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Update on APERC Activities and Energy Modelling for the 7th Outlook

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APERC
Asia Pacific Energy Research Centre

APEC
Asia-Pacific Economic Cooperation

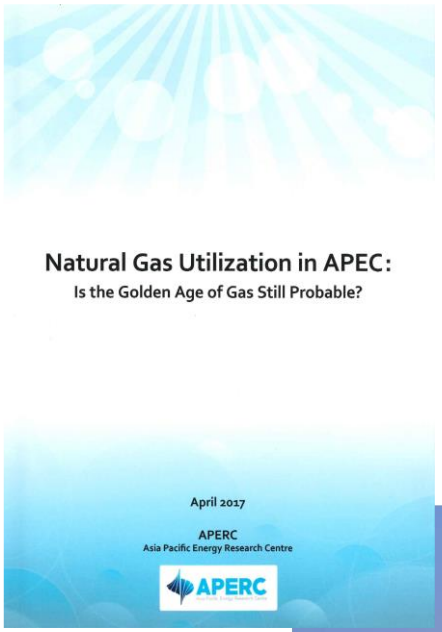
Overview of APERC Events Since April 2017

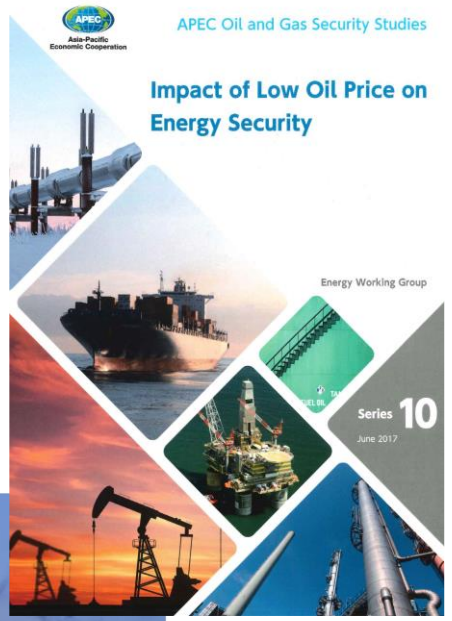
- May
  - APERC Annual Conference and Joint Symposium with IEEJ (Tokyo)
- June
  - 3rd Oil & Gas Security Network (OGSN) Forum (Irkutsk)
- August
  - Peer Review on Low Carbon Energy Policies (PRLCE) in Papua New Guinea (Port Moresby)
- September
  - 1st Low-Carbon Model Town Symposium (Jakarta)
- October
  - LNG Producer-Consumer Conference, co-hosted with METI with more than 1,200 participants (Tokyo)

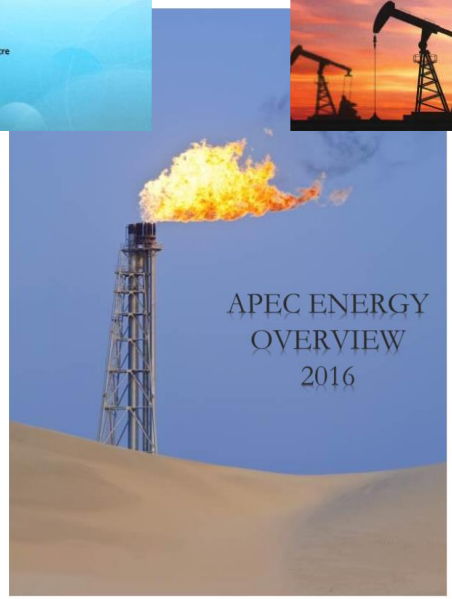
Overview of APERC Events Since April 2017

Overview of APERC Publications Since April 2017

- Publications
  - April
    - Natural Gas Utilization in APEC: Is the Golden Age of Gas Still Probable?
  - May
    - APEC Energy Overview 2016
    - Superiority of LPG - A Disaster-Resistant Energy Source (APEC Oil and Gas Security Studies Series 9)
    - Geopolitical Implication of Iran Nuclear Agreement

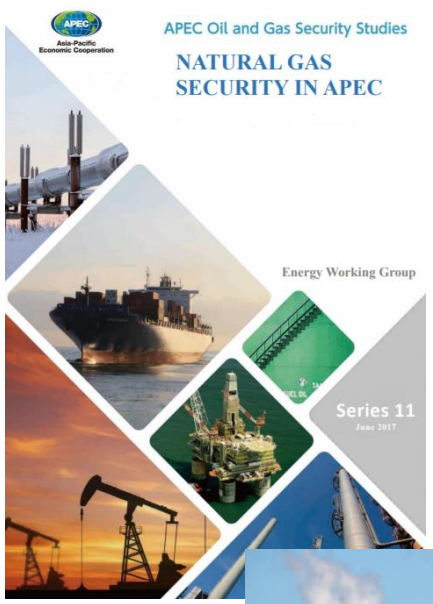


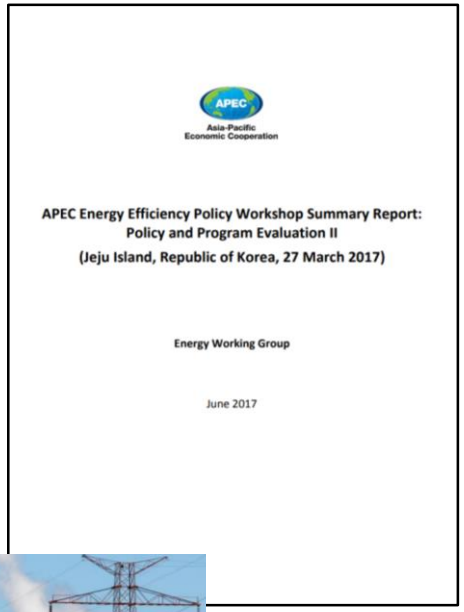


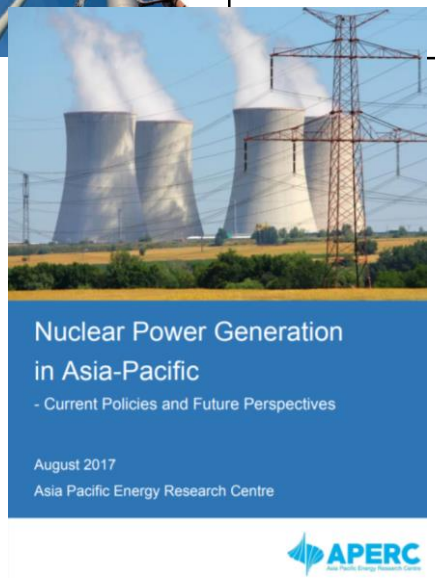


Overview of APERC Publications Since April 2017

- Publications (continued…)
  - June
    - Impact of Low Oil Price on Energy Security (APEC Oil and Gas Security Studies Series 10)
    - Natural Gas Security in APEC (APEC Oil and Gas Security Studies 11)
    - APEC Energy Efficiency Policy Workshop Summary Report: Policy and Program Evaluation II
  - August
    - Nuclear Power Generation in Asia-Pacific







1. Overview of the 7th Outlook Modelling Approach & Timeline

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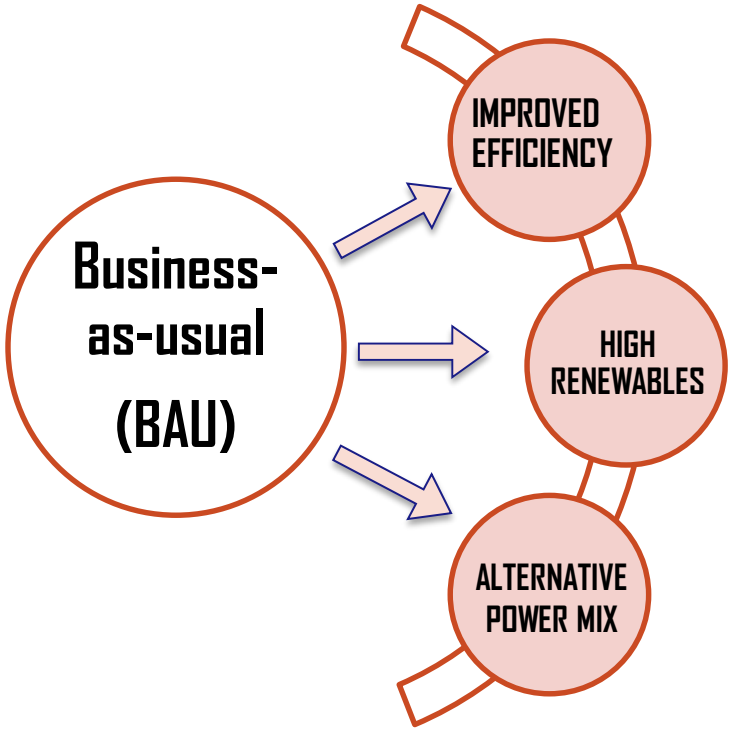
7th Edition integrates renewables, enhances supply

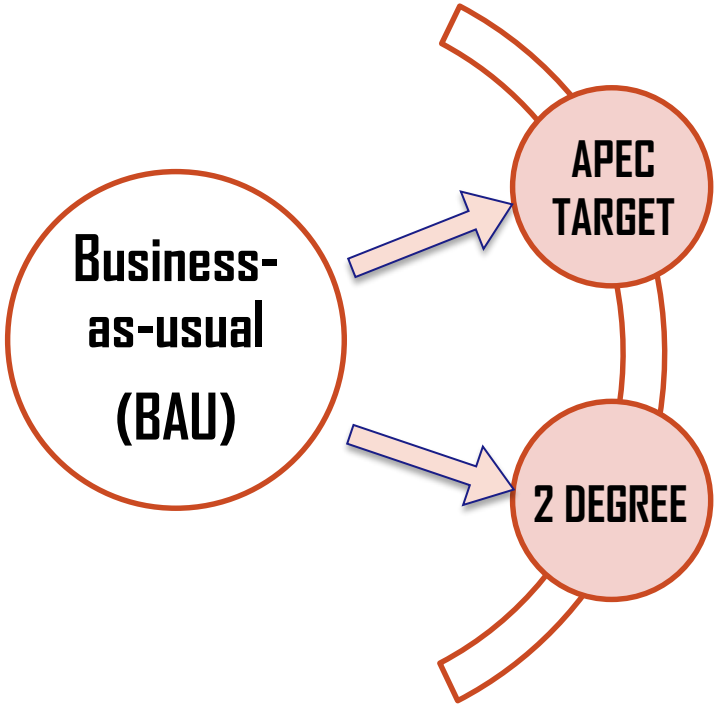
- Extended the outlook period to 2050
- Integrated renewable energy analysis with the demand and electricity models
- Added a supply model and an integrating module
- Increased collaboration with economies, for instance modelling assumptions review process
- 2 alternative scenarios
    - ***APEC Target***: integrates APEC energy efficiency and renewables aspirational goals
    - ***2-Degree Scenario (2DS)***: investigates technology transition pathways to reduce carbon dioxide emissions

7th edition of the Outlook will produce two alternative scenarios through 2050

Outlook 6th edition scenarios (to 2040)



Outlook 7th edition scenarios (to 2050)



Alternative scenarios

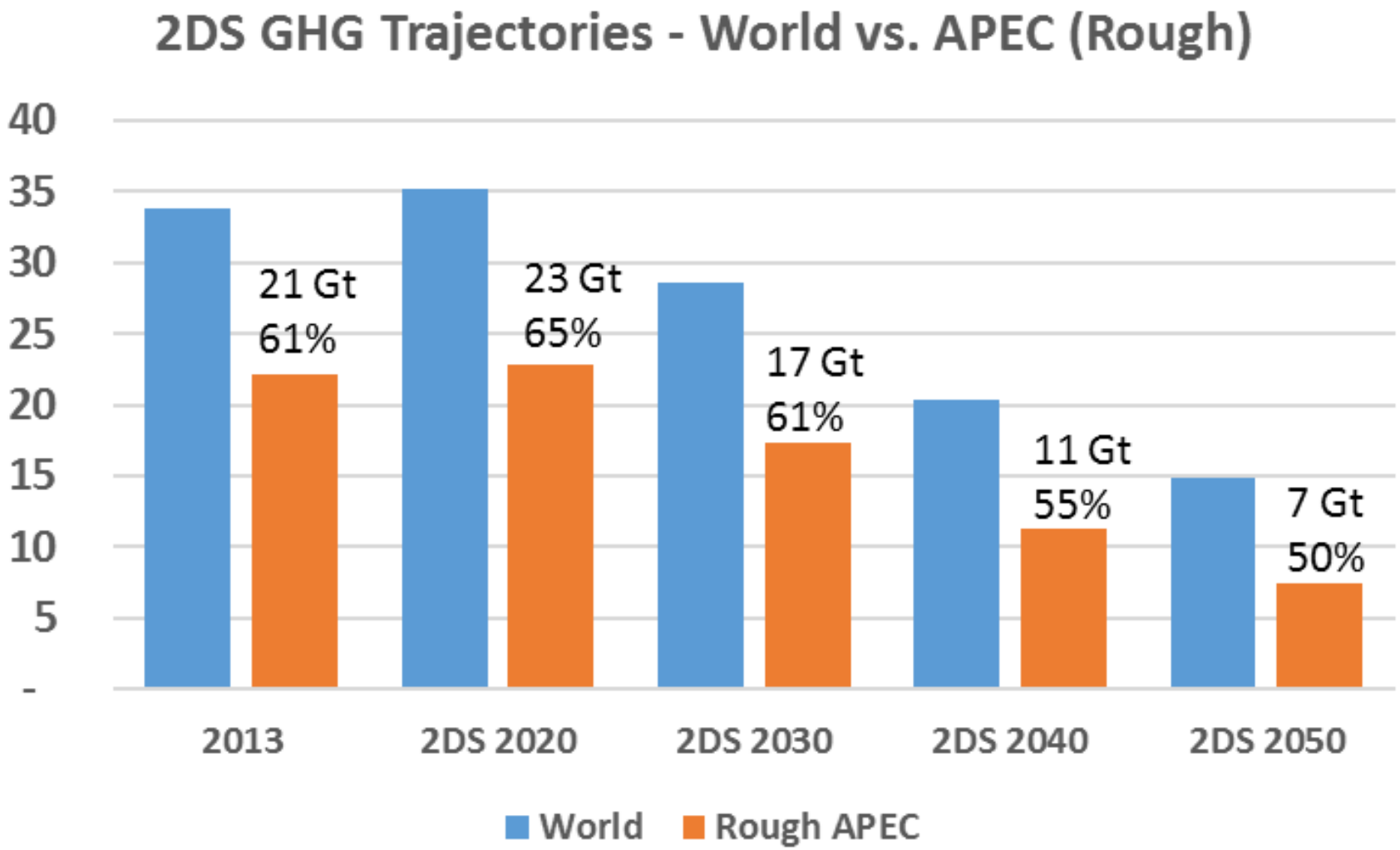
Assumptions for the APEC Target Scenario

- This scenario focuses on **simultaneously** achieving the APEC energy intensity and renewables capacity goals.
  - whereas 6th Edition looked at the two goals separately
- For the **energy efficiency goal**
  - In 2007, APEC Leaders agreed to a regional aspirational goal of reducing energy intensity by at least 25 percent by 2030 (with a 2005 base year). This goal was updated in 2011 to a 45 percent reduction of regional aggregate energy intensity by 2035.
  - Energy denominator is still under discussion – for now, we are looking at final energy demand.
- As for **renewables**
  - in 2014, APEC Leaders endorsed a new aspirational goal to double the share of renewable energy in APEC's overall energy mix by 2030 (over 2010 levels) and increase cooperation to achieve it.
  - goal is applied to final energy demand and includes energy sources such as large-scale hydropower, but not traditional biomass (i.e. following the UN's definition).

Emissions Boundary and CO_2 Emissions Factors

- We will consider CO2 emissions from fuel combustion + industrial process emissions
- If possible, we will also calculate fugitive emissions and include these values in the discussion (but no figures)
- Agriculture: excluded although represents more than 15% of total GHG emissions for 7 economies
- LULUCF: excluded – large variations year on year which are either negative or positive
- CO2 Factors: Use global factors for coal, oil and gas instead of economy specific factors (6th edition)

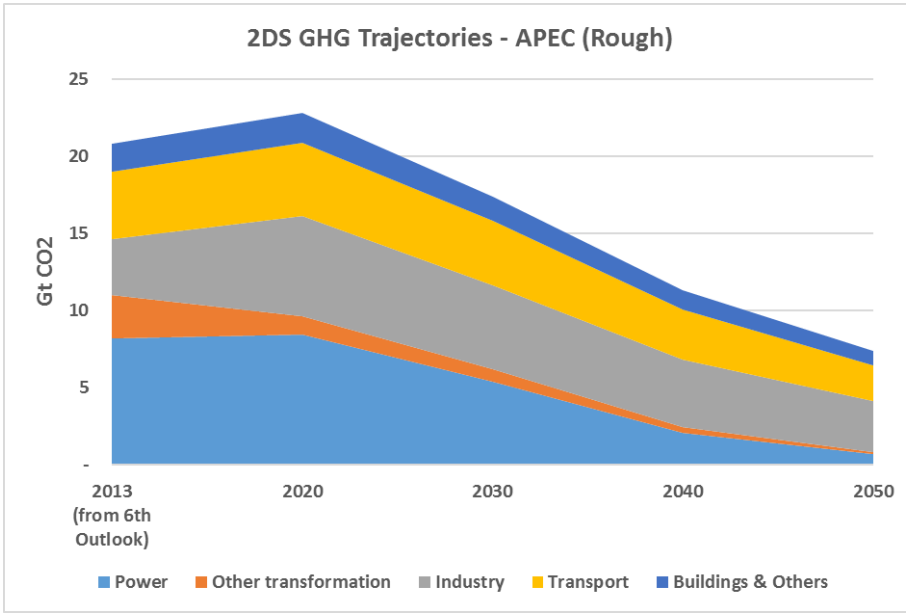
Assumptions for the 2-Degree Scenario (2DS)

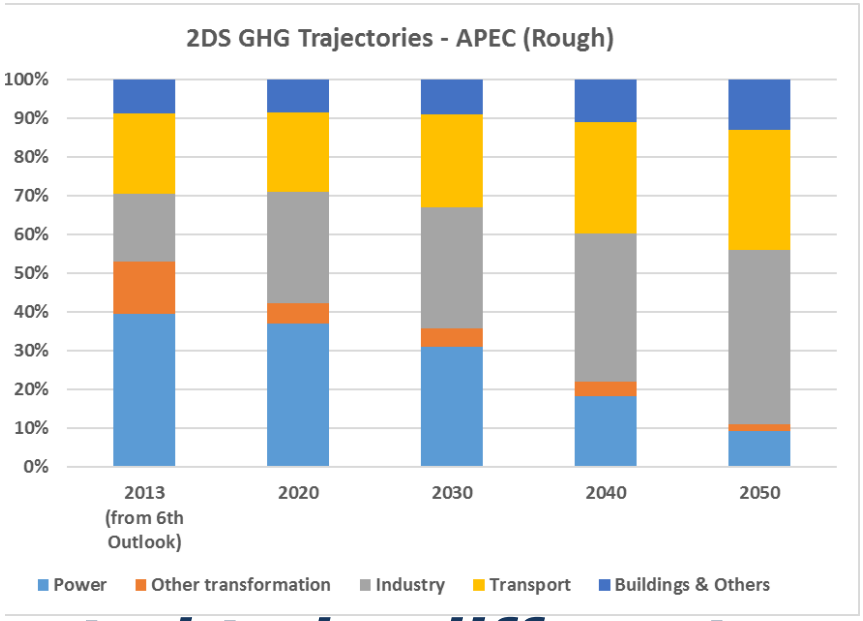


IEA ETP sees a declining share of APEC budget within global emissions

Rough APEC 2DS sector budgets based on IEA ETP

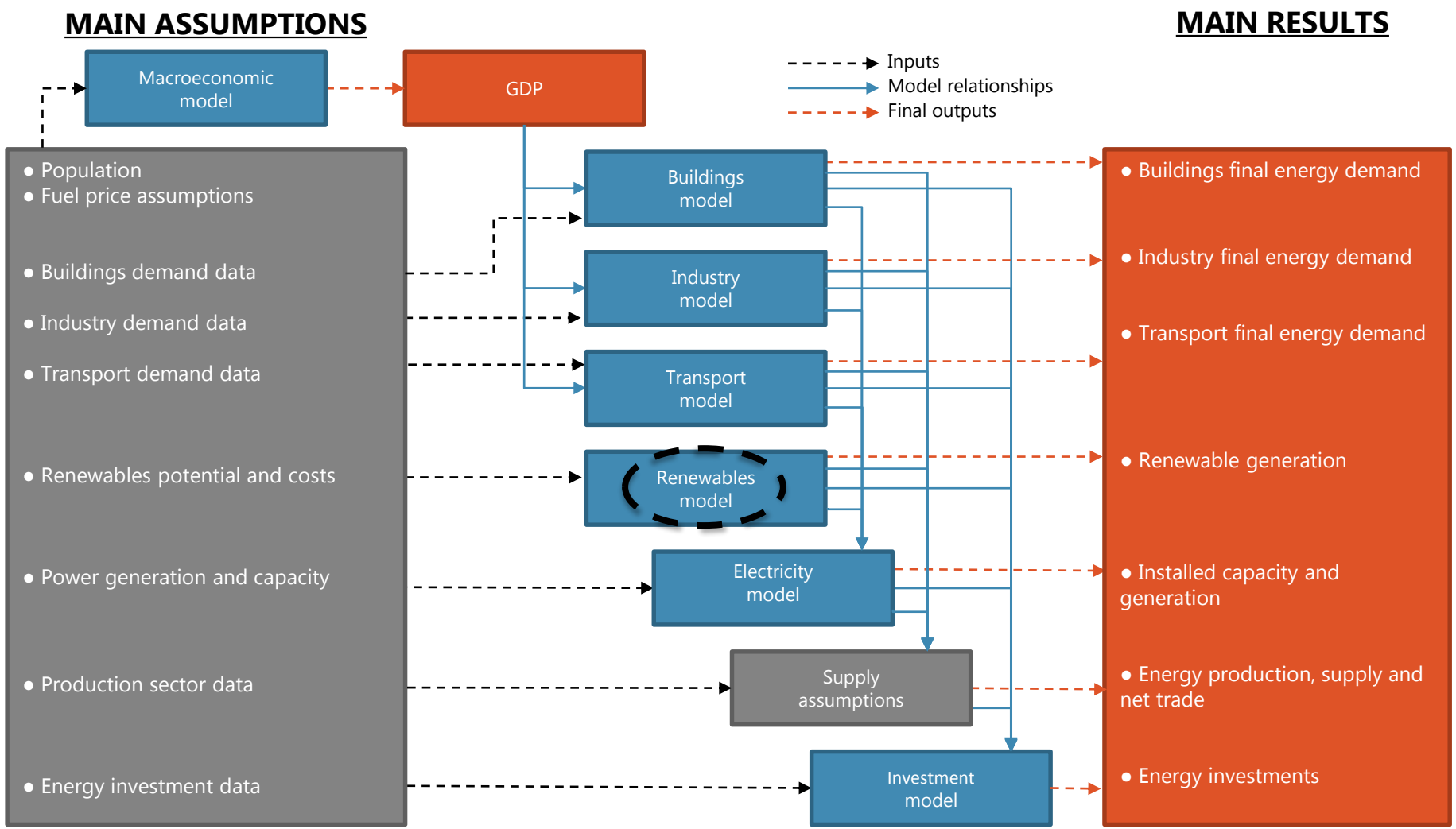
(Gt CO2)	Power	Other transformation	Industry	Transport	Buildings & Others	*Total*	*% of Global*
2013	8.21	2.81	3.62	4.32	1.85	***20.81***	***61%***
2020	8.43	1.17	6.55	4.71	1.93	***22.79***	***65%***
2030	5.40	0.82	5.40	4.17	1.56	***17.35***	***61%***
2040	2.07	0.40	4.32	3.24	1.27	***11.30***	***55%***
2050	0.69	0.12	3.33	2.27	0.97	***7.39***	***50%***



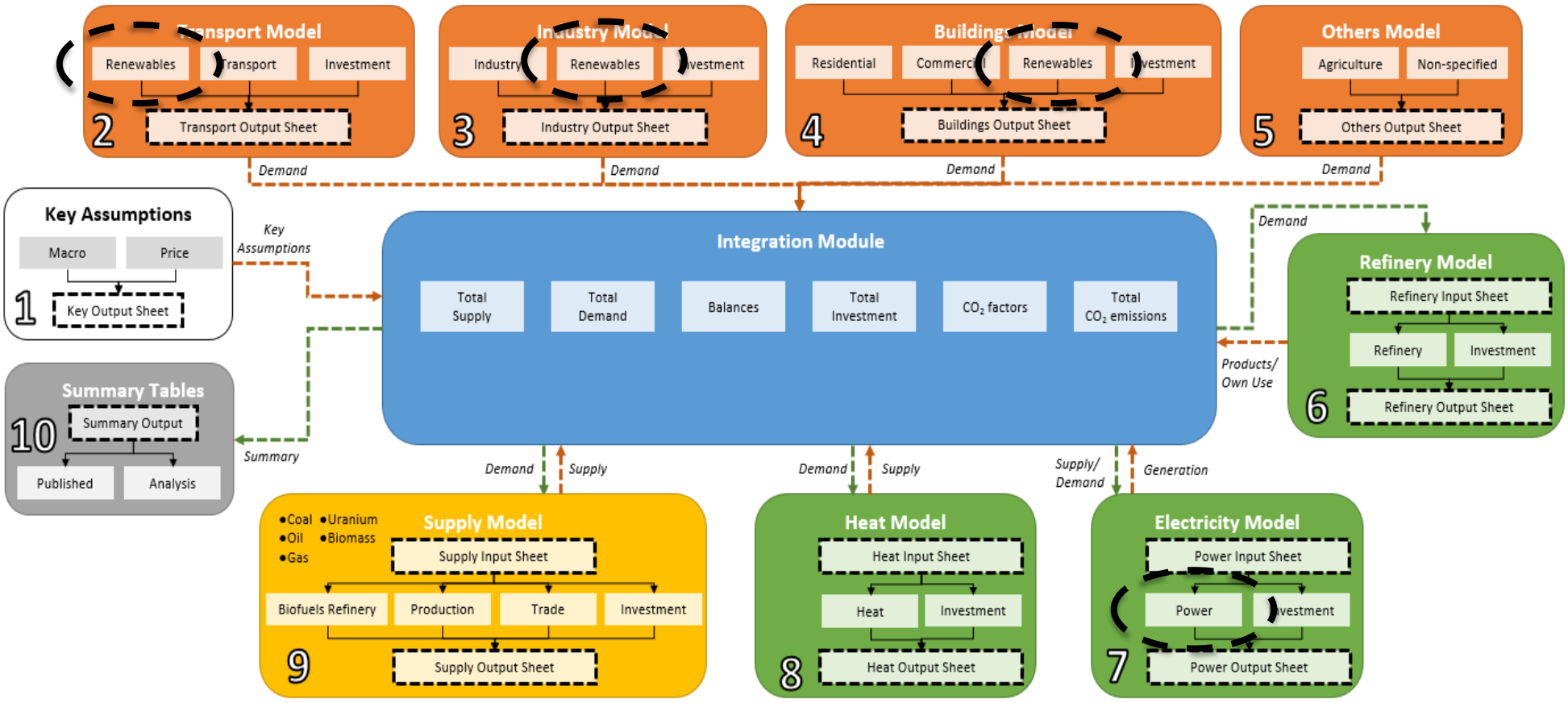


Emission pathways are expected to be different across the sectors

Past: 6th Edition - Outlook model structure



Present: 7th Edition – Outlook model structure, including integration module to aggregate data



Renewables modelling updates for 7th Edition

- **Integrate renewable energy analysis into Demand (Buildings, Industry, and Transport) and Power models**
  - **Consider policy mandates, technical limits…**
- **Incorporate renewable capacity stock modelling**
  - **Look at currently available waste/residue**
- **Assess direct renewable use (for heating and cooling applications)**
- **Estimate detailed renewable potential by economy and by sector**
- **Improve daily load curves analysis to quantify impacts of variable renewables in power**
- **Expand list of renewable technologies in Demand and Power models**

7th edition adds low-carbon implementation chapter

Part 1 – APEC demand and supply under business as usual

- Introduction
- Outlook for energy demand
- Outlook for energy supply
- Outlook for the power sector

Part 2 – APEC demand and supply under alternative scenarios

- APEC energy goals scenario (combined intensity + doubling renewables share)
- 2-degree scenario (low carbon transition/advanced technologies)
- Energy investment
- Energy security
- Raising APEC climate ambitions (focus on implementation)

Models are being run & results will be reviewed this autumn

	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	2019
Economy review of assumptions	✓								
Model development	✓	✓	✓						
Demand model runs			✓						
Power & supply model runs				✓					
Economy reviews of model results				✓					
Model reruns to respond to comments					✓				
Outlines, drafting of chapters					✓	✓			
Editing, printing							✓	✓	
Publication									April

Thank you for your kind attention

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