OUTLINE

• Background
• Objective of the Masterplan
• Implementation framework
• Methodology
• Data Requirements
• Key Policy for Scenario Development
• Lessons Learnt & Challenges
BACKGROUND

• The Ministry received to develop the Renewable Readiness Assessment (RRA),
• Upon completion, in 2016-2018, the Ministry received support from IRENA on long-term energy planning,
  • A core team was formed consisting of key institutions in energy planning,
    • Ministry of Natural Resources Energy,
    • Eswatini Electricity Company,
    • Eswatini Energy Regulatory Authority,
    • Central Statistical Office &
    • University of Eswatini (CSER),
  • The core team is responsible data gathering, model runs, close liaison with stakeholders, drafting of reports, presentation to stakeholders
• Energy Masterplan, 2034 was launched on October, 2018,
The Objective of the Energy Masterplan is to:

- Identify the investments of the electricity sector that allows the country to meet the forecasted energy demand with the least cost to the country
- Identify the investment plan over the given period
- A guide for policies, industry, investors, utilities and even the citizens (predictable environment and energy priorities)
  - recognizes the opportunities to be harnessed from locally available resources—renewable energy
- The planning period extended from 2034 to 2050 inline with global Net-zero by 2050 plan,
- In-depth analysis of energy demand and key drivers
- More accurate representation of solar and wind generation in resource planning models,
IMPLEMENTATION FRAMEWORK

Steering committee
- Policy direction and relevance
- “National Energy Masterplan” endorsement

Working team (MNRE, EEC, ESERA, CSO, CSER)
- Training participation
- Data collection
- Execution of analysis
- Writing a report

Models: MAED, MESSAGE, ESST

IAEA
- Training provision
- Analysis support
- Technical reviews

Partners
- IRENA
- UNDP
- SAEP
- Local Stakeholders
Development process

- **Project Inception**
- **Model Calibration (2020/21)**
- **Data Gathering (2019)**
- **Complete Report draft (up to Dec, 2021)**
- **Stakeholder Consultations (Nov-Dec, 2021)**
- **Final draft**
- **Approval (Cabinet)**
Methodology

• The model planning period is 2018 – 2050.
• **Energy Demand Model-MAED** (Model for Analysis of Energy Demand)
  • Different demand scenarios were developed within the given set of assumptions (Population growth rate, electrification rate, GDP growth rate).
• **Energy Supply Model- MESSAGE**
  • MESSAGE is a least-cost optimization planning tool
    ▪ as inputs, it contains demand projections from MAED, and a catalogue of energy supply technology options characterized by parameters.
    ▪ For an assumed/selected reference energy demand projection, energy supply scenarios were developed based on a given set of targets and constraints (technology, environmental, and financial constraints)
• The modelling approach was expanded to incl. non-power sectors (to account for demand for fuels other than electricity).
• Model results include projections on, among others, investments required, electricity production, fuel use and trade, CO2 emissions.
• **Energy Scenarios Simulation Tool (ESST)**
  • to identify and compare scenario and demonstrate benefits or challenges of energy sector development to decision makers.
Data Requirements

Energy Demand
- Energy Balance & Energy Statistics
- Biomass, Electricity, Petroleum & other energy sources
- Residential, Industry, Agriculture, Commerce, Public Sector

Macroeconomic & Demography
- Population, Urbanisation, labour force
- GDP, growth rates, discount rate etc

Power plant cost and resource availability
- Candidates for power expansion (review of each technology: VRE, hydro, bagasse)
- Committed plants and timeline

Infrastructure topology
- Key transborder transmission
- Energy intensities for Sectors?

Planning Reports and Policies
- Studies on new technologies

Electricity data for financial analysis (future)
- Operational cost structure
- Long-term debt
Key Policies for Scenario Development

- To support the development of domestic resources for a target of 50% of the energy mix in the electricity generation
- To strive to provide all households with access to modern energy by 2030.
- To develop 40 MW Solar PV and 40 MW Biomass project by 2024
- To ensure energy security by 2026 (baseload generation capacity)
- To provide adequate supply of energy to drive the economic recovery
Lessons Learnt

- Data Storage
- Documentation model assumptions
  - Centralised energy data system
- Traditional Biomass quantities
  - Other types of bioenergy e.g. cow dung, biogas, wood wastes, charcoal, briquettes etc
  - Measuring efficiency of the modern wood cookstoves
- Data collection from smaller size facilities and small scale auto producers (e.g. small PV installations; non-grid connected generation and stand alone applications like solar PV public lights)
- Allocation of energy consumption end-use sectors in residential
- Financing of Data Collection
- Stakeholder Management
- Confidentiality
- Additional Technical Capacity
CHALLENGES SO FAR

• Impacts on resource planning methods
  • The level of, and uncertainty in, natural gas fuel prices;
  • More stringent environmental regulations on coal-fired power plants;
  • Regulatory changes and technological breakthroughs e.g. geothermal, battery storage
QUESTIONS

THANK YOU!
SIYABONGA!

Ms Nolwazi Khumalo
Senior Energy Officer
Email: khumalonol@gov.sz or nolzntungwa@gmail.com