



**DEVELOPMENT PROCESS OF ESWATINI
ENERGY MASTERPLAN, 2050**

November, 2021

By Energy Planning Team



OUTLINE

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- Implementation framework
- Methodology
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- 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,

Objective of the Energy Masterplan



- **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

Advice

Working team (MNRE, EEC, ESERA, CSO, CSER)

- Training participation
- Data collection
- Execution of analysis
- Writing a report

Models: MAED, MESSAGE, ESST

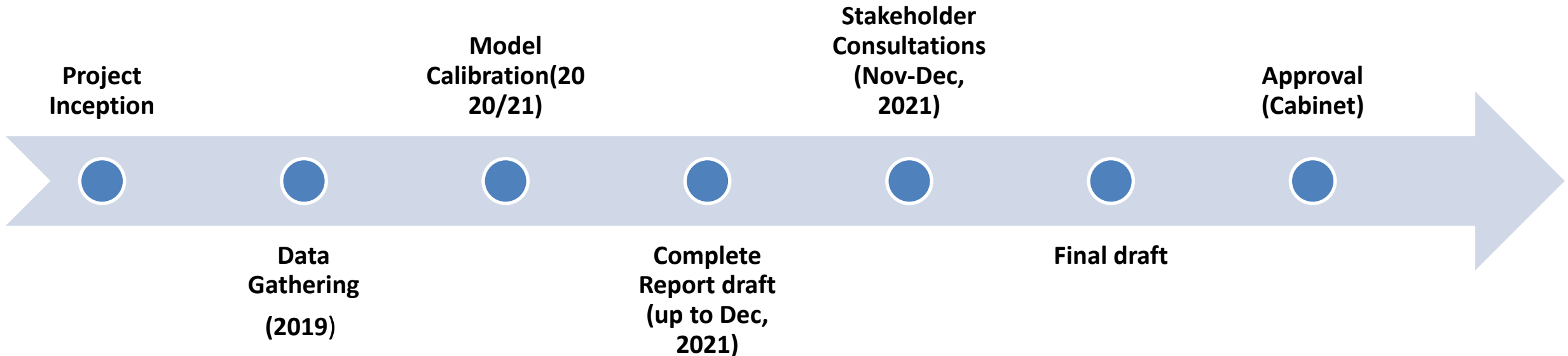
IAEA

- Training provision
- Analysis support
- Technical reviews

Partners

- IRENA
- UNDP
- SAEP
- Local Stakeholders

Development process

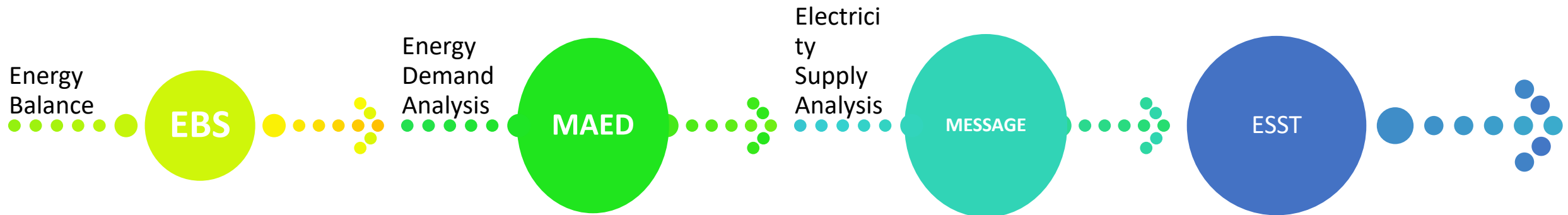


Methodology

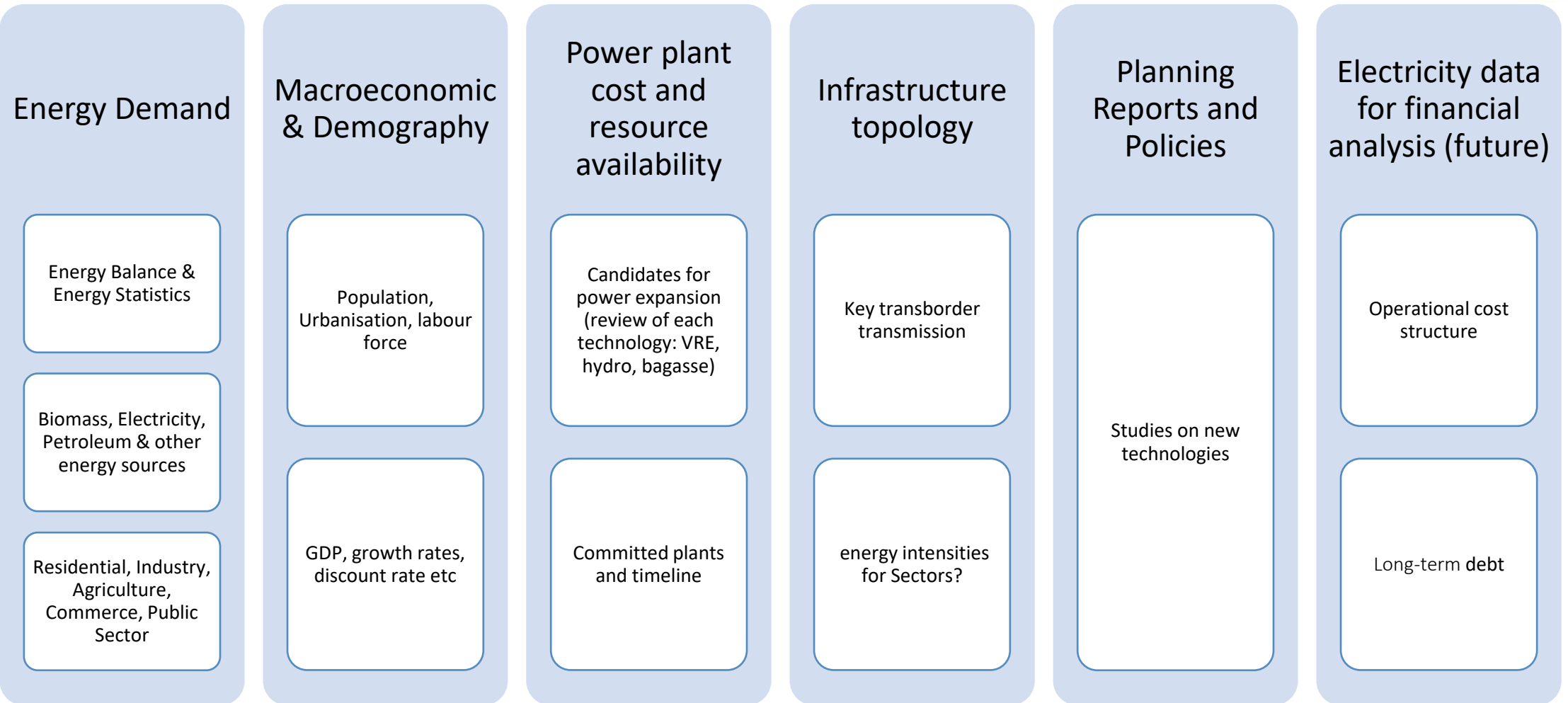


- The model planning period is **2018 – 2050**.
- **Energy Demand Model-MAED** (Model for Analysis of Energy Demand)
 - Different demand scenarios were developed within the given set of assumptions (Population growth rate, electrification rate, GDP growth rate).
- **Energy Supply Model- MESSAGE**
- MESSAGE 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.

ENERGY MODELLING



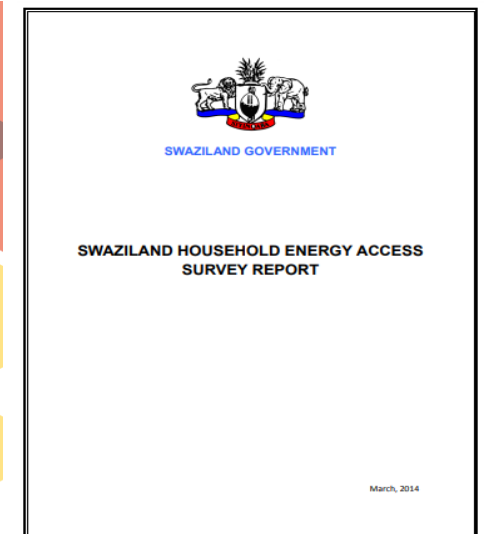
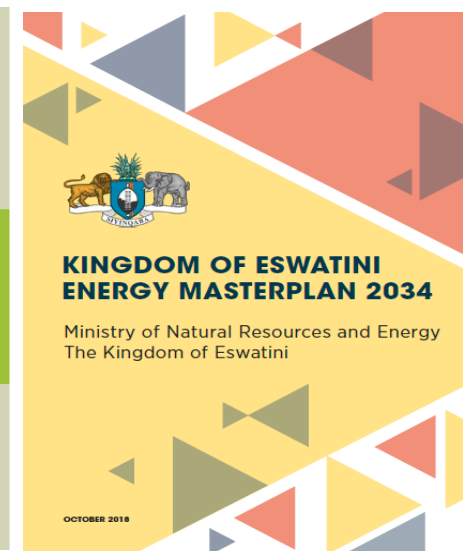
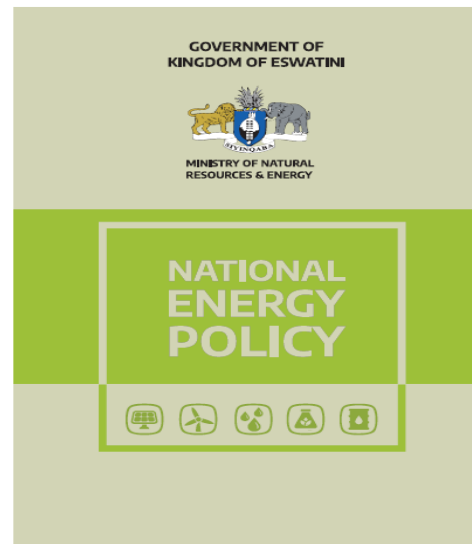
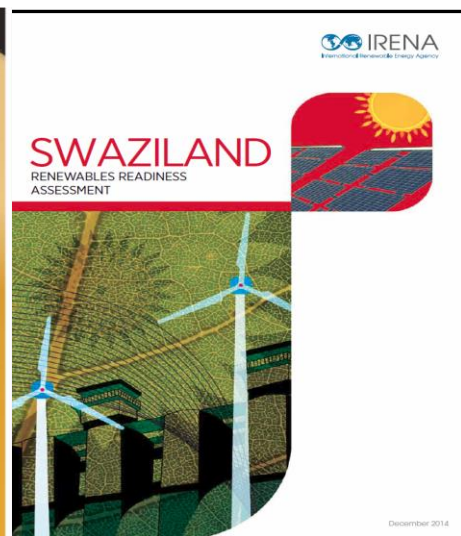
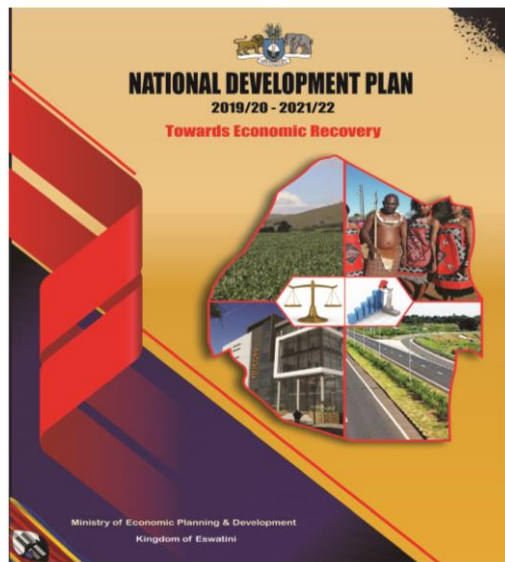
Data Requirements



Key Policies for Scenario Development



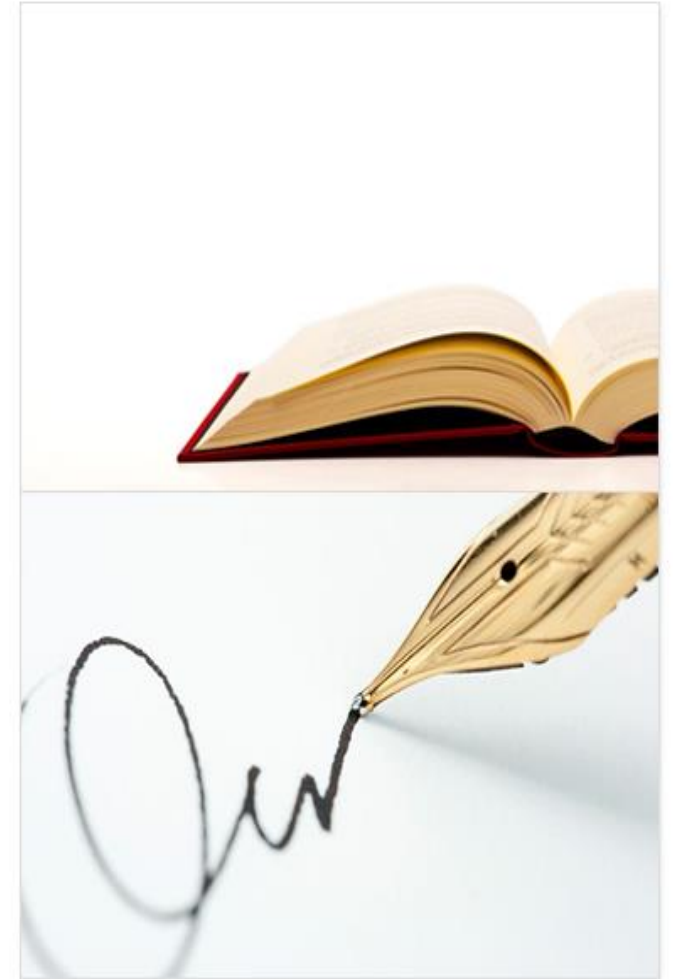
- To support the development of domestic resources for a target of 50% of the energy mix in the electricity generation
- To strive to provide all households with access to modern energy by 2030.
- To develop 40 MW Solar PV and 40 MW Biomass project by 2024
- To ensure energy security by 2026 (baseload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

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