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# Pakistan Long Term Energy Planning – TIMES model and capacity development

## Inception Report

Implemented by

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On behalf of the
German Federal Ministry for Economic Cooperation and Development (BMZ)
Alternatively: German Federal Foreign Office

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# 1 Introduction

The Government of Pakistan (GoP) has implemented significant policy reforms over the past decade to tackle various challenges and promote sustainable development.

In November 2016, Pakistan ratified the Paris Agreement, committing to develop and communicate Long-Term Low-Emission Development Strategies (LT-LEDS) in accordance with Article 4.19 of the agreement. As part of this commitment, the GoP has initiated the development of a Long-Term Vision for mid-century as a foundational step towards formulating its LT-LEDS. To meet the objectives outlined in Pakistan Vision 2025 and the Sustainable Development Goals (SDGs) for 2030, several key advancements have been made in the country's energy sector.

Achieving optimal investments and resource combinations to ensure energy security, decarbonisation, and improved economic outcomes — while facilitating a fair and just energy transition — requires comprehensive and multifaceted analysis. In this context, this project seeks to strengthen Pakistan's existing knowledge base by developing new modeling tools, building capacity, and conducting an in-depth scenario assessment of the country's energy transition. This assessment will focus on Pakistan's ambitious goal of achieving its LT-LEDS targets by 2050, considering critical interactions with major energy-consuming sectors such as transportation, manufacturing, and electricity generation.

This study will incorporate prior analyses and knowledge base conducted by GIZ, EPRC, Argonne National Laboratory (USAID), Asian Development Bank (ADB) and the Planning Commission of Pakistan and integrate closely with planning performed by the Government of Pakistan, the Government's agencies including (i) Ministry of Energy (Power Division/NTDC) in charge of power planning; (ii) Ministry of Energy (Oil & gas division) in charge of oil and gas demand forecasts; (iii) Ministry of Energy (National Energy Efficiency & Conservation Authority) for energy savings; (iv) Ministry of Climate Change (MoCC) for Nationally Determined Contributions (NDC) and Long-Term Low Emission Development Strategy (LT-LEDS) and (v) Pakistan Atomic Energy Commission (PAEC) as the responsible for planning and development of Nuclear power plants. The project will also benefit the engaged bilateral and multilateral partners.

This project is funded by the German cooperation programme, implemented by GIZ in the context of the *Digitisation and Decarbonisation of Power Distribution Networks in Pakistan* program. This program aims to support Pakistan's energy sector in terms of building technical capacities to enable them for the clean and just energy transition. The project falls under output indicator 1.1, focusing on supporting long-term energy planning (LTEP) to develop two ambitious scenarios with a time horizon of 2050 with the Integrated Energy Planning (IEP) Department of the Planning Commission.

The implementation was delivered through the Global Energy Transformation Programme (GET.transform) Transforming Energy Sectors Globally, within work package 2 activities focussing on leveraging Long-Term Energy Planning.

To undertake the activities our consulting team – composed by international experts from IED and E4SMA – will interface primarily with the Energy Planning & Resource Centre (EPRC), which plays a central, custodial and champion's role in IEP.

## 1.1 Scope of work

This project aims to assist long-term energy planning in Pakistan by providing technical services on integrated energy plannings. The project encompasses three main intervention areas:

i. developing a newly designed national integrated energy model for Pakistan (PAK-IEM 2.0), using the TIMES modelling framework.

ii. delivering scenario analysis to exploring two ambitious long-term scenarios.
iii. Providing capacity-building to EPRC and relevant national experts in using TIMES, and in specific the newly developed PAK-IEM 2.0 model.

The project work is organised around four different tasks and some specific subtasks, for a duration of 13 months.

The tasks consist in:

- **Task 1.** Developing national expert community for TIMES modelling.
- **Task 2.** Development of a new TIMES model for Pakistan.
- **Task 3.** Develop two ambitious scenarios with the new TIMES model for Pakistan.
- **Task 4.** Capacity development for TIMES in Pakistan.

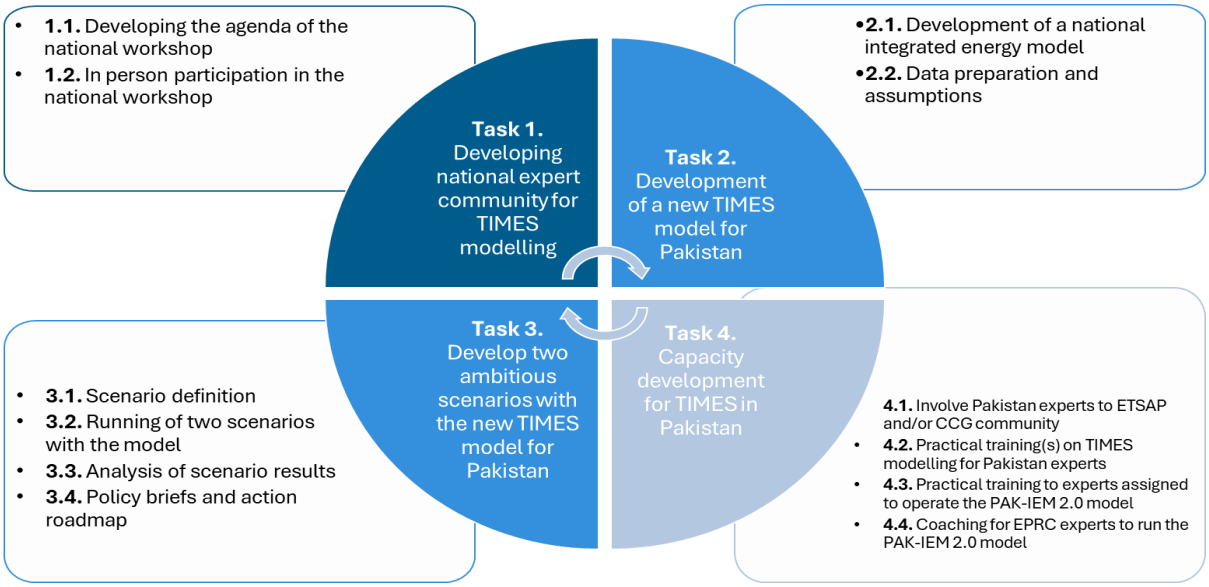


*Figure 1: Project tasks summary*

## 1.2 About this deliverable

This report is the Inception Report (Deliverable 0) of the technical assistance Pakistan Long Term Energy Planning – TIMES model and capacity development.

The key purpose of this Inception Report is to provide a concrete plan of the technical assistance. In particular, it specifies the overall approach, and the schedule of the activities, and reports the relevant guidelines to manage the technical assistance effectively.

This report follows the delivery of the project kick-off (KO) meeting, held online on October 2nd, 2024.

The report is structured as follows:

- Project work programme (section 2).
- Project team (section 3).
- Project plan and deliverables (section 4).
- Communications and documentation (section 5).
- Risks and mitigation strategies (section 6).

# 2 Project work programme

This section provide a review of the project work programme to be carried out in the next 13 months, following the KO meeting and follow up discussions.

## 2.1 Task 1. Developing national expert community for TIMES modelling

This task aims to contribute to a national workshop with Pakistani experts on TIMES. The workshop will take place in Islamabad on the **18th of November 2024** and will have a duration of 1 full day. Our contribution to the workshop is highlighted in the following task sections.

### *2.1.1 Task 1.1: Developing the agenda of the national workshop*

Our team will prepare in advance a draft agenda for the workshop, identifying topic sessions and schedule of the different interventions. The draft agenda will therefore be discussed with the EPRC and GIZ. Feedback received will be therefore integrated into the final agenda, which will serve EPRC to submit invitations to participants. Below the draft workshop agenda, prepared by our project team and amended by GIZ experts.

**National Workshop, 18th November**

| Time | Topic | Speaker |
|---|---|---|
| **Morning session: Long-term energy planning in Pakistan** | | |
| **09.30-10.00** | **Participants registration** | |
| 10.00-10.15 | Welcome | GIZ, MoPD&SI |
| 10.15-10.30 | Keynote speech | tbd |
| 10.30-11.00 | Overview of the energy planning activities in Pakistan | EPRC |
| 11.00-11.20 | Long-term energy planning in Pakistan | Faizan Ali (GIZ) |
| 11.20-11.30 | Q&A | |
| **11.30-11.50** | **Coffee/Tea break** | |
| 11.50-12.20 | How TIMES can support the long-term energy planning process | Alessandro Chiodi (E4SMA) |
| 12.20-12.50 | Long-term energy planning in the power sector | Roberta Orlando (EA) |

| | | |
|---|---|---|
| 12.50-13.00 | Q&A | |
| **13.00-14.00** | **Lunch break** | |
| **Afternoon session: The new PAK-IEM 2.0 model** | | |
| 14.00-14.30 | Co-design of the new model | Alessandro Chiodi (E4SMA) |
| 14.30-15.00 | Data availability, existing gaps and requirements | EPRC/Alessandro Chiodi (E4SMA) |
| 15.00-15.30 | Definition of scenarios and sensitivity analysis | Alessandro Chiodi (E4SMA) |
| 15.30-16.00 | Q&A and next steps | EPRC/GIZ |

*Table 1: Draft agenda – National workshop*

### *2.1.2 Task 1.2: In-person participation in the national workshop*

This subtask consists in the in-person participation at the workshop. Two experts from our project team will contribute to the workshop, namely, one expert in TIMES modelling and a power sector expert.

The workshop aims to enable engagement with national stakeholders, by:

i. Making stakeholders aware of the most recent GoP, EPRC, GIZ activities in long-term energy planning and showcasing the scope of the project.
ii. Introducing key features of TIMES, the modelling framework widely adopted to support energy planning.
iii. Identify existing knowledge base, gaps and limitations of previous modelling works.
iv. Discuss the goals and expectations from this project.
v. Collect views and insights to inform the design and preparation of the new PAK-IEM 2.0 model.

### *2.1.3 Task 1 deliverables*

The Task 1 deliverables are:

» D1: Workshop agenda.
» D2: Workshop slide deck and presentations during the workshop.

## 2.2 Task 2. Development of a new TIMES model for Pakistan

This task focuses on the development of a new integrated energy model for Pakistan (tentatively named **PAK-IEM 2.0**) using TIMES, based on best practices and the most recent data information, and customised to EPRC's needs. This task consists in two macro activities (subtasks):

i. Model development.
ii. Data preparation and assumptions.

Our technical support strategy is organised through a number of steps, as detailed in the following sections.

### *2.2.1 Task 2.1: Development of a national integrated energy model*

This subtask consists in the preparation of the new PAK-IEM 2.0 energy system model of Pakistan. All steps will be closely coordinated with EPRC and the national experts community, which will provide guidance on key modelling decisions.

The model development task will encompass the following steps:

i. **Development of a "PAK-IEM starter" model** (referred thereafter as the "starter model"): This step encompasses the preparation of a fully functioning TIMES model for Pakistan. This model is a single region model of Pakistan built using as starting point some of the template structures already developed by the consulting team in the past for similar models. The starting model could be then customised on the basis of stakeholder needs, and at the same time will i) speed-up the model development phase, as we are not starting from a blank page, and ii) facilitate the involvement of local teams, which since early stages will be allowed to play with a functioning model. It is worth noting that this development phase will not require any data collection, as will be entirely based on international datasets and assumptions.

ii. **Evaluation of the old PAK-IEM model and any other relevant tools:** In order to ensure that previous modelling efforts are considered in the new model development, a review of the existing Pakistan Integrated Energy Model (PAK-IEM) developed in 2010 will be delivered, along with any other modelling tools (e.g., LEAP). This review will inform some design decisions and possibly serve as useful data source for some specific input templates.[1] This review will be ideally completed before any customisation of the starter model. The review will be delivered by our modelling team and will conclude with a brief evaluation report. The report will cover lessons-learned, identifying main weaknesses of the previous approach and suggest improvements, including considerations on what technologies to include/exclude, number of regions, temporal resolution, level of detail for sectors/subsectors etc. In addition, the report will include an overview of data and structures which can be reused in the new model.

iii. **Develop a plan for development of the customised PAK-IEM 2.0:** This activity will analyse the need for customisation of the PAK-IEM starter model. This task will be informed by inputs and insights received from EPRC and national stakeholders (during national workshop); and the evaluation of the old PAK-IEM model (previous bullet point). To facilitate this process weekly technical virtual meetings will be scheduled (under task 4.4) early in the project. The focus of these online sessions will be possibly defined in advance, as to ensure the participation of all relevant experts across EPRC, Pakistani experts, GIZ and our project team; and ensure participation of all parties in key modelling decisions. These sessions discuss design approaches of the starter model, and collect and discuss possible alternative ideas for customisation, also considering related data requirements. At the end of this series our team will draft a "customisation" plan, summarising in a document all key decisions taken. These decisions will likely include items like the model calibration year, regionalisation, time

[1] The old PAK-IEM model will not be directly used as starting point for the PAK-IEM 2.0 for a number of reasons. Among the others:

i. the modelling interface: PAK-IEM works using the Veda platform (not supported anymore), while a more efficient platform (Veda 2.0) was released in the meantime.
ii. structure and transparency: the PAK-IEM starter structures are built to making more rational and transparent data flow; increase usability; making easier any future data update or recalibration.

resolution, level of detail for the different sectors of the model, etc. GIZ and EPRC will contribute providing inputs and review to this report.

iv. **Development of the customised PAK-IEM 2.0:** This activity implements the customisation plan for the PAK-IEM 2.0 (previous bullet point). The development of new modelling and data structures will be primal responsibility of our modelling team, however engagement and interaction with experts responsible for data collection and elaboration will play an important role. This activity will be closely linked to task 2.2, which focuses on data preparation and assumptions to be inputted in the model. Furthermore, online technical session to update status of the preparation and to ensure agreement on the assumptions and characteristics for the sector will be scheduled. Once completed, the modelling team will deliver some consistency tests, to check whether all components of the model are working consistently.

v. **A model manual of the customised PAK-IEM 2.0:** We will develop a model manual in English for the customised PAK-IEM 2.0 model. It is intended as a basic user manual of the model, which can be used together with the training material that will be developed during the project. The user's guide is meant to enable the users to know the characteristics of the model, assumptions, inputs, the developed scenarios narratives etc. The manual will be based on the final version of the PAK-IEM 2.0 model, which includes the implementation of the scenario analysis. A manual outline will be preliminary developed and discussed with GIZ and EPRC steering team.

### *2.2.2 Task 2.2: Data preparation and assumptions*

This task consists in the preparation and elaboration of data to be inputted in the PAK-IEM 2.0. EPRC will be the main responsible for data processing, however our project team will support the task.

For this purpose, our team will encompass the following steps:

i. **Guidance on data collection:** EPRC is the main responsible for data collection. However, our modelling team will support EPRC's experts by providing guidance on the data requirements for the PAK-IEM 2.0 model. This activity is linked to task 4.2 (training session 1) and task 4.4 (technical online meetings), which discuss model design, ideas customisation and data requirements. When needed, data collection templates and supporting materials will also be prepared. Furthermore, data collection templates may serve as basis for standardised data collection process within EPRC and potentially used to compile the data quality reports outlining strength and weaknesses of input data.

ii. **Data preparation and assumptions:** Our project team includes a pool of sectorial experts, which are at disposal to support EPRC and the modelling team in the data preparation. Modelling and sectorial experts will collaborate to identify any data gap and propose strategies to EPRC to address them. Attention will be also paid to enhance data collection, including disaggregation of gender data in order to maximise the better inform impact of actions.

iii. **Data quality assessment:** Sectoral experts will be mobilised during weekly meetings with EPRC to provide guidance on needed data (type, disaggregation, quality). They will assist EPRC to assess the available data and outline how to bridge any identified gap.
Optional: The gender expert may assist EPRC to identify any gender-related bias in the available data.

To enhance clarity and transparency our team will propose to adopt a common referencing system to data inputs used to feed the new PAK-IEM 2.0 model. This would facilitate understanding to model users and future updates. Guidance material will be shared.

### *2.2.3 Task 2 deliverables*

The Task 2 deliverables are

- D3: PAK-IEM 2.0 model base templates
- D4: PAK-IEM 2.0 model manual
- D5: Data templates for data input into the model
- D6: Filled data tables and data quality report

## 2.3 Task 3. Develop two ambitious scenarios with the new TIMES model for Pakistan

The purpose of this task is to deliver a model-based scenario assessment for Pakistan energy transition. At this purpose the newly developed PAK-IEM 2.0 will be employed to develop **two scenarios targeting 2050** (or beyond).

The activity encompasses a number of tasks, detailed as follows:

i. Scenario definition.
ii. Running 2 scenarios with the model.
iii. Analysis of scenario results.
iv. Policy briefs and action roadmaps.

Our strategy in the delivery of these tasks is highlighted in the following sections.

### *2.3.1 Task 3.1: Scenario definition*

The objective of this task is:

- the definition of the **scenario narratives** to be explored.
- the identification of the **set of coherent assumptions** about the future trajectories of drivers (e.g., GDP and Population growth, GHG target(s), rate of technology evolution, etc.), distinguishing between 'Root' (or basic) and 'Scenario' assumptions.
- the identification of the **measures** that will be employed to explore energy transition pathways.

EPRC will be the leading contributor in shaping the scenario definitions. When needed or relevant, other stakeholders' views may be included in the discussion, by inviting them in specific meeting and pushing them to express their views.

Our team will support the definition process by steering the discussion and circulating supporting materials. Furthermore, templates for data collection for both Root (basic) and Scenario-specific assumptions will be prepared. When relevant, sectorial experts will support the scenario definition process, by providing ideas and supporting scenario data collection and elaboration.

The resulting decisions arising from this task will be summarised in a presentation, containing storylines and key underpinning assumptions of each of developed scenarios.

### *2.3.2 Task 3.2: Running two scenarios with the model*

This task involves the integration of the assumptions defined in task 3.1 into the energy model and the realisation of the model runs for the different scenarios.

The task activities include the following steps:

i. Translation of the scenario narratives into a **set of coherent modelling inputs**, e.g., translating relevant plans, policies and measures, pledges, etc. into modelling language.
ii. the identification of **result metrics** to be tracked during the scenario modelling and results comparisons.

iii. **Run and debugging** of scenarios.

Preliminary results will be circulated in advance within the project working group and EPRC to gain their expert views and identify possible gaps to be fulfilled before the scenario delivery. Although our modelling team will undertake the responsibility of running of the PAK-IEM 2.0 model, the model will be made accessible to EPRC at all stages, making them able to run independently the scenarios.

It is worth noting that, there are a wide variety of potential results arising from a TIMES model. Our modelling team will discuss most relevant results metrics and possible format of delivered outputs, as to facilitate results exchange and comparison. Below a short summary of possible formats:

- Csv raw output files.
- Excel simple dashboard templates.
- Interactive visualisation platforms, accessible to various type of users and stakeholders.

Discussion concerning output data formats will be delivered in due time.

### *2.3.3 Task 3.3: Analysis of scenario results*

This task will deliver an analysis of the key implications of the two developed scenarios. The analyses – delivered by our modelling and sectorial experts – will use scenario outputs (primarily through key results metrics identified in the previous task) to assess impacts at technical, economic, policy and environmental level of the alternative scenario pathways. Furthermore, our experts will translate complex modelling outputs into easy-to-understand synthetic indicators, which may easily be understood also by non-technical stakeholders. This analysis will also help to identify key uncertain factors which may relevantly impact the ability of Pakistan's energy system to transition to mitigation energy pathways.

Key insights of the scenario analysis will be summarised in a technical report and a slide deck. These will include either a technical summary of results (including scenario storylines and policy briefs) and a summary for policy makers. These will be prepared by EPRC in close cooperation with our project team.

### *2.3.4 Task 3.4: Policy briefs and action roadmaps*

This task will (optionally) deliver support to EPRC in the preparation of sectoral policy briefs and action roadmaps to be included in the technical report and a summary for policy makers. These policy briefs and action roadmaps will be prepared in line with Pakistan's international commitments to fulfill the responsibilities. Our sectorial experts are available to support EPRC during all phases of this preparation.

The objective is to assist EPRC to deliver

- A series of policy briefs addressing various aspects of long-term energy planning.
- A comprehensive action roadmap with clear milestones and performance metrics.

### *2.3.5 Task 3 deliverables*

The task 3 deliverables are:

- D7: Slide deck and presentation of the two scenarios, describing assumptions and storylines.
- D8: Data tables with scenario assumptions.
- D9: Scenario outputs tables for two scenarios.
- D10: Technical report and slide deck on scenarios analysis

## 2.4 Task 4. Capacity development for TIMES in Pakistan

The objective of this task is to support the creation of a TIMES modelling expert community in Pakistan and enable an **effective handover** of the PAK-IEM 2.0 model.

The activity encompasses a number of tasks, detailed as follows:

i. Engagement with the international modelling community.
ii. Training session(s) on the TIMES modelling for national experts.
iii. A training session on the PAK-IEM 2.0 model for experts assigned to operate the model.
iv. A series of virtual coaching/technical support meetings.

### *2.4.1 Task 4.1: Involve Pakistan experts to ETSAP and/or CCG community*

This task will introduce Pakistani experts from EPRC (and others) to key international modelling communities. The participation to communities like the IEA-ETSAP[2] or Climate Compatible Growth (CCG)[3] – which are active in the energy planning and modelling space – will facilitate access to modelling knowledge and best practices. Also, the may serve as useful benchmark base fir case studies and national assessments.

Our modelling team is currently involved in both the IEA-ETSAP and CCG community and will serve as a bridge between EPRC and other national experts with these communities. Our workplan will consist in:

i. Establish communication with these communities, by exchanging contacts and organising engagement meetings.
ii. Support any further engagement strategy (to be agreed with EPRC and GIZ), which may include, for example, the participation to community workshops, or even the presentation of some case study analysis on Pakistan.

Fees related to the participation in these meetings will be borne by GIZ.

### *2.4.2 Task 4.2: Practical training(s) on TIMES modelling for Pakistan experts*

This task aims to conduct training session(s) with the aim of creating an expert base in TIMES energy systems modelling in the country.

A training session with the duration of two to three days has be scheduled on **19th-21st of November 2024**, right after the National workshop on long term energy planning with TIMES (task 1.2). The session will be delivered by a senior TIMES modelling expert, supported by our power sector sectorial expert.

This training session is intended to get the participants familiar with the PAK-IEM starter model, discussing the general structure, data and input templates. Customisation ideas and approaches will be also discussed.

Furthermore, the PAK-IEM starter model will be also used to practically assess TIMES model principles, and functionalities of the VEDA 2.0 interface. The training includes a mix of theoretical and practical sessions, ensuring a hands-on approach to the TIMES model and modelling environment.

Below the draft agenda, prepared by the E4SMA training team:

## Training in TIMES modelling

[2] https://iea-etsap.org/
[3] https://climatecompatiblegrowth.com/

## Tuesday 19 November 2024, 9.30am-04.00pm

Morning session 9.30am – 1.00pm

*Tour of the table*

The TIMES-Pakistan starter model

- Overview of the model structure and sectoral description
- Default base year data
- Naming conventions, color coding, legend sheets
- VEDA 2.0 templates (base year, technology repositories and regular scenarios)

*Lunch break 1.00pm-2.00pm*

Afternoon session 2.00pm – 4.00pm

Hands-on session with the TIMES-Pakistan starter model (Part I)

- Importing the model in VEDA
- Browsing the model structure
- Running the model and checking results

## Wednesday 20 November 2024, 9.30am-04.00pm

Morning session 9.30am – 1.00pm

Hands-on session with the TIMES-Pakistan starter model (Part II)

- Changing input assumptions for the base year calibration
- Building alternative scenarios
  - Technology data
  - Policy assumptions
  - Others
- Analysis model results

*Lunch break 1.00pm-2.00pm*

Afternoon session 2.00pm – 4.00pm

Hands-on session with the TIMES-Pakistan model (Part III)

- How to work with user constraints in TIMES
- Exercise with a simple user constraint in VEDA 2.0

*Wrap up and Closing remarks*

**Thursday 21 November 2024, 9.30am-04.00pm**

Optional post-training session

Our trainer is available to work together with EPRC experts on (customizable):

- Data collection / elaboration
- Continuing discussing on modelling approaches
- Model implementation
- Q/A and problem solving
- Etc.

*Table 2: Draft agenda – Training session I*

Approximately one week in advance from the training, the E4SMA team will share with EPRC trainees a list of software and hardware requirements and installation instructions, and, when necessary, will provide (virtual) support to the installation. The installation of all software packages must be completed before the starting of the training session, as to avoid the risk of delaying the whole training event.

Furthermore, if needed, temporary software licences will be provided to all training participants. A list of software and hardware requirements and installation instructions will be provided in advance to trainees.

An additional training session has been also considered, as option. This session is tentatively scheduled in May 2025, right after the delivery of first set of customised PAK-IEM 2.0 base year templates (Deliverable 3), and the definition of scenarios (Deliverable 7). This training session may serve EPRC modellers (and others), to enhance modelling capacities in TIMES, and getting familiar with the customised model. This session has a preliminary duration of 2-3 days and can be either held virtually or in presence (still to be determined).

### *2.4.3 Task 4.3: Practical training to experts assigned to operate the PAK-IEM 2.0 model*

This subtask aims to provide an effective **handover training** to the EPRC's TIMES modelling team.

Trainees will familiarise with the PAK-IEM 2.0 model, by browsing existing assumptions, learning how to run the scenarios and analyse results, to maintain the model, and learning how to modify or update input assumptions and build new scenarios. The session will therefore focus on the hand-over of the PAK-TIMES 2.0 model, including:

i. Practical sessions on how operating the model
ii. Develop new scenario analyses
iii. Update key assumptions

This practical training will be tentatively delivered in **October 2025**. Training duration still to be defined (up to four days). Our modelling team will prepare and share in advance (2-3 weeks) a training agenda.

### *2.4.4 Task 4.4: Coaching for EPRC experts to run the PAK-IEM 2.0 model*

This subtask aims to facilitate the EPRC TIMES team's continuous involvement in the development of the PAK-IEM 2.0 model and to offer continuous support. It consists in a series of **online/virtual**

**support and help desk** to ensure continuous access to problem solving/clarifying questions that may occur.

The content of each session will be decided based on model development stage and the demands from the EPRC team. In the initial phase of the project these will consist in weekly (~1 hour) sectorial sessions focused on discussing the PAK-IEM starter model structure, Pakistan energy system specifics, exploring customisation ideas and guide data collection.

This coaching support may also include (based on the request):

- Modelling examples/input data sheets.
- Short additional documentation.
- Detailed explanation of model sector/sub-sectors design and data.
- Co-design of the customised model (new/changing input data, assumptions, constraints, etc.).
- Guided hands-on sessions on how to update/review data and change the sectors.

### *2.4.5 Task 4 deliverables*

The task 4 deliverables are:

- D11: Agenda and slide deck/training material, presentation for first training
- D12: Agenda and slide deck/training material, presentation for second training (optional)
- D13: Agenda and slide deck/training material, presentation for the final training

# 3 Gender Mainstreaming (Optional tasks)

This project will also provide considerations about gender equality implication in the long-term energy planning.

In this task an approach of “Gender mainstreaming” will be proposed. This is essential to design more solid long-term clean energy scenarios, which consider diverse perspectives and needs, promote inclusive decision-making, equitable access to resources, and a just transition that benefits all.

List of potential activities to incorporate gender aspects into long-term energy planning:

- **Gender-Responsive Data Collection:** Review EPRC's existing data sources and identify gender data gaps; Provide recommendations on designing gender-responsive data collection methods; Develop a template or checklist to help EPRC assess the gender-responsiveness.
- **Gender-Inclusive Energy Modelling and Scenario Development:** Collaborate with EPRC to incorporate gender-responsive assumptions and parameters into the long-term energy modelling; Analyse the gender-differentiated impacts of various energy transition scenarios, such as the effects on women's access to clean cooking solutions; Provide guidance on how to interpret the modelling results from a gender perspective.
- **Gender-Responsive Policy Briefs and Action Roadmaps:** Review EPRC's existing policy briefs and action roadmaps to identify opportunities for integrating gender considerations; develop guidelines for EPRC to ensure gender-responsive language, analysis, and recommendations in their policy outputs; and provide capacity-building support to EPRC

# 4 Project team

The project team is composed by the following members:

- **Project coordination:** Corentin Amiraut (IED)
- **TIMES modelling and capacity building** (E4SMA):
  - Alessandro Chiodi
  - Maurizio Gargiulo
  - Alessia Elia
  - Tommaso Pillon
- **Sectorial experts:**
  - Roberta Orlando (Power sector)
  - Yann François (Biomass)
  - Bruno Chretien (Energy efficiency & industry)
  - Dominique Breuil (Transport)
  - Henri Beaussant (Oil and Gas)
- **Gender expert:**
  - Marine Cornelis

Below an overview of the team structure.

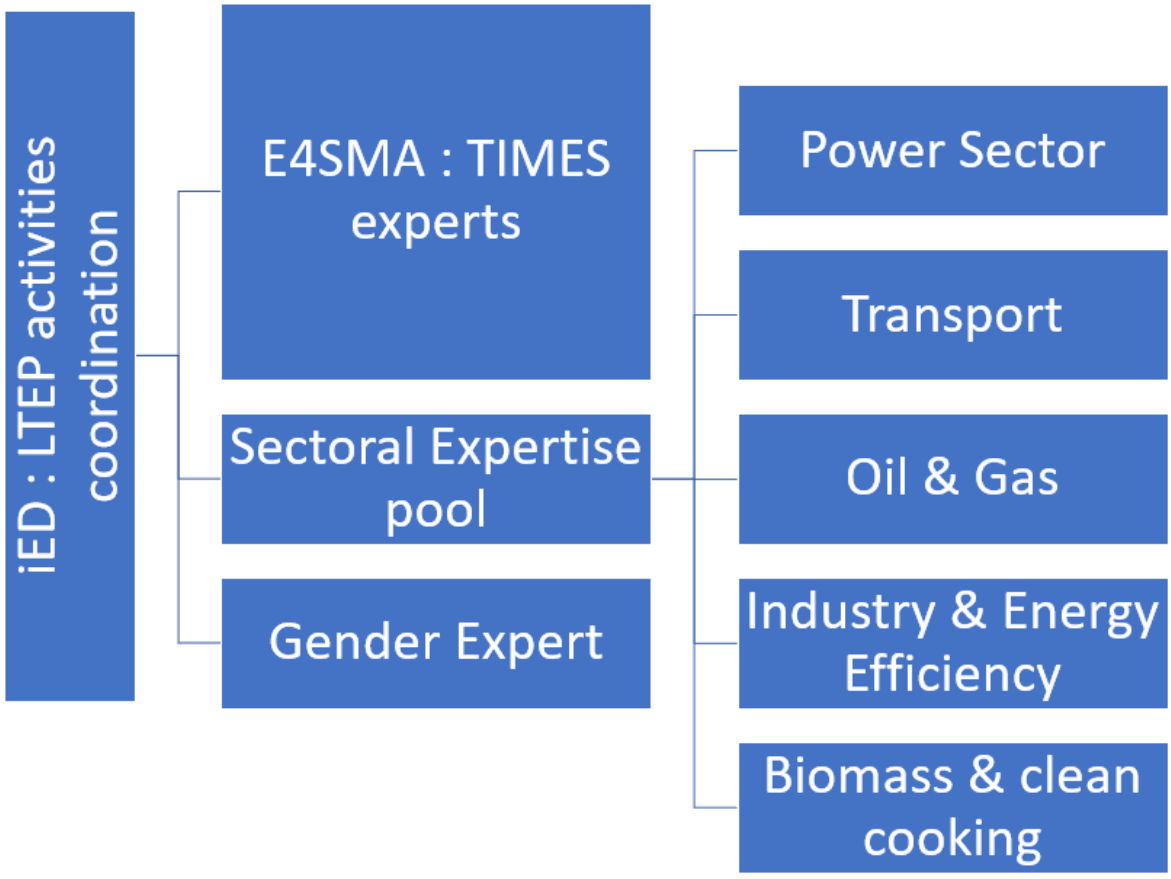


*Figure 2: Structure of the project team*

# 5 Project plan

The following GANTT diagram summarises the action plan for the project. Compared to preliminary allocation (as shown during the kick-off meeting), some adjustments were made to accommodate requests and discussion points of EPRC.

In particular,

- Task 4.2 training session was anticipated to November 2024, as to speed-up the learning process on the model, since the beginning of the project
- Technical weekly meetings were established to enhance participatory approach during the model development process.
- A general revision of timelines.

The start and the end dates of single subtasks have been designed to ensure the best use of the available project resources. In case of any deviation from the project schedule, GIZ and EPRC project team will immediately be informed. Mitigation measures will be proposed to address any possible delay in action, without compromising the quality of project outputs and deliverables.

| | Oct-24 | Nov-24 | Dec-24 | Jan-25 | Feb-25 | Mar-25 | Apr-25 | May-25 | Jun-25 | Jul-25 | Aug-25 | Sep-25 | Oct-25 | Nov-25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Task 1: Developing national expert community for TIMES modelling** | | | | | | | | | | | | | | |
| **1.1** Developing the agenda of the national workshop | **D1** | | | | | | | | | | | | | |
| **1.2** In person participation in the national workshop | | **M1/ D2** | | | | | | | | | | | | |
| **Task 2: Development of a new TIMES model for Pakistan** | | | | | | | | | | | | | | |
| **2.1** Development of a national integrated energy model | | | | | | | **D3** | | | | | | **D4** | |
| **2.2** Data preparation and assumptions | | **D5** | | | | | **D6** | | | | | | | |
| **Task 3: Develop two ambitious scenarios with the new TIMES model for Pakistan** | | | | | | | | | | | | | | |
| **3.1** Scenario definition | | | | | | | | **D7/ D8** | | | | | | |
| **3.2** Running of two scenarios with the model | | | | | | | | | | | | | **D9** | |
| **3.3** Analysis of scenario results | | | | | | | | | | | | | | |
| **3.4** Policy briefs and action roadmap | | | | | | | | | | | | | | **D10** |
| **Task 4: Capacity development for TIMES in Pakistan** | | | | | | | | | | | | | | |
| **4.1** Involve Pakistan experts to ETSAP and/or CCG community | | | | | | | | | | | | | | |
| **4.2** Practical training(s) on TIMES modelling for Pakistan experts | | **M1/ D11** | | | | | | **M2/ D12*** | | | | | | |
| **4.3** Practical training to experts assigned to operate the PAK-IEM 2.0 model | | | | | | | | | | | | | **M3/ D13** | |
| **4.4** Coaching for EPRC experts to run the PAK-IEM 2.0 model | | | | | | | | | | | | | | |

* Optional

*Table 3: Project Plan*

The following table describes the project deliverables and a summary of key meetings. Additional meetings may be planned, based on agreement between project parties.

| **Deliverables** | **Due date** |
|---|---|
| **Deliverable D0**: Inception report | 17/10/2024 |
| **Deliverable D1**: Workshop agenda | Oct-24 |
| **Deliverable D2**: Workshop slide deck and presentations during the workshop | 18/11/2024 |
| **Deliverable D3**: PAK TIMES 2.0 model base templates | Apr-25 |
| **Deliverable D4**: PAK TIMES 2.0 model manual | Oct-25 |
| **Deliverable D5**: Data templates for data input into the model | Nov-24 |
| **Deliverable D6**: Filled data tables and data quality report | Apr-25 |
| **Deliverable D7**: Slide deck and presentation of the two scenarios, describing assumptions and storylines | May-25 |
| **Deliverable D8**: Data tables with scenario assumptions | May-25 |
| **Deliverable D9**: Scenario outputs tables for two scenarios | Oct-25 |
| **Deliverable D10**: Technical report and slide deck on scenarios analysis | Nov-25 |
| **Deliverable D11:** Agenda and slide deck/training material, presentation for first training | Nov-24 |
| **Deliverable D12**: Agenda and slide deck/training material, presentation for second training (optional) | May-25 |
| **Deliverable D13**: Agenda and slide deck/training material, presentation for the final training | Oct-25 |
| **Meetings** | **Due date** |
| **Kick-off Meeting (Virtual)** | 02/10/2024 |
| **Meeting 1**: In-person participation at workshop & practical training on TIMES modelling for Pakistan experts | 18-21/11/2024 |
| **Meeting 2:** Practical training on TIMES modelling for Pakistan experts (virtual or in person) | May-25 |
| **Meeting 3:** In-person practical training in Pakistan to experts assigned to operate the PAK TIMES 2.0 model | Oct-25 |

*Table 4: Project deliverables and meetings schedule*

# 6 Communication and documentation

Our project team aims to maintain a smooth communication and coordination with the EPRC, GIZ and any other relevant institution involved in the project. In order to facilitate the interaction a number of measures will be implemented, with the aim of to ensure the most effective and smooth collaboration between parts.

The measures include:

i. Identification of project management **focal points**: Corentin Amiraut and Alessandro Chiodi will represent the focal point from the consultancy side.
ii. Setting up **monthly status meetings** between the consultant, the EPRC and GIZ project teams. Written minutes after each of the meeting will be produced.
iii. Establish a **communication platform** to facilitate data and information exchange, setting up a shared space in MS Teams (provided by GIZ).
iv. Setting up weekly/bi-weekly **technical meetings** between the consultant, and the EPRC modelling team to discuss data assumptions, coaching with the model and provide when needed technical helpdesk.
v. Prepare **action items** with expected timelines and key responsible persons.
vi. Establish a common **sharing space** for the model (e.g. Teams, others). This will provide access to all modelers to the most up-to-date version and allow tracking development actions.
vii. Establishing exchange and cooperation with consultants from the **other GIZ (and/or other donors) projects** (e.g., LT-LEDS) will be important. Meetings and exchange events will be organised once the consultants are on board. At this purpose on October 29th, a meeting with USAID has been organised to discuss coordinated support to EPRC.

# 7 Risks and mitigation strategies

Some potential risks factors have been identified and some pre-determined mitigation actions are identified:

H=High, M= Moderate, L=Low

| Risk | Probability | Impact | Mitigation actions |
|---|---|---|---|
| Low level of engagement of relevant stakeholders | M | H | The project team will do its best to engage experts and will approach the work in a proactive way so to "trigger" the discussion. Our team will propose solutions to fill possible gaps caused by the failure of participation/engagement of the stakeholders, in order to avoid delay in the workplan. |
| Lack of continuity of key staff | L | M | GIZ project team is immediately informed about a discontinuity. Substitutes for key roles will be identified within the project team. Change of key staff is subject to GIZ's approval. |
| Data gaps | H | M | Our team has wide experience in data collection, report comparison and analysis dataset. Other (similar) experiences, benchmarks with specific key performance indicators (KPIs), and available databases can be used to fill data gaps. Furthermore, a team of sectorial expert has been identified for most important areas. Solutions and approaches will be proposed to the EPRC and GIZ before the implementation. |
| Dynamic institutional set-up | L | L | We will maintain a flexible and pragmatic approach towards the project implementation and be ready to adapt to an evolving situation. Clear goals and objectives will be shared with institutional actors, as to facilitate the understanding of the assignment, |
| Deviation from the timeline | M | H | GIZ and EPRC project team is immediately informed about any relevant deviation compared to the original work plan. Mitigation measures will be proposed to address any possible delay in action, without compromising the quality of project outputs and deliverables. |

*Table 5: Possible risks and mitigation strategy*

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