Hands-on with LEAP

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Saturday

• Data input and modeling in LEAP:
  • Direct data input: constants
  • Expressions: mining GDP – constant – growth rate - interpolation
  • Expressions: planning reserve margin power sector
  • Step(1999,0, 2002,20)
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- Exercise: Mining electricity intensity
  - constant 2000-2010 - double from 2010
  - GDP-mining 10% growth annually

- What is the composition of mining energy consumption in current accounts?
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- Exercise: Power sector
- Change planning reserve margin to 15%
- What is the hydropower share of capacity in 2010?
- Export exogenous capacities to excel and make a graph of hydropower capacity
- Why is this correct without running the model?
Interpretation of Reference Scenario

• Reference scenario – business as usual (BAU) – forecast - projection?
• Focus on long term with historical data to 2003
• Energy scenario – not cost minimisation or cost calculation
• Energy demand – conversion and extraction
Reference Scenario

Assumptions

• Drivers
• GDP – intensities
• Shares
• Expansion plans and resource variables
Primary energy supply: Reference scenario

(adjusted to approximate NEB definitions)
Energy intensities for Malaysia 1999-2020

toe per RM mill

- Blue line: Final energy intensity
- Green line: Electricity intensity (right axes)

Net imports and self-sufficiency - here defined as \( \frac{\text{(indigenous production)}}{\text{(indigenous production} + \text{imports)}} \).
Global Warming Potential (GWP) intensities.

The chart shows the trend of CO2 per GDP and CO2 per capita over the years 1999 to 2019. Both metrics have been increasing over time, with CO2 per GDP remaining relatively stable around 500 tonnes per RM mill, while CO2 per capita has shown a steep increase, reaching接近10 tonnes per capita in 2019.
LEAP reference scenario examples

- New GDP assumptions: sectoral disaggregation
- Transport sector: road transport – air sea rail
- Road transport: passenger – freight
- Passenger: vehicle mileage
- Vehicle fuel economy
LEAP GDP assumptions

- Disaggregated growth assumptions
- Example increase in service sector growth to 8% annually using excel file

- Exercise: Moderate growth: reduce growth rates for manufacturing in total to 4% from 2010 and services to 5% (use excel file)
LEAP fuel economy

- Disaggregated transport sectors
- Example: adjusting basic parameters for cars

- Exercise: Increase fuel economy by 5% in 2010 for cars of all types
LEAP mileage

• What is the interpretation of mileage

• Example: Use a new scenario to compare results - reduce mileage for cars in 2010 and onwards by 10%

• Exercise: Reduce mileage gradually to 16000 km in 2020 and only 18000 for diesel
LEAP scenario

• Construct a scenario containing the elements:
  • Increase the gas extraction of peninsular Malaysia from 2012 with 25%
  • Assume additional hydro capacity in PM and build a new hydro plant in 2015
  • Introduce hybrid cars on gasoline and electricity: assume fixed fuel shares e:25%
  • Standards reduce specific consumption for ac by 25% gradually from 2005 to 2020