

Memorandum of Understanding

between

energy & meteo systems GmbH, Oldenburg, Germany,

and

Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) through its Large Scale Solar Energy Program in Mexico (DKTI Solar), Mexico City, Mexico

and

Centro Nacional de Control de Energía (CENACE), Mexico City, Mexico

Energy & meteo systems GmbH (energy & meteo systems), the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) through its Program "Large Scale Solar Energy in Mexico" (DKTI Solar), and Centro Nacional de Control de Energía (CENACE), hereinafter referred to collectively as "Parties" and individually as "Party";

WHEREAS energy & meteo systems is a company with offices in Oldenburg, Germany, that provides solar and wind energy forecasts for system and plant operators, and for energy traders, enabling energy systems with a high share of fluctuating renewable energies to maintain grid stability and enhancing the use of renewable energy in the management of large energy portfolios;

WHEREAS energy & meteo systems is interested in offering its services in Latin America and the Caribbean as these regions experience strong growth in the installation and operation of wind and solar plants;

WHEREAS the GIZ is a German federal enterprise that provides services worldwide in the field of international cooperation for sustainable development;

WHEREAS GIZ, through its Program DKTI Solar, implemented on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) and in cooperation with the Mexican Ministry of Energy (SENER), seeks to improve the technological, financial and organizational conditions for the use of large-scale solar energy in Mexico through a variety of work streams such as flexibility options, load management and energy storage, regulatory issues and technical options, among other subjects, in order to reduce barriers for the deployment of renewable energy technologies;

WHEREAS CENACE is a Mexican public entity with the legal mandate to exert operational control of the National Electric System, manage the wholesale electricity market and granting impartial access to the national transmission and distribution grids;

WHEREAS CENACE was established in the process of structural reforms that led to a liberalization of the Mexican energy market. Since then, CENACE has been responsible for leading the auction processes which have been initiated to further incorporate clean energy into the Mexican energy mix;

WHEREAS the Parties recognize that the expected increase of the share of variable renewable energy generation will create new challenges for the management and operation of the energy system whilst acknowledging that short-term forecasting is a proven instrument to support system operation and management, and are aware of the fact that it would be beneficial to exchange international experiences and strengthen institutional capacities in the design, use and application of forecasting models in Mexico;

WHEREAS the Parties have decided to cooperate and work together with the aim of addressing the challenges ahead due to the strong growth of solar and wind power in Mexico in the coming years;

WHEREAS energy & meteo systems has submitted an application to the GIZ for an international cooperation project titled "Wind and Solar forecasting in El Salvador, Panama and Mexico" (develoPPP.de project, see Annex) under the "Public Private Partnership Program" (develoPPP.de program) financed by the BMZ, in order to receive financial and organizational support for its implementation;

WHEREAS the project proposal submitted by energy & meteo system has been accepted by the GIZ office in charge of managing the develoPPP.de project; and

WHEREAS the Parties agree to work together under the umbrella of the 2-year long develoPPP.de project, with the aim of enhancing the Parties' (and other institutions) technical know-how and forecasting capabilities;

NOW, THEREFORE, in consideration of the foregoing provisions and the terms herein contained and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties have reached the following understanding:

Article 1.
Objective

The purpose of this Memorandum of Understanding (MoU) is to create a framework that encourages and promotes cooperation in the field of short-term energy production forecasts, based on mutual benefit, equality and reciprocity.

Article 2.
Scope of Cooperation

The Parties will direct their efforts towards the joint implementation of activities to strengthen capacities in the Mexican energy sector with regard to the use of forecasting models within the frame of the develoPPP.de project as outlined in the Annex, as well as other areas of interest agreed upon by the Parties.

Article 3.
Joint Activities and Commitments of the Parties

The activities and the agreed upon commitments of the Parties foreseen in the present MoU, under the develoPPP.de project (Annex), are as follows:

Energy & meteo systems will:

1. Implement the respective activities of the develoPPP.de project in Mexico as outlined in the Annex as part of the present MoU.
2. Be entirely responsible for the implementation and deliverables of the develoPPP.de project as outlined in the Annex.
3. Choose, along with CENACE, the solar and wind power plants in Mexico for the forecasting phase.
4. Commit to handle all information provided by CENACE with regard to the pilot forecasting phase (Phase 3) as confidential. The respective agreements will be specified in a separate document (Term of Reference) at a later stage.
5. Appoint an in-house expert for the coordination of the project.
6. Appoint Ulrich Kaltenbach from Kaltenbach Energy Consulting as external consultant to provide support in the organization of the visits and in the communication with CENACE, DKTI Solar, and other Mexican partners.
7. Assume all travel and logistic expenses to Mexico which will be co-financed by BMZ / GIZ in the develoPPP.de program.
8. Share deliverables to CENACE, GIZ DKTI Solar and when applicable with other entities, as outlined in the Annex.

CENACE will:

1. Serve as the main operational counterpart and main beneficiary of the activities of the develoPPP.de project in Mexico implemented by energy & meteo systems.
2. Along with energy & meteo systems, choose the solar and wind power plants in Mexico for the one-year long pilot forecasting phase.
3. Provide:
 - a) energy & meteo systems access to the information required for the pilot forecasting phase (phase 3), in particular for sites to be forecasted: standing data i.e. geo location, manufacturer, type of machine, hub height (wind turbines), inclination angle and type of tracking (solar plants), historical production data of plants over the past 12 months (when applicable). The required information and respective confidentiality agreements will be determined and specified in a separate document (Term of Reference) at a later stage;
 - b) relevant information regarding the Mexican energy sector, and
 - c) facilities for the workshops/seminars that form part of the work package as per the Annex.
4. Ensure the inclusion of relevant departments and units within CENACE, and help identify other relevant stakeholders.
5. Together with GIZ DKTI Solar:
 - a) coordinate all communication with the main national partners Comisión Reguladora de Energía (CRE), Comisión Federal de Electricidad (CFE), the state-owned utility company, and its relevant subsidiaries, and SENER, amongst others,
 - b) organize the logistics behind the meetings and workshops/seminars, and
 - c) explore the possibility of funding and financing options for the inclusion of additional solar and wind power plants, beyond the 25 plants covered in this MoU as outlined in the Annex.
6. Appoint a professional who will assume the task of coordinating the project implementation in Mexico.

GIZ DKTI Solar will:

1. Act as the main coordinating counterpart of energy & meteo systems in Mexico.
2. Together with CENACE:
 - a) coordinate communication with the main national partners CRE, CFE and its subsidiaries, and SENER, among others;
 - b) organize the logistics behind the meetings and workshops/seminars in Mexico. Where applicable, assume all costs that may arise from the need of an interpreter,
 - c) invite the Mexican partners to the workshops and/or seminars, and
 - d) explore the possibility of funding and financing options for the inclusion of additional solar and wind power plants, beyond the 25 plants covered in this MoU as outlined in the Annex.
3. Provide relevant information regarding the Mexican energy sector.
4. Appoint a professional who will assume the task of coordinating the project implementation in Mexico.
5. Share deliverables to CENACE, as outlined in the Annex.

The Parties agree to maintain close and constant communication amongst each other during the entire duration of the develoPPP project.

The Parties agree to publicly promote the project and its main findings and results in Mexico and abroad. Nevertheless, all public relations activities such as press releases, interviews, etc. shall be coordinated with all Parties.

Article 4.
Implementation

The Parties appoint a professional and/or consultant who will act as point of contact for, and who will assume the task of coordinating the project's implementation, on behalf of their respective organizations:

energy & meteo systems:

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Ulrich Kaltenbach
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CENACE:

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GIZ DKTI Solar:

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Article 5.
Confidentiality

The Parties may use any publicly available information in compliance with the provisions of this MoU and in accordance with the respective legal legislation that may apply.

In the event that information that is not in the public domain, or results of a confidential nature arise when the research project is carried out, these will be kept confidential by the Parties.

If a Party wishes to publish, disseminate and/or share with third parties the results obtained under the present MoU, the prior written consent of the other Parties must be obtained.

The obligations contained in this Article shall remain in force for a period of five (5) years upon termination of this Agreement.

Article 6.
Funding

The Parties agree that all costs that may arise from the implementation of their activities and commitments as outlined under this MoU shall be covered under their respective budget and shall be assumed by the Party incurring in them, unless otherwise stipulated in writing.

Article 7.
Final Provisions


The present MoU does not create legally binding obligations for any of the Parties.

The implementation of this MoU is based on the willingness and best intentions of the Parties. The Parties will seek to conduct consultations to address any aspect related to the interpretation or application of this MoU.

This MoU shall enter into force after it has been signed by the Parties for a duration of two years. Any Party may at any time terminate this MoU, informing the other Parties in writing, at least 30 days in advance.

IN WITNESS WHEREOF, the undersigned representatives, duly authorized to do so, sign three original copies of this MoU, in English.

08 Jun / 2017
Date, Place CDMX


Nemorio González Medina
Director for System's
Operations and Planning
CENACE

8/6/2017
Date, Place


Dr. Matthias Lange
General Manager
energy & meteo systems GmbH

CDMX, 08.06.17
Date, Place

Könemund
Trudy Könemund
Program Director
GIZ - DKTI Solar

ANNEX

Summary of the developPPP.de project "Wind and Solar forecasting in El Salvador, Panama and Mexico" by energy & meteo systems and GIZ

Objective

The project aims to increase the awareness of system operators, regulatory authorities and other institutions of the Central American energy sector (in particular Mexico and El Salvador) regarding the importance of solar and wind power forecasting. The objective being that the relevant entities increase their know-how of wind and solar power and energy forecasts, and how these forecasts can be implemented into their day-to-day processes.

Duration

February 2017 to December 2018.

Countries and Scope

The activities of the developPPP.de project will be implemented in parallel in several countries in Central America, in particular, El Salvador, Panama and Mexico. The activities in Mexico are independent and not linked to the activities in the other two countries.

Work packages in Mexico

First work package

Aim: Analyze the conditions in Mexico for the integration of renewable energies into electrical grids and markets with a focus on forecasting.

Approach:

- On-site visit undertaken by energy & meteo systems in order to hold meetings and interviews with CENACE, CRE and other relevant institutions from the Mexican energy sector.
- Analysis of the *status quo* of the energy market and the current system integration procedures.

Deliverable(s):

- Brief report containing market analysis, and proposals on how to effectively introduce forecasting tools in the energy system and regulatory framework.

Second work package

Aim: Discussion and verification of the assessment from the first work package, as well as training / capacity building for advanced wind and solar forecasting in Mexico.

Approach:

- Joint organization of a workshop and seminar intended to:
 - Present, discuss and verify findings of the analysis carried out in the first work package with key stakeholders (bilateral with CENACE).
 - Present and discuss suggestions on how to adapt the regulatory framework for forecasting.
 - Introduce the Parties to the specifics of wind and solar energy forecasting as pertaining to the Mexican context by means of a public workshop.
 - Present examples and best practices of forecasting in other countries.
 - Discuss the integration of forecasts in energy systems.
 - Others that may be specified at a later time.

Deliverable(s):

- Workshop presentations in electronic format.

Third work package:

Aim: Provide short-term forecasting experience for solar and wind energy in Mexico through the implementation of a one-year long pilot project that demonstrates the functioning of forecasts in a practical environment.

Approach:

- Energy & meteo systems provides its forecast services to CENACE of one year starting from October 2017 until the end of September 2018, to create operational capacities.
- Energy & meteo systems along with the Mexican partners will jointly select the plants for the implementation of the forecasting project.

- The forecasting results will be sent electronically according to requirements of CENACE within the options provided by energy & meteo (e.g. twice per day, electronic transfer by either email, sshFTP or web service).
- The number of plants included in the pilot forecasting model is limited to 25 wind and solar plants. The inclusion of further plants will depend on additional co-financing, in which case, CENACE and GIZ could agree on its terms, by entering into a separate agreement, or obtain additional funding from third parties. The decision to include further plants shall be made upon interest expressed by the beforementioned entities at the beginning of the third package.
- Continuous and constant dialogue between energy & meteo systems and the Mexican partners (e.g. via video conferences) on the quality of forecasts, their integration into the grid and system operation and experiences concerning an improved grid integration of solar and wind energy.
- Review and discussion of the accuracy of forecasts, technical problems, and implementation of forecasts into decision making processes.
- Energy & meteo systems presents international standard procedures for tendering forecasting services.
- Energy & meteo systems and the Mexican partners will present the results of the pilot phase in a workshop at the end of the develoPPP project.

Deliverable(s):

- Brief report documenting the key points from the one-year long pilot project including but not limited to: the criteria employed for the selection of the wind and solar plants used during the modeling; the accuracy of forecasts and possible means and actions to increment it; the technical problems encountered and ways to avoid them in the future; the implementation of forecasts into the decision-making processes of CENACE; key lessons learned, and next steps going forward.
- Advice on General Terms of Reference enabling CENACE to call for bids for the acquisition of a short-term forecasting model.

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