MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HIKINA WHAKATUTUKI

Electricity Demand and Generation Scenarios (EDGS)

Draft EDGS 2015

Modelling and Sector Trends, MBIE

Outline

- Introduction
  - Background
  - Purpose to the EDGS
- Scenario Overview
  - Key uncertainties
  - Assumptions
- Scenario results
- MBIE demand modelling
- MBIE next steps

Background

- Released discussion paper in 2012 on the EDGS – submissions received on this – Feedback was sought on process, responsibilities and main scenario themes
- Released Electricity Insight in 2013, similar to Energy Outlook but only updates to electricity sector – The Electricity Insight presented MBIE's initial scenario modelling from the EDGS
- Decided to delay EDGS while no major transmission plans and due to the uncertainty around Tiwai and project build
- This is MBIE's latest modelling

EDGS Purpose

- Electricity Demand & Generation Scenarios (EDGS)
  - Overview: 8 Scenarios specifying future development of the electricity sector out to 2040 reflecting different uncertainties.
- Regulatory tool
  - Used by Commerce Commission to regulate Transpower's major capital expenditure
    - In the Capital Expenditure Input Methodology Determination (Capex IM) EDGS are used in the "investment test" in which net electricity market benefit is a weighted average across a range of scenarios (the EDGS scenarios are the default)

Question: Do you agree with this description of the purpose of the EDGS, including the material in the appendix? (Q1)

Scenario Overview

Scenarios - Key Uncertainties

- 3 key uncertainties:
  - Type of generation built x 3
  - Demand growth x 2
  - Tiwai Aluminium Smelter x 2

	Scenario
1	Base Case (Mixed Renewables)
2	High geothermal availability
3	High gas availability
4	Global low carbon emissions
5	Lower Tiwai demand
6	Tiwai exit
7	Low demand growth
8	High demand growth

Assumptions Summary

Inputs varied	Scenario number and name							
	1	2	3	4	5	6	7	8
	Base case (mixed renewables)	High geothermal availability	High gas availability	Global low carbon emissions	Lower Tiwai demand	Tiwai exit	Low demand growth	High demand growth
GDP, population, household numbers	Medium						Low	High
Projection of residential demand per household	Medium						Low	High
Tiwai load from 2017	572			400		0	572	
Geothermal resource availability	Medium	High	Medium	Low	Medium			
Gas supply availability	Medium		High	Low	Medium			
Cost of Wind Generation	Medium			Low	Medium			
Carbon Prices	Medium		Low	High	Medium			
Solar energy uptake (2040)	Medium (185 MW)		Low (96 MW)	High (822 MW)	Medium (185 MW)			
Uptake of electric vehicles (2040)	Medium (108 k)			High (934 k)	Medium (108 k)			
Retirement of old Huntly units	2018, 2020		Late: 2019, 2021	Early: 2017, 2019		Early: 2017, 2017	2018, 2020	
TCC retirement	2024			2022	2024	2022	2024	
Otahuhu B refurbishment	Refurbish 2021			Convert to peaker 2017			Refurbish 2021	

Questions: Assumptions/scenarios

Question: Do you agree that the key uncertainties identified in this section, and the proposed eight equally weighted scenarios, sufficiently represent overall uncertainty for the purpose of the EDGS? (Q3)

Question: Is the variation in key assumptions consistent with the scenario design and future uncertainty? (Q5)

Question: Does the high uptake of electric vehicles (and Solar PV) that are used in our Global Low Carbon Emissions scenario adequately reflect future uncertainty? (Q7)

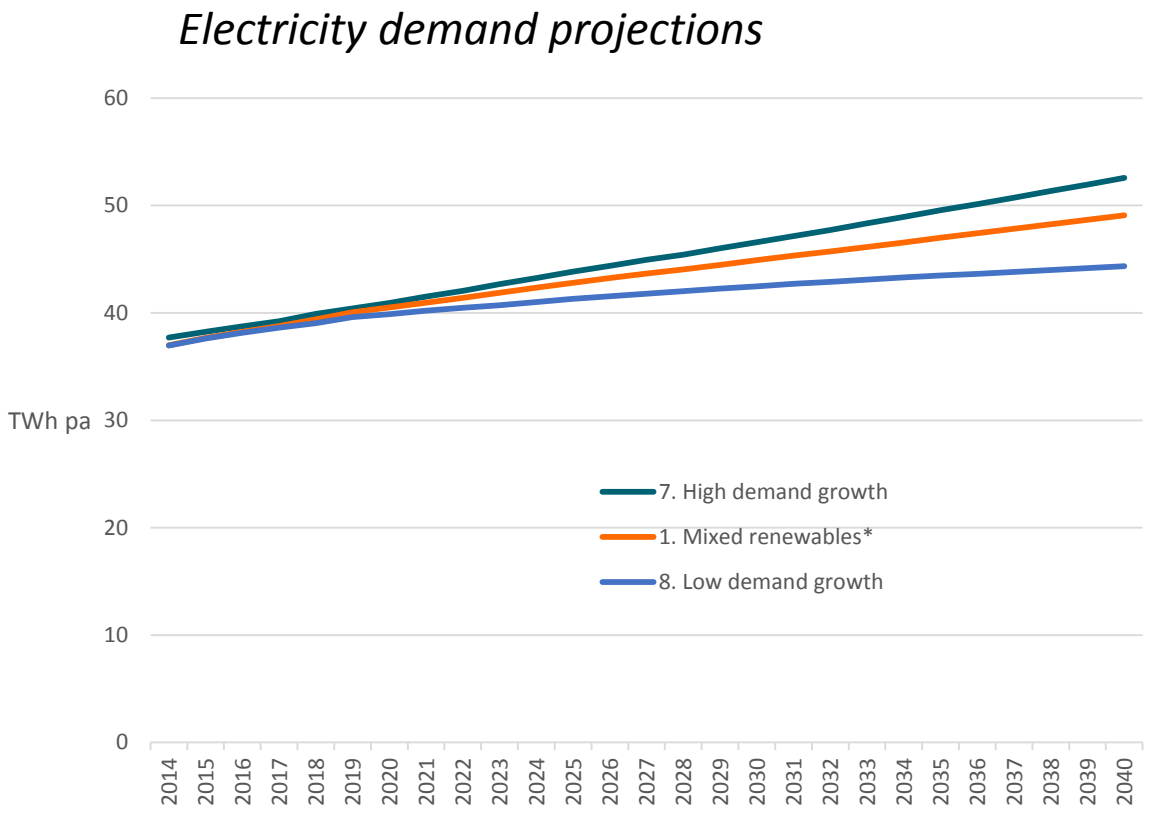
Question: Should we put more weighting on the low gas availability option given the current level of oil prices? (Q8)

Question: Does the range of retirement for the Huntly units across the scenarios adequately reflect the associated uncertainty? (Q9)

Results

Results - Demand

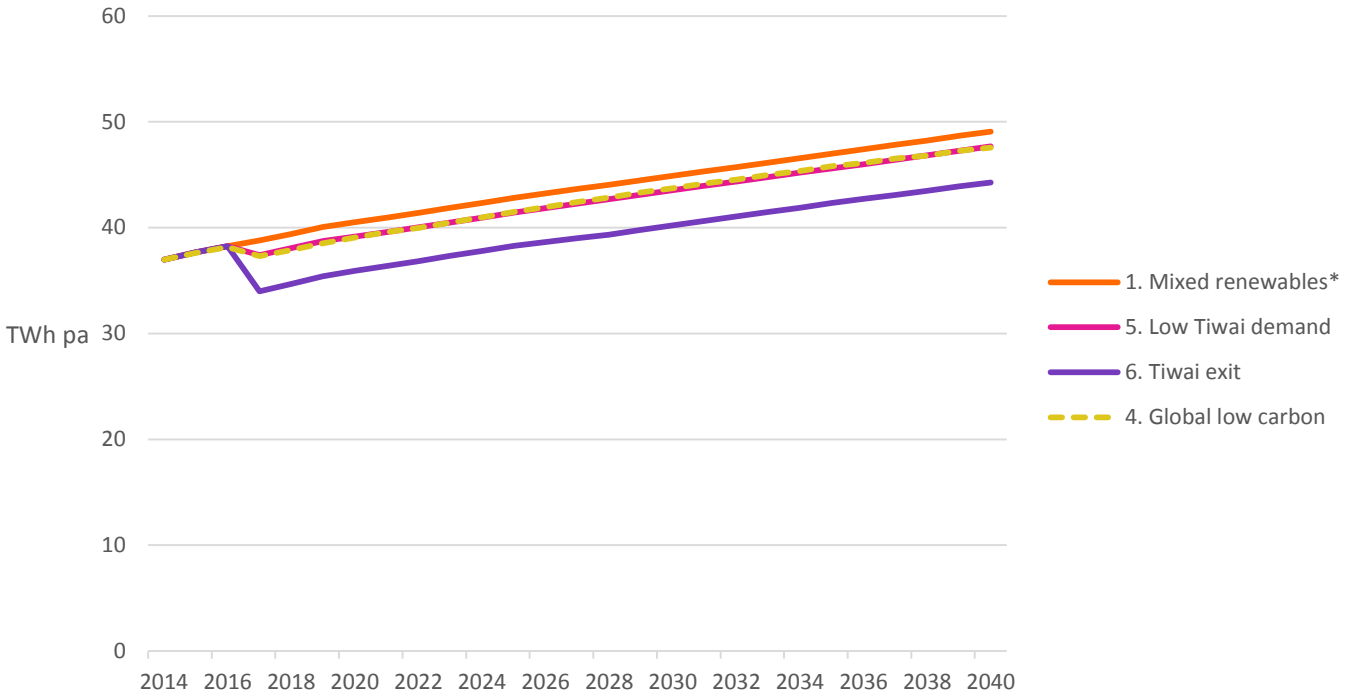
- Electricity demand grows at 1.1% per annum compared to GDP growth of 2.0% in our base case



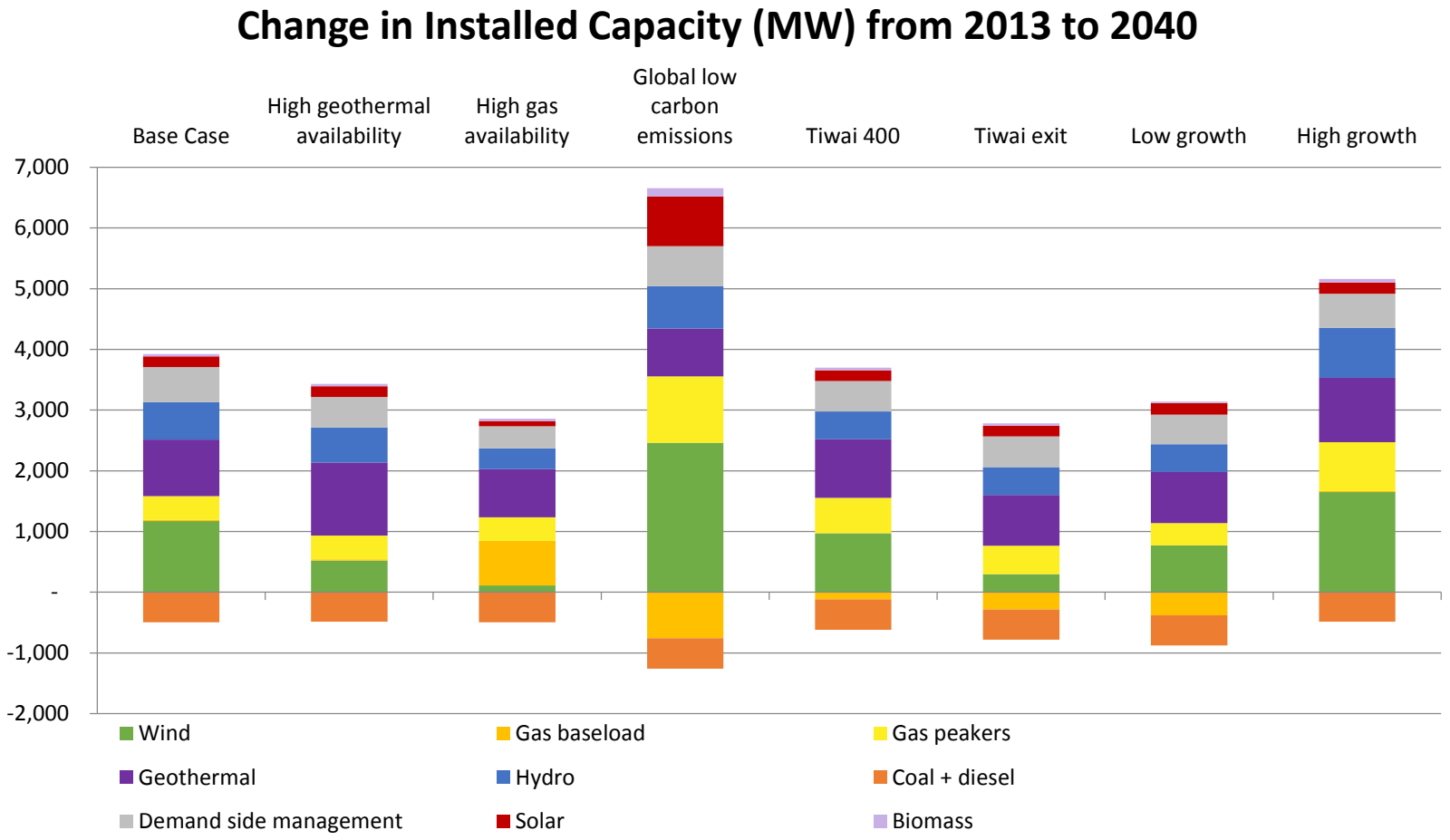
Results – Tiwai Demand

- It takes 9 years for electricity demand to return to 2016 levels if Tiwai closes in 2017

Demand projections for Tiwai reduced demand scenarios

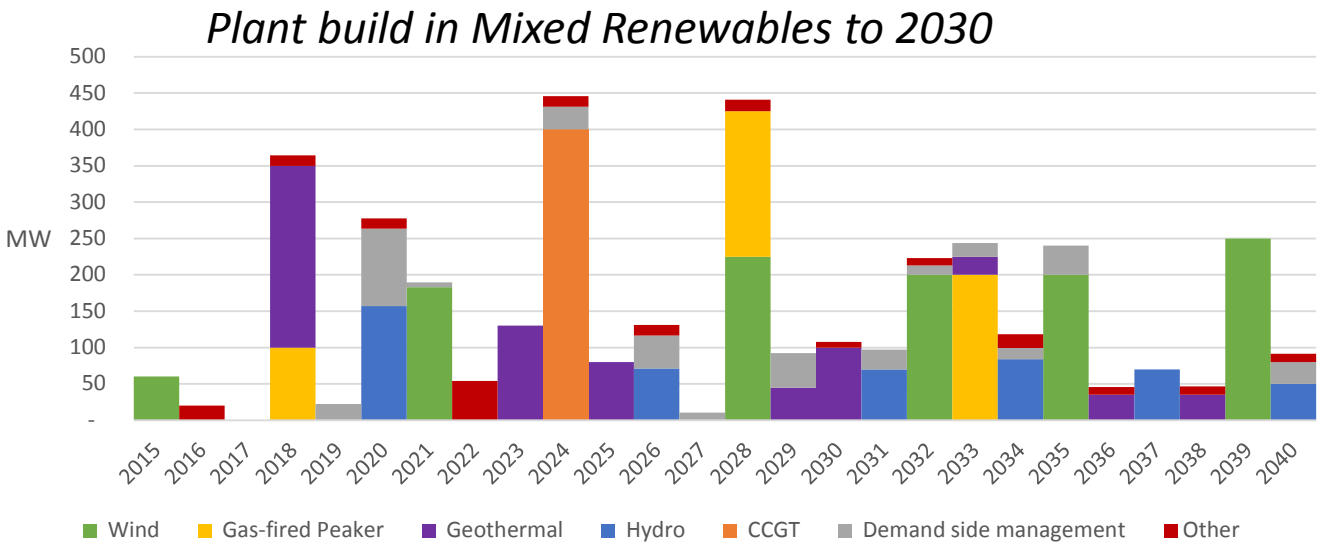


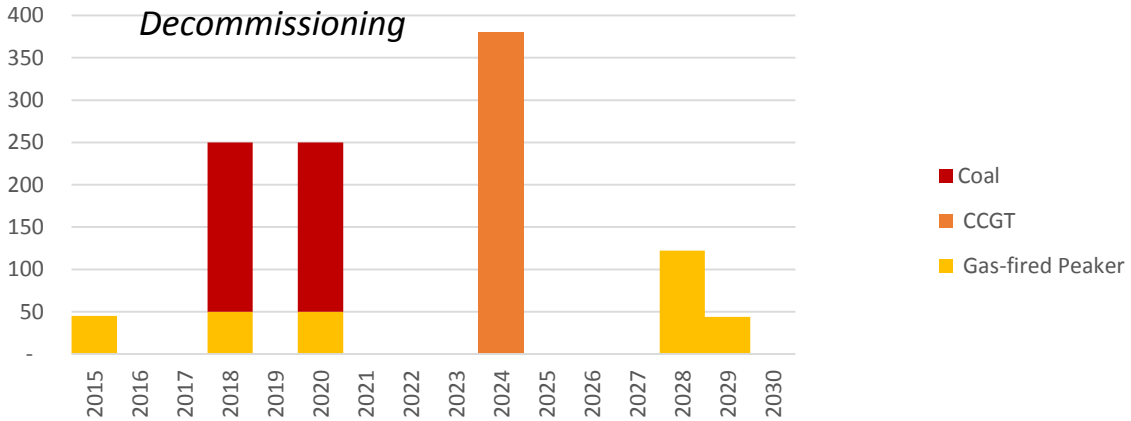
Results – technology type



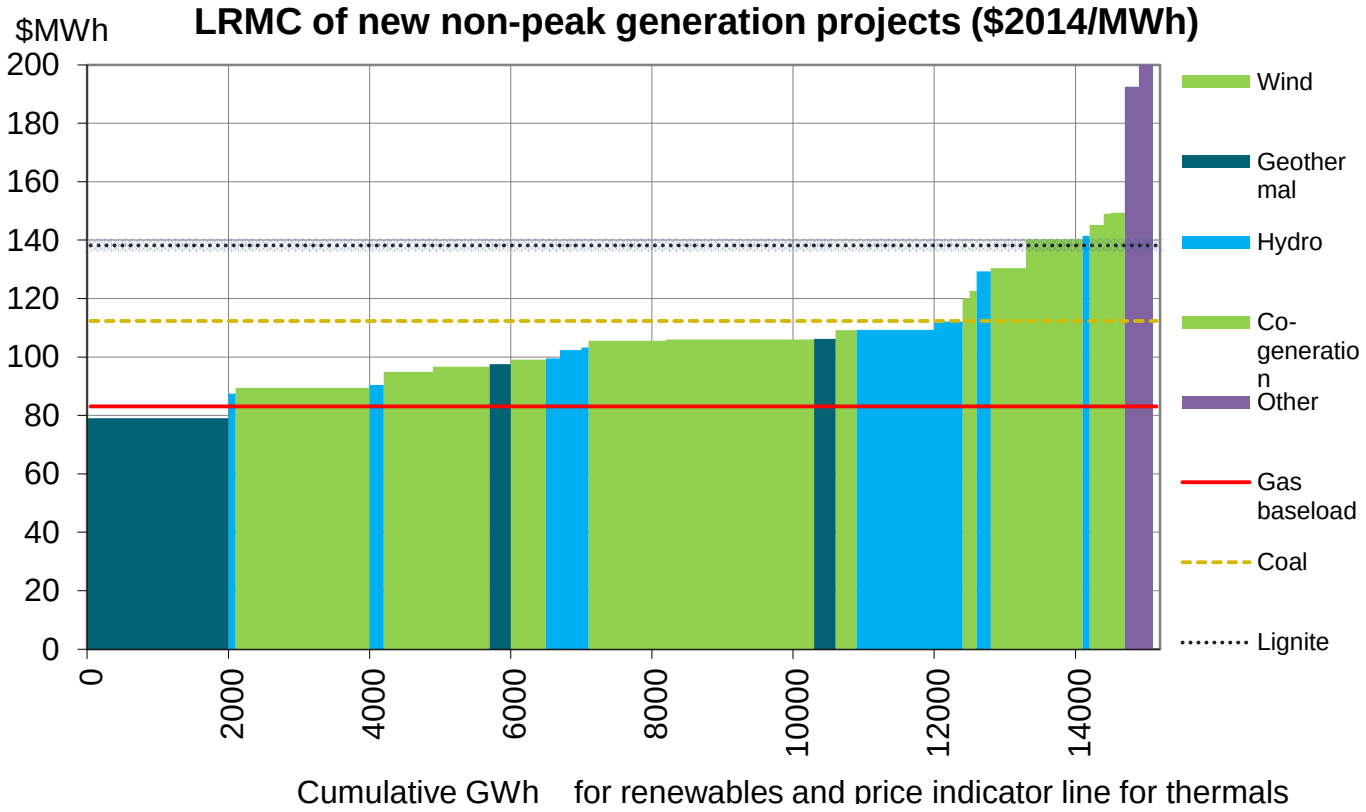
Results – New plant build

- No new plants built until 2018 in all scenarios
- If Huntly unit retires in 2017-2019 and there is demand growth new plant will be required in 2018
- In 2018 geothermal built in 5 of the 8 scenarios





Long Run Marginal Cost



Question: Do you have any specific feedback on the proposed EDGS capital cost assumptions which are sourced primarily from the PB report in 2011?(Q4)

Results – location of plant build

- Many Geothermal power plants are built in the central North Island unless there is cheap plentiful gas.
- Gas baseload is built in Taranaki or Auckland
- Majority of plants built in the north island closer to demand centres
- Plant build in South Island is almost exclusively hydro

Demand modelling

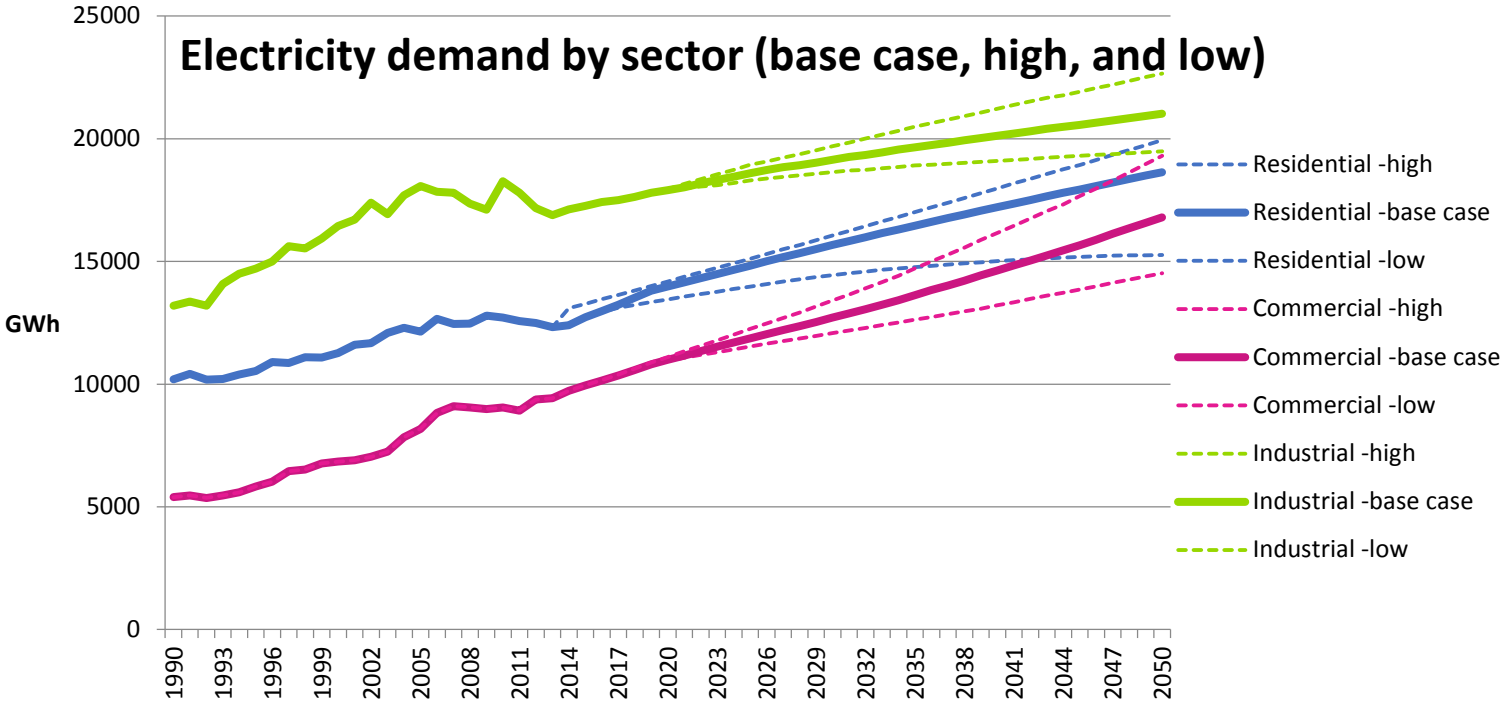
Peak demand forecasts

- In the EDGS 2012 consultation it was proposed that MBIE publish Transpowers's peak demand projections in our consultation document
- These projections are prepared by Transpower for transmission planning purposes
- MBIE proposes EDGS will not include prudent peak demand forecast or regional demand forecasts
  - MBIE does not have the expertise to produce these projections
  - MBIE would be happy to work with stakeholders to develop a process to independently verify Transpower's peak projections

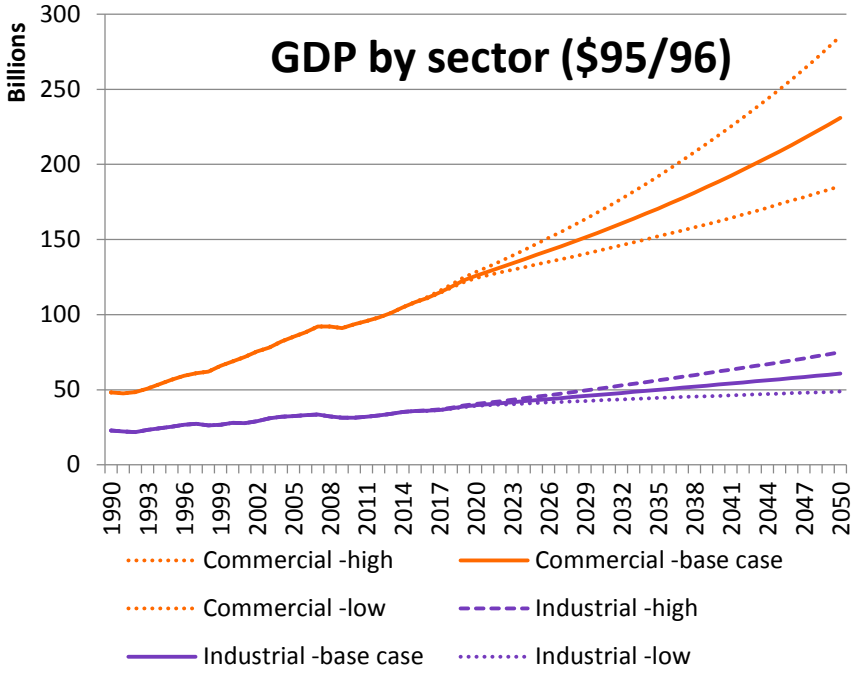
Question: In the absence of regional and peak demand projections being a part of the EDGS, the Ministry would like to ask for your feedback on the best way to independently verify regional and peak demand projections. (Q2)

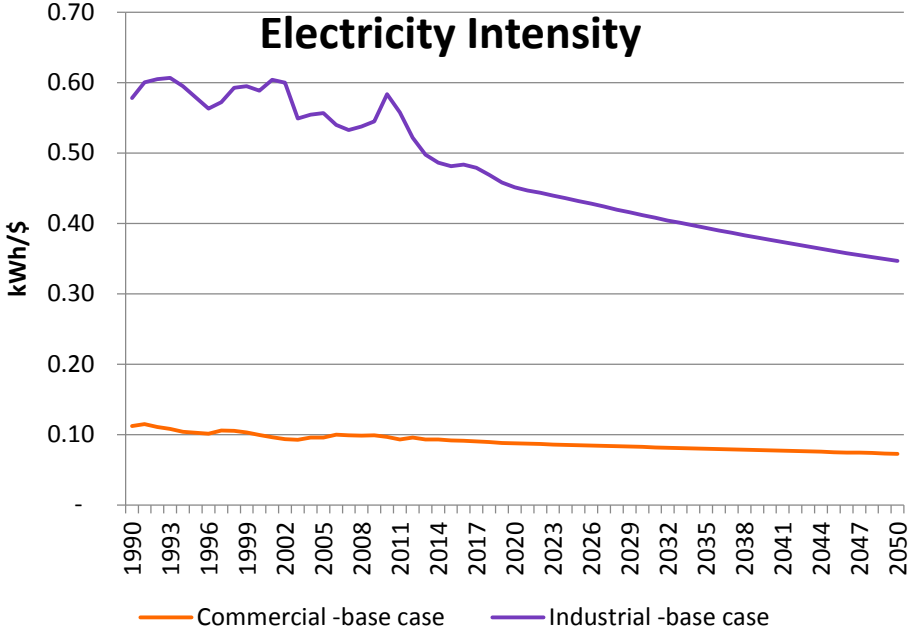
Electricity demand models

- Separate models of electricity demand by sector
  - Residential = # households * demand per household
  - Commercial = f(Commercial GDP)
  - Industrial = f(Industrial GDP and prices)
- NZ GDP growth forecasts mainly driven by commercial sector GDP



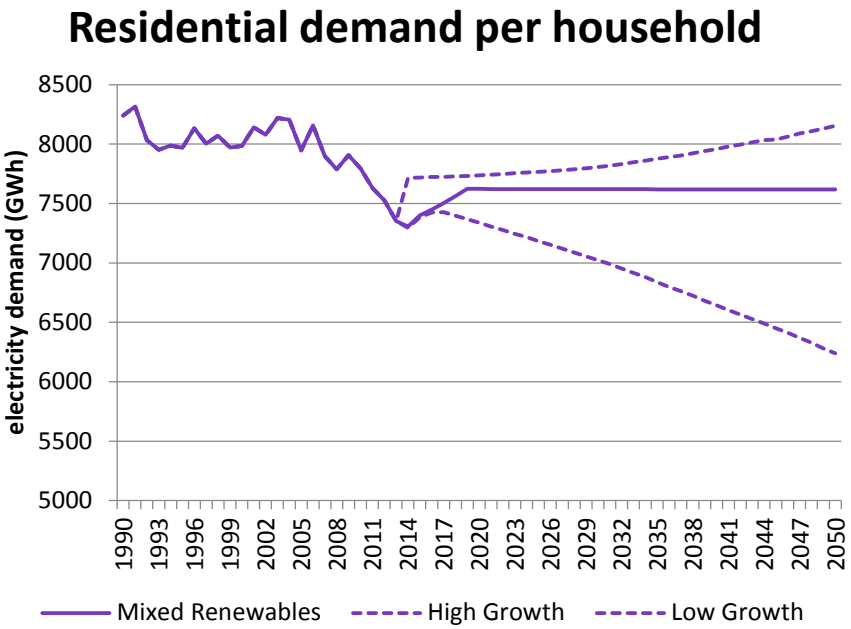
Drivers of Commercial and Industrial electricity demand

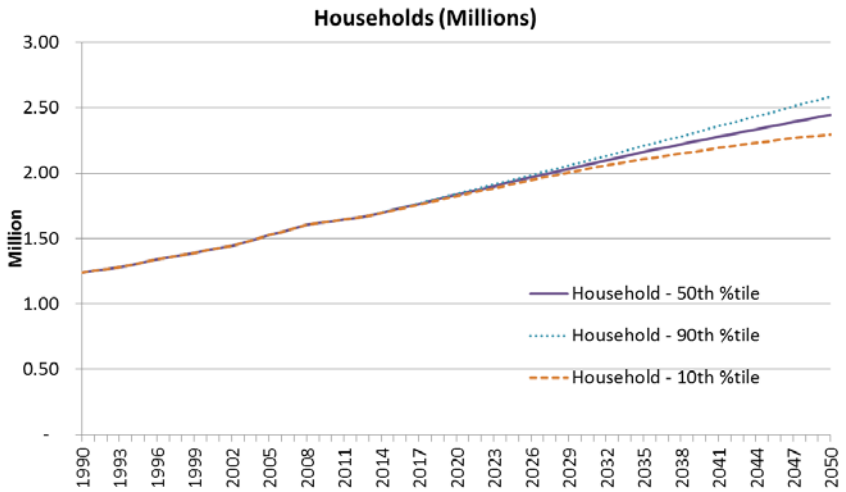




Residential electricity demand forecasts in Draft EDGS

- Residential demand = #households * demand per household





Question: Given the current flat demand environment, should we put more weighting on low demand growth scenarios? (Q6)

Next Steps

- Consultation process

15 May 2015	**Close of submissions**
22 May 2015	Submissions published for cross-submission
5 June 2015	Close of cross-submissions
12 June 2015	Cross-submissions published
Mid-late June 2015	Stakeholder workshop summarising feedback from stakeholders, and MBIE's next steps (if needed)
August 2015	Final EDGS published with the Ministry's final view on issues raised during the engagement process

- Updates before Final EDGS
  - Updating Oil and Gas model to reflect recent oil prices. Also, reviewing capital costs and basin technical resource estimates.
  - Reviewing electric vehicle model and effect of different charging regimes.

That concludes our workshop today, thank you for attending

EDGS 2015 online:
http://www.med.govt.nz/sectors-industries/energy/energy-modelling/modelling/electricity-demand-and-generation-scenarios/draft-edgs-2015

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