ESCAP
Economic and Social Commission for Asia and the Pacific

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ASIA CLEAN ENERGY FORUM 2025
2–6 June | ADB Headquarters, Manila

Deep Dive Session: Holistic Approaches to Integrated Energy System Planning: Bridging Technology, Policy, and Sustainability

5 June 2025, 2:00 P.M. – 5:30 P.M., ADB Headquarters, Manila

7 AFFORDABLE AND CLEAN ENERGY

Energy system planning to increase access to energy and to transition to sustainable energy

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The Energy Access Challenge in Asia-Pacific

- **Rural access gap closing but still remains**
- **67 million still unelectrified—most located in large developing countries**
- **Energy access gaps persist in rural, island, and fragile contexts**
- **High reliance on fossil fuels (~85% of primary energy)**
- **Climate vulnerability amplifies energy insecurity**

Why Energy System Planning Matters

- **Aligns national energy development with climate and SDG goals**
- **Supports reliable, affordable, and low-carbon supply**
- **Provides a roadmap for integrated investment and policy**
- **Essential for efficient resource allocation and grid stability**

Integrated Energy System Planning Approach

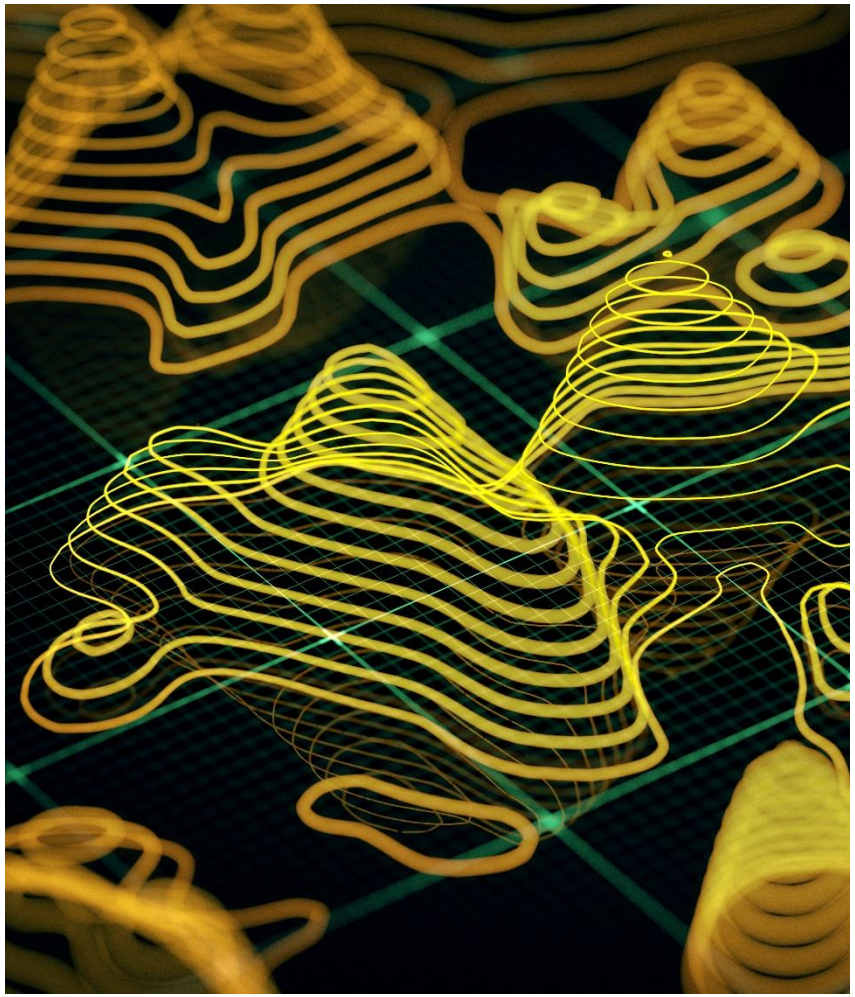
- **Holistic and cross-sectoral:** electricity, cooking, cooling, transport
- **Scenario-based modeling:** accounting for NDCs, technology costs, demand growth
- **Inclusive:** addresses energy poverty and equity
- **Multi-stakeholder driven:** government, private sector, civil society

Importance of Energy Modelling

- Informed decision-making
- Future scenario planning
- Central to planning for SDG and NDC achievement
- Resource optimization
- Social, environmental and economic impact analysis
- Investment guidance

Limitations of Energy Modelling

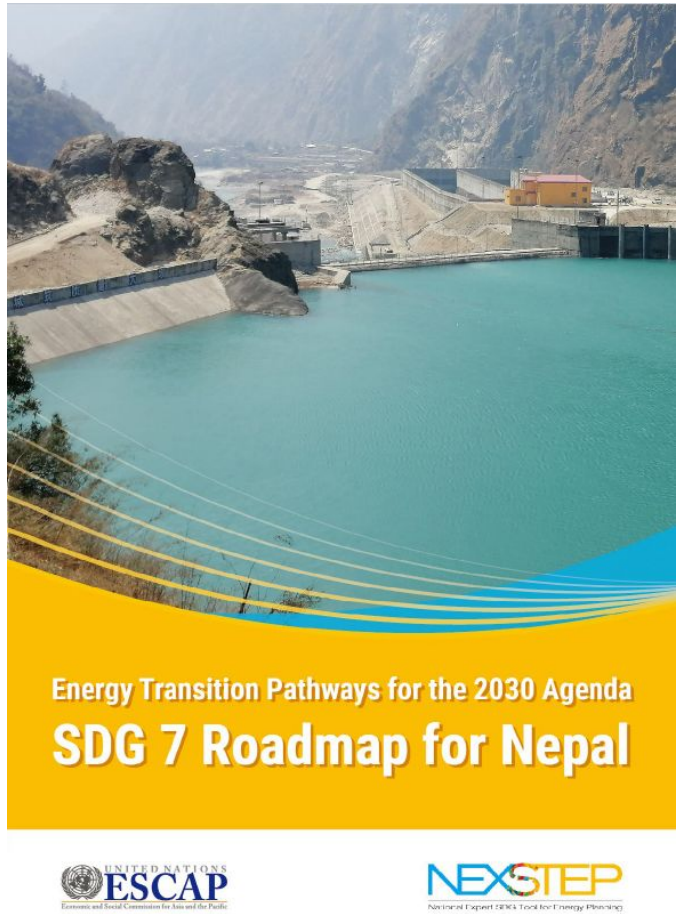
- Static nature of models
- Geographic and sectoral limitations
- Uncertainty and assumptions
- Data quality and availability
- Difficulty in capturing behavioral and social factors
- Complexity and cost



Case Study: Development of SDG 7 Road Map using NEXSTEP

National Expert SDG Tool for Energy Planning

- NEXSTEP is an integrated tool to assist policymakers make informed policy decisions that help achieve SDG7 targets and NDC.
- Forms the basis of SDG 7 roadmap development.
- Based on LEAP model.
- 20 countries partnered with ESCAP to developed SDG 7 Roadmaps to date.
- Focused policy and technology recommendations for each country.



https://www.unescap.org/projects/nexstep

SDG 7 Road Maps

Available at https://nexstepenergy.org/

National level

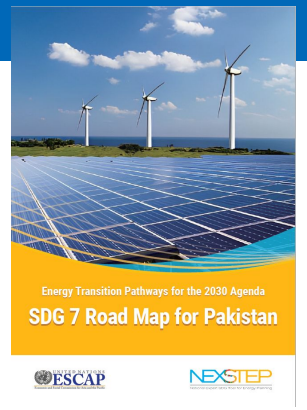
- Armenia
- Bhutan
- Fiji
- Georgia
- Indonesia
- Lao PDR
- Nepal
- Kazakhstan
- Kyrgyzstan
- Kiribati
- Micronesia
- Mongolia
- Pakistan
- Thailand
- Tonga
- Timor-Leste
- Viet Nam

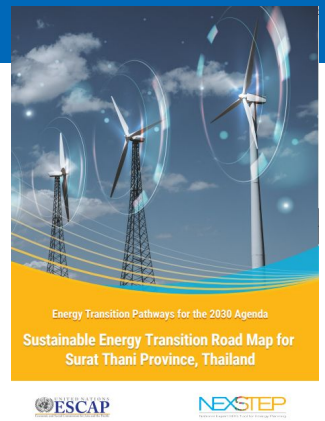
Sub-national level

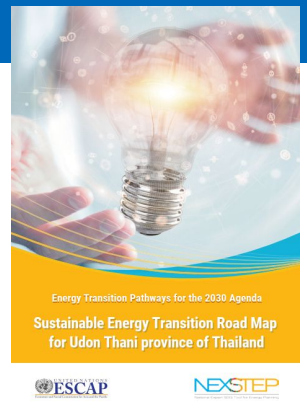
- City of Jakarta, Indonesia
- Iskandar, Malaysia
- City of Borongan, Cauayan and Ormoc of the Philippines
- Provinces of Thailand - Surat Thani, Udon Thani and Chiang Rai

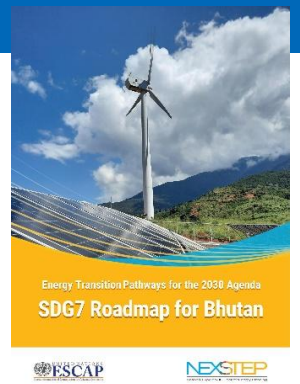
Ongoing

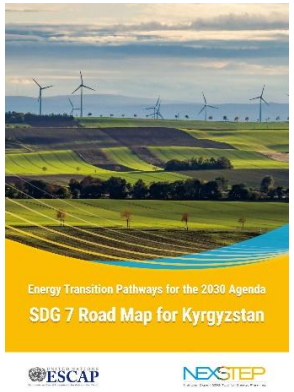
Bangladesh; Tajikistan; Uzbekistan

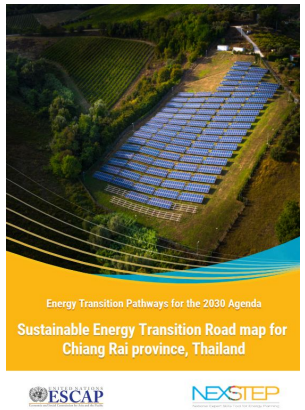


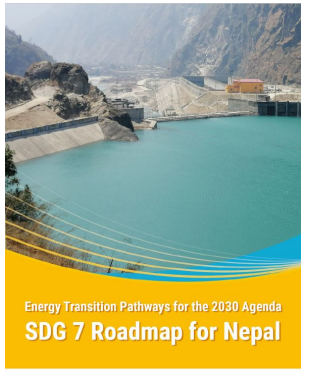


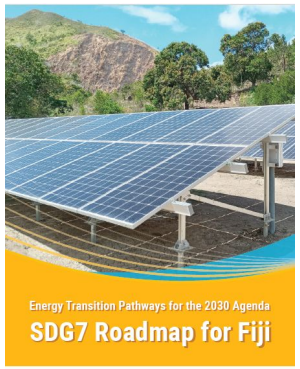


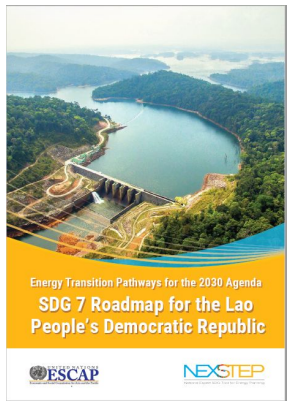


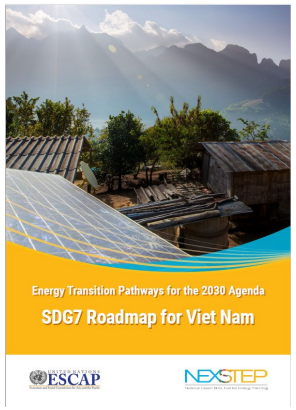


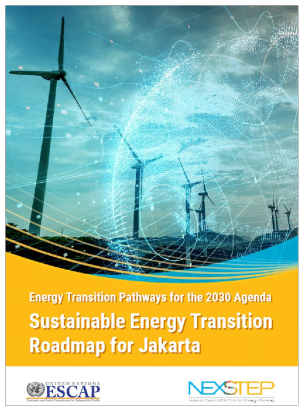


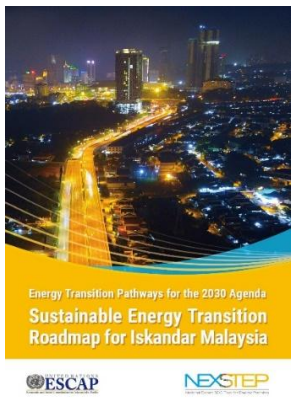


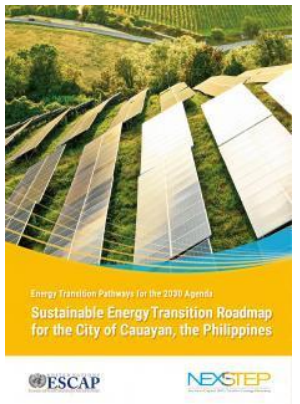


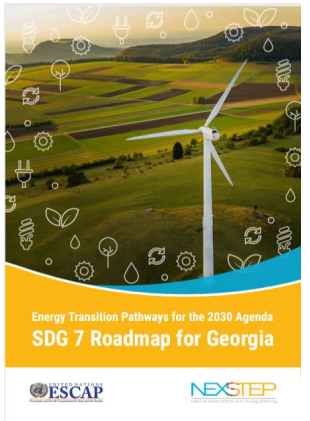


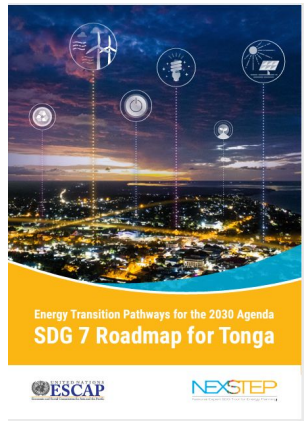




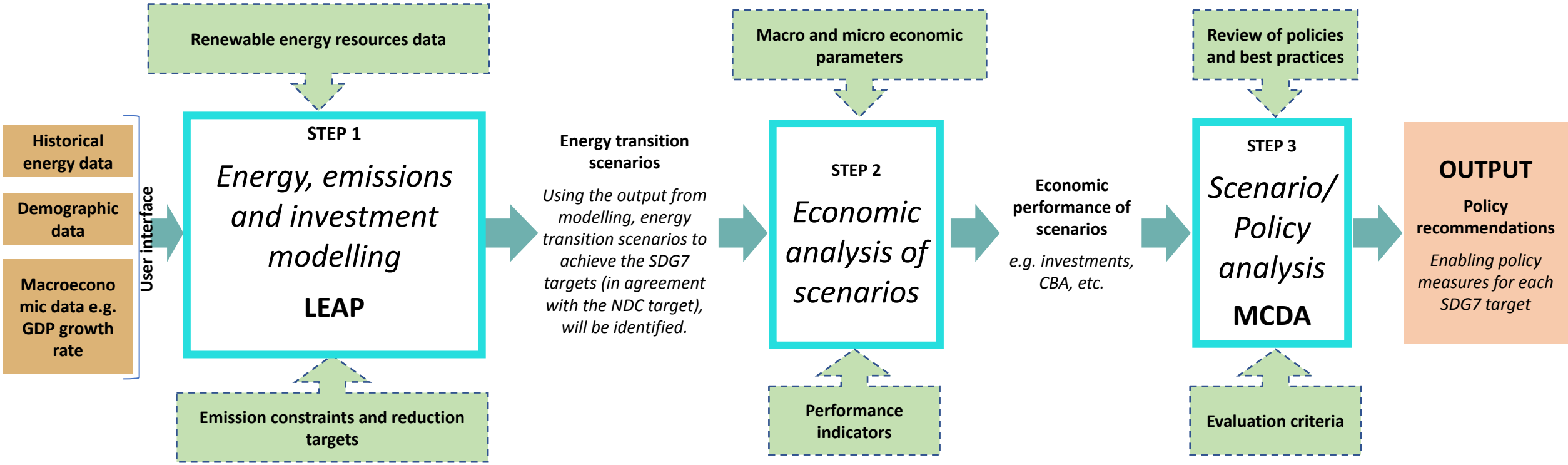








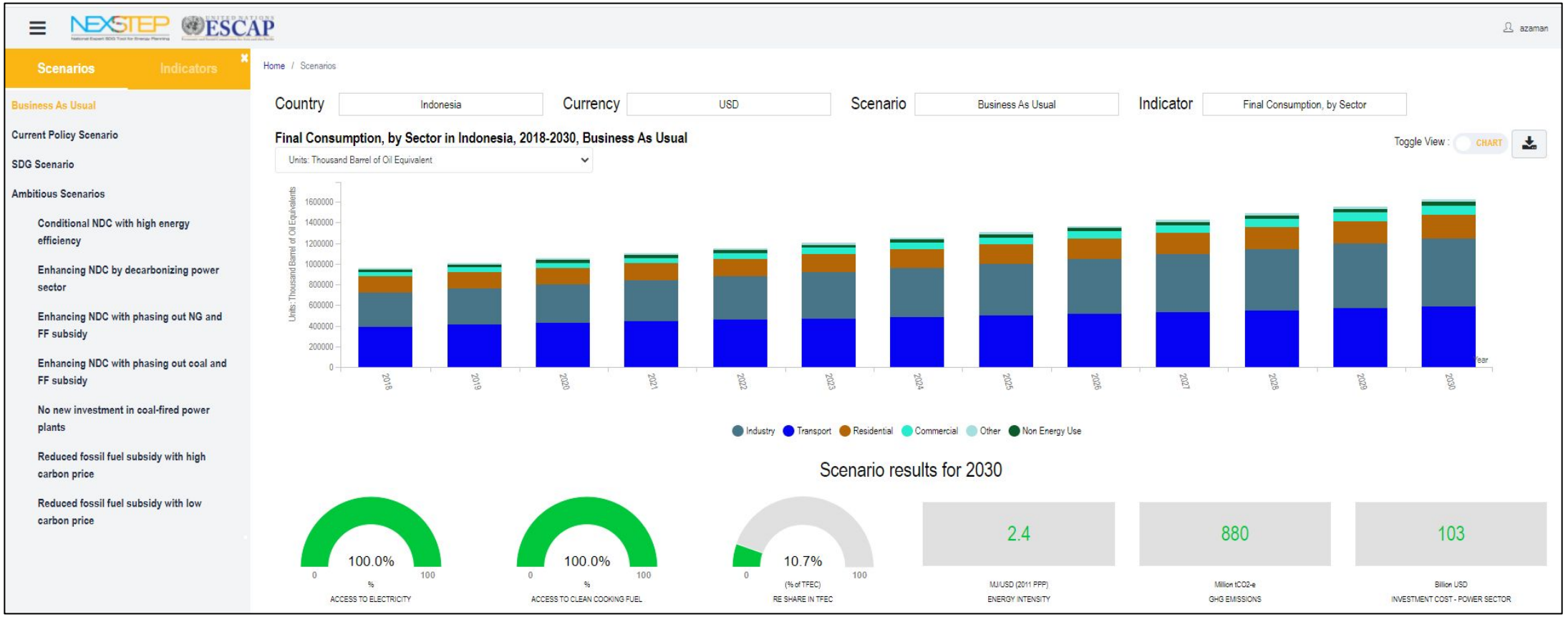
NEXSTEP methodology



The unique feature of this methodology is the backcasting approach for energy and emissions modelling which is important for the case of SDG7 planning.

Expected output

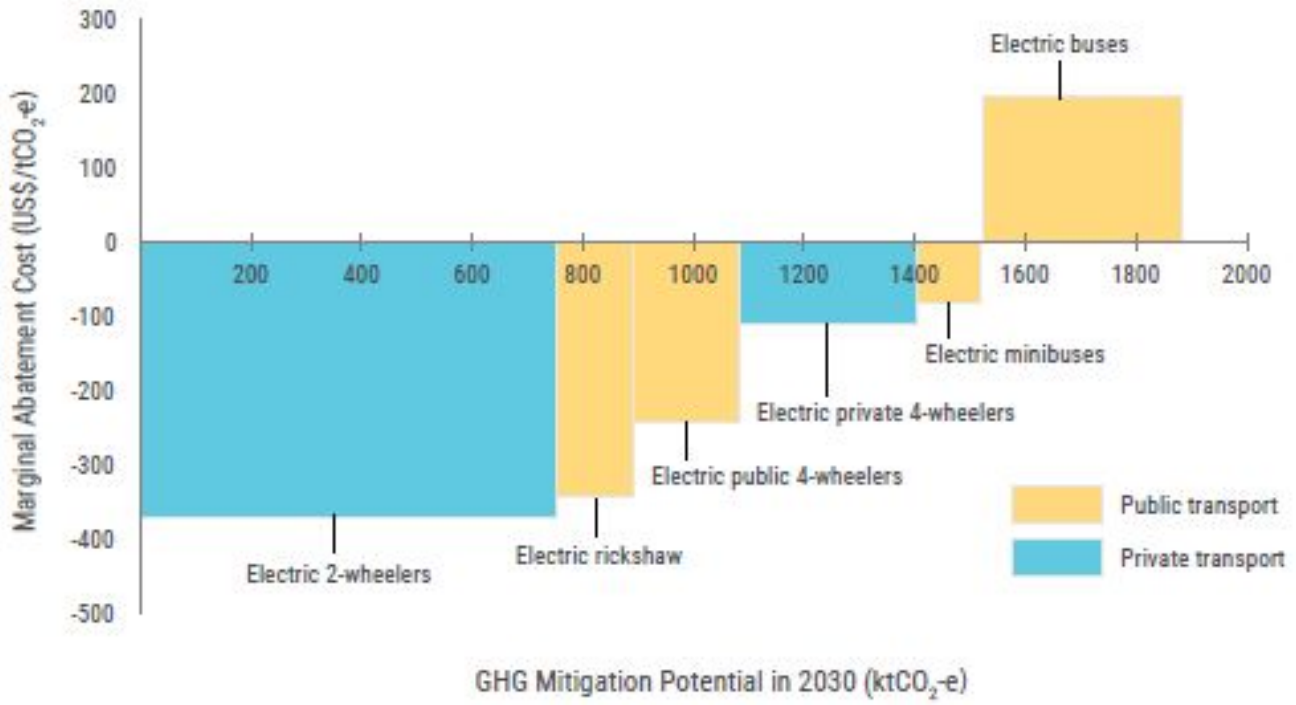
- Models a range of energy demand and supply scenarios –e.g. business as usual, SDG and ambitious scenarios
- Technology identification and prioritisation for each scenario
- Policy options to achieve the targets of SDG7 and NDC
- Investment estimation and cost-benefit analysis for each scenario
- Marginal abatement cost curve (MACC)
- Levelized cost of Electricity (LCOE)
- NEXSTEP online portal with results and policy recommendations



- Data from LEAP are extracted and uploaded on to the portal
- Can be accessed from anywhere
- Data and graphs can be downloaded
- Policy recommendations can be viewed
- Customised reports can be generated

Better policy decisions - Marginal abatement cost curve (MACC)

- SDG7 Road Map presents Marginal Abatement Cost Curves (MACC)
- MACCs are a strong tool to compare different GHG mitigation technologies
- They identify the most economic ways to reduce emissions from the energy sector



NEXSTEP training on energy and emissions modelling

- ESCAP has been developing capacity of policymakers on energy emissions modelling through the NEXSTEP training
- Training has been completed for
  - Pacific
  - Lao PDR
  - Bhutan
  - Nepal
  - Thailand

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