# 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)

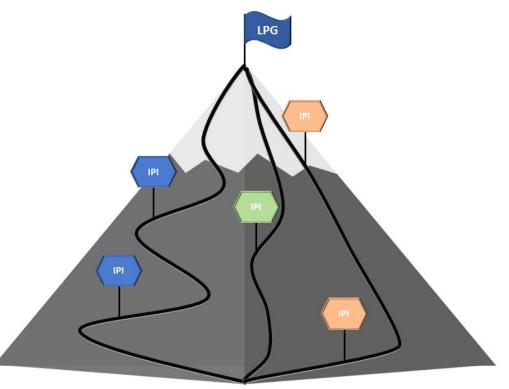
- Stated targets that can be measured
- Inherently globally harmonious
- Defined as outcomes in 2050
- Not all LPG's are necessarily harmonious (achieving one may make achieving another harder)
- Linked to energy related SDG's



## **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**

INPUT (Quantified Assumptions)	Examples	<b>MODEL</b> (Quantified Relationships)	OUTPUT (Quantified Outcomes)	Examples	Targets/Goals
Demographic	<ul> <li>Population by region</li> <li>GDP per capita by</li> </ul>	Integrated Model • Resource	Energy Security	<ul> <li>Price of energy</li> <li>Energy imports/exports</li> <li>Electricity access</li> <li>Energy/GDP</li> </ul>	LPG
Productivity Technology	region <ul> <li>Power plant conversion <ul> <li>efficiency</li> <li>Transport fuel economy, etc.</li> <li>Crop yields, etc.</li> </ul> </li> </ul>	extraction, exports- imports, energy transformation and use Markets Capital Labor Agriculture Land use	Quality of Life	<ul> <li>GDP per capita</li> <li>Energy services per capita</li> <li>Share calories from non- staples</li> <li>Water stress</li> </ul>	LPG
Resources	•Fossil fuel, uranium, solar, wind, geothermal, land, water and other	<ul> <li>Carbon cycle</li> <li>Atmosphere</li> <li>Hydrology</li> <li>Oceans</li> </ul>		<ul> <li>SO<sub>2</sub> NO<sub>x</sub> O<sub>3</sub> concentrations</li> <li>Deforestation/afforestation</li> </ul>	
Policies	<ul><li>Pollution control</li><li>NDCs</li><li>Water use</li></ul>		Environmental Sustainability	<ul> <li>Avg. Earth surface temp</li> <li>Water withdrawals/recharge</li> </ul>	LPG

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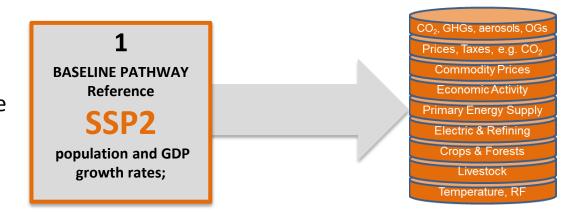


## **Modelling Approach: Start**

## **Reference Scenario**

- Contains baseline assumptions from historical trends and current policies
- Modelling starts with the reference scenario (SSP2)

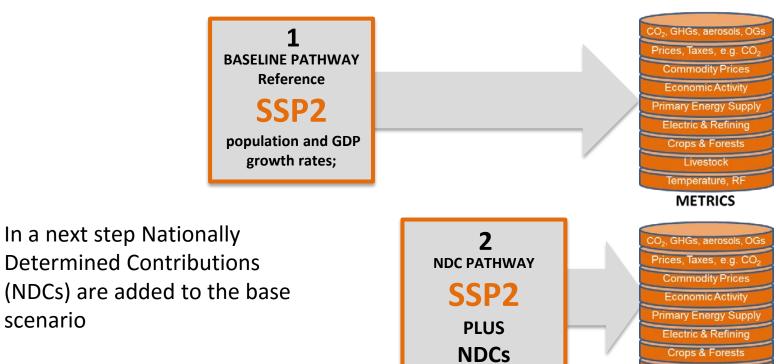
 Reference Scenario for this project is SSP2 (Shared-Socio-Economic-Pathway) – termed "the middle of the road"





METRICS

## Modelling Approach: Next Step



#### METRICS

Livestock Temperature, RF



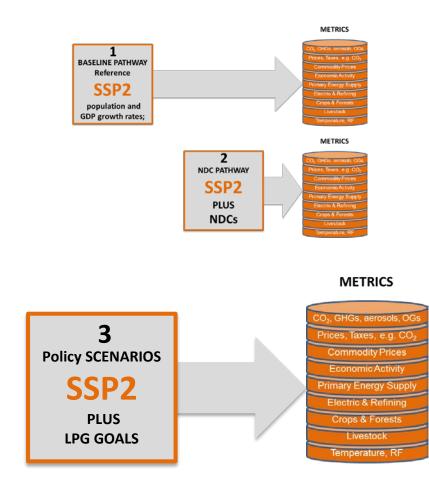
scenario

## **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**

