

## **TERMS OF REFERENCE for STUDY: SOCIOECONOMIC IMPACTS of the ENERGY TRANSITION**

### **1. Background**

SHURA Energy Transition Center contributes to decarbonisation of the energy sector via an innovative energy transition platform. It caters to the need for a sustainable and broadly recognised platform for discussions on policy, technological, and economic aspects of the Turkey's energy sector. SHURA's mission is to support the debate on transition to a low-carbon Turkey's energy system through energy efficiency and renewable energy by fact-based analysis and best available data. Taking into account all relevant perspectives by a multitude of stakeholders, the center contributes to an enhanced understanding of the economic potential, technical feasibility and the relevant policy tools for this transition. SHURA Energy Transition Center is founded by European Climate Foundation (ECF), Agora Energiewende and Sabancı University (SU) Istanbul Policy Center (IPC).

In line with this mission, SHURA provides a wide range of knowledge products and services to the Turkish energy community through thematic work clusters of policy, economics, technology and strategic partnership and dialogue across all sectors of the energy system, power, heating and cooling and transport.

Measuring and quantifying the macroeconomic impacts of a multifaceted process, as a low carbon energy transition, will require complex and multidimensional analyses. If the transition is viewed as an absolute necessity with the survival of the planet at stake, then the particulars of economic accounting may seem trivial. On the other hand, the exercise is crucial for an appropriate planning of the transition and setting of priorities and intermediate steps.

Current progress in the energy transition in Turkey has been mainly in increasing the share of renewable energy in power generation. Since 2000, the share of renewable energy in total power generation increased from 24% to just below 40 per cent while power demand increased 2.5-fold. On the energy efficiency side, energy intensity has been declining at an annual rate of more than 1%; however, the rate of decline has to speed up both to realize the vast efficiency potential and to reach the national sector-wide targets set by the government. Despite improvements in power generation, the share of renewables in primary energy supply has remained constant over the same period (at around 12%-13%) due to rapid increase in energy demand and the very limited renewable energy use in transport and heat.

Over the next ten years, energy transition in Turkey is expected to concentrate in further penetration of renewable energy in power generation, reduction in energy intensity along the lines of the National Energy Efficiency Action Plan, and increased electrification of the transport sector. Crosscutting these three areas will be grid development, including flexibility technologies, smart grid applications, and battery storage, as well as industrial development in related areas, such as domestic production of renewable energy and energy efficiency equipment, batteries for electric mobility and power storage, and electric vehicles.

### **2. Objective**

Deepening understanding of the impact of the low-carbon energy transition beyond environmental issues and contributing to an enhanced policy dialogue connecting benefits of improved environmental and energy security with broader socio-economic aspects of the transition.

### 3. Technical Scope

The study will build upon previous work by SHURA, government targets, and other national and international studies, such as the following:

1. Available information on the IPC study on the co-benefits of climate of climate change mitigation in Turkey;
2. International studies on the macroeconomic impact of global low carbon energy transition (such as those performed by IRENA and IEA) and some individual country examples, such as Germany and Japan;
3. SHURA scenarios on power system transformation (by 2030, 50% renewable energy share in power generation and savings in electricity demand of 10% compared to the government baseline);
4. SHURA scenarios for electrical vehicles by 2030 and implications for the distribution grid and demand for EV and grid type batteries;
5. SHURA studies on energy transition finance, non-market monetary flows and the external costs of fossil fuels use in the energy, transport, buildings and industrial sectors.

The study will provide the following output:

1. **Economic Impact:** The net impact of the energy transition on the national value added (value added includes profits generated + wage income), employment, external trade, the current account balance, consumption, investment, and industrial transformation (measured by change in the technology level of manufacturing and change in value added of the manufacturing sector).
2. **Social Impact:** The impact of the energy transition on average wage levels, income distribution, regional income, health (externalities) and environment (externalities).

The effects will be quantified to the extent made possible by available data and expressed in monetary terms. It will be important to show both positive and negative impacts of the transition broken down by sectors and subsectors as needed. The analysis should include direct and indirect effects and sectoral interactions and linkages.

As the energy transition is a long-term process and covers many different areas of energy and the economy, this study will focus on socioeconomic impacts of achieving defined targets set for a specified period of time (2018-2030). Input for targets and scenarios, as well as health and environment externalities, will be provided by SHURA. A comparison of “business as usual” or baseline scenario with a defined transition scenario will form the basis of the study. While the targets will be set for 2030, the methodology should take into account impacts whose effect may be observed with a lag after 2030.

#### Scope of Work

The consultant is expected to perform the following tasks:

Task 1: Together with the SHURA team, establishing a baseline of the current level of low-carbon energy supply in Turkey and developing baseline and energy transition scenarios for 2030.

- Reviewing available data, trends and government targets in energy focusing on renewable energy and energy efficiency.

- Reviewing SHURA and other relevant studies and scenarios for Turkey on energy transition finance, optimum capacity mix, fossil fuel externalities, energy efficiency road map, electric vehicles and enabling technologies.
- Establishing the baseline scenario showing target-year power and primary energy demand, supply and fuel mix.
- Setting targets for renewable energy, energy efficiency and electric vehicles for 2030 for the energy transition scenario and establishing the scenario showing target-year power and primary energy demand and fuel mix.
- Calculating the investments needed for the baseline and energy transition scenarios.

**Task 2: Literature review and establishing an appropriate integrated methodology for measuring socioeconomic impacts of the energy scenarios**

- Reviewing international studies and methodologies on measuring the socioeconomic impacts of the energy transition.
- Developing an appropriate model for Turkey showing positive and negative impacts, interactions and outcomes broken down by sectors, and subsectors as needed.

**Task 3: Obtaining and reviewing the quantitative outcomes**

- Assessing quantitative outcomes on major economic indicators, such as GDP, employment, external trade, wages, current account deficit, income distribution, regional income, and others to be proposed by the consultant.
- SHURA and the consultant will set up an expert group to review the results of the study and make the necessary revisions.

**Task 4: Preparing the final report**

- After the quantitative revisions are made, a final report covering the economic and social impacts of the energy transition will be prepared.
- In addition to methodology and quantitative results, the report will cover implications for economic, industrial, social and human development.

**4. Deliverables and timeline**

The project is due to start in April 2020 and the work and draft final report completed by end-2020. After the draft final report is completed, revisions will be requested as needed depending on expert reviews. The study and the report are expected to be finalized by the end of December 2020. An overview of major tasks, deliverables and timeline is provided in the table below.

<b>Deliverables</b>	<b>Timeline</b>
<b>Contract starts</b>	<b>April 2020</b>
<b>Task 1 &amp; Task 2</b>	
Development of study concept, methodology, identification of data sources	End-May 2020
Establishing baseline and energy transition scenarios	End-May 2020

Forming and engaging an expert reviewer group- sharing study design and getting feedback	End-May 2020
<b>Methodology Report: Baseline, methodology, scenarios, data sources and literature review</b>	<b>Mid-June 2020</b>
<b>Task 3</b>	
Measuring socioeconomic impacts of energy scenarios-modelling and initial results	End-July 2020
Review of initial results with expert reviewer group and revisions	End-August-2020
<b>Results and Discussion Report (Draft)</b>	<b>End-September 2020</b>
Review of Results and Discussion Report by expert group	Mid-October 2020
Revisions by consultant and review by SHURA	End-October
<b>Results and Discussion Report (Final)</b>	<b>Mid-November</b>
<b>Task 4</b>	
Revision of socio-economic impacts final report content plan based on results and reviews, focusing on implications and policy recommendations	End-November
<b>Final Report (Draft): Socio-economic impacts of the energy transition in Turkey</b>	<b>End December</b>
Review of draft report by expert reviewer group, SHURA reviewers and revisions	<b>End December</b>
<b>Final Report: Socio-economic impacts of the energy transition in Turkey</b>	<b>End December</b>

In line with the nature of the study, the consultant will present a detailed proposal including a methodology and table of contents as part of the bid for this TOR. A suggested report outline is provided in the annex of this document. The proposal made by the consultant should also include a detailed and sub-task based timetable.

#### **Annex: Suggested Report Outline**

1. Introduction: The energy transition concept and its relation to socio-economic and human development
2. Studies related to socioeconomic impacts of the energy transition in the World and in Turkey
3. Baseline and energy transition scenarios for Turkey
4. Methodology
5. Results and discussion
  - a. Economic Impact: The net impact of the energy transition on national value added, employment, external trade, the current account balance, consumption, investment, and industrial transformation.
  - b. Social Impact: The impact of the energy transition on average wage levels, income distribution, regional income, health (externalities) and environment (externalities).
  - c. Linkages, interactions and two-way impacts
6. Implications for economic, industrial, social and human development
7. Conclusions and policy recommendations