Introduction to Modelling Approach



Glossary: Important Definitions

Metrics

- Quantifiable indicators consistent with three pillars of sustainability
- Measurable in real world and from model outputs
- Either linked to a specific SDG or an "informal" indicator assigned to a SDG
- Not limited to the SDG time frame, go beyond 2030

Long-term Performance Goals (LPGs)

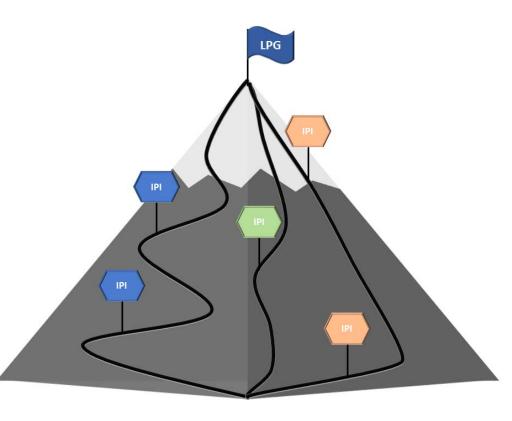
- Stated targets that can be measured
- Inherently globally harmonious
- Defined as outcomes in 2050
- Not all LPG's are necessarily harmonious (achieving one may make achieving another harder)
- Linked to energy related SDG's



Glossary: Important Definitions

Interim Performance Indicators (IPIs)

- Modelled values of metrics at specific points in time along a given pathway
- Used to track progress towards LPGs
- May be LPG measures or other metric
- Either consistent with SDG indicator c an informal indicator assigned to a SE





Glossary: Important Definitions

Storylines

- Narrative descriptions of alternative futures
- Qualitative in nature
- Do not contain strategies for achieving specific goals or outcomes

Scenarios

- Quantified descriptions of a future (often outlined by a storyline)
- Quantification in 3 stages:
 - Quantified Assumptions (Input)
 - Quantified Relationships (Modelling)
 - Quantified Outcomes (Output)



Model Overview and Definition Summary

MODEL **INPUT OUTPUT** (Quantified **Examples** Targets/Goals (Quantified (Quantified **Examples Relationships**) **Assumptions**) **Outcomes**) Demographic Population by region · Price of energy • Energy imports/exports **LPG Integrated** Electricity access • Energy/GDP Model Resource GDP per capita by **Productivity** extraction, exportsregion imports, energy transformation and use GDP per capita Power plant conversion Markets • Energy services per capita Quality of efficiency **LPG Technology** Capital · Share calories from non- Transport fuel economy, etc. Life staples • Labor Crop yields, etc. Water stress Agriculture • Land use Carbon cycle • Fossil fuel, uranium, solar, Atmosphere Resources wind, geothermal, land, Hydrology water and other Oceans • SO₂ NO_x O₃ concentrations • Deforestation/afforestation Environmental **LPG** · Avg. Earth surface temp Sustainability Pollution control Water **Policies** NDCs withdrawals/recharge Water use

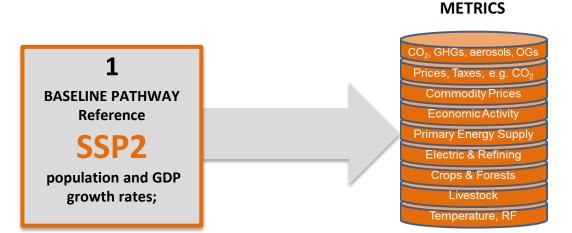


Modelling Approach: Start

Reference Scenario

- Contains baseline assumptions from historical trends and current policies
- Reference Scenario for this project is SSP2 (Shared-Socio-Economic-Pathway) – termed "the middle of the road"

Modelling starts with the reference scenario (SSP2)

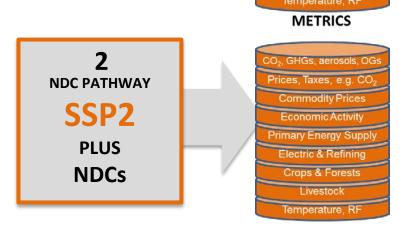




Modelling Approach: Next Step



In a next step Nationally
 Determined Contributions
 (NDCs) are added to the base scenario



METRICS

Prices, Taxes, e.g. C

Commodity Prices

Primary Energy Suppl Electric & Refining

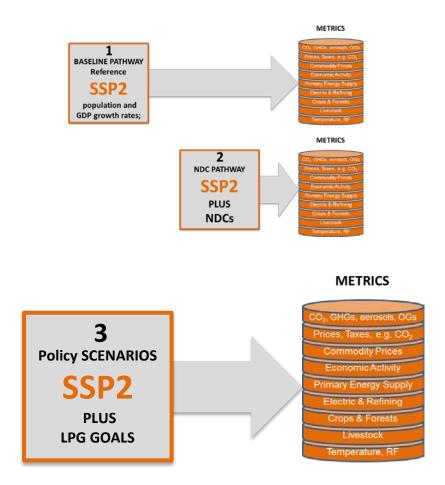
Crops & Forests

Modelling Approach: Policy Scenarios

In a third step policy scenarios are added

Policy Scenario

- 2 types of policy scenarios
 - A <u>policy proposal</u> is given (i.e. a subsidy for technologies x,y,z) and modelled on top of the base scenario
 - Or an <u>LPG</u> can be analyzed.
 For this the target
 range/value of the LPG is
 inserted into the model as a
 constraint





Example Policy Scenarios



