market for electricity where both CFE and the private sector generators can offer electricity for sale through the market by submitting bids based on their operating costs. CENACE is thus made able to launch power, generation and clean energy certificates auctions. CENACE's electricity dispatch must give priority to 'clean energy' as defined by the Electricity Industry Law.

- The Energy Transition Law (ETL), adopted on 24 December 2015, is the cornerstone of Mexico's legislation on sustainable use of energy and sets targets for the electric industry's obligations for using clean energies and reducing greenhouse gas emissions. SENER is responsible for the promotion of power generation from clean energy sources through the Clean Energy Goals and Energy Efficiency Goals, thus enabling industry to comply with standards established in Mexico's General Climate Change Law and Electric Industry Law. SENER shall set as a goal a minimum participation of clean energies for the generation of electric power of 25 percent for 2018, 30 percent for 2021 and 35 percent for 2024. Companies in Mexico as well as multinationals with operations in Mexico must comply with the law's Clean Energy Goals and Energy Efficiency Goals. A main vehicle for reaching compliance with the Clean Energy Goals is the Clean Energy Certificates. The Law requires the enactment of various regulations during 2016.

Why a reform?

The need for the electricity sector to be part of an energy reform has been pressing for many reasons. There is major concern linked to the transition to a low-carbon and sustainable energy production to meet Mexico's huge domestic demand for energy, which is due to increases in industrial and residential electricity consumption. Approximately 21% of Mexico's electricity is lost in distribution (technical and non-technical losses), the highest loss rate among OECD countries. Energy intensity in Mexico remains high in spite of market improvements in certain industries towards greater energy efficiency.

Mexico's electricity demand is forecasted to grow significantly. However, an aging and insufficiently integrated national transmission network and barriers to the interconnection of potential new generation projects have pushed the need for investments in new transmission lines and upgrades of existing ones to meet this demand. The CFE has been the main entity undertaking the transmission, distribution, and marketing of electrical power in all of Mexico. This effective monopoly position stifled a competitive market for development of new capacity and the economic attractiveness of building new generation has been absent. To enable the transformation of the national grid, a number of main barriers for the smart grid deployment need to be addressed through the creation of a proper regulatory and management framework to enable high penetration renewable energy system to function optimally. This includes the development of in-country institutional and technical capacity.

Overall goals and targets

Mexican climate change legislation and the legislation stemming from the Energy Sector Reform set a number of overall goals:

- The 2012 General Law on Climate Change (GLCC), approved in the Senate by consensus, established the goal of generating 35% of power from clean energy sources to 2024, as well as the aspirational goal to reduce greenhouse gas emissions in 30% to 2020 with respect to baseline and 50 % by 2050 compared with the year 2000.

- The objective of reaching clean energies for the generation of electric power of 25 % for 2018, 30 % for 2021 and 35 % for 2024 (from 19 % in 2012) adopted in December 2015 as part of the Energy Transition Law.

- With the approval of the 2014 Electricity Industry Law, there was a redefinition of the concept of "clean energies," including "efficient co-generation" and nuclear power into the Mexican definition of clean energy. The definition now covers renewables, nuclear power, efficient cogeneration, and carbon-capture technologies.

- Mexico released its Intended Nationally Determined Contribution (INDC) in 2015. The INDC includes a minimal percentage of "clean energies" in the power generation, using the definition in the Electricity Industry Law, of 25% to 2018, 30% to 2021 and 35% to 2024. The INDC also includes a voluntary and unconditional goal of reducing 22% of greenhouse gas emissions to 2030. With international assistance, these cuts could grow to voluntary reductions of 36% if there is financial support and technological transfers at the international level. The INDC also committed to peaking net emissions from 2026 and reducing emissions per unit of GDP by around 40 % from 203 to 2030.

- Mexico ratified the Paris Agreement in September 2016, thus making the goals in the INDC part of Mexico's international commitment to the UNFCCC.

- Mexico also made trilateral commitment on climate change with the United States and Canada in July 2016. The joint declaration includes pledges inter

alia to achieve 50 percent clean power generation across North America by 2025, to reduce emissions of methane–an especially potent GHG–in the oil and gas sector by 40 to 45 percent by the same year, and to present "mid-century, long-term low GHG emission development strategies" to the UN climate change secretariat by the end of 2016.

Key stakeholders

The key government agencies involved in the energy sector reform and the work of the 21CPP include:

- The cross-sector Consultative Council for Energy Transition which holds a key role in coordinating the energy transition strategy, and its two special programs (energy transition and energy efficiency), and the Smart Grid Consultative Council (previously the National Smart Grid Committee), which holds a key role in coordination the institutionalisation of smart grids policy, and regulation;
- The Ministry of Energy (SENER) being the key responsible for issuing and enforcing market rules, planning the expansion of the national grid and doing monitoring of the wholesale market during its first years of operations;
- The Energy Regulatory Commission (CRE) responsible for regulations and issuing of permits for generation, setting of tariffs, establishment of criteria for issuance of clean energy certificates and emission certificates;
- The National Centre for Energy Control (CENACE) responsible for operative control of the national transmission grid, operation of the wholesale electricity market, and the energy auctions;
- The Federal Electricity Commission (CFE) responsible for building, operating and maintaining the transmission and distribution system;
- Other stakeholders involved in regulation and operation across the power sector value chain (generation, wholesale, transmission, distribution and customer service) include wholesale electricity market providers, market participants, generators, retailers and end users.

Key stakeholders for governmental actions and inter-ministerial coordination of actions towards the national and international climate change targets include:

- The Inter-ministerial Commission on Climate Change (CICC) is the key responsible for implementation of and compliance with the climate commitments and objectives of the UNFCCC and other instruments derived from it. CICC is also entitled with promotion of coordination of climate change actions between governmental agencies, the development and implementation of national policies on climate change mitigation and adaptation and their incorporation into corresponding sectoral programs and actions.

- The Secretariat of Environment and Natural Resources (SEMARNAT) is the responsible implementation agency. SEMARNAT periodically reports to the CICC, which reports to the Secretariat of Foreign Affairs to communicate Mexico's actions to international agencies and organizations.

- The National Institute of Ecology and Climate Change (INECC) provides technical support to SEMARNAT.

2.2 CIFF activities in Mexico

2.2.1 Background for CIFF support

CIFF's motivation for support

In 2013, the Mexican government requested technical and capacity building support from the 21CPP under the Clean Energy Ministerial (CEM) to support Mexico's power system transformation by accelerating its transition to a reliable, financially robust, and low carbon system, especially addressing critical questions and challenges facing policy makers, regulators, and system operators.

The reasoning for CIFF's support to 21CPP is found in CIFF's original Energy Transformation SPA Strategy Document (2012). The Energy SPA identifies clean energy supply as one of the primary routes to reducing GHG emissions. Deploying clean energy at scale requires a shift from deploying incremental renewables to developing clean energy systems to achieve a high penetration rate of renewables. Among the key tasks in developing clean energy systems is the strengthening of transmission networks and the deployment of smart (demand-balancing) grids and electricity storage. Only such energy systems can achieve the displacement of traditional fuel sources and ensure that emissions will be reduced in the future.

Mexico seen as a front runner and future leader

CIFF's cooperation with Mexico was initiated for a number of reasons. Mexico was considered a climate change leader in the region and at the world stage and as a future leader in renewable energies and smart grids. The country was a priority geography for CIFF's Energy transformation SPA, and Mexico was considered to be a good showcase of progress in the energy sector in a middle income country and a good example of an energy sector reform vis-à-vis other Latin American countries. Given the timing of the energy sector reform, it was considered a unique opportunity to support Mexico in its configuration of the national energy system during 2014-2016. Mexico had furthermore joined the Clean Energy Ministerial (CEM)[1] and would host the 6th CEM meeting in April 2015. Also, the global climate change policy agenda as well as the cross-party commitment to climate change in Mexico was seen as an important driver.

[1] CEM is a global forum to promote policies and share best practices to accelerate the global transition to clean energy, initiated by the US government in 2010 and supported by 23 countries including the European Union.

2.2.2 21CPP

CIFF initiated its support to the 21st Century Power Partnership (21CPP) in November 2013 through a grant of USD 3.9 million over 3 years. This supported a plurilateral technical support platform – the 21CPP – to provide world class technical, policy and regulatory support through the US Government's National Renewable Energy Laboratory (NREL) on power system transformation and decarbonisation including long-range power sector planning, distributed generation and smart grid implementation. 21CPP is a partnership under the CEM. As a lead partner for 21CPP, NREL was seen as primary provider of technical expertise and as a catalyst for the governmental discussions on energy reform in relation to policy planning and regulatory framework.

High level objectives over the three years of programme

The 21CPP sought to deliver a process during 2014-2016 with the following overall scope, based on the original investment memorandum and annual work programmes:

- Accelerating "next generation" transmission planning for 2030 (2014)
- Supporting evaluation and expansion of existing smart grid pilot projects - (2014)
- Providing technical assistance in grid operational practices for wind integration - (2014)
- Supporting development of a renewable energy Integration Roadmap - (2015-2016)
- Encouraging a policy and regulatory framework to promote scale-up of smart grids for renewable energy integration and reduction of non-technical losses - (2015-2016)
- Supporting the development of a policy and regulatory framework to accelerate transition - (2015-2016).

Some built-in flexibility was foreseen in the design of the programme due to the expected uncertainties and dynamics of the roll out of the energy sector reform. Activities and detailed work programs were to be set out in further details in advance of each calendar year. Over time, the project thus adjusted its scope and more focus was directed towards assistance to the long-term auction process, evaluation of economic and environmental benefits of distributed energy, energy efficiency and smart grid technologies, the establishment of Mexico's wholesale market monitor, and development of a data management platform.

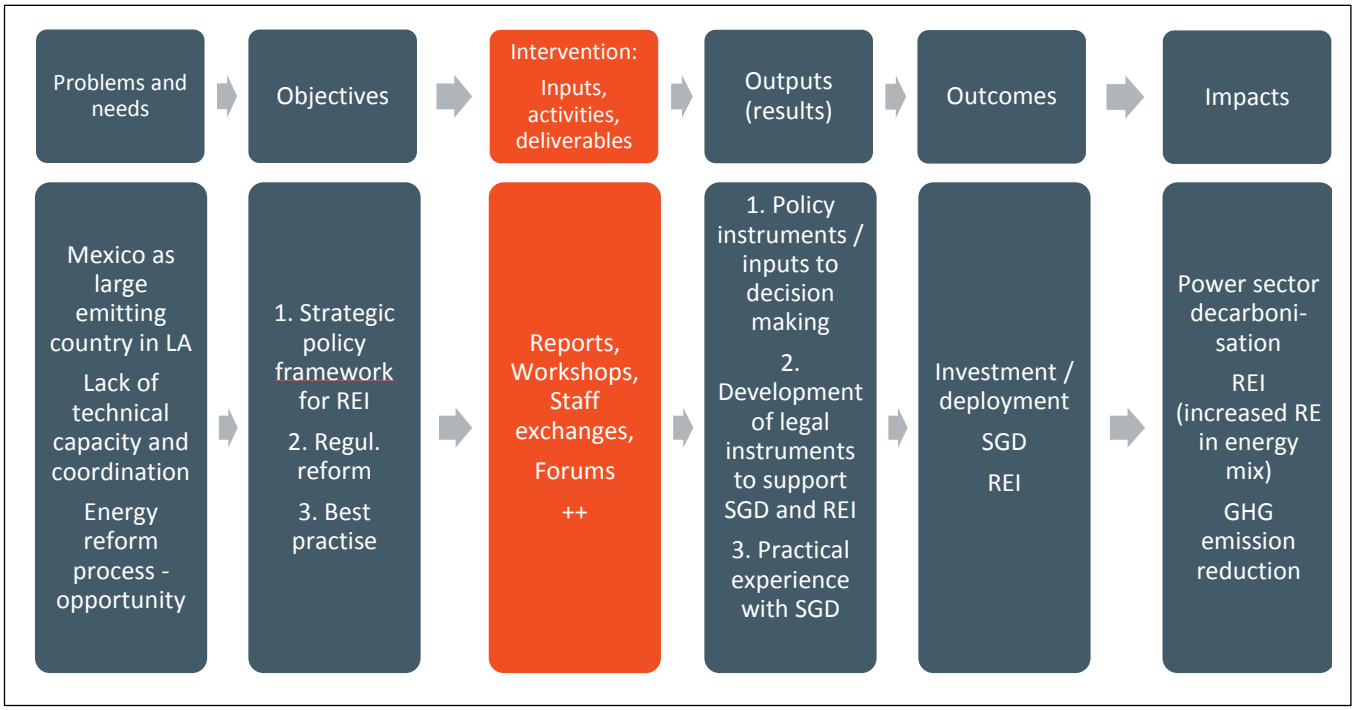
By the end of 2016, the programme aims to have shifted Mexico's energy sector (including regulatory agencies and electricity providers) onto an institutionalised pathway towards achieving the deployment of high penetration of renewables. Smart grid development is an essential foundation for the achievement of the full abatement potential in the power sector in Mexico (60Mt CO2e p.a. by 2020

and 130-155Mt CO2e p.a. by 2030)[2]. The actual implementation and financing of the grids is outside the scope of the programme.

The Theory of Change

The theory of change (ToC) developed for the purpose of the evaluation is included in Appendix D. The theory of change takes its point of departure in the overall objectives as well as the specific deliverables of the Mexico 21CPP programme over the three year lifecycle of the initiative. The ToC is based on the original investment memo (2013), the contract, and the related work plans. The ToC is used as the basis for the assessment of whether specific activities were carried out as planned or deviations have occurred. It is also used for assessing whether results, impacts in the medium term, and impacts in the long term (transformational impacts) have been obtained. The figure below illustrates a simplified version of the ToC.

Figure 2-1 Simplified Theory of Change



Role and activities of 21CPP

The role of 21CPP was in particular to provide targeted assistance to the Mexican government though tailored research on specific topics agreed upon with partner institutions, expert exchanges of 1-2-weeks, placing experts on site with regulators, utilities and grid operators, best practice workshops, case-based scenarios, and power system modelling efforts.

21CPP management set-up

The management set-up was foreseen from the beginning to include a team with world renowned energy system experts from NREL (led by Morgan Brazilian and Doug Arent, spending approximately 60 % and 45 % of their time respectively on the wider 21CPP initiative, and 20 % and 15 % respectively on the Mexico 21CPP programme). There was also a Mexican based team comprised of a Programme Director (spending approx. 50 % time in Mexico, open for later

[2] CIFF Investment Memorandum 27 november 2013 including references

review, and relocated to Mexico in Year 2 as full-time), an associate Director and an Assistant.

2.2.3 ICM/LARCI

In parallel to the support to 21CPP activities, CIFF also provided for technical assistance through ICM/LARCI to assist SENER in its effort towards the adoption of Energy Transition Law and to provide advice on specific themes in the Energy Sector Reform package. It is therefore a secondary objective of this evaluation to assess the effectiveness of CIFF's strategy of combining technical assistance by 21CPP with the technical assistance provided by ICM/LARCI to support the reform of Mexico's energy sector, in particular on the coherence between the two sets of assistance.

3 Methodology

The methodology for the evaluation was developed to address a set of key evaluation questions. Below, we present the questions and the approach to data collection and analysis employed to answer them. In addition, we offer some insights on the challenges and limitations we faced when implementing the evaluation.

3.1 Evaluation questions

The key evaluation criteria and questions addressed are listed below. They form the basis against which the methodological framework as briefly presented below was developed.

Table 3-1 List of key evaluation questions

Evaluation criterion	General
Relevance	› To which extent was CIFF support to 21CPP and ICM/LARCI relevant in supporting energy sector reform in Mexico and to showcase potentials to other Latin American countries and other middle-income CEM countries?
Effectiveness	› To which extent have inputs and activities been implemented as planned? › To which extent have expected outputs been produced? › To which extent have expected results been realised?
Coherence	› To which extent do 21CPP and ICM/LARCI operate in coherence with other programmes and funds active in mitigating climate change in Mexico?
Impact	› Is it likely that 21CPP and ICM/LARCI will lead to expected impacts? (why, why not) › Are there any unintended effects/impacts?
Sustainability	› To what extent are the effects of the programmes likely to be sustained beyond the duration of the CIFF support?

3.2 Evaluation framework

Theory of change as starting point

Our evaluation methodology is based on elaborating of a theory of change (ToC) of 21CPP and LARCI/ICM. See chapter 2 and Appendix D for more information.

On the basis of the ToC, we developed – for each question – an evaluation framework consisting of sub-questions, judgement criteria and indicators to ensure transparency in how judgements are made while enabling a data collection design that provided information on the relevant indicators. This evaluation framework is shown in Appendix F.

3.3 Data collection and analysis

We have used two primary forms of data collection in the evaluation: Document review and interviews. Further, during a field mission to Mexico, representatives from COWI observed and participated in relevant events and meetings.

3.3.1 Document Review

A comprehensive review of various documents has been used for several types of analysis in the evaluation as summed up in the table below.

Table 3-2 Document Review

Evaluation criterion	Type of documents	Type of analysis
Effectiveness	Internal 21CPP project documents, contracts, annual work plans, progress reports, quarterly reports etc. › Energy reform policy documents (National Electric System Development Program 2016-2030 (PRODESEN)", June 2016. › "Special Program for the use of Renewable Energy 2013-2018". › "National Renewable Energy Inventory". › "National Renewable Energy Prospective 2015-2029", 2015. › "Electricity Sector Prospective 2015-2029", 2015. "National Program for the Sustainable Energy Use 2014-2018", 2014. › National Energy Strategy 2013-2027	Referring to the ToC: Comparison of planned and realised activities, outputs and results as they are reported and documented in the 21CPP documents (per year / per type of objective). Review of energy reform policy documents to identify areas where inspiration or direct influence from 21CPP activities and outputs can be ascertained
Impacts	Strategies and planning documents of 21CPP as well as progress reports and project outputs produced Research and background documents on energy reform process in Mexico (List of background documents and literature included as Appendix G)	Qualitative analysis of the likelihood of reaching climate change targets and renewables in the energy mix, based on findings of effectiveness as well as review of research and background documents. Used as basis for forming questions to interviewees.
Coherence	Strategies and planning documents of 21CPP, ICM/LARCI Other donor programmes and Terms of Reference as available	Comparative analysis identifying areas of synergies, overlaps or gaps between 21CPP and LARCI to be further explored through interviews Analysis identifying areas of synergies, overlaps or gaps between 21CPP and other donor programmes further explored through interviews
Sustainability	All those mentioned above	Similar to analysis for impacts
Relevance	All those mentioned above	Similar to analysis for impacts

Note: A list of documents reviewed is included in Appendix G

3.3.2 Interviews

Several types of interviews have been undertaken as part of the evaluation:

› Interviews with the CIFF climate team. These were conducted during a visit to CIFF in London as well as by telephone. The aim was to understand better the rationale of CIFF's investment in 21CPP (and ICM/Larci) as well as to obtain the climate team's own assessment of the effectiveness,

impact, coherence, sustainability and relevance of the investment. Interviews were semi-structured following a thematic interview guide with a few key questions.

- Interviews with 21CPP key staff. (Douglas Arent, Director of 21CPP, and Ricardo Bracho, project leader of the CIFF supported 21CPP activities in Mexico.) Several interviews were conducted by telephone and in person in Mexico. The aim was to obtain 21CPP / NREL's own assessment of the effectiveness, impact, coherence, sustainability and relevance of the investment. In addition, interviews were held with the key staff of ICM/LARCI concentrating on the aspects of coherence. The in-person interviews were conducted according to an interview guide (included in Appendix A).

- Interviews with external stakeholders including government institutions, the private sector, other donors, academia and NGOs. The list of interviewees can be found in Appendix B. This was done primarily during a mission to Mexico with some additional interviews carried out by telephone (see interview guide in Appendix A). These interviews included three main groups:

  - The first group is the inner-circle of most immediate beneficiaries and partners that work directly with 21CPP. These are mainly stakeholders from the Mexican Ministry of Energy (SENER) and the institutions that are directly related to the ministry, including the regulatory commission (CRE) and the independent system operator (CENACE). From these stakeholders, the interviews provided direct observations on the usefulness of 21CPP activities and outputs to facilitate implementation of the energy sector reform process.

  - The second group consists of stakeholders who had some knowledge of 21CPP as they had participated in some activities. This group included the private sector, academia, NGOs, as well as other donors present in Mexico in the field of energy and climate change. These interviews provided useful insights on the energy sector reform process in general.

  - Finally, interviews were held with a group of stakeholders (composed of various government agencies, the private sector, academia, NGOs) that were not aware and did not know about the 21CPP activities in relation to the energy reform, despite the fact that they were working with energy issues and the implementation of the Energy Reform. They were thus able to give useful insights on the reform process and the outlook, but not on the role or achievements of 21CPP.

3.3.3 Observation of meetings and events

During the mission to Mexico the team also participated in two meetings organised by 21CPP:

Steering Committee meeting

On Tuesday, 27 September the evaluation team participated in the 21CPP Steering Committee[3]. Participation proved useful for the evaluation team to understand the challenges faced by Mexico in its effort for implementation of various issues of the Energy Reform. In addition, the meeting also gave good insight into the delivery of the preliminary results of the Modelling Scenarios of Participation of Renewable Energy in the Electric System Baja California Sur and the presentation on the monitoring of the Wholesale Electricity Market. Finally, the team received information about the future tasks of 21CPP in Mexico as well as other specific assistance activities proposed for 2017-2018.

Meeting for the private sector

On the same day, 21CPP organized a meeting for private sector stakeholders. Douglas Arent and Ricardo Bracho conducted the meeting and presented the Clean Energy Ministerial under which the 21Century Power Partnership is operating. The purpose of the meeting was to present the activities of 21CPP and how the 21CPP can facilitate private sector involvement and information sharing in view of eliminating barriers for private investments in the integration of renewable energy in the Mexican energy sector. The meeting provided a good understanding of the main concerns of the private sector and the obstacles the sector faces in engaging more with the production of clean energy in Mexico as well as the views of the private sector stakeholders on the work done by NREL and 21CPP to enhance of economic development in Mexico and reduce greenhouse gas emissions.

Political workshop

The evaluation team also participated in a workshop in the Chamber of Deputies of Mexico on September 28 on "Political visions towards energy transition in Mexico towards 2030" with the participation of the major Mexican energy NGO's such as CEMDA, political representation the Special Committee on Climate Change of the Mexican Senate and the Energy Committee at the Chamber of Deputies, and the World Bank in Mexico. The workshop participation proved useful in presenting main visions, strategies, and instruments of the political parties in Mexico that can be implemented to increase clean power production and reduce carbon emissions. The role of political parties is essential to understand the energy transition challenges that Mexico is facing.

3.3.4 Validation seminar

A one and a half day validation seminar was held in Mexico in the beginning of January 2017 with the participation of SENER, ICM, NREL, CIFF and the evaluation team. The evaluation team presented the findings and these were discussed among the participants in a process facilitated by CIFF and the evaluation team. This contributed to a deepening of the understanding of the context and key elements in the achievements made as well as challenges encountered. The programme for the workshop is included as Appendix H.

[3] The attendance list of the meeting is found in Appendix C.

3.4 Limitations

There are a number of limitations in an evaluation of this nature, some of which have been foreseen already in the terms of reference and they were also discussed at the inception meeting with CIFF. In addition, there were also some challenges related to availability of data, etc. Some key points include:

- As discussed elsewhere in the report (see e.g. conclusions), the system of indicators and reporting systems applied for the grants did not facilitate an easy overview of the degree to which activities and outputs were produced as planned. This meant that the evaluation team used more time and effort than should be needed to clarify this leaving less resources to follow up on matters related to broader results, impacts and sustainability.

- The evaluation relied to a large extent on data collected through interviews. Conducting interviews with a broad range of stakeholders should allow for different views to come into play and ensure a fairly 'correct' interpretation of the results and impacts achieved and the interaction of 21CPP and ICM/LARCI with the energy policy context. However, the evaluation team did experience a level of reluctance to voice criticism of the programmes (among most stakeholders) and this leads to a concern that the interviews may have given a picture that is too positive. We have sought to counter this by seeking other types of evidence, which could support interview data and also by giving weight to interviews that were critical and gave good substantiation.

- Another limitation relating to interview data was that once we moved outside the 'inner circle' of stakeholders who worked together with 21CPP/NREL, the stakeholders were not very well aware of the 21CPP programme and therefore were not in a good position to judge its results and impacts in relation to the energy reform. This means that our data basis for making this assessment was relatively limited.

- We also faced other limitations in relation to evaluating impacts and sustainability. First of all, the 21CPP programme is still on-going and the energy reform is just started and it is still too early to make any final assessment in that regard. Secondly, attributing the changes taking place in connection with the reform to the activities undertaken by 21CPP and ICM/LARCI is difficult as there are so many external factors at play (including programmes funded by other donors as well as co-funding of 21CPP by other donors). We sought to address this by working with the theory of change and showing how certain regulatory and policy developments can be linked to the 21CPP programme and CIFF funding.

4 Findings

This chapter presents the main findings of the evaluation for each evaluation criterion (effectiveness, impacts, coherence, sustainability and relevance). Details on data and supporting evidence is found in appendices as referenced.

4.1 Effectiveness

The evaluation of the effectiveness of the 21CPP support follows three evaluation criteria specified above:

- To which extent have inputs and activities been implemented as planned?
- To which extent have expected outputs been produced?
- To which extent have expected results been realised?

The validation of our document review findings was based solely on the interviews with 'inner' stakeholders, since outside stakeholders were insufficiently informed to make a judgement or were not aware of the specific activities linked to 21CPP.

4.1.1 To which extent have inputs and activities been implemented as planned?

Most activities in the ToC have been achieved, but some had a significant delay

In a desk review exercise, we compared the intended activities (as expressed in the ToC) with the actual implemented activities to gauge the extent to which planned activities were realised. The detailed result of this comparison can be found in Appendix E. On this basis, we find that most activities were completed in their foreseen format, with the exception of two activities. Furthermore, we identified one activity and one sub-activity that have not been realised to date.

The activity that has not yet been implemented is a grid operator exchange on Public-private models for RE transmission investment (activity 1.2.6). We have not identified any event that directly relates to this issue. The reason provided for this deviation is that the government did not request specific assistance on this matter and that CENACE moved on with a request for proposals on a Public-private model for a High-Voltage Direct Current transmission line on their own. A request of assistance in the future may still arise, of which an evaluation of the submitted proposals is a potential opportunity for outside support. We have identified two workshops held by the Utility Variable Integration Group (UVIG) that dealt with relevant aspects on RE transmission, though we could not identify any aspects that explicitly relate to Public-Private-Partnership models.

The agenda of the 21CPP expanded over the course of time, adopting a fourth strategic objective of assisting the implementation of energy reform directives. This additional strategic objective has been fulfilled. The intended support to the restructuring of the CFE was cancelled, however, in view of the required legal expertise and confidentiality issues.

The desk review showed that some activities experienced a significant delay. One thought leadership report (activity 1.1.2) that was foreseen for the work plan of year 1, 2014/2015, was published only in July 2016 (year 3). Also, a Transmission Planning review (activity 1.1.1) and Smart Grid workshop (activity 3.1.2) scheduled for the 1st year were completed in the 2nd year. Some activities planned in the 2nd year also experienced some delay of up to three months into the third programme year.

Restructuring, budget cuts, and need for trust building slowed implementation in initial phase …

The interviews showed that the delays occurred for several reasons. First of all, the key government agencies underwent restructuring and experienced budget cuts, which had implications for the staff available for collaboration and thus challenged the implementation of the activities. Secondly, an initial phase of trust building between the 21CPP initiative and the relevant government agencies was necessary.

…partially due to a low visibility on the public domain…

In some interviews, the low visibility of the 21CPP is seen as an inhibiting factor to establishing early trust. This was reasoned with the fact that a lack of information about the 21CPP induced an initial, yet short-lived, 'uncertainty' about its intentions and capabilities. In the case of CENACE, this situation was further amplified by the high confidentiality of data held by the institution. Here, more cautious and clearer communication by CIFF, NREL or SENER about the roles, responsibilities, and inputs provided by the 21CPP to the relevant agencies could have facilitated the building of trust. One interesting point to consider is whether a permanent presence of a fully dedicated manager in Mexico either through CIFF or NREL could have facilitated the building of trust through clearer signalling of intentions.

…but its flexibility proved valuable to the implementation

One aspect that improved implementation was the flexibility of the programme. This is reflected in the consideration to re-do the Baja California Sur study, and the ability to tailor the support to specific needs. Furthermore, the flexibility of expanding the scope of support proved important to the energy sector reform as a whole, since stakeholders stated that, for example, the Wholesale Market Monitoring Unit would not have come as far as it has without the 21CPP. Overall, recipients put a high value to the 21CPP's flexibility to tailor its support, which is seen to be unmatched by other donors in the Mexican space. The 21CPP moreover expressed high appreciation of CIFF's own flexibility of support to the 21CPP, as it has helped drive effectiveness.

4.1.2 To which extent have expected outputs been produced?

To evaluate the produced outputs, we asked 'to which extent have expected outputs been produced?'

Outputs are as expected

Two activities provided outputs that deviate from the work plan. The long-range power system planning (activity 1.2.3) did not produce a report. Per request by the Mexican government the results were instead presented at for example the Steering Committee and will be published on a scientific magazine. However, it also requested updates to the results of the Baja California Sur study with a

dynamic model, with an accompanying report instead of the initially planned topic. The second activity relates to the nationwide solar and wind modelling (activity 1.2.4), for which the government expressed a preference for a dissemination of summaries instead of a technical report. Further, the results of this study will be shared between NREL and the Mexican government, as it is a key input for further outputs, such as the designation of renewable energy zones. All in all, the review of the key documents demonstrates that the foreseen topics have been covered, and that deviations are explained.

Our review showed that the topics covered in reviewed outputs addressed those foreseen in the work plans. Thus, we find that the 21CPP was effective in producing the foreseen outputs at an overall level.

Long initiation phase for Baja California Sur study

The evidence shows that one particular area that required more time and work from the 21CPP than anticipated was the work on the Baja California Sur and national grid studies. The entire modelling work required time-intensive preliminary work and discussion, which effectively delayed parts of the power system planning and thus parts of the energy sector reform process. In part, this can be attributed to an initial lack of trust by the recipients that first needed to be earned, so as to avoid producing an irrelevant study. In addition, many initial decisions had to be made and the quality of background data needed to be checked and, in parts, updated. For some of the individuals involved in this study, the delays were not associated with a poor quality of the 21CPP's services, but rather with an initial miscommunication (that is as of today seen as a past issue) and the novelty of CENACE cooperating with external partners on topics regarded as highly sensitive in terms of national security.

Reporting framework ineffective for follow-up on activities and outputs

The evaluation of activities and outputs and the extent to which they were produced according to plan was inhibited by a lack of readily available information on progress compared to plan. We found that information in this regard could be drawn from two sources: Progress reporting by 21CPP and the internal reporting in CIFF from the Climate Team.

Reporting by the 21CPP

The progress of the programme is regularly reported through phone calls and Progress Reports to CIFF. The Progress Reports provide a concise insight into the recent activities, yet these only allow a partial judgement of the process towards the set goals because the context in which each activity stands towards the ToC is unclear. The monitoring value of the Progress Reports can in conclusion be further improved through a designation of activities in the form of e.g. activity codes to an explicit ToC (in the form of a living document).

Internal reporting by CIFF

The consistent use and definition of 'measurable' Indicators can improve the traceability of progress

CIFF's internal Quarterly Reports contain little detail on the progress at the activity level, but provide a framework for an assessment of progress towards the set goals at the level of results and wider impacts. Our assessment of these reports shows, however, that they were inconsistently updated (no updates past September 2015 due to resource constraints in CIFF), and thus of limited use. Also, we found that the key performance indicators defined in the Quarterly Reports differed from those in the main contract. At the validation seminar, it became clear that 21CPP was not informed about the key performance indicators applied by CIFF. A more uniform and transparent framework for monitoring and follow-up building on coherence between the reporting from 21CPP and the internal reporting in CIFF – and the selection of a set of manageable and measurable indicators would improve the oversight of the programme without leading to additional administrative burden.

4.1.3 To which extent have expected results been realised?

The evaluation criterion to assess the results of the 21CPP's result builds on the question, 'to which extent have expected results been realised?' The judgement drew on questions of whether the 21CPP shaped the regulatory and planning framework, built technical capacity, and helped to put Mexico on an institutional pathway towards deploying renewable energies. Accordingly, this section is structured in these three judgement criteria.

Shaping the regulatory and planning framework

The 21CPP shaped the regulatory and planning framework…

The work of the 21CPP managed to shape the regulatory and planning framework. Key outputs in that respect include:

- The Smart Grid Regulatory Roadmap[4], which includes all of the 21CPP's 91 suggestions for effective Smart Grid implementation for consideration by Mexico. These are partially in the ETL, and a concrete example includes the implementation of Steering Committees for Smart Grid projects throughout the country
- The Surveillance of the Wholesale Electricity Market Chapter of the Market Rules (Ch. 18)[5]
- The Roadmap for Transformation of the Baja California Sur Electrical System[6]
- The Distributed Generation Manual[7]

[4] http://www.cre.gob.mx/documento/3979.pdf

[5] http://www.cenace.gob.mx/Docs/MarcoRegulatorio/BasesMercado/Bases%20del%20Mercado%20Eléctrico%20Acdo%20Sener%20DOF%202015%2009%2008.pdf

[6] Progress Report, August 31 2015, 2015-08-09 BCS Power System Planning

[7] http://www.cenace.gob.mx/Docs/MarcoRegulatorio/Manuales/Manual%20de%20Inter

One additional output that is currently progress is the Business Practice Manual, which helps market participants adhere to the rules of the electricity market.

All inner stakeholders confirmed that their own achievements would not have been developed as far without this support. Some stakeholders indicated that they would have managed to achieve the results on their own, albeit at the cost of a lengthy process.

The programme's emphasis on knowledge-sharing with other countries is seen by stakeholders as a highly effective way to find the right solution in the Mexican context, as they acknowledge that there is no single-best solution for energy systems.

…and is a trusted partner, influencing decision-makers…

All relevant stakeholders regard the 21CPP's support to be of high quality and relevance. As one respondent answered, 'every workshop proved to be very useful for us'. The evidence suggests that the 21CPP has gained a high degree of trust and an ability to find the most beneficial solution for the energy sector reform. One example is that CENACE and the 21CPP had different ideas about a model to be built for the Baja California Sur study: While CENACE initially planned to receive training from the 21CPP and build the model on their own due to the highly sensitive data involved from a national security perspective, the 21CPP intended to build the model in collaboration. Ultimately, the latter solution was chosen, which CENACE acknowledged to be the more beneficial solution after all. As this example shows, the 21CPP managed to establish the trust required to support the agencies on confidential issues, but also convince the various stakeholders of more beneficial approaches through collaboration.

This observation is further confirmed by the increasing attention from higher ranking officials at CENACE that show interest in the Baja California Sur study. In connection to it, CENACE expressed strong interest to update the existing study with a dynamic model, as it could alter its conclusions. CENACE therefore shows strong interest in producing a study that delivers valuable results for subsequent work.

…but there is still considerable work ahead.

Although Mexico has achieved many important intermediate goals of the energy sector reform, the regulatory framework is still not complete. Examples of areas for further development include the unfinished, final regulation on Distributed Generation (state of *primo* October 2016), and Business Practice Manual (state of *primo* October 2016). According to the private sector, there are remaining issues that impact the deployment of renewables, such as the rights to distribution and transmission, and if the restructuring of the CFE results in a levelled playing field. Furthermore, there are several threats to the sustainability of the results, including a lack of regard for social impacts, which are discussed in section 4.4 below. All told, despite major achievements, Mexico still has a considerable way to establish a strong regulatory and planning framework. Given that the 21CPP established itself as a trusted partner and that potential market suppliers are eager to see the market fully operational, continued

conexi%C3%B3n%20Centrales%20Generaci%C3%B3n%20Menor%20a%200.5%20MW%20DOF%202016%2012%2015.pdf

support would be a time-efficient solution to help Mexico put that framework in place.

Building institutional capacity

The support to the implementation of the energy sector reform builds on best practice and quality assurance. The Progress Reports provide evidence of many workshops, events, summits, and site visits. A notable observation is that many of these events are part of networks that specialise in relevant issues, such as the UVIG, NARUC, EC-LEDS, or ISGAN. The Government of Mexico gained quick access to a wide knowledge pool.

The relevant stakeholders emphasised that this access proved invaluable. Specific examples of improved capacity include the design and operation of the Market Monitoring Unit, the ability to assess the potentials for renewable energy sources (especially through the application of models), or an improved ability to evaluate the National Electric System Development Program (PRODESEN) through a more coordinated use of modelling tools.

Positive evaluation by some stakeholders, but limited outreach

During interviews, we asked government stakeholders to rate whether the 21CPP is effective in reaching the desired objectives. Nearly all interviewees rated it with five out of five[8]. Commonly, the reason was that the 21CPP helps each stakeholder build their own capacity required to successfully contribute to the energy sector reform. This suggests that the 21CPP is successful in relation to capacity building. However, this concerned mainly the inner group of stakeholders, whereas there were also a number of stakeholders who had not benefitted from the support in the same way and thus were not in a position to judge the effectiveness of 21CPP. We therefore find that the outreach of the capacity building efforts within the institutional system was limited to a specific set of stakeholders – but within that scope, there was a high degree of effectiveness.

Our interviews showed that the relevant stakeholders managed to increase their technical capacity. Moreover, they gained access to a wide knowledge network that enabled them to engage with other experts and networks. CENACE has been invited in one case to a workshop in Sweden to present their current challenges and participate in discussions, which was made possible through the knowledge pool. The 21CPP has played a strong and important role, which is also reflected in the high rating of their support.

Institutional pathway towards renewable energy deployment

First two energy auctions provided a good start

Based on our document review and interviews, we find that Mexico has managed to create an effective regulatory and planning framework, and improved its technical capacity. Next to the key outputs provided above, Mexico ran two

[8] Our impression was that the governmental stakeholders found it inappropriate to express a critique about a programme that provides them with valuable support and thus may have given a very high score even if they found that there was some scope for improvement. However, the interview data still points to a high level of effectiveness – even with this bias.

successful auctions. The first auction in March 2016 resulted in 1.8 GW of new solar and wind, with a weighted average contract price of USD 47 per MWh, and a cheapest bid of USD 35 MWh.[9] Moreover, the auction sold 4 million Clean Energy Certificates that assist Mexico in moving towards its goal of supplying half of its electricity using clean energy by 2050. The second auction in September 2016 set a contract price of USD 27 per MWh against the USD 47 cost of energy, paid in combined heat and power. The resulting growth in capacity is 2.8 GW. The lowest bid for solar set a new record low for solar energy in Latin America (NB: the last auction in Abu Dhabi achieved USD 24 MWh)[10,11,12].

However, not all aspects of the Market Monitoring Unit are fully operational. Some components have yet to be integrated into CRE. The progress of the restructuring of the CFE is unknown (as the support by the 21CPP was no longer feasible), and the modelling of the Baja California Sur, national grid, and NARIS is not completed.

Mexico would face significant challenges without the 21CPP

A general observation by all interviewees is that all relevant stakeholders are subject to an enormous pressure due to a magnitude of challenges substantially higher than the available capacity of each stakeholder. The sources of pressure derive mainly from the desire to fulfil the expectations of the market (i.e. potential suppliers of energy). The recent budget cuts had many repercussions on the relevant agencies in this process. The addition of the fourth objective to support the implementation of the reform's directives in the work plan of the second year, underline the importance of assistance to the Mexican government.

Many stakeholders acknowledged that the progress of the energy sector reform would be less without the 21CPP and that it is an important ally in the effort to keep up with the pace and not disappoint market expectations.

Mexico is on an improved pathway towards achieving the deployment of a high penetration rate of renewable energies, and we find that this can partially be attributed to the support provided by 21CPP. Some stakeholders, particularly from CENACE, CRE, and SENER, are optimistic that Mexico is on the right track to meet its target. Others, particularly the private sector stakeholders, expressed concern that Mexico is not quick enough with finishing the energy sector reform in due time to achieve the announced renewable energy targets.

Overall, our evaluation of the effectiveness of the 21CPP support shows that the support is effective. The need to establish trust with the recipients initially slowed down the overall progress, but culminated in a partnership with a

[9] https://www.greentechmedia.com/articles/read/Solar-Stuns-in-Mexicos-First-Clean-Energy-Auction-1860-MW-Won-at-50.7-P

[10] http://www.pv-tech.org/news/mexico-second-power-auction-preliminary-results-reveal-highly-competitive-r

[11] http://ipdlatam.com/ipds-renewable-energy-tracker-october-2016/

[12] http://www.gob.mx/sener/prensa/inversion-de-4-mil-millones-de-dolares-al-concluir-el-proceso-de-la-segunda-subasta-electrica-69919

currently high degree of trust and a support that manages to tailor the activities to the needs of the Government of Mexico.

4.2 Impacts

Our assessment of the 21CPP's impact draws on two evaluation questions:

- Is it likely that the 21CPP and ICM/LARCI will lead to expected impacts? (why, why not)
- Are there any unintended effects/impacts?

These evaluation questions are answered by looking at four judgement criteria: evidence towards smart grids and renewables penetration, evidence of emissions reductions, evidence that Mexico is perceived as a good example, and evidence of unintended impacts.

As explained in chapter 3, there are some methodological limitations in regard to making this assessment and it is also important to emphasise that the generation of impacts is beyond the direct control of the 21CPP and ICM/LARCI and may be influenced by a number of external factors.

4.2.1 Is it likely that 21CPP and ICM/LARCI will lead to expected impacts?

The evaluation of the expected impacts tries to answer, whether it is 'likely that the 21CPP and ICM/LARCI will lead to expected impacts? (why, why not)'. The answer to this question is based on three judgement criteria that also determine the structure of this section: i) evidence (progress towards) penetration of smart grids and renewables in the production market, ii) evidence (progress towards) emissions reductions, and iii) evidence of impacts that Mexico or its energy sector reform are seen as a good example for other countries.

Evidence of penetration of smart girds and renewables

Strong evidence of progress towards penetration of renewables

The evidence of progress towards the penetration of renewables and smart grids suggests that Mexico made some important advancement towards its 2024 clean energy goal. The findings on the results of the 21CPP shows that Mexico put some key aspects for a functioning energy market in place (market monitoring unit, market rules, smart grid roadmap). The successful results of the two recent energy auctions highlight the competitiveness of renewable energies (see section 4.1.3 above) and most importantly the transparency and confidence of potential suppliers in the Mexican energy market.

Auctions supplied about 25% of the foreseen additional renewable energy capacity for 2024

One source estimates that the newly gained capacity of renewable energies corresponds to approximately 5.5% of the average gross generation estimated

for 2015-2016.[13] In light of the PRODESEN's projected increase of renewable energy capacity by 16.9 GW (and 24.1 GW clean energy) until 2024, the 4.6 GW obtained correspond to about a 25% achievement of the PRODESEN's projected renewable energy increase.[14] According to one respondent, the two recent auctions will bring Mexico 80% towards the renewable energy targets of 2024, which contradicts our findings above.

Governmental as well as some non-governmental stakeholders deemed the auctions to be very successful and important evidence that potential suppliers show a strong interest in Mexico. This optimism is not shared by the private sector due to doubts whether there will be sufficient demand and projects to achieve the targets.

The 21CPP has supported the Mexican government in processes such as the implementation of the INDCs and the Smart Grid Roadmap. However, we did not identify a support to the National Smart Grid Task Force Group or Smart Grid Consultative Council[15]. The 21CPP has however collaborated with SENER and ISGAN on subjects that lead up to the formation of the Smart Grid Consultative Council. The renewable energy targets and the INDC target were found to be sufficiently coordinated. According to the 21CPP, efforts are made to further increase the INDC in cooperation with SEMARNAT. However, we did not find evidence to suggest that the 21CPP had an impact on Mexico's current ambition level of the INDC.

Major challenges remain for a successful deployment

We have identified some bottlenecks that slow the potential deployment of renewables. The most important bottleneck relates to the processing of the social impact assessments and the execution of the environmental impact assessments. The details on this issue are discussed in the Sustainability section below. Several stakeholders pointed to large-scale energy projects that cannot be deployed due to environmental concerns of the project sites (SENER requested assistance from the 21CPP on that matter). From the private sector, we further heard concerns that the transmission system currently has unacceptably high technical and non-technical losses to benefit from distributed generation, and that more clarity of CFE's future role (including better transparency) on the electricity is desired.

At the validation seminar, NREL noted that, in terms of implementation, there are still major hurdles ahead and emphasised that support for the development of public sector policies and accomplishing as much as possible before the Mexican general elections in 2018 is particularly relevant.

---

[13] http://ipdlatam.com/ipds-renewable-energy-tracker-october-2016/

[14] Note that this includes only renewable energies. Mexico's official targets are 'clean energy' targets, which additionally include combined gas-cycle plants. Calculations based on Table 4.4.5 in the 2016 PRODESEN, http://www.gob.mx/cms/uploads/attachment/file/102165/PRODESEN_2016-2030_2.pdf

[15] The Council was formed due to the termination of the Task Force Group as part of the energy reform, but according to stakeholders the process took until summer 2016.

Government stakeholders are nevertheless optimistic

Quantifying the impact of the 21CPP on the Government of Mexico's renewable energy deployment, all respondents of the 'inner' stakeholders provided a rating of 5 (with 5 being the highest). A uniform reflection was that the 21CPP helped stakeholders better understand the design of a good regulatory framework and its implementation. This picture differed in the outer circle, as no one felt informed enough to provide a confident rating. The evidence shows that Mexico is, on paper, on a pathway towards increased renewable energy supply. These projects will begin operation at the beginning of 2018 the earliest, and their eligibility in terms of impacts still needs to be assessed. Yet the foundations of the electricity markets are operational. However, care needs to be taken to fulfil the expectations of potential suppliers to keep interest in the Mexican energy market high.

Evidence of emissions reductions

Little evidence of reduction exists

The evidence suggests that Mexico made progress towards the penetration of smart grids and renewables. However, current projections on the extent to which Mexico is likely to meet its GHG emissions reductions goal are inconclusive.

- One report in the literature concludes that Mexico's power sector will only be able to achieve a reduction of 40Mt CO_2 by 2020, which is two-thirds of its envisioned 60Mt CO_2.[16]

- Based on its commitment made in the NDC[17], an assessment done by the Climate Action Tracker concludes that the way in which the Energy Transition Law is implemented is crucial for Mexico's continued emission pathway, due to the inclusion of co-generation into the definition of clean energy - likely to be natural gas, which is a fossil fuel, and still emits CO2. The analysis refers to national projections, which suggest that the cogeneration plants' share of the electricity mix could be as high as 9% by 2030—up from 0% in 2014. The scenario could thus be - if not using entirely zero emission sources - that emissions would be 58MtC02e—or 6% higher—in 2030, and could reduce the share of renewables in the 2024 clean energy target to 29%[18].

- Another study considers it likely that Mexico would be able to reach the unconditional and conditional targets *if* the government continuously

---

[16] http://www.cespedes.org.mx/EnergiasLimpias/PwC_CESPEDES_estudio_energias_limpias.pdf

[17] Mexico has pledged an **unconditional target** to reduce 25% of its Greenhouse Gases and SLCP emissions (below BAU) for the year 2030. This commitment implies a reduction of 22% of GHG and a reduction of 51% of Black Carbon. As **conditional target**, the 25% reduction commitment could increase up to a 40%, subject to a global agreement addressing important topics including international carbon price, carbon border adjustments, technical cooperation, access to low-cost financial resources and technology transfer, all at a scale commensurate to the challenge of global climate change. Within the same conditions, GHG reductions could increase up to 36%, and Black Carbon reductions to 70% in 2030. http://www4.unfccc.int/ndcregistry/PublishedDocuments/Mexico%20First/MEXICO%20INDC%2003.30.2015.pdf

[18] http://climateactiontracker.org/countries/mexico.html

expands and strengthens current climate and energy policies and standards in several sectors of the economy and insofar as also new policies are introduced with a focus on driving the necessary up front investments and addressing barriers to implementation[19].

When looking at more specific aspects, the carbon intensity of Mexico's economy has decreased in 2014-2015 (-4.4%), notably more than the annual decrease announced in the INDC. Energy related emissions further decreased by -2.0%.[20] The literature thus only provides limited evidence that Mexico is on a path towards decarbonisation, and projections are evidently uncertain.

Power is seen as the right starting point, but other sectors were neglected

There is a consensus among all stakeholders that the power sector is the most important one to begin with in Mexico. However, many stakeholders acknowledge that there are sectors (e.g. transport, building, agriculture) that have been neglected by the Mexican government. This negligence is explained by the recent budget cuts, which will deepen in the next budget period (see section 4.4.1 below). A further point of concern is that there is little coordination of SENER's energy policy with the climate change policy of SEMARNAT, which is also discussed in section 4.4 below.

The risk of a long-term gas-lock-in could work against the power-sector-decarbonisation

Stakeholders from the private sector expressed concern that Mexico runs the risk of a long-term gas-lock-in due to major investments in northern Mexico for the import of natural gas from the USA. The current low gas prices, combined with a fairly cheap refitting cost of existing oil plants, have been named as the major incentive for CFE to invest into gas. As one stakeholder put it, 'it's a shame that Mexico sold its soul to gas.' CFE's investments into gas amount to, as of 2015, USD21 billion in infrastructure and USD5 billion into the refitting of combined cycle plants[21]. At the same time, governmental and other private stakeholders highlighted that gas is only meant as a bridging technology or necessary to provide a reliable base level of energy supply.

These counter arguments above are valid, as natural gas can in the medium-term indeed help provide a reliable base supply with lower GHG emissions. In the long-term however, the demand for additional power supply through, by that point in time, even more competitive renewables will be reduced, due to saturation through gas. The comparably higher costs of natural gas can also have negative ramifications for the political promise of lower electricity prices, when gas prices increase again. In conclusion, the gas investment supports the energy transformation, but can develop into a counteracting factor for the long-term decarbonisation of the power sector.

[19] Achieving Mexico's Climate Goals: An Eight-Point Action Plan" Washington, DC: World Resources Institute, Energy Innovation LLC, Centro Mario Molina, Working Paper, November 2016.

[20] PwC, 2016, The Low Carbon Economy Index 2016

[21] One stakeholder even mentioned investments of USD20 billion into combined cycle plants, but these numbers could not be verified. Our verification source can be found under https://www.wilsoncenter.org/sites/default/files/tracking_progress_of_mexicos_power_sector_reform.pdf

Despite high importance of work, large uncertainties about the impact on long-term goals

When asked for a rating of the 21CPP's expected impacts on the climate change targets, we experienced a reluctance to provide such due to a high degree of uncertainty and unfinished work ahead. The doubt does not originate from the 21CPP's work itself, but from the neglect of other sectors and a slow execution of the energy sector reform to meet the targets set within the envisioned timeframe. A last aspect mentioned is that the climate change policy and energy policy are not sufficiently coordinated (which is further discussed in the Sustainability section).

Mexico as a good example to other countries

The answer to the question of whether Mexico is a good example to other countries rests on the judgement criteria of 'evidence that Mexico and its energy sector reform is regarded as a good example demonstrating effects and results to other similar countries'.

Mexico's achievements are exposed in global forums,…

The document review identified several outputs in the form of events or thought leadership reports that point to an exposure of Mexico's achievements and approaches in global forums. The output we find most relevant is the thought leadership report produced for the CEM7, which includes a case study on Mexico's approach toward energy transformation.

…and other countries take interest in Mexico's high ambitions…

The interviews and validation workshop showed that there is a general interest in the Mexican case, due to its ambitious climate and energy targets and policy. Interest from Chile, China, Egypt, Guatemala, and Peru were mentioned in the interviews. The validation workshop highlighted active cooperation with Cuba and Ecuador. The 21CPP suggests that a formal push for a Latin American dialogue on energy transitions could be a next step forward, as the Mexican experience from the reform process could provide a template for other countries. The Mexican progress has so far resulted in several tools that can be shared in the Latin American region, such as Mexico's Renewable Energy Atlas.

Stakeholders confirmed an active participation in many events. One example worth mentioning is that through one multilateral Smart Grid workshop, a Swedish delegation invited CENACE to a Smart Grid seminar, in which CENACE could demonstrate their own challenges and visions. Other events highlighted include events in South Africa during the CEM6 and a scheduled Latin American conference. Moreover, while stakeholders could name examples of international workshops, they could not provide a specific example in which Mexico was used as a reference for best practice. Finally, many respondents remarked that Mexico is a latecomer when it comes to the liberalisation of the energy market. While most interviewees evaluate that Mexico is currently learning a lot from others, they expect that Mexico will contribute more in the future. We thus find that Mexico contributes to the global knowledge pool but is, up to this point in time, not evidently proving as a best practice case.

Evidence from progress reports, interviews and the validation seminar shows that, show-casing of Mexico and actively pursuing take-up of the Mexican experience in Latin America has not been an explicit priority related to CIFF support to 21CPP although it was part of the initial rationale of CIFF providing

the grant. A more explicit ToC shared between CIFF and 21CPP could have contributed to clarity of purpose in this regard.

4.2.2 Are there any unintended effects/impacts?

The unintended impacts are evaluated by assessing whether unintended impacts can be associated with the 21CPP's support or the energy sector reform.

The document review did not identify any unintended impacts specifically related to the work of the 21CPP. In relation to the energy reform however, we identified a general risk factor that determines the reform's acceptance in the public.

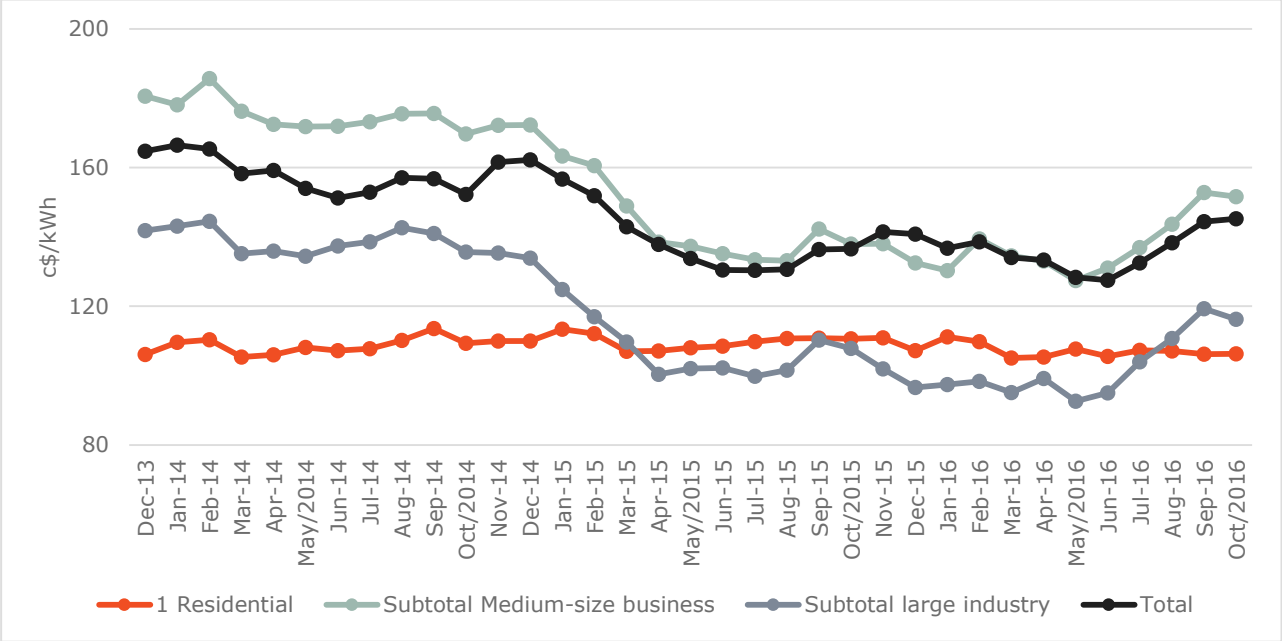
Political promise of low consumer prices risks a poor public acceptance of the reform

One of the major political arguments to sell the energy reform to citizens was the promise of lower electricity prices. Due to the subsidisation of the electricity prices for consumers, a link between production costs and consumer prices never existed. Now that the wholesale price of electricity depends on variable costs (especially under consideration of CFE's major investments into gas), the electricity prices are out of the control of government. This political promise of lower electricity prices could thus endanger public support of the energy reform, as residential consumers may (incorrectly) correlate high prices with a poorly executed reform.

The gap between residential and general electricity prices reduced…

The figure below depicts the development of the monthly electricity prices for the three main categories, of which the residential tariff is for low-end electricity consumers, since the current Mexican administration took office. Further tariffs exist, but have been excluded out of space considerations. As can be seen, the general electricity prices fell by approximately 23% until June 2016. This decrease is particularly notable for all other sectors but the residential sector. Prices increased again after June 2016, with the residential prices remaining stable.

Figure 4-1: Monthly electricity prices (in c$/kWh) [22]



According to the office of the Mexican president, the results of the Energy Reform are creating cheaper energy with a positive impact on Mexican families and that the reform has reduced electricity rates. Until March 2016, the reduction throughout the administration has achieved 39.4% in the industrial sector, up to 23.5% in the commercial sector and 8.7% in the high domestic consumption sector and that March 2016 marked the 15th consecutive month of falling electricity rates.[23] The Minister of Energy pointed out during a recent appearance at the Chamber of Deputies that low income residential electricity prices have remained at the same levels, contrary to before the energy reform when general electricity prices increased at an annual rate of 4 percent.[24],

…but only due to reduced gas prices

The main explanation for the drop in electricity prices are the international as well as US price developments for gas and oil, along with the devaluation of the Mexican Peso and shift in the energy mix from oil to gas, which is echoed by stakeholders. [25] In light of the great share of gas additions foreseen in the future (ca. 44% of the new capacity), there is a strong risk that low-income consumers could be severely affected if gas prices rebound in the future.

The evaluation consulted with the National Council for Evaluation of Social Development (CONEVAL) whether evidence is available in terms of impacts of

[22] Despite the provision of data through the Sistema de Información Energética, which is an official platform, it is not clear whether these prices are adjusted for inflation, http://sie.energia.gob.mx/bdiController.do?action=cuadro&subAction=applyOptions

[23] http://www.gob.mx/presidencia/articulos/removing-barriers-boosting-clean-energy

[24] Short-hand version of the appearance of the Secretary of Energy, Pedro Joaquín Coldwell, at the Energy Commission at the Chamber of Deputies, held on Tuesday, October 25, 2016. http://cronica.diputados.gob.mx/.

[25] http://www.enerdata.net/enerdatauk/press-and-publication/energy-news-001/electricity-tariffs-dropped-mexico-2015_33880.html

electricity prices for low income households. CONEVAL does not have such data on impacts of electricity prices in low-income households. This is mainly due to the fact that the decline in energy prices started in the second half of 2014 only and there are still no indicators to measure as part of CONEVALs social evaluations.

4.3 Coherence

In relation to coherence, the principal question addressed the extent to which the 21CPP and ICM/LARCI were found to operate in coherence with other programmes and funds supporting energy sector reform in Mexico and whether the need would not have otherwise been met. It assessed whether there had been any duplication with other donors or programmes, and how coherence could potentially be improved in the field. The question addresses both the internal coherence between ICM/LARCI and 21CPP, as well as the external coherence with other (non-CIFF supported) activities.

4.3.1 Did 21CPP and ICM/LARCI work in a complementary way?

Complementarity in practice more than in project design

CIFF's strategy was to combine technical assistance provided by 21CPP and NREL with policy advocacy provided by LARCI to support the reform process. Even though the 21CPP activities and ICM/LARCI activities were not designed in common, a logical complementarity and coherence appeared during implementation of the two set of activities, as the activities by the two programmes had a number of de facto linkages and synergies. That being said, synergies between the two project scopes could have materialised at an even earlier stage if this aspect had been stated explicitly into the original design of the two projects.

Synergies in preparation for the ETL and in bringing on board the private sector

The activities conducted by the 21CPP and the ICM/LARCI in parallel tracks were nevertheless considered very useful by the two implementing partners. Synergies were felt especially during the first 1½ year of the reform process and the support to 21CPP where the preparation for the Energy Transition Law were still ongoing and for discussions on how the technical work could be appropriately reflected in the policy design. Coherence between 21CPP and ICM/LARCI also proved helpful for the 21CPP in bringing on board relevant private sector representation to the project activities, due to ICM/LARCIs strong anchorage and credibility among Mexican stakeholders. ICM/LARCI thus participates in all coordination meetings between NREL and the Mexican Government.

Further formalisation

The potential for further synergies and coherence was more firmly established when ICM signed a contract of over two years with NREL in August 2015 to provide in-country assistance for the 21CPP program of work in Mexico, and ICM made a grant agreement with CIFF in September 2015 to increase opportunities for the approval of the Energy Transition Law.

In future initiatives, CIFF may consider aligning objectives with parallel projects from the beginning, or at least ensuring alignment of common activities across projects. However, the evaluation team is aware that other concerns may prevent greater integration of project portfolios.

4.3.2 Did the activities by 21CPP and ICM/LARCI fill a gap where no other actors or programmes were conducting similar activities?

21CPP programme has provided very relevant and targeted support

The support through the 21CPP activities clearly covered a need within the Mexican government which was not otherwise met by other actors or programmes in the comprehensive form that the Mexico 21CPP programme was able to provide. As pointed to also under Relevance in section 4.5, the 21CPP provided access to technical, policy, and regulatory support to which SENER and its institutions had not had access to before, though other donors became more active in this field shortly after the energy reform was launched.

ICM/LARCI has played a crucial support role on the ETL

In terms of whether ICM/LARCI activities addressed a need that would otherwise not be met, ICM/LARCI has played a substantial role in ensuring that the energy sector reform did not concentrate only on the oil and gas sector, but has put equally high emphasis on the electricity sector. Stakeholders involved directly in the Constitutional energy reform and law making processes expressed that without the technical assistance and inputs provided by ICM/LARCI, the emphasis on sustainability, low carbon development, and protection of natural resources would not have materialized. Also, the Energy Transition Law would have been much less ambitious in relation to the mitigation goals without this support due to strong opposition from the steel, iron and industry sectors, if ever approved by the Lower Chamber and the Senate. ICM/LARCI's ability to engage stakeholders through outreach activities involving renewable as well as traditional energy businesses, business organisations, politicians, media and newspapers were emphasized in this respect.

4.3.3 Did the activities lead to synergy effects with other actors or programmes targeting similar objectives?

Alignment with key donors: Danida, GIZ USAid and British Embassy

The overall perception is that the 21CPP in general has worked in alignment with other key programmes in Mexico such as Danida/DEA, GIZ and USAID. The key factual content of these programme are listed below. Synergies as well as potential overlaps have been identified and are described further below.

Text Box 4-1 Content of key programmes

The Danish-Mexican Climate Change and Energy Mitigation Programme (CCMEP) is a 3-year programme working with SENER and SEMARNAT on climate change, energy efficiency and renewable energy. The programme is anchored with the Danish Energy Agency (DEA) under the Ministry of Energy, Utilities and Climate Change (MEUC). Under the RE component of the programme, DEA cooperates with SENER *inter alia* on RE integration, methodologies for RE energy planning and on technology capacity in wind and bioenergy. This implies the development of model based renewable energy scenarios for 2050. The DK-MEX cooperation has established a power sector optimization model (Balmorel) to analyse options for integration of RE and simulate the Mexican power market based on model based scenario analyses. The current programme runs till mid-2017. A specific 3-year project component with DTU

Department of Wind Energy on the Wind Atlas for Mexico in cooperation with IIE, CFE-GEIC and UNAM is prolonged till October 2018, with SENER's Fund for Energy Transition and Use of Renewable Energy (FOTEASE) providing Mexican co-funding. A Phase 2 of the overall CCMEP is expected for 2017-2020 and is currently being programmed by DEA in cooperation with SENER, CENACE, CONUEE and INECC.

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Federal Ministry for the Environment (BMU) programmes are currently covering five programmes in Mexico in total promoting energy efficiency in houses and commercial buildings, renewable energy and addressing climate change issues, e.g. improving legal frameworks, implementing funding and roll-out schemes, and building capacities through training and awareness-raising programmes. A new GIZ programme to start in 2017 will focus specifically on coherence between energy policy and climate change policy.

Under the **USAID/Mexico's Country Development Cooperation Strategy**, the USAID has supported the Mexican Government in 2014-2018 on low emissions development strategies and specific mitigation efforts in the energy, forestry and agricultural sectors, inter alia through the Mexico Low Emission Development Programme (MLED) programme (e.g. helping on preparing for the energy auctions), implemented by Tetratech/WWF(MGM Innova, and the Enhancing Capacity for Low Emission Development Strategies (EC-LED) programme assisting in the elimination of barriers to greater use of renewable energy (wind, solar, and geothermal). The EC-LED programme is implemented by NREL. A new programming for an MLED2 programme has just been conducted.

British Embassy in Mexico has supported SEMARNAT mainly on developing the regulatory framework and policy framework on climate change. The British approach is undergoing adjustments and will in the future focus mainly on pilot projects over a longer time span. The next four years of the British support will focus mainly on oil and gas, energy efficiency and renewable energy as well as sustainable cities.

Use of modelling tools needs more attention

Some overlaps between programmes are observed, including on the use of modelling tools (Balmorel, Plexos, ReEDS), with the risk of different areas having different models not necessarily being sufficiently coordinated, even within SENER itself. Acknowledging the need for clarification of the respective scope of the modelling tools, the 21CPP held such a seminar in collaboration with EC-LEDS with various experts in early 2016. During interviews, several stakeholders pointed to the need for additional activities to ensure coordination through seminars or other activities focussing on the scope of the models, their potentials and limitations and how they can complement each other as well as existing Mexican modelling tools, such as the Integral Modelling System of the Energy Sector (SIMISE, run by UNAM, project running 2014-2018), providing a better understanding of this among relevant government institutions and other involved stakeholders. The evaluation finds that these issues need to be addressed to promote synergies between key projects and models in the area. This is needed both in terms of implementation on a daily basis but also to ensure an appropriate anchor and exit strategy ensuring wider sustainability.

Synergies need to be actively promoted

Synergies are seen to an increasing extent between donors active in this field, recognizing that the energy sector reform is complex and needs specialist expertise at many levels, so room is made for specific countries expertise in the field. That being said, the coordination between 21CPP and other programmes could be further improved through the Steering Committee meetings playing a more pro-active role focusing on coordination aspects. However, coordination

needs to happen more regularly than just through Steering Committee meetings. For example, there is an opportunity to strengthen SENER coordination on a daily basis, and strengthened donor coordination in general. In terms of the latter, coordination between donors is particularly relevant at the project identification stage, but as shown with the examples on the modelling tools, continued networking activities are also needed to ensure alignment between dynamic programmes in implementation. Steps seem to be taken to ensure better coordination between the 21CPP and the Danish CCMEP and for ensuring better synergies.

Coherence at inter-ministerial level is absent

Coherence is relevant to assess not only in terms of other donor programmes but also in relation to inter-ministerial and inter-institutional coherence. Key stakeholders around SENER generally find that the 21CPP and NREL work is closely aligned with the key Mexican governmental institutions directly involved in the project (SENER and its institutions). However, coherence and coordination between the 21CPP activities, SENER, SEMARNAT, and their respective institutions is absent -in terms of ensuring the relevant linkages to Mexico's climate change targets. To reach Mexico's ambitious energy and climate change targets, a combination of integrated, coordinated actions needs to be ensured in terms of policy, legislative and non-legislative planning and implementation steps. Currently, the energy and climate change field is characterized by different pieces of policies and legislation adopted at different points in time, thus the targets and objectives are not always coherent and lack sufficient integrations and alignment. This may lead to lack of transparency and uncertainty about what are the Mexican energy and climate change goals, including lack of investor certainty. The 21CPP activities have not harvested the potential for promoting relevant inter-institutional coordination and mutual learning with SEMARNAT and INECC in this respect. Evidence from interviews shows that 21CPP has not taken a proactive stance in involving these stakeholders although they formally have been part of the Steering Group. This refers back to the original design of the CIFF grant which did not sufficiently take into account the wider decision making context on energy and climate change policies.

Implementing the energy reform is a cross-cutting exercise where all key economic sectors need to be involved. An example of the need for increased intergovernmental coordination and planning mentioned at the evaluation validation seminar was that droughts over the recent years have led to reduced energy supply from hydropower, which is Mexico’s largest source of renewable energy and reduces the effective renewable energy share. As water is also a resource for human nutrition and agricultural irrigation, there is a need to improve the coordination with the Mexican Water Commission (CONAGUA). This coordination could take the form of a more efficient water allocation scheme.

Steering Committee provides room for transparency and collaboration, but could be more productive

In the context of effectiveness, we asked interviewees who participated in the Steering Committee their opinion of the role of the meetings. The preliminary findings show that the opinion is not uniform. For those stakeholders from the outer circle, especially the private sector, the Steering Committee is not perceived as the place where many decisions are taken. Rather, it is seen as an informal exchange. On the inner circle, the Steering Committee is seen as a

place of opportunities for institutions to identify potential collaborations (including with the GIZ, Danish Energy Agency), and further demonstrates transparency of the 21CPP's work. A common criticism of the Steering Committee meetings is that these could be structured in a more productive manner. As some interviewees put it, they found the meetings to have too many participants with too little opportunity to present themselves and very little room for discussion, ultimately resulting in inconclusive meetings.

Coordination needs to be promoted through the relevant forums

This evaluation finds that inter-institutional coordination and cooperation should be a priority and needs to be further institutionalised for the remainder of the project. It is not clear why this aspect has not been dealt with earlier on in the project, however it is an institutional risk that will need to be addressed if CIFF aims at engaging the Mexican government towards integrated common energy and climate change targets. In this respect, sufficient future coordination by the Inter-ministerial Commission on Climate Change needs to be ensured, and better linkages between the Consultative Council for Energy Transition and the CICC may also be considered.

Outreach and dissemination can be improved

As pointed to by some stakeholders, the 21CPP has not had as much visibility and outreach outside the internal core group as would have been useful. This may have impacted negatively on the possibilities for other external stakeholders including donors to indicate their interest in the project activities and for establishing relevant synergies and coherence with other programmes and initiatives.

4.4 Sustainability

As for sustainability, the core question focused on the extent to which the effects of the programme are likely to be sustained beyond the duration of the CIFF support. It also examines whether there is evidence that this is a transformative initiative creating lasting change in Mexico's energy sector in ways that will support long term deep decarbonisation.

4.4.1 To what extent are the effects of the programme likely to be sustained beyond the duration of the CIFF support?

Institutional capacity has been built

Generally, stakeholders with detailed knowledge of the 21CPP activities have found that the assistance provided by 21CPP has induced a strong capacity and commitment of relevant government agencies beyond the support of the partnership. However, a number of risks of both short term and longer term character are still present for which no mitigation actions seem available. The longer term risks go beyond the current project lifetime, but are nevertheless issues that the CIFF and other potential donors and stakeholders may consider in case of further support to this area.

Modelling tools an area for further attention

As for the immediate project outcomes, stakeholders pointed to the use of modelling tools, and the need for an exit strategy for the modelling tool support, due to licence payment requirements and budgetary constraints. Emphasis

should be put on the need for building up necessary competences within the Mexican government and institutions devoted to modelling, and to ensure that the relevant models are interlinked with existing Mexican model tools such as SIMISE. Otherwise, this may put several outcomes at risk in the longer term (e.g. the PRODESEN, the RE Outlook).

As for the progress on the national Clean Energy goals and relevant evidence, the two auctions to acquire Clean Energy power on a long term basis held by ISO-CENACE in March and September 2016 respectively, are seen by all stakeholders as two major milestones and the most promising signs of a future competitive clean energy market. The national Clean Energy goals of the ETL is thus expected to be met within the foreseen time schedule by the majority of stakeholders.

Institutional capacity in key government institutions is very fragile

In terms of the progress towards the climate change targets, stakeholders express much more concern. The targets will be difficult to meet, not least due to the wide span and differences of the sectors. Mexico is on good track on the power side as the 'low hanging fruit' sector, whereas progress in other sectors is still to be seen. Stakeholders refer to the drastic budget cuts in 2014 and 2016 respectively in the Ministry of Environment and Natural Resources (SEMARNAT) and the National Institute of Ecology and Climate Change (INECC) that has already affected the climate change related work of these institutions and possibilities for engaging in relevant sector ministerial dialogues. Further budget cuts of more than 35 % in SEMARNAT for 2017 is foreseen to bring the sustainability of the general Mexican climate change effort at severe risk.

Table 4-1 historic and projected budgets for SEMARNAT, INECC & SENER (in MXM million)[26]

Year	SEMARNAT			INECC			SENER		
	Budget (MXM million)	Dif.	Annual variation (%)	Budget (MXM million)	Dif.	Anual variation	Budget (MXM million)	Dif.	Annual variation (%)
2013	56.471			272			2.334		
2014	66.227	9.756	17.3	257	-15	-5.5	3.294	960	41.1
2015	67.976	1.749	2.6	257	0	0.0	3.088	-206	-6.3
2016	55.770	-12.206	-18.0	207	-50	-19.5	2.807	-281	-9.1
2017	36.058	-19.712	-35.3	211	4	1.9	2.361	-446	-15.9

[26] *Sources:* http://finanzaspublicas.hacienda.gob.mx/es/Finanzas_Publicas/Paquete_Economico_y_Presupuesto & http://dof.gob.mx/nota_detalle.php?codigo=5463184&fecha=30/11/2016

Need for better integration and coordination of energy policy and climate change targets

Better coherence needs to be ensured between energy policy and climate change policy to avoid the risk of failing on climate change targets. Given that key Mexican climate change policy and legal instruments (the General Law on Climate Change, the National Strategy on Climate Change, the Special Climate Change Programme) were elaborated and launched before the Energy Sector Reform, the climate change process and the energy sector reform process are currently not sufficiently integrated. A number of stakeholders thus pointed to the need for a thorough 'Roadmap' for the Mexican Government on how to meet the climate change targets across sectors, pointing to the common goals of the Government on climate change and specifying on commitments and responsible sectors and actions. Such a road map may draw on the findings and lessons learned from the current evaluation of the Special Climate Change Program (PECC).

Risk of slowing down the energy reform process

In terms of sustainability risks beyond the immediate project, stakeholders point to the risk of slowing down the energy reform process, including due to general economic problems and the risk of facing a severe economic crisis in Mexico, human resources problems in and lack of coordination among key governmental institutions, or the uncertainties of the result of the US 2016 election and future 2018 Mexican elections. Weak coordination between government institutions is considered a continued risk for not meeting the climate change goals as scheduled. Several interviewees pointed to that the Inter-ministerial Commission on Climate Change (*Comisión Intersecretarial de Cambio Climático*) under the General Law on Climate Change would need to be strengthened further to ensure coordination of the formulation of policies relevant for climate action across the key ministries. Also, the high institutional turn over will continue to pose a threat to the building up capacity beyond the support of the 21CPP activities.

Private sector stakeholders point in particular to the need for the government to demonstrate that it is in a position to create a fair playing field for all developers. Whereas the overall energy sector framework and legislation are now in place, implementation needs to be proven to be feasible.

SIA process management a serious threat to reform implementation if not facilitated

Implementation of the pipeline of investment projects is key to a successful achievement of energy reform objectives. Challenges and potential bottlenecks for implementation of the reform within the foreseen timeframes from the private sector perspective include Social Impact Assessments (SIA), indigenous consultations, and how to deliver social benefits to local communities. So far, no standards or guidelines are finally agreed to, so it is unclear for many private sector stakeholders how the government will address this, which slows down project preparation, impact assessments and approval of projects due to unclear risks. Given the scale of this (1000 SIA in 2015, more than 1600 SIA in 2016 to date), solutions to this need to be found both at federal level mainly within SENER and at sub-national, community and land owners' level. The SIA process management problem is most pressing in the South of Mexico, Yucatan and Oaxaca with most indigenous communities, in order to mitigate harm and enhance social benefits. Social unrest is already seen in some of these areas, as also discussed at the validation seminar. Because of social barriers, investors have moved to other states with a less complicated social environment.

A way forward may be to differentiate more between the various types of SIAs, as not all projects have large scale social impacts. Similar albeit much less concern is raised whether the Environmental Impact Assessments procedures may become bottlenecks for implementation of projects. EIAs is nevertheless regarded as a much more well-functioning process. A few stakeholders pointed to the potential for aligning Social Impact Assessments and Environmental Impact Assessments into one and same integrated assessment, to have one entry point, ensure administrative effectiveness and avoid unnecessary administrative burdens on the private sector. Others pointed to the need for separating the assessment of the SIA from the institution that also gives the permit.

There is a general concern among the broader group of stakeholders, including NGOs, that social aspects have not been sufficiently addressed yet, and that more attention needs to be invested into how social benefits can be enhanced as part of private sector developments as an investment in proper risk management. The current situation may negatively impact the speed at which social benefits are realised based on competitive prices on energy. A few NGOs also noted the reluctance by MDBs in engaging into the Mexican challenge with the SIA, and stated that MDBs were more inclined to direct their climate finance towards environmental and social safeguards for their specific projects to be implemented in Mexico. Ways may thus be found for better synergies between safeguards and SIAs, including between the MDB requirements and the national planning instruments.

A sound and solid process needs to be established for the conduction of SIA to sustain the results achieved in the first phase of the energy sector reform. It may be considered whether the Steering Committee meetings can allow for ad hoc Civil Society representation to ensure that social aspects would be appropriately discussed and addressed. The examples from the European Union countries of the Energy Ombudsman and the Network of National Energy Ombudsmen (NEON) were mentioned as a possible next consideration in Mexico for mediation and settling of disputes in the future e.g. in relation to energy rights and vulnerable consumers. Whereas this may be an idea in the long term, first and foremost SENER should give priority to settle the framework for social impact assessment and provide necessary guidance in terms of procedural matters.

4.5 Relevance

The evaluation of relevance follows the overall question, to which extent the CIFF support to the 21CPP and ICM/LARCI has supported the energy sector reform in Mexico in an appropriate way, as well as, to which extent the achievements in Mexico have showcased potentials to other Latin American countries and other middle-income CEM countries.

4.5.1 The extent the CIFF support has supported the energy sector reform in Mexico

The 21CPP's approach of technical, policy, & regulatory support has been highly relevant

The CIFF support and the 21CPP activities have played a catalytic role in Mexico. CIFF came with support to the Mexican reform process at a very appropriate time. The 21CPP provided access to technical, policy, and regulatory support to which the Mexican government, first and foremost SENER, had not had access to before. The support helped to speed up both the technical and institutional developments despite significant capacity constraints within the energy reform process. The 21CPP activities were very relevant to the acute need for support at all three levels: strategic policy development, regulatory framework, and best practices for the development of the grid.

Many of the inner stakeholders stated that the energy reform process would not have progressed as far today without the 21CPP support. Concrete examples of outputs highlighted are the market rules, technical assistance to help solving interconnection issues, the study on Baja California Sur (BCS) to be extended to the national level, information exchange and workshops with the participation of US utilities, and finally international workshops with smart grid experts. Moreover, the results from the two auctions and the contract prices obtained for renewables compared to other energy forms are referred to as evidence that the market reform is performing as hoped. Overall, support by NREL was considered relevant due to the similarity between the future Mexican and current US electricity market as well as NREL's competence on intermittent renewable energies.

Access to knowledge sharing has been very useful

Of the three programme objectives, the implementation through training and best practices has often been named as the most relevant aspect. Given that the reform process is new to Mexico and the Mexican government neither has the expertise nor the resources to ensure the implementation, it helped stakeholders to define their own way forward, based on the lessons learned from other countries.

The scale of support has been a differentiator

When speaking with other donors, they deemed the 21CPP support especially relevant in light of the large resources provided with the backing of NREL. Even though the 21CPP required a longer time to establish trust and confidence with the relevant agencies than initially planned, their concrete inputs and activities are perceived as very timely with respect to the general progress of the energy reform process and especially the opening of the energy market in early 2016.

Some stakeholders and areas have received less attention

The obvious focus of the 21CPP programme on SENER and its institutions also meant that in the initial phase 21CPP did not engage with the private sector. Stemming from NREL and the US Department of Energy (DoE), the 21CPP's natural focus lies though on SENER and its associated energy agencies. As a consequence, this focus has also meant that the involvement of SEMARNAT and INECC and the relationship to the CICC has received little attention and thus the project had limited effect on the integration of the climate and energy targets.

Other areas of crucial importance have been overlooked until now include the social and environmental issues related to the implementation of the energy

reform (see section 4.4.). This aspect was not made explicit in the design stage of the original CIFF grant agreement. A successful implementation of the energy reform, especially the development of the energy market for renewable energy, requires solutions to be found to the SIA management issues in close cooperation with the private sector. Now the SIAs have become a real risk to the process. It is thus recommended that CIFF take such political aspects into account more explicitly at the strategic program level as well as at the project design phase in future activities. This is relevant in Mexico as well as in other country programmes.

The 21CPP work provides high value to the energy sector reform

In terms of the value that the 21CPP work provides to the energy sector reform process as such, inner and external stakeholders all provided a high rating between four and five (with five being the highest). The rating tended to be lower in the external stakeholders' point of view, as they find the support relevant, but think that certain aspects have been omitted, such as social and environmental impacts. Governmental stakeholders in turn all rated the value with five and had no concrete suggestions on how to improve the value further.

4.5.2 To which extent did the achievements in Mexico work to demonstrate the potentials to other countries?

A limited showcasing potential for the moment, but interest in the Mexican case exists

Overall, there is an interest by other countries in the Mexican experience, which is in parts related to the pace with which Mexico is progressing on the planning of the integration of renewables into the energy system, and in terms of having set ambitious energy and climate change greenhouse gas reduction goals demonstrating at the political level that ambitious climate action is politically desired. The 21CPP activities are perceived by some of the closest stakeholders to be relevant for showcasing Mexico.

Good exposure at the international level through CEM

Mexico has had a high level of exposure at the CEM meetings, not least as the host of CEM6 in Merida in May, 2015 and as a partner country participating in the Joint Statement of the CEM Power System Challenge stressing the strategic importance of power system transformation and launching a series of core principles and eight key actions that the CEM is to focus on. Through the CEM, the Mexican experiences have also been presented to organisations such as the International Energy Agency, the International Renewable Energy Agency, and the International Partnership for Energy Efficiency Cooperation that further facilitates and disseminates country experiences globally. Bilateral country visits by delegations from China and Egypt to CRE have been mentioned.

Mexican stakeholders are very aware that they are one of the last countries to liberalise the energy sector and open its electricity market. In terms of the market opening, Mexico is seen as a latecomer in the Latin American region. More specifically, agencies identified exchanges of experiences with Chile, Guatemala and Peru on this aspect. As already mentioned, Mexico is already engaged with active cooperation on energy matters, such as geothermal, with Cuba and Ecuador.

5 Conclusions and recommendations

Emerging conclusions and recommendations are outlined in the section below, which will be validated in the coming weeks prior to the validation workshop in January.

5.1 Conclusions

Effectiveness

The 21CPP provides an effective support to the Mexican government. It achieved most of the foreseen activities, although some with a considerable delay, as the programme had a slower start than anticipated. The 21CPP provides an unmatched flexibility of support that is highly appreciated by governmental stakeholders. The outputs provide evidence that the 21CPP managed to shape the regulatory and planning framework of Mexico, including the Smart Grid Regulatory Roadmap, Ch. 18 of the market rules, and the roadmap of the Baja California Sur Electrical System.

Further, it managed to increase institutional capacity and helped Mexico onto a pathway of renewable energy deployment. Through these achievements, the 21CPP established a high level of trust and a strong reputation among governmental stakeholders (e.g. in form of providing support to the NARIS study). Since there is still a long road ahead and further budget cuts have been announced, the institutional capacity of the Mexican government will strongly depend on the further support of the 21CPP.

Impacts

The 21CPP has contributed to the penetration of renewables into the market, but we cannot conclude that Mexico is on a strong path of GHG mitigation. The 21CPP made significant contributions to the objective to decarbonise the energy sector. Overall, Mexico's carbon intensity reduced by -4.4% and energy related emissions decreased by -2.0% (2014-2015). Other sectors that lie outside of the 21CPP's traditional focus have however been neglected so far. In addition, there is a risk of a gas-lock-in in the long term, which could reduce the demand for competitive renewable energies. The price development of gas is likely to be an ever more determining factor of the electricity price. The political promise of lower electricity prices for consumers could endanger public acceptance of the energy reform.

We note that these conclusions are based on a limited base of available data. The recent auctions supplied about 25% of the foreseen renewable energy capacity for 2024, and further auctions still lie ahead. There is still uncertainty whether all foreseen projects will materialise due to a less than fully operational framework, particularly in terms of social and environmental impacts (assessments). The accumulating problems with negative social impacts of renewable energy projects highlights that the political economy has been neglected in the 21CPP's initial's programme design. Local resistance was already foreseeable during the programme design phase and this should have been factored in – and activities and mitigating actions included within the scope.

Coherence

The 21CPP operates in good coherence with other programmes and funds supporting the energy sector reform in Mexico. Some difficulties in the delineation of work have been observed, such as at the stages of project identification of new projects and in particular in relation to modelling. First and foremost, there is a need to address the coordination issues on the modelling aspects through continuing the efforts of the 21CPP to share their knowledge on modelling and taking an active role in informing and coordinating on the use and integration issues in relation to various models.

At the intergovernmental level, the 21CPP activities have not harvested the potential for promoting sufficient inter-institutional coordination with SEMARNAT and INECC. This needs to be addressed for the remainder of the programme as well as for any potential future activities. As the governmental climate change framework was developed before the Energy Sector Reform was launched, the two processes are currently not sufficiently integrated, and there is an apparent lack of coherent goals across the Government on energy and climate change specifying on commitments and responsible sectors and actions.

The evaluation showed that there were synergies between CIFF's support to 21CPP and ICM. However, these synergies were achieved by chance rather than by design. The intentions of achieving the synergies were not made clear by CIFF to either of the parties and thus the potentials were not fully exploited.

Sustainability

The 21CPP assistance has generated considerable capacity and commitment from relevant government agencies with its practical technical assistance targeted at specific institutions. However, direct outcomes are still at potential risk in the short term due to human resource constraints, high institutional turn-over, and yearly budget uncertainties within key governmental institutions.

To ensure sustainability beyond the support of the partnership and to mitigate the risk for not meeting the energy and climate change targets, mechanisms should be agreed upon and supported for the implementation of the second stage of implementation of the energy sector reform. This also ensures appropriate involvement and support to those governmental institutions that address challenges and potential bottlenecks for the continued implementation of the energy and climate change goals and for providing the relevant frameworks for roll-out of the investments needed at project level, such as in terms of ensuring the appropriate framework for social impact assessments in due time.

Coordination of the formulation of policies relevant for climate action across the key ministries requires clear and direct alignment and the Inter-ministerial Commission on Climate Change needs to be involved and strengthened to ensure coordination between the policy framework of the energy sector reform and the climate change commitments. Challenges and potential bottlenecks for implementation of the reform in relation to the SIA process management problem are pressing challenges to mitigate harm and enhance social benefits.

Relevance

The support to the Mexico 21CPP activities played a catalytic role and at a very appropriate time, with technical, policy, and regulatory support to which the

Mexican government, first and foremost SENER, had not had access to before. A positive lesson has been the project design itself with substantial resources provided by 21CPP and the solid anchorage within NREL which has made it possible to deliver on demanding tasks within the foreseen project duration. The support helped to speed up the technical and institutional developments despite significant capacity constraints within the Mexican institutions.

The 21CPP activities were very relevant to the acute need for support at all three levels: strategic policy development, regulatory framework, and best practices for the development of the grid. The 21CPP support has contributed with highly requested input in terms of knowledge and experience sharing and resources to support both policy and regulatory development; as well as support to solving technical issues following the increased distributed power generation based on renewable energy and the need for interconnection of the power grid.

The critical emphasis on the 21CPP's focus on support primarily to SENER and government institutions, leaving aside involvement of CICC, SEMARNAT and its institutions, and coupled with the information that social and environmental issues were not integrated as a potential risk factor in the original project design and thus are expected to become a major barrier, suggest that these areas will be of outmost relevance for support, if CIFF wishes to continue the support to the implementation of the Mexican energy reform.

Although Mexico’s case receives attention by other countries and Mexico’s achievements are highlighted in global forums, there is no evidence that impacts have been achieved in the form of directly inspiring reform processes in other countries. Although this was part of CIFF's original rationale for the grant, this has not been pursued in a clear way in the implementation of the grant by neither NREL nor CIFF.

In terms of CIFF management and reporting structures, the evaluation shows that there was no explicit theory of change guiding the CIFF grant to support 21CPP. Although the main stakeholders in many ways had a shared vision of what was to be achieved, and this was supported by annual work programmes and coordination, some of CIFF's objectives were actually not clear to NREL and ICM as grantees. This was in particular the case regarding the objectives relating to Mexico as an international show-case example and intended synergies between parallel support to 21CPP and ICM. A more explicit theory of change – shared between the main stakeholders – could have helped to give clarity of purpose and also to address political and institutional risks within a common design framework.

In a similar vein, the framework for monitoring and reporting has been divided in two separate parts, which have not been well-integrated: The progress reporting by 21CPP to CIFF and internal CIFF follow-up reports on progress towards targets in respect to selected KPIs. A more coherent and transparent system focusing on a common set of KPIs connected with a theory of change would have been beneficial.

5.2 Recommendations

In view of the above findings and conclusions, as well as the feedback and validation of these at the joint seminar in January 2017, the evaluation team suggests the following recommendations to NREL, SENER and CIFF respectively:

Recommendations to NREL

Address difficulties in delineation of work in relation to other donors, in particular in relation to modelling with the aim of better knowledge distribution between stakeholders. Recognizing that initial activities were conducted by 21CPP to promote coordination of modelling activities, there seems to be scope for more activities in this area to ensure wider understanding and dissemination of knowledge on the modelling aspects. An additional common workshop addressing the potential scope of the various models and their benefits and drawbacks, including how they may interact and complement each other, may still be needed in the short term to ensure common understanding, capacity building and anchorage across the relevant institutions.

Seek to evaluate the resilience of produced results towards the 2018 state and federal election in cooperation with SENER (and potentially ICM as well). In order to ensure continued progress and to consolidate the energy reform, including the progress towards the climate change targets, steps and actions should be identified for follow up action in 2017 and 2018. This may include communication activities to the political level including Congress on the benefits and gains from the reform, as well as activities at towards governors at sub-national level. It could potentially also include identification of further technical support to CFE to enhance its capacity in dealing with renewable energies thus keeping the momentum of the reform.

Support the roll-out of the next phase of the energy reform and the implementation on the ground of the investment projects, in terms of paving the way for the process around the Social Impact Assessments. In the short run, the 21CPP Steering Committee may allow for Civil Society representation to ensure that social aspects would be appropriately discussed and addressed. In addition NREL may, in cooperation with ICM, support SENER in identifying future actions and project support that can address the current barriers at community level in Mexico with respect to social impacts assessments. This 'project identification' may also entail concrete activities with the private sector developers as well as with local, municipal and state governments to involve them in the long term system planning and decision making processes.

Recommendations to SENER

Harvest the potential for better coordination between institutions at the intergovernmental level with SEMARNAT and INECC as part of future 21CPP activities. The energy reform process and the climate change policy agenda are not sufficiently integrated creating uncertainty about what the targets are and whether there is an integrated governmental action plan for reaching the targets. At federal level, action is needed by SENER and SEMARNAT in concert to ensure sufficient alignment between the energy sector reform and the international climate commitment made. In the short term, the 21CPP should integrate in its work SEMARNAT and INECC as the two key institutions

responsible for Mexico's efforts towards compliance with the climate change policy targets. SENER and SEMARNAT may in cooperation, supported by the 21CPP, consider how to ensure the information to and the involvement of the Inter-ministerial Commission on Climate Change of the 21CPP activities and outputs.

SENER needs to give priority and resources to the process around the Social Impact Assessment procedures to ensure the roll-out of the renewable energy projects, social inclusion and re-distribution of benefits. This may imply strengthening of the internal SIA Unit in SENER in terms of human resources, ensuring that the impact assessments procedures are mandatory and fully prescribed by law, and in terms of providing more operational guidance to private sector developers on how social benefits can be enhanced as part of the private sectors investment in proper risk management. Private sector needs to be trained inter alia in mechanisms for how to establish and share social benefits from the projects to the local communities.

SENER may consider facilitating further the support to the energy reform at sub-national level. Support may be provided to municipalities and state governments, particularly on the implementation of renewable energy projects on the ground, through the creation or utilisation of existing platforms in which these can act as a common actor. Individual support to municipalities and state governments may result in redundant repetition of the same support to different recipients. A dedicated support platform can efficiently bundle the support through the support of a group, sharing of best practices, or even inter-municipal support. Most importantly, such a forum helps to ensure that local communities can reap the energy reform's benefits to the best extent possible.

Recommendations to CIFF

Recommendations to CIFF include those related directly to the activities in Mexico as well as those of a more general nature.

<u>Recommendations in respect to activities in Mexico:</u>

CIFF should consider support for the SIA process management challenge at federal level and beyond for the second phase of the energy sector reform. Whereas the overall policy and legal framework of the Energy Reform now is in place, there are severe bottlenecks and risks of not being able to roll-out the renewable energy investments at the project level. CIFF, other donors and MDBs may discuss and consider how to address the SIA process management problem and ensure an appropriate framework for social impact assessments and prior informed consent procedures, in order to mitigate harm and enhance social benefits. One activity could be to communicate the benefits of the energy reform, e.g. as a small study on potential (social) impact scenarios of the energy reform. Other highly relevant activities would be to support SENER in developing guidance materials to different target groups involved in the social impact assessments such as the local/indigenous communities and State and local level governments. Support to SENER could also be considered targeting guidance to private sector developers on how social

benefits can be defined and enhanced as part of the private sectors investment in proper risk management to the benefit of the local communities.

CIFF should consider continued support to SENER involving SEMARNAT to ensure better alignment between the Government's energy and climate change targets in the next phase of the implementation of the energy sector reform. The support to the Mexico 21CPP activities have played a catalytic role at a very appropriate time, supporting the overall policy, regulatory and institutional framework. However, significant progress is required as part of the second stage implementation of the reform. In order to better integrate the climate change goals and the energy targets it is important to appropriately include the Inter-ministerial Climate Commission (CICC), SEMARNAT and INECC as part of any further support.

CIFF should consider the expansion of technical assistance to sectors other than power to ensure that Mexico meets its INDC despite the budget cuts. While many sectors like buildings or agriculture lie outside the traditional scope, cooperation with NREL on the Mexican transport sector should be considered. Particularly in the context of electric mobility, NREL could be a strong partner who has already established a strong reputation in one key ministry (SENER), and who can further bring in strong competences in energy infrastructures and the planning of additional capacity.

CIFF should explore the possibilities to continue a combined approach to support focusing on technical assistance and support through NREL and ICM. This combination proved effective during the previous period and the evaluation shows that additional benefits may be derived from a clearer strategy of cooperation.

Make a more formal push for best-practice sharing in Latin America to increase the exposure of Mexico's achievements and lift the confidence in the region. An active push can lift the exposure of Mexico's and other countries energy transition achievements (e.g. produced tools). These achievements can serve as a template to countries with only minor or no experience with high renewable energy levels, and consequently raise their own confidence with high renewable energy levels.

<u>Recommendations of a general nature:</u>

CIFF should take political context aspects explicitly into account at the strategic program level as well as at the project design phase. Where this broader approach seems neglected a bit in the first phase of support to Mexico, it may be of crucial importance for future activities. This is relevant in Mexico as well as in other countries.

CIFF should consider strengthening the use of theory of change as a design instrument and as a tool to support monitoring and follow-up to enable a shared vision and understanding of the intended pathways to impacts among the grantees and the main recipients of support. This will also help to

facilitate a common agreement on a set of KPIs to be applied in project monitoring.

CIFF should consider increasing transparency and consistency in its monitoring and reporting system by integrating the system and being explicit and open to grantees about the KPIs applied to measure the success of its investments. Good practise in setting up KPIs should be observed and developed, e.g. ensuring that KPIs conform with 'RACER' criteria (relevant, accepted, credible, easy, robust). Development of common templates and guides to grantees to support the implementation of the system is recommendable.

Appendix A Interview Guide

EVALUATION OF CIFF'S SUPPORT TO THE ENERGY SECTOR REFORM IN MEXICO

- INTERVIEW GUIDE –

EXTERNAL STAKEHOLDERS

Introduction	
A.X.1	About CIFF´s scope for support in Mexico (for those less familiar with CIFF), and the background for the CIFF evaluation.
Answ.	
A.X.2	Pls. describe your role and the relations you and your organisation have in the Energy Sector Reform process and describe your relationship (if relevant) with CIFF's work in Mexico through 21CPP and (ICM/LARCI if relevant)
Answ.	

Relevance – to which extent was CIFF's support to 21CPP the relevant way to support the energy sector reform in Mexico?	
R.X.1.	Do the 21CPP activities match the relevant energy reform agenda in Mexico? Do you think 21CPP's approach to provide support to the development of strategic policy framework, effective regulatory reform, and best practice in the development of distributed generation, smart grids and integration of RES addresses the key areas of the Energy Reform? Is there anything overlooked where GoM should have assistance, but doesn't?
Answ.	
R.X.2	What value do you consider the 21CPP work gives to the energy sector reform work as such?
Answ.	
Rate	Please rate from 1-5, 5 the highest
R.X.3	Has the 21 CPP work been able to showcase potentials to other Latin American countries and other middle income CEM countries?
Answ.	
R.X.4	What has 21CPP done for you and your organisation? Did it help you to progress towards your own internal goals? *What evidence is there of this (if any)*?
Answ.	

Effectiveness – to which extent have expected outputs been produced and expected results been realised?	
E.X.1	Has 21CPP been effective in reaching desired objectives?
Answ.	
Rate	Please rate from 1-5, 5 as most effective
E.X.2	If you participated in any concrete activities, how do you perceive the quality of those? Especially in terms of bringing stakeholders together and accommodating the individual interests, while still working in progressing to the objectives?
Answ.	
E.X.3	To your knowledge, have the 21CPP activities influenced decision-makers? What evidence is there of this (if any), e.g. in terms of the support for the adoption of the ETL, likelihood of GHG emissions reductions in the power sector, increased advocacy by the Mexican administration for the ETL, etc.? *Pls. provide examples*
Answ.	
STEERING COMMITTEE ONLY	
E.X.4	Being a member of the Steering Committee, what role and attribution would you give its meetings in terms of progressing to the goals as well as resolving issues? Can you name any example, in which the SCM made a contribution that wouldn't have happened in its absence? Is this the place where things get done/set? Is it a place, where a lot is discussed/resolved?
Answ.	

Impact – Is it likely that the efforts by 21CPP will lead to the expected impacts? Are there any unintended impacts?	
I.X.1	How would you assess the importance of 21CPP at the national level to the energy sector reform? How do you see Mexico on the way towards the deployment of renewables and smart grids, if 21CPP was absent?
Answ.	
Rate	Pls rate 1-5, 5 the highest, how 21CPP impacted GoM's performance on RE deployment.
I.X.2	How would you assess the importance of 21CPP activities at the international level? *Pls. provide examples*
Answ.	
I.X.3	Did 21CPP contribute to national and/or transnational sharing of expertise and best practises? *Pls. provide examples*
Answ.	
	On a scale from 1-5, 5 the highest, please rate whether you expect that the work of 21CPP contributes to MX's long-term climate goals e.g. 35 % electricity generation from non-fossil sources by 2024 or 30 % emissions reduction by 2020 /or 50 % by 2050?
Rate	

Coherence – To which extent do 21CPP operate in coherence with other programmes and funds working in relation to the Energy Sector Reform in Mexico?	
C.X.1	Are the 21CPP activities coherent with other initiatives (does it meet a need not otherwise met?)
Answ.	
C.X.2	Does the CIFF support duplicate work done by other organisations/donors?
Answ.	
C.X.3	How can coherence potentially be improved in the field – and through which channels?
Answ.	

Sustainability –To what extent are the effects of the programmes likely to be sustained beyond the duration of the CIFF support through 21CPP?	
S.X.1	What progress can be seen in terms of goals and targets in the long term national planning documents? (*what evidence is available*)
Answ.	
S.X.2	Have any new policy and/or legal instruments been created to enable higher investments in renewables and their integration into the grid? *Pls. provide examples*
Answ.	
S.X.3	What evidence is there that the support has been transformative, creating lasting changes in Mexico's energy sector?
Answ.	
S.X.4	Do you see the future elections in Mexico (2018) as potential threat to the current achievements of 21CPP? t and to the Energy sector reform as such? What can be done to mitigate the risk of a potential slowdown of the reform?
Answ.	
Rate	Please rate on a scale from 1-5, 5 being highest, how strong do you judge that the assistance provided by 21CPP has induced a strong capacity and commitment of relevant GoM agencies to penetrate RE into the market beyond the support of this partnership?

Appendix B List of Interviewees

Name [27]	Title	Institution
Government – 21CPP Recipients		
Francisco Delarosa	Head of Unit, Electrical Studies	National Energy Control Center, CENACE
Gustavo Villa	Deputy Director of Grid Planning and Technical Studies	National Energy Control Center, CENACE
Ruben Flores Garcia	Independent Director	Federal electricity commission, CFE
Francisco Javier Varela Solis	Modernisation Manager, Gas	Federal electricity commission, CFE
Guillermo Arizmendi	Distributed Planning	Federal electricity commission, CFE
Martin Llerena	Deputy Smart Grids	Energy Regulatory Commission, CRE
Cesar Alejandro Hernandez	General Director of Electricity Market Analysis and Monitoring	Secretariat of Energy, SENER
Efrain Villanueva Arcos	General Director of Clean Energy	Secretariat of Energy, SENER
Oliver Flores	General Director of Generation and Transmission of Electricity Power	Secretariat of Energy, SENER
Jeff Pavlovic	General Director of Monitoring and Coordination of the Electricity Power Industry	Secretariat of Energy, SENER
Edmundo Gil	General Director of Distribution and Marketing of Electric Power and Social Bonding	Secretariat of Energy, SENER
Government – other		
Marisa Ortiz Mantilla	Congresswoman, Former Deputy of Committee	Climate Change Committee, Chamber of Deputies
Pedro Hernandez Lopez	Director of Policy Planning for Energy Efficiency	National Commission for the Efficient Use of Energy, CONUEE
Beatriz Bugeda	General Director of Climate Change Policy	Secretariat of Environment and Natural Resources SEMARNAT

[27] The contact information can be provided by CIFF and/or COWI at request, depending on the specific stakeholder

Name [27]	Title	Institution
Saul Pereyra Garcia	-	Secretariat of Environment and Natural Resources, SEMARNAT
Victor Escalona Gomez	Deputy Director of Policy Analysis of Mitigation	Secretariat of Environment and Natural Resources, SEMARNAT
Rolando Nieva	Director of electric systems	INEEL
Claudia Octaviano	General Coordinator of Climate Change and Low Carbon Development	National Institute of Ecology and Climate Change, INECC
Hugo Rodrigo Mendoza Núñez	Head of Department of analysis of results of the general direction of evaluation	CONEVAL
Katya Puga Cornejo	(Now previous) Director General for Social Impact Assessment and Prior Consultation - –interview in her personal capacity	(Previously) SENER
Academia		
Víctor Rodríguez-Padilla	Prof., Politics & Energy	National Autonomous University of Mexico, UNAM
Aaron Sanchez	Dr, Centro de Investigación en Energía (IER)	National Autonomous University of Mexico, UNAM
Private Sector		
Hector Trevino	Executive Director	Mexican Wind Energy Association, AMDEE
Jose Ramon Ardavin	Executive Director	Center for Private Sector Studies for Sustainable Development, CESPEDES
Oscar Perez	Tax Partner	Latin American Business Center, Oil & Gas, Ernst & Young
Hector Olea	President and CEO	GAUSS Energia
Adrián Katzew	CEO	Zuma Energía
Donor Agencies		
Nethe Veje Laursen	Special Advisor, Centre for Global Cooperation	Danish Energy Agency
Ernesto Feilbogen	Programme Coordinator	GIZ
Ulla Blatt Bendtsen	Senior Energy Adviser / Asesora en Energía	CCEMP, Danida

Name [27]	Title	Institution
	Danish-Mexican Energy and Climate Program	
Kate Hampton	Chief Executive Officer	CIFF
Matt Baker	Program Officer, Environment	Hewlett Foundation
Donald Mccubbin	Environmental Officer, US Embassy	USAid
NGOs ao.		
Juan Mata	Asesoria y Consultoria Infratructura y Sustentabilidad	IMDEXI
Ana Mendivil	Analyst, Public Policy and Human Rights	Mexican Centre for Environmental Law, CEMDA
Jorge Villarreal-Padilla	Advocacy Specialist	ICM/LARCI
Daniel Chacon-Anaya	-	ICM/LARCI
Juan Carlso Arredondo-Brun	Programme Officer-Mexico	ICM/LARCI
Carlos Muñoz	Coordinator of Economic Research	Centro Mario Molina - Molina Center for Strategic Studies in Energy and the Environment

Appendix C Attendance Lists

Steering committee meeting

Participation:

- Leonardo Beltrán, Undersecretary of Planning, SENER
- Efrain Villanueva, General Director of Clean Energies, SENER
- Fidel Carrasco, Department of Clean Energies, SENER
- Jessica Quezada, Direction of Analysis and Monitoring of Electricity Market, SENER
- Gustavo Villa, Operation Manager of the National Electric System, CENACE
- Francisco de la Rosa, Head of the Unit of Electrical Studies, CENACE
- Pamela Suárez Velázquez, CENACE
- Edmundo Gil Borja, General Director of Distribution and Marketing of Electric Power and Social Linking, CENACE
- Doug Arent, NREL
- Carlo Brancucci Martinez-Anido, NREL
- Ricardo Bracho, NREL
- Francisco Varela, Modernization Projects Manager, CFE
- Rodolfo Nieva Gómez, Director of Electrical Systems, IER-UNAM
- Jorge Tenorio, IER-UNAM
- Alberto Díaz, Lawrence Berkeley National Laboratory
- Ernesto Feilbogen, GIZ Mexico Program
- Jorge Villarreal, ICM-LARCI
- Carlos Tornel, ICM-LARCI
- Daniel Chacón, ICM-LARCI
- Patricia Ortega, Director of Electric and Electronics Industries, Secretaría de Economía
- Don Mccubbin, USAID Mexico Mission
- Rogelio Avendaño, USAID Mexico Mission
- Guillermo Hernandez, World Bank Mexico
- Norma Alvarez Girard, Direction of Integration of Clean Energy, CRE
- Eduardo Reyes Sánchez, Secretary of Sustainable Energy Development of Campeche State.
- Eugenio Barrios, Director of Water Program, WWF
- Jennifer DeCesaro, IRENA

Private stakeholder meeting

Participation:

- Jonathan Pinzón Kuhn, Corporate and Government Relations, Zumma.
- Valeria Cruz Blancas, Government Relations Coordinator, WWF-Mexico.
- Juan Carlos Mendoza, Sustainable Development Expert, Mario Molina Center.
- Jennifer DeCesaro, IRENA
- Carlo Brancucci Martinez-Anido, NREL
- Hector Teviño, Vicepresident, AMDEE
- Juan Manuel Diosdano, Deputy Director, CESPEDES
- Lady, Carbon Trust

Appendix D Theory of Change

Intervention Logic for the 21st Century Power Partnership

Note: 1) The Results represent 'Acceptable Outcomes' of the Critical Success Factors in the Investment Memo
2) The logic bases on the work plan for year 1 (2014/2015) and year 2 (2015/2016):

<table>
<tr><th>Problems and needs</th><th>Objectives</th><th>Input</th><th>Activities</th><th>Results</th><th>Outcomes</th><th>Impacts</th></tr>
<tr><td rowspan="2">CIFF's Energy SPA identifies Mexico as one of the two largest emitting countries in Latin America and therewith a key player in climate change mitigation.

Therefore, there is a need to establish Mexico as a thought leader in the field of renewable energy.

The ongoing energy reform in Mexico is a facilitating opportunity to address the need.

Based on that, CIFF will finance 21CPP to provide technical support to enable the</td><td>Policy:
Drive the development of a strategic policy framework to support the high penetration of renewables, and to support the acceleration of "next generation" planning around scale-up and integration of renewables and smart grid transformation</td><td rowspan="2">Funding USD 4.0 million (Modelling, Reporting, Technical Assistance)

Additional USD 25.000 to support from ICM/LARCI

Energy systems experts from NREL and a three-person team based in Mexico</td><td>i. Transmission Planning Review
ii. Thought Leadership Reports (Transmission planning, resource forecasting, Smart grid public policies, distributed generation best-practice, policies, planning)
iii. Workshops (Smart grid integration roadmap)</td><td>21CPP develops useful and state-of-the-art policy instruments for the Mexican government with regards to smart grid and renewables integration. These are used as input to the government's sectoral landscape and decision making.</td><td rowspan="2">Investment in and deployment of smart grids and renewable energy generation</td><td rowspan="2">Modern And Efficient Energy System In Mexico, Which Can Be Measured With The Following Indicators:

RE Integration
i. 25% Electricity Generation from "Clean" sources by 2018
ii. 30% Electricity Generation from "Clean" sources by 2021
iii. 35% Electricity Generation from "Clean" sources by 2024
(RE, Hydro, Nuclear, Combined Cycle; Base: 22.5% In 2013)

Power Sector Decarbonisation
i. 60Mt CO_2 less p.a. by 2020
ii. 130-155 Mt CO_2 less p.a. by 2030
(Base: 2000)

GHG Mitigation</td></tr>
<tr><td>Regulation:
Support the development of effective regulatory reform and oversight, which can facilitate investment in renewables and related energy infrastructure</td><td>Activities
i. Regulator exchange
ii. Workshops
iii. Regulator forum (CRE's regulation roadmap)
iv. Regulatory report (Renewable energy network flexibility)</td><td>21CPP provides good quality support to CRE to identify some of the legal instruments to enable smart grid development and renewables integration. International forums and networking allow CRE to engage with other agencies to seek specific technical support.</td></tr>
</table>

Government of Mexico to coordinate, accelerate and institutionalise the development of smart grids in Mexico.	**Implementation:** Provide best practice and quality assurance in generation and transmission to Mexican grid and utility operators		Activities i. Technical reports (Power system planning and modelling for Baja California Sur and national level) ii. Grid operator exchanges (~~Public-private RE investment~~, wind power integration) iii. Workshops (Best practices on priority RE zones, RE integration, existing resource forecasting practices) iv. Staff exchanges (Smart grid operation, high RE level system forecasting, energy storage, Wide area monitoring) v. Wholesale market monitoring unit support (Technical report, best practices, recommendations, workshops ~~vi. Restructuring of the CFE~~ vii. Data system platforms support viii. Energy Systems and Smart Grid Data Management Systems technology demonstrations	CENACE has gained experience of and replicated some international smart grid technologies best practices from other countries		i. 30% GHG Emissions Reductions by 2020 ii. 50% GHG Emissions Reductions by 2050 (Base: 2000)

Appendix E Effectiveness Assessment

Attached as Excel spreadsheet

Appendix F Evaluation matrix

Below, we describe the judgement criteria, indicators, data sources and analysis for each evaluation question.

F.1 Relevance

The overall relevance question is:

To which extent was CIFF support to 21CPP and ICM/LARCI the relevant way to support energy sector reform in Mexico and to showcase potentials to other Latin American Countries and other middle-income CEM countries – and what are the key lessons learned?

Table 5-1 Relevance: Judgement criteria, indicators and data sources

Judgement criteria /sub-questions	**Indicators**	**Data sources/analysis**
CIFF's work in Mexico through 21CPP and ICM/LARCI has been effective in reaching desired objectives, is on a path to achieving intended impacts in relation to mitigating climate change	See below under effectiveness and impacts	See below under effectiveness and impacts
CIFF's work in Mexico through 21CPP and ICM/LARCI is internally coherent and coherent with other initiatives and continues to fulfil a need not otherwise met for climate mitigation	See below under coherence	See below under coherence
Did the support provided through 21CPP and ICM/LARCI support the reform process in an appropriate way? To which extent did the achievements in Mexico work to demonstrate the potentials to other countries? What are the lessons learned – what could CIFF have done differently?	Perceptions of stakeholders on timing and scoping of CIFF support and the extent to which support provided supported the reform process. Key stakeholders in CEM and 21CPP and their views on Mexico as the example and CIFF's role in this regard. Do CEM members view that Mexico in terms of providing an example of clean energy development in a middle income country is appropriate and shows relevant progress compared to other 21CPP countries such as South Africa.	Analysis of key policy documents Interviews with experts and key stakeholders in Mexico Interviews with selected CEM actors that participated in CEM6 meeting in Mexico in 2015. These could be government officials from Denmark and Germany and representatives from a middle-income country upon CIFF's advice

F.2 Effectiveness

The effectiveness questions are:

- *To which extent have inputs and activities been implemented as planned?*
- *To which extent have expected outputs been produced?*
- *To which extent have expected results been realised?*

Table 5-2 Effectiveness: Judgement criteria, indicators and data sources

Judgement criteria	**Indicators**	**Data sources/analysis**
21CPP inputs and activities implemented as planned If there are deviations from plans, these are explained by external factors and revised plans have been developed taking new situation into account CIFF has been responsive to needs for changes in plans allowing 21CPP to be sufficiently flexible to accommodate new needs and thus maintain effectiveness	Progress reports and key performance indicators show satisfactory implementation of key activities (ref. theory of change) Minutes of meetings and progress reports provide evidence of flexible planning approach Interviews with 21CPP and CIFF provide evidence of flexible planning approach	Comparison of initial plans (investment memorandums, annual plans) with actual achievements (annual reports, various progress reports and KPIs) Interviews with 21CPP and CIFF
21CPP deliverables produced according to plans	Progress reports and key performance indicators show satisfactory implementation and delivery (ref. theory of change)	Comparison of initial plans (investment memorandums, annual plans) with actual achievements (annual reports, various progress reports and KPIs) Review of key documents produced (meeting/workshop reports, technical reports, etc.) Interviews with relevant staff of 21CPP
21CPP data and advice/activities have influenced decision-makers and the regulatory and planning framework for smart grid and renewable integration by contributing to establishing a climate friendly definition of clean energy and by providing capacity building to support the he necessary capacities in the new energy institutional set-up to prepare for the energy certificate system and the implementation of the Energy Transition law.	Preconditions for promoting renewable energy and smart grids, such as a definition of clean energy that promotes considerable shares of renewable energy in the energy mix; quantified targets for RES and smart grids; primary and/or secondary legislation for smart grid and RES integration and deployment, appropriate institutional set-up (special focus on CRE) have been included in regulatory proposals (e.g. Energy Transition Law, Restructuring of the CFE, Energy Sector Programme) Similar preconditions have been included in key planning documents (e.g. Smart grid regulatory roadmap) Policymakers consider 21CPP data and inputs to have been useful and applicable in their context and can give concrete examples of their use and ensuing results in terms of policy development	Review of policy and planning documents leading up to the formulation and adoption of the Energy transition law finding evidence of the necessary preconditions, followed by a case study of the Energy Transition Law, Clean Energy Certificate Guidelines to find evidence that the necessary regulatory framework is in place for the integration of renewable energy and smart grids Interviews with policy makers (SENER, CONUEE); other government institutions such as CEF, CRE, CENCEA, other relevant stakeholders that participate in the Steering Group (to be identified when we receive list of Steering Group participants)

Judgement criteria	Indicators	Data sources/analysis
21CPP technical assistance and capacity building activities have resulted in increased institutional capacities with relevant stakeholders (CFE, CRE, SENER)	Workshops/exchanges and other activities have resulted in knowledge building and skills building for concerned individuals and organisations Representatives of key stakeholders consider that their capacity to develop and implement policy on renewables/smart grid has been increased and can provide concrete examples and evidence to support this	Reports and other evidence from capacity building activities Interviews with key stakeholders
ICM/LARCI has contributed towards influencing the institutional and policy framework in the direction of deployment of renewables and smart grids through its policy advocacy and regranting activities	ICM/LARCI has chosen suitable stakeholders as partners/recipients of regrants ICM/LARCI framing of regrants has helped the stakeholders to organise effective advocacy activities or effective processes to contribute to policy development and implementation Stakeholders' views on effectiveness of ICM/LARCI policy advocacy activities	Interviews with ICM/LARCI staff Interviews with key stakeholders Evaluation of LARCI (if available)
Mexico is on an institutional pathway towards achieving the deployment of high penetration of renewables as a result of 21CPP and ICM/LARCI	Mexico has clearly articulated targets for renewables which are translated into clear policies and regulation Mexico has increased institutional capacity (e.g. SENER, CRE) and the Electricity Federal Commission (CFE) has committed to leadership in renewables integration Stakeholders assess that developments above can be (partially) ascribed to 21CPP & ICM/LARCI	Review of policy and planning documents (e.g. Energy Transition Law, Clean Energy Certificate Guidelines) Interviews with policy makers (SENER, CONUEE); other government institutions such as CEF, CRE, CENCEA
The strategy of employing two interventions (21CPP with technical assistance and ICM/LARCI with advocacy support) proved effective and the two tools worked together to achieve results in terms of advancing the energy reform process.	Stakeholders assess that the mix was appropriate given the needs and prevailing situation See below under coherence	Interviews with stakeholders

F.3 Coherence

The overall coherence question is:

- *To which extent do 21CPP and ICM/LARCI operate in coherence with other programmes and funds active in relation to mitigation of climate change in Mexico?*

Table 5-3 Coherence: Judgement criteria and indicators

Judgement criteria	**Indicators**	**Data sources/analysis**
21CPP and ICM/LARCI worked in a complementary way in which technical assistance provided through 21CPP (as well as some ICM/LARCI regrants) were complementary to the policy advocacy activities supported by ICM/LARCI	No overlaps between activities conducted by the two initiatives Linkages between the two initiatives established and potential synergies exploited, where relevant Synergy effects such as mutual learning or efficiency gains identified by staff of 21CPP and/or ICM/LARCI	Mapping and comparison of activities conducted/supported and stakeholders targeted Interviews with key stakeholders – especially staff of 21CPP and ICM, but also CIFF
21CPP / ICM LARCI filled a gap where no other actors or programmes were conducting similar activities 21 CPP /ICM LARCI led to synergy effects with other actors or programmes targeting similar objectives	No overlaps with activities of other actors/programmes Linkages with other actors/programmes established during implementation and potentials for synergies exploited Synergy effects such as mutual learning or efficiency gains identified by staff of 21CPP and/or ICM/LARCI and/or staff of other key actors or programmes	Mapping of other actors and programmes targeting similar objectives, comparison of types of activities supported and what was done to achieve synergy effects if possible through desk studies of progress reports as well as interviews with relevant stakeholders as well material made available on other relevant actors/programmes. Other sources and actors/organizations: CIDAC, Molina Center for Energy and Environment, French Agency of Cooperation, WRI, Pembina Institute, CEMDA, CIDE Mexico, CAP Mexico.

F.4 Impact

The overall impact questions are:

- *Is it likely that 21CPP and ICM/LARCI will lead to expected impacts? (why, why not)*
- *Are there any unintended effects/impacts?*

Table 5-4 Impacts: Judgement criteria and indicators

Judgement criteria	Indicators	Data sources/analysis
There is evidence of (progress towards) penetration of smart grids and renewables in the energy production market	Regulatory framework is in place/investments have been made in smart grids and renewable energy generation 21CPP/ICM/LARCI have been involved in associating and supporting processes such as 1) development of the Mexican INDC, other relevant preparations of COP21; 2) National roadmap for Smart Grids 3) creation of the National Smart Grid Task Force Group (NSGTFG). The targets of the energy reform are reflected in the renewable energy and GHG emissions modelling and forecast as a basis for the INDC. 21CPP/ICM work has had impact on the ambition level of the Mexican INDC through various channels and on various levels such as political support and technical assistance and reflecting CIFF's goals in terms of increased RES integration and smart grid deployment in Mexico Mexico is used as a best practice example in development of a clean energy systems also outside CEM, in forums such as UNFCCC, OECD, IEA IRENA and in Latin American cooperation. Stakeholders assess that this can be linked to results achieved on 21CPP / ICM/LARCI support	Official statistics and data on energy market Interviews with stakeholders, On INDC development and preparation of COP21: SENER, SEMANAT, INECC; including external stakeholders such as OECD,IEA IRENA, Inter-American Development Bank,
There is evidence of (progress towards) emissions reductions being achieved	This will be assessed in a tentative and mostly qualitative way. It is not likely that there will be reported any major GHG reductions in Mexico within such a short time span (i.e. the short period that CIFF has supported 21CPP and LARCI) and if so, it would be difficult to attribute certain developments to the 21CPP and ICM/LARCI interventions. It should also be noted that GHG reporting always is a least two years behind so that reporting in 2016 will only cover up until 2014. It might be possible to say something qualitative on the basis of the Mexican GHG projections. Key trends in energy consumption and production in Mexico will be discussed with key stakeholders Stakeholders will be asked to assess whether the 21CPP activities	Data and trends in energy production in Mexico; the amount of integrated renewable energy sources; usage of smart grids to improve energy efficiency, regulate energy consumption and integrate RES. Interviews with the relevant stakeholders and research in documentation and reporting on energy development in Mexico. First of all the authorities responsible for energy policy development and reporting to both the national and international audience (SENER, INECC) will be consulted. The status of development as well as reporting will be checked within the international agencies (IEA, IRENA, UNFCCC) that Mexico is reporting to. The modelling on sectors and projects in the Mexican INDC will

Judgement criteria	Indicators	Data sources/analysis
	conducted and results achieved were relevant and appropriate and helped to support the achievement of the overall target of emissions reductions	give an idea of the expected and planned emissions reductions, but this cannot be validated in such a short timeframe since both the national Mexican energy targets and the INDC are targets to be achieved within the next 8 to 14 years.
There is evidence of impacts in terms of Mexico and the energy reform being regarded as a good example demonstrating effects and results to other similar countries.	Stakeholders' perception of Mexico as a demonstration country compared to other middle income countries also supported by CEM such as Brazil, South Africa and China	Interviews with stakeholders, and especially CEM representatives whom should be capable of comparing the country initiatives supported by CEM through 21CPP
Sub-question: Have there been any unintended or negative impacts of the interventions by 21CPP and ICM/LARCI, or are there risks of such effects? What effects have the reforms had (or are likely to have) on low-income households?	Data on household incomes and expenses in relation to energy consumption considering income distribution – and analysis of effects of the energy reform (if enough data is available and sufficiently processed by CONEVAL or others) Stakeholders' assessment of unintended effects; stakeholders will include CONEVAL (National Mexican council on evaluation of multidimensional poverty measurement). Stakeholders will be asked if the support of 21CPP and ICM/LARCI have provoked any counterproductive reactions	Review of relevant studies and data from CONEVAL and others Interviews with stakeholders - – this could be from: 1) the oil industry, regional governments that perceive the energy reform as constraining and compulsory, industry in general as opposed to environmental regulation. 2) Labour unions, NGOs, civil society

F.5 Sustainability

The overall sustainability question is:

- *To what extent are the effects of the programmes likely to be sustained beyond the duration of the CIFF support?*

Table 5-5 Sustainability: Judgement criteria and indicators

Judgement criteria	Indicators	Data sources/analysis
21CPP is a transformative initiative, creating lasting change in Mexico's energy sector in ways that will support long-term deep decarbonisation	New legal instruments, policies and planning documents have been created which set targets and enable higher investments in renewables and their integration in the grid. Peer-to-peer workshops and staff exchanges have built capacities in the new institutional set up to implement the Energy Transmission	This will to a large extent build on data and analyses done for effectiveness and impact (see above)

Judgement criteria	Indicators	Data sources/analysis
	Law (SENER, CONUEE, CRE, CFE, regional authorities). Special focus on capacity building in CRE that has gained increased authority with the energy reform to establish the regulatory framework for restructuring the energy sector and dismantling the monopolistic structure. Capacity has been built with key institutions and organisations to further develop and implement policies for renewables and smart grid Stakeholders' assessment of needs for further support to sustain results achieved	

Appendix G List of Background Documents relevant to the Energy Sector Reform

Table 5-6: List of documents reviewed

Programme	Doc Type	Title	Intervention Logic
21CPP	Investment Memo	21st Century Power Partnership: Smart grid solutions and renewable energies integration for Mexico	Objectives, Input, Activities, Results, Outputs, Impact
21CPP	Investment Memo	Final Investment Memo, incl. all Modifications and Workplans (2014-2016)	Objectives, Input, Activities, Results, Outputs, Impact
21CPP	Performance Review	21CPP-PerformanceReview	Activities, Outputs
21CPP	Progress Report	Progress Report and associated documents, 30-09-14	Activities, Outputs
21CPP	Progress Report	Progress Report and associated documents, 31-03-15	Activities, Outputs
21CPP	Progress Report	Progress Report and associated documents, 31-05-15	Activities, Outputs
21CPP	Progress Report	Progress Report and associated documents, 31-08-15	Activities, Outputs
21CPP	Progress Report	Progress Report and associated documents, 30-11-15	Activities, Outputs
21CPP	Progress Report	Progress Report and associated documents, 31-12-15	Activities, Outputs
21CPP	Progress Report	Progress Report and associated documents, 29-02-16	Activities, Outputs
21CPP	Progress Report	Progress Report and associated documents, 31-05-16	Activities, Outputs
21CPP	Progress Report	Progress Report and associated documents, 31-08-16	Activities, Outputs
21CPP	Progress Report	Year End Financial Report, 2015	Activities, Outputs
21CPP	Quarterly Report	Quarterly Report, Dec 2015	Activities, Outputs
21CPP	Quarterly Report	Quarterly Report, Feb 2015	Activities, Outputs
21CPP	Quarterly Report	Quarterly Report, Feb 2016	Activities, Outputs
21CPP	Quarterly Report	Quarterly Report, Jun 2014	Activities, Outputs
21CPP	Quarterly Report	Quarterly Report, Jun 2015	Activities, Outputs
21CPP	Quarterly Report	Quarterly Report, Oct 2014	Activities, Outputs
21CPP	Quarterly Report	Quarterly Report, Sep 2015	Activities, Outputs
21CPP	Workplan	Mexican Federal Government Programme of the 21CPP, 2015-2016	Activities, Outputs
21CPP	Workplan	Mexican Federal Government Programme of the 21CPP, 2016-2017	Activities, Outputs
21CPP	Workplan	Secondment of NREL Personnel for Work with Energy Sector Management Assistance Programme (ESMAP)	Activities, Outputs

Programme	Doc Type	Title	Intervention Logic
CFE	Regulation	Bidding rules for the first High Voltage Direct Transmission Line in Mexico (link)	Outputs
CENACE	Regulation	Extension and Modernization Program of the Electric Network (2015-2029) (Link)	Activities, Outputs
CENACE	Regulation	Call for the first long-term auction of CENACE (Link)	Activities, Outputs
CENACE	Regulation	Access to the Extension and Modernization Model of the NTN (2015-2029) (Link)	Activities, Outputs
CENACE	Regulation	Criteria for the interconnection of power plants and connection of load centres (Link)	Activities, Outputs
CENACE	Regulation	Market Participants Contract Models and NTN & GDN Agreements (Link)	Activities, Outputs
CENACE	Regulation	Short Term Electric Market Starts Operations (Link)	Activities, Outputs
CENACE	Regulation	Bidding rules of the Long-Term Auction SLP-1/2016 (Link)	Activities, Outputs
CENACE	Regulation	Auction calendar SLP-1/2016 (Link)	Activities, Outputs
CENACE	Regulation	Second Bidding for the Long-Term Auction (Link)	Activities, Outputs
CIFF	SPA	Energy Strategey - .ppt	Problems and Needs
CIFF	SPA	The Energy Transformation	Problems and Needs
CRE	Regulation	Resolution issuing the General Administrative Provisions for the Operation of the System of Management of Certificates and Compliance of Clean Energy Obligations (Link)	Activities, Outputs
CRE	Regulation	Resolution issuing the General Administrative Provisions for the Operation of the System of Management of Certificates and Compliance of Clean Energy Obligations - Appendix (Link)	Activities, Outputs
CRE	Regulation	Resolution laying down the criteria for the imposition of sanctions arising from non-compliance with clean energy obligations (Link)	Activities, Outputs
CRE	Regulation	General Administrative Provisions for the operation of the system of management and fulfilment of obligations of Clean Energies (Link)	Activities, Outputs
CRE	Regulation	Manual of Interconnection of Generation Plants with Capacity less than 0.5 MW (Link)	Activities, Outputs

Programme	Doc Type	Title	Intervention Logic
External	External-Report	Renewable Energy Outlook Background Report 4 - Ea Energy Analyses	Problems and Needs
External	External-Report	Transformation of the Mexican power sector - PWC	Problems and Needs
External	External Report	Altamirano, J., E. Ortiz Sánchez, J. Rissman, K. Ross, T. Fransen, C. Brown Solá, and J. Martinez. 2016. "Achieving Mexico's Climate Goals: An Eight-Point Action Plan." Working Paper. Washington, DC: World Resources Institute. http://www.wri.org/publication/	Outputs, Results
GoM	Regulation	Transition Strategy to Promote the Use of Cleaner Technologies and Fuels (Link)	Activities, Outputs
GoM	Regulation	North American Climate, Clean Energy, and Environment Partnership Action Plan (Link)	Activities, Outputs
GoM	Regulation	Energy Transition Law (Link)	Activities, Outputs
GoM	Regulation	Prospective on Renewable Energies (2015-2029) (Link)	Activities, Outputs
GoM	Regulation	Prospective on Electricity Sector (2015-2029) (Link)	Activities, Outputs
LARCI/ICM	Balanced Scorecard	Balanced Scorecard of Mexico's decarbonisation strategy (v.2.1)	Activities, Outputs
LARCI/ICM	Budget	ICM Budget 2016	Inputs
LARCI/ICM	Investment Memo	Investment Memo of Phase 2, LACF	Problems and Needs
LARCI/ICM	Investment Memo	LACF Investment Memo	Problems and Needs
LARCI/ICM	Logic Framework	Energy Decarbonisation Outcome Tree	Activities, Outputs
LARCI/ICM	Performance Review	Milestones and Deliverables 2016	Outputs
LARCI/ICM	Performance Review	Key Performance Indicators 2016	Results
LARCI/ICM	Performance/Workplan	Achievements 2015/Projected Wins 2016	Outputs, Results
LARCI/ICM	Progress Report	Quarterly Report, Q1, 2014 (alternative format)	Activities, Outputs
LARCI/ICM	Progress Report	Quarterly Report, Q1, 2015 (alternative format)	Activities, Outputs
LARCI/ICM	Progress Report	Quarterly Report, Q1, 2016 (alternative format)	Activities, Outputs
LARCI/ICM	Progress Report	Quarterly Report, Q2, 2014 (alternative format)	Activities, Outputs
LARCI/ICM	Progress Report	Quarterly Report, Q2, 2015 (alternative format)	Activities, Outputs
LARCI/ICM	Progress Report	Quarterly Report, Q2, 2016 (alternative format)	Activities, Outputs
LARCI/ICM	Progress Report	Quarterly Report, Q3, 2014 (alternative format)	Activities, Outputs
LARCI/ICM	Progress Report	Quarterly Report, Q3, 2015 (alternative format)	Activities, Outputs

Programme	Doc Type	Title	Intervention Logic
LARCI/ICM	Progress Report	Quarterly Report, Q4, 2014 (alternative format)	Activities, Outputs
LARCI/ICM	Progress Report	Quarterly Report, Q4, 2015 (alternative format)	Activities, Outputs
LARCI/ICM	Quarterly Report	Quarterly Report, Q1, 2014 (CIFF Format)	Activities, Outputs
LARCI/ICM	Quarterly Report	Quarterly Report, Q1, 2015 (CIFF Format)	Activities, Outputs
LARCI/ICM	Quarterly Report	Quarterly Report, Q1, 2016 (CIFF Format)	Activities, Outputs
LARCI/ICM	Quarterly Report	Quarterly Report, Q2, 2014 (CIFF Format)	Activities, Outputs
LARCI/ICM	Quarterly Report	Quarterly Report, Q2, 2015 (CIFF Format)	Activities, Outputs
LARCI/ICM	Quarterly Report	Quarterly Report, Q2, 2016	Activities, Outputs
LARCI/ICM	Quarterly Report	Quarterly Report, Q3, 2014 (CIFF Format)	Activities, Outputs
LARCI/ICM	Quarterly Report	Quarterly Report, Q3, 2015 (CIFF Format)	Activities, Outputs
LARCI/ICM	Quarterly Report	Quarterly Report, Q3, 2016	Activities, Outputs
LARCI/ICM	Quarterly Report	Quarterly Report, Q4, 2015 (CIFF Format)	Activities, Outputs
LARCI/ICM	Strategy	Mexico Climate Policy Strategy	Problems and Needs, Inputs, Activities, Outputs, Results, Impacts
LARCI/ICM	Strategy	Mexico Power Strategy (Draft, Dec. '14)	Problems and Needs, Inputs, Activities, Outputs, Results, Impacts
LARCI/ICM	Strategy	Mexico Power Strategy (Final, June '14)	Problems and Needs, Inputs, Activities, Outputs, Results, Impacts
LARCI/ICM	Strategy	Mexico Transport Strategy	Problems and Needs, Inputs, Activities, Outputs, Results, Impacts
LARCI/ICM	Summary/Analysis	Summary and Analysis of 2014 Expert Roundtable Discussion of Climate policy and funding strategies for the region (docx)	Inputs, Activities, Results, Impact
LARCI/ICM	Summary/Analysis	Summary and Analysis of 2014 Expert Roundtable Discussion of Climate policy and funding strategies for the region (pdf)	Inputs, Activities, Results, Impact
LARCI/ICM	Workplan	Annual Workplan 2016	Inputs
NREL	Outputs	Renewable Electricity Grid Integration Roadmap for Mexico: Supplement to the IEA Expert Group Report on Recommended Practices for Wind Integration Studies (Link)	Outputs

Programme	Doc Type	Title	Intervention Logic
NREL	Outputs	Opportunity assessment for USAID Mexico (Link)	Outputs
NREL-RAP-CRE	Outputs	Design of Public Policies and Tariffs for Distributed Generation in Mexico	Outputs
Mexican Energy Sector	Activities	Information Request Energy Transition law	Activities
Mexican Energy Sector	Information	Energy Transition Law - 2slides for Kate	Activities
SENER	Implementation	Development Programme of the National Electric System (PRODESEN) (Link)	Outputs, Results
SENER	Regulation	Smart Grids Program (Link)	Outputs, Results
SENER	Regulation	Agreement by which the Secretary of Energy issues the Bases of the Electricity Market (Link)	Outputs, Results
SENER	Regulation	Agreement by which the Legacy Interconnection Contracts Manual is issued (Link)	Outputs, Results
SENER	Regulation	Guidelines that establish the criteria for the granting of Clean Energies Certificates and the requirements for their acquisition (Link)	Outputs, Results
SENER	Regulation	Notice that discloses the requirement for the acquisition of Certificates of Clean Energies in 2018 (Link)	Outputs, Results
SENER	Regulation	Notice that discloses the requirement for the acquisition of Certificates of Clean Energies in 2019, established by the Ministry of Energy (Link)	Outputs, Results
SENER	Regulation	Agreement by which is issued the Manual of Interconnection of Power Generation Units with Capacity less than 0.5 MW (Link)	Outputs, Results
SENER	Implementation	Clean Energies Progress Report. 2016 (Link)	Outputs, Results
SENER	Regulation	National inventory of renewable energies (Link)	Outputs, Results, Impacts
SENER	Implementation	Content development for Mexico in the web site of the 21st Century Electric Systems Challenge (Link)	Outputs, Results
SENER	Regulation	Bases of the electricity market (Link)	Outputs, Results
SENER-INEEL-DTU-CFE-GEIC	Implementation	Wind energy Atlas (Link)	Outputs, Results, Impacts

Programme	Doc Type	Title	Intervention Logic
USITA	Summary/Analysis	2016 Top Markets Report Renewable Energy Country Case Study: Mexico (Link)	Results
Workshops			
SENER	Workshop	Workshop on Modelling of Renewable Energy Scenarios in the Electric Sector and Analysis of System Flexibility	Activities, Outputs
SENER-NREL-USAID-CIFF	Workshop	Greening the grid and renewable energy zone collaboration in México	Activities, Outputs
SENER-LARCI-GIZ	Workshop	Workshop for the Planning of the Program of Promotion of Distributed Generation based on Solar Panels (PROSOLAR 2.0)	Activities, Outputs
SENER-NREL	Workshop	Workshop for the Development of Public Policies to Promote Distributed Generation in Mexico	Activities, Outputs
SENER-NREL	Workshop	The future of distributed generation in Mexico. Technical workshop on efficiency, renewables and grid management	Activities, Outputs
SENER	Workshop	Follow-up meeting of the initiative for the transformation of the electrical system in Baja California Sur	Activities, Outputs
SENER	Workshop	Planning Mission on Technical and regulatory assistance for the evaluation of PRODESEN	Activities, Outputs
CRE-USAID-NARUC	Workshop	Technical Workshop on Market Monitoring (Link)	Activities, Outputs
SENER-CENACE-CRE-IIE-NREL-LARCI	Workshop	Workshop for the Safe and Reliable Planning of an Electrical System	Activities, Outputs

Appendix H Validation seminar programme

Provided separately