



INDEPENDENT  
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# 2014 SWIS Electricity Demand Outlook

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On 29 April 2014, the IMO received a direction from the Minister for Energy to defer certain aspects of the 2014 Reserve Capacity Cycle. In light of this, the IMO has delayed publication of the 2014 ESOO and the setting of the Reserve Capacity Target for the 2016-17 Capacity Year until 17 June 2015.

This SWIS Electricity Demand Outlook report has been prepared by the IMO to provide updated electricity and peak demand forecasts for the period 2014-15 to 2023-24, for the information of current and potential participants in the WEM and other interested stakeholders.

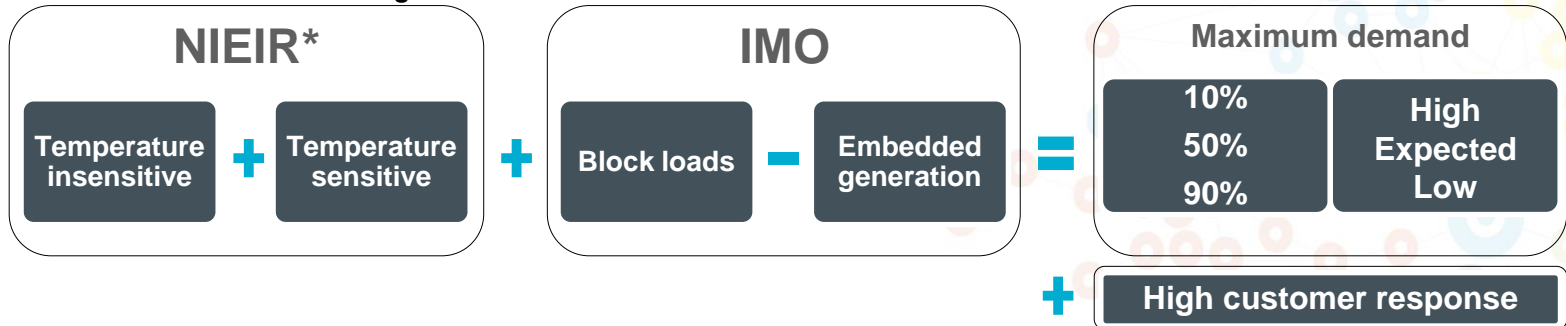


# IMO approach to forecasting

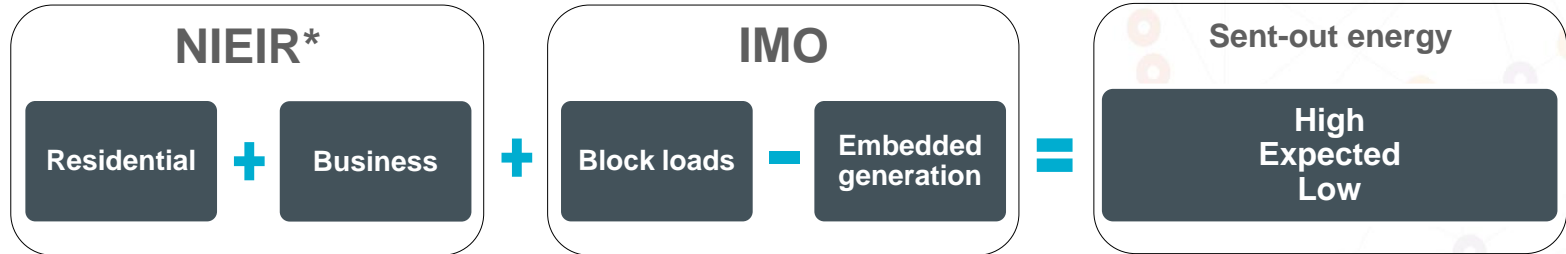
The IMO contracts forecast services from independent contractors, in order to prepare the demand and energy forecasts published in the annual Electricity Statement of Opportunities.

The same approach was taken in regards to the 2014 SWIS Electricity Demand Outlook.

## Maximum demand forecasting



## Sent-out energy forecasting



\*National Institute of Economic and Industry Research

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SWIS demand growth slowing



Customer behaviour changing rapidly



Generation continues to diversify



# SWIS demand growth slowing

Demand growth in the SWIS is comprised of multiple elements, including residential, small commercial, and major industrial customers. In addition, demand can be viewed as the end consumption by customers (uninfluenced), or as the amount that must be supplied by incumbent generation and transmission infrastructure (influenced).

## Growth by segment

Growth in residential and small commercial demand is slow, largely due to low temperatures at time of system peak

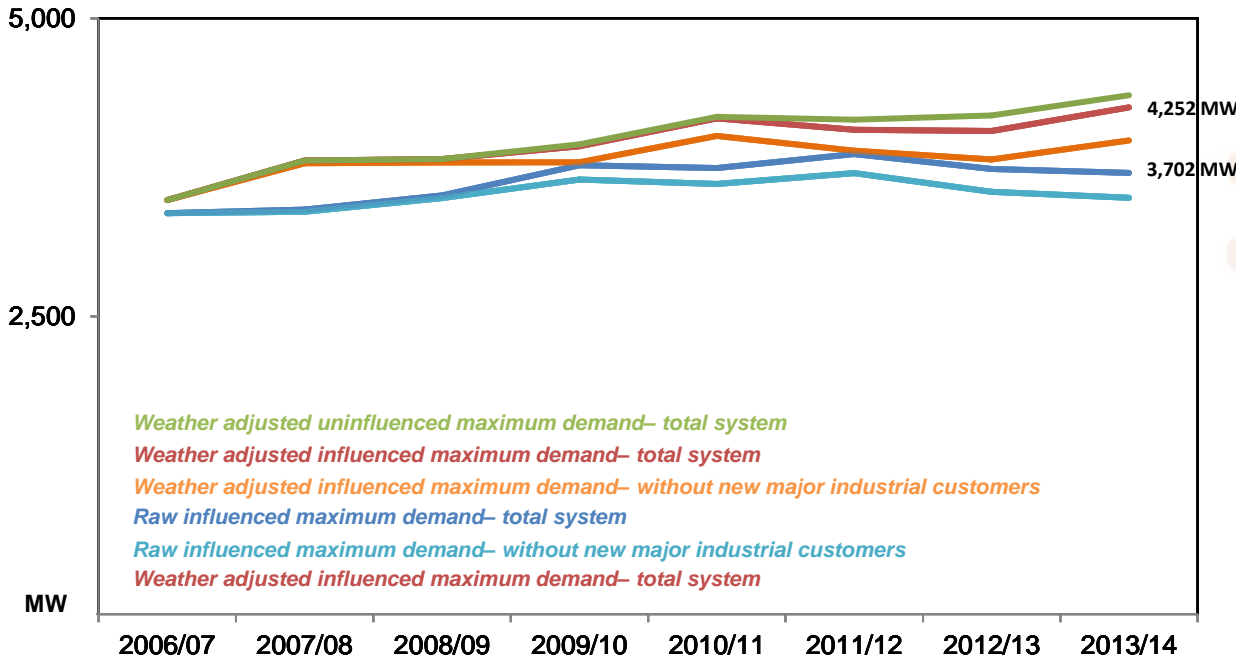
Connection by new industrial customers contributes to growth in SWIS historic demand  
 – 3,702 MW, raw system peak

Weather correction to adjust for cooler than PoE 10% events indicates that underlying growth in demand has occurred, although it has slowed in the last 5 years

Reintroduction of industrial customers shows the importance to growth in the SWIS  
 – 4,252 MW, weather corrected system peak

Addition of an allowance for the amount of energy estimated to be produced by distributed generation at the time of system peak reveals that energy use is growing even more strongly, although this is not all sourced from the network

SWIS PoE 10% summer maximum demand



SWIS – Growth rates by dataset

Range (yr)	%	%	%	%	%
06/07-10/11	1.8	2.7	3.7	4.6	4.7
06/07-13/14	0.5	1.4	1.9	2.9	3.3
09/10-13/14	-1.1	-0.4	1.2	2.0	2.5

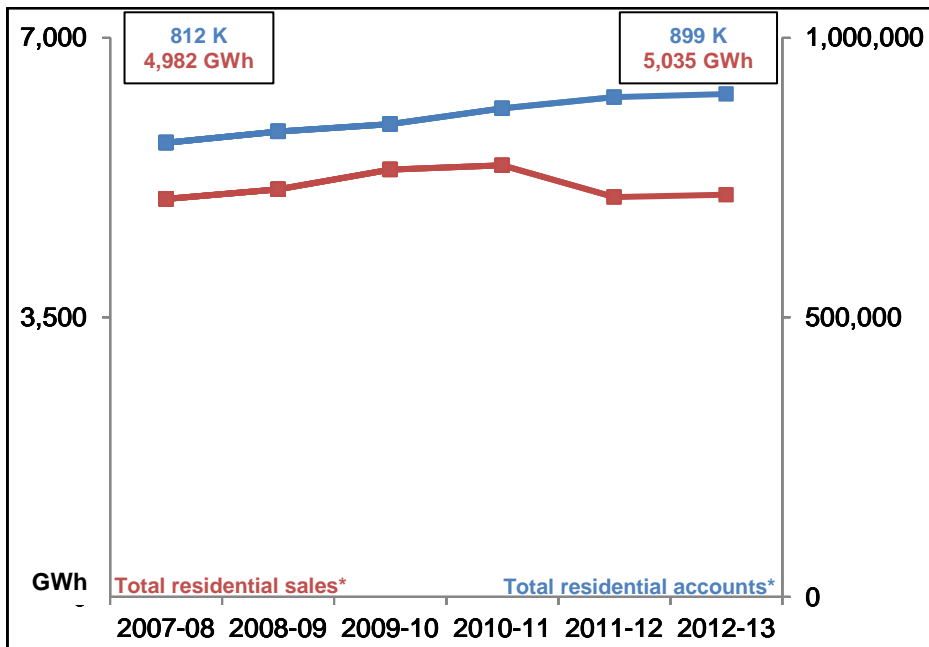


# Customer behaviour changing rapidly

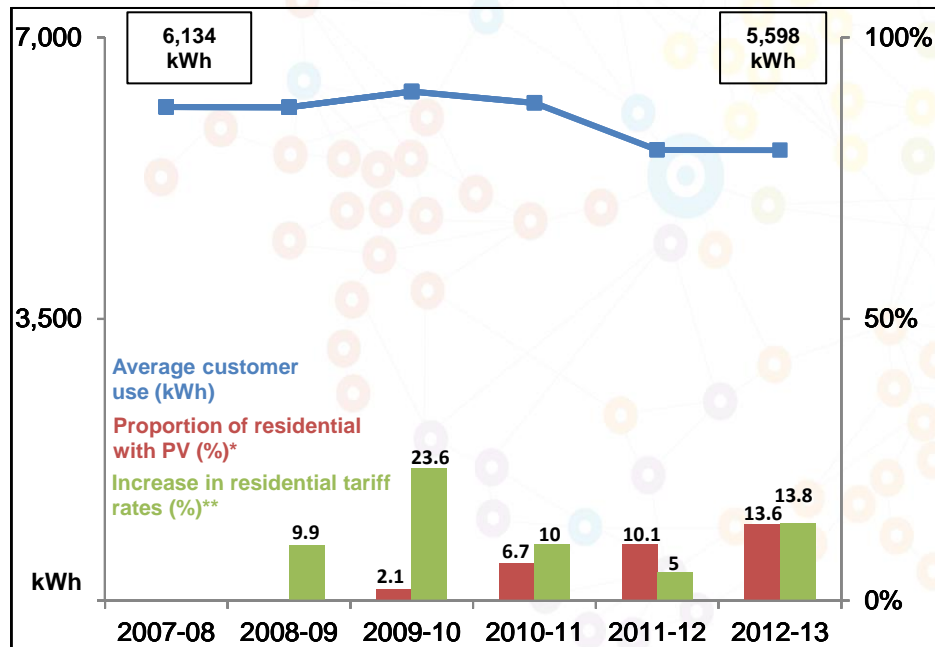
Energy consumption per connection has reduced in the residential sector over recent years. This reduction is likely to be due to a number of factors, including rising electricity prices, increasing energy efficiency standards in construction of houses and buildings and manufacturing of appliances and electronics, and increased uptake in demand-side technologies such as rooftop solar PV.

While increase in solar PV installations has been shown below, modelling to understand the effect of energy efficiency is yet to be undertaken.

**SWIS residential – annual energy sales vs total customer numbers**



**SWIS residential – annual energy usage vs solar rooftop PV**



\*Synergy

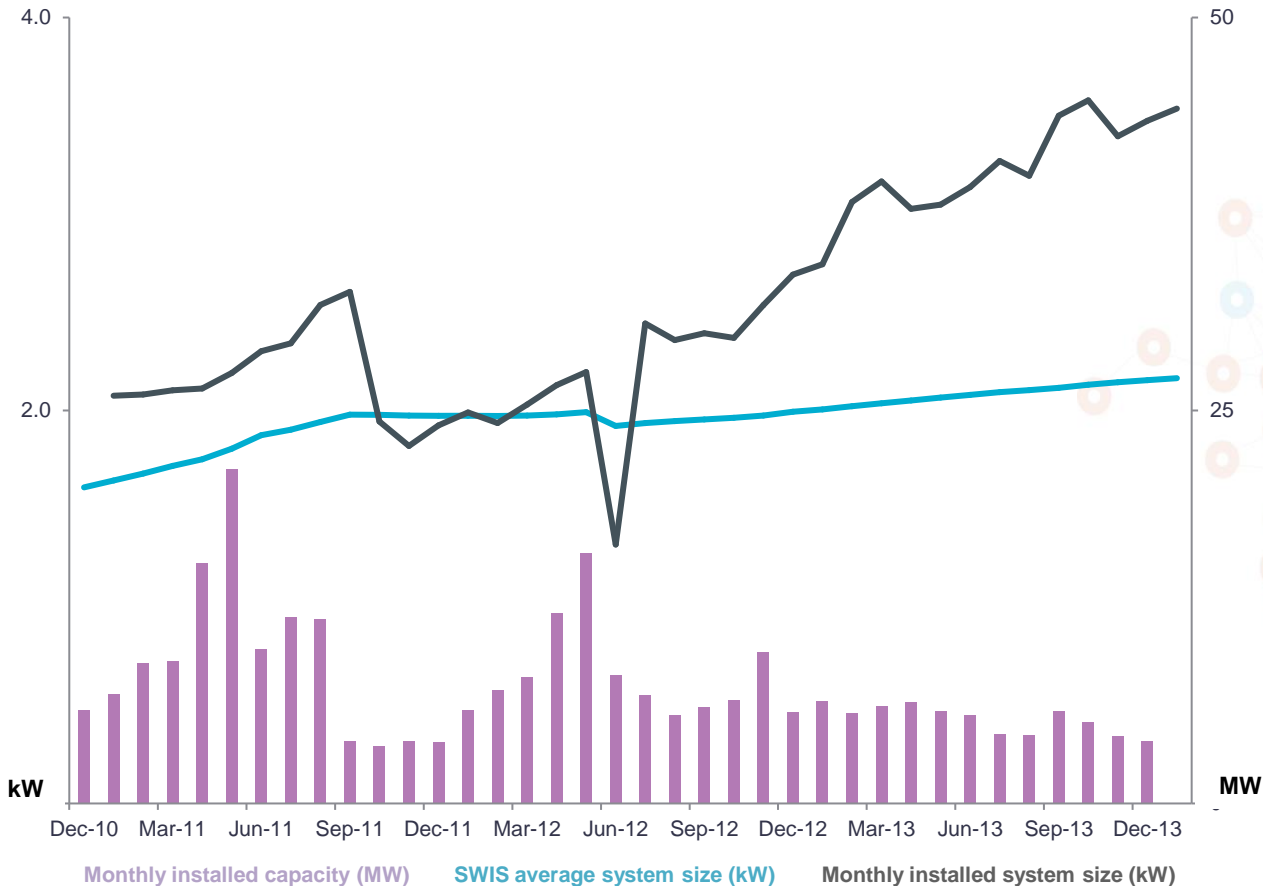
\*\*Energy Operators (Electricity Retail Corporation) (Charges) By-laws 2006





# Customer behaviour changing rapidly

### SWIS – Rooftop solar PV – installation size vs monthly installed capacity



### Rooftop Solar PV installation

There are currently ~140,000 systems installed in the SWIS\*  
 ~15% of residential customers  
 >336 MW of installed capacity

Number of installations per month has begun to slow  
 ~4,000 in 2011/12  
 ~1,400 in 2013/14 (YTD)

Despite this, installed capacity continues to increase by approximately 4.5 MW per month  
 Average monthly system size is increasing rapidly  
 - 2 kW in Jan '11 to 3.4 kW Jan 2014

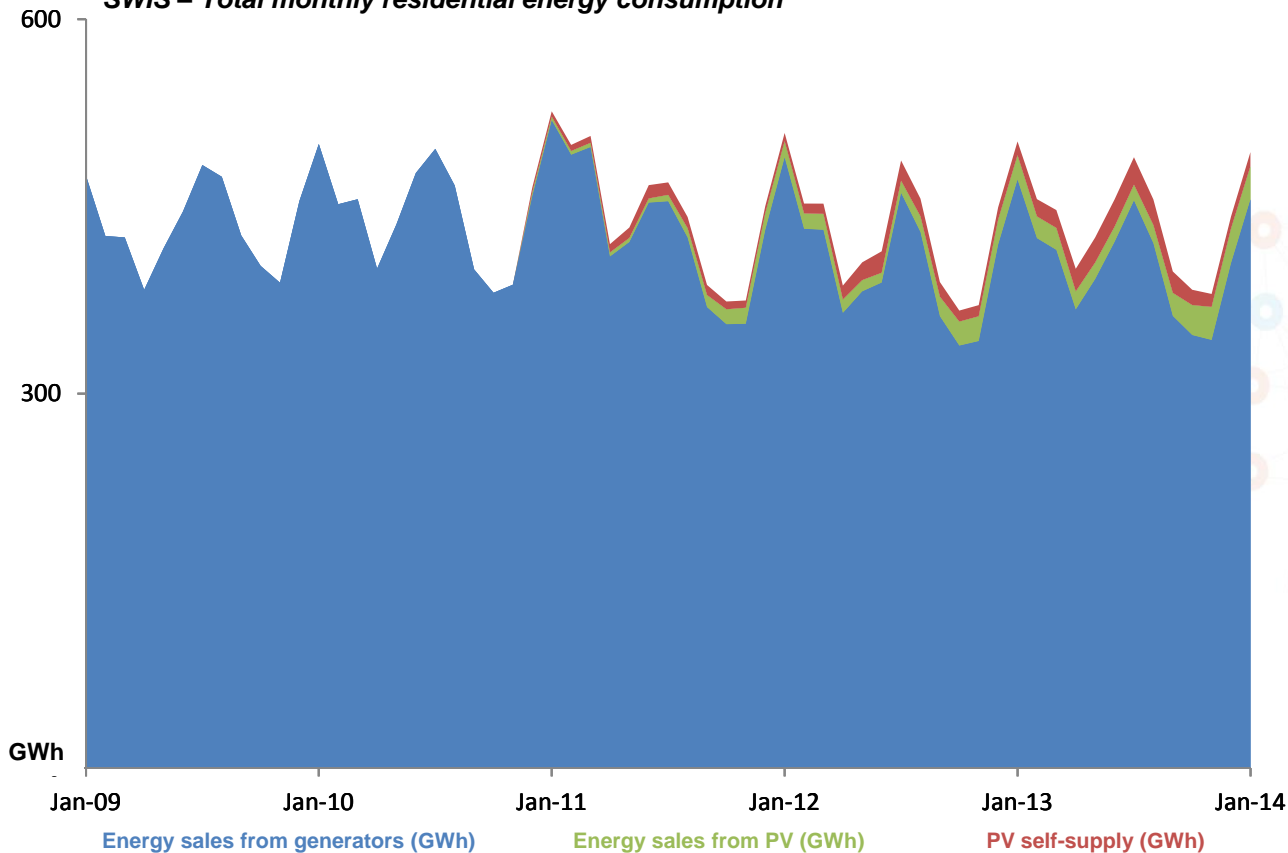
As technology costs decrease, opportunity for commercial application becomes more compelling.

\*Estimated according to Synergy/Clean energy regulator



# Customer behaviour changing rapidly

SWIS – Total monthly residential energy consumption



## Rooftop Solar PV generation\*

Energy sales to residential customers\*\* is approximately the same as in Jan '11

Energy produced from Solar PV is estimated to be increasing by 5% monthly since Jan '11  
38 GWh in Jan 2014

This energy produced from rooftop solar is equivalent to:

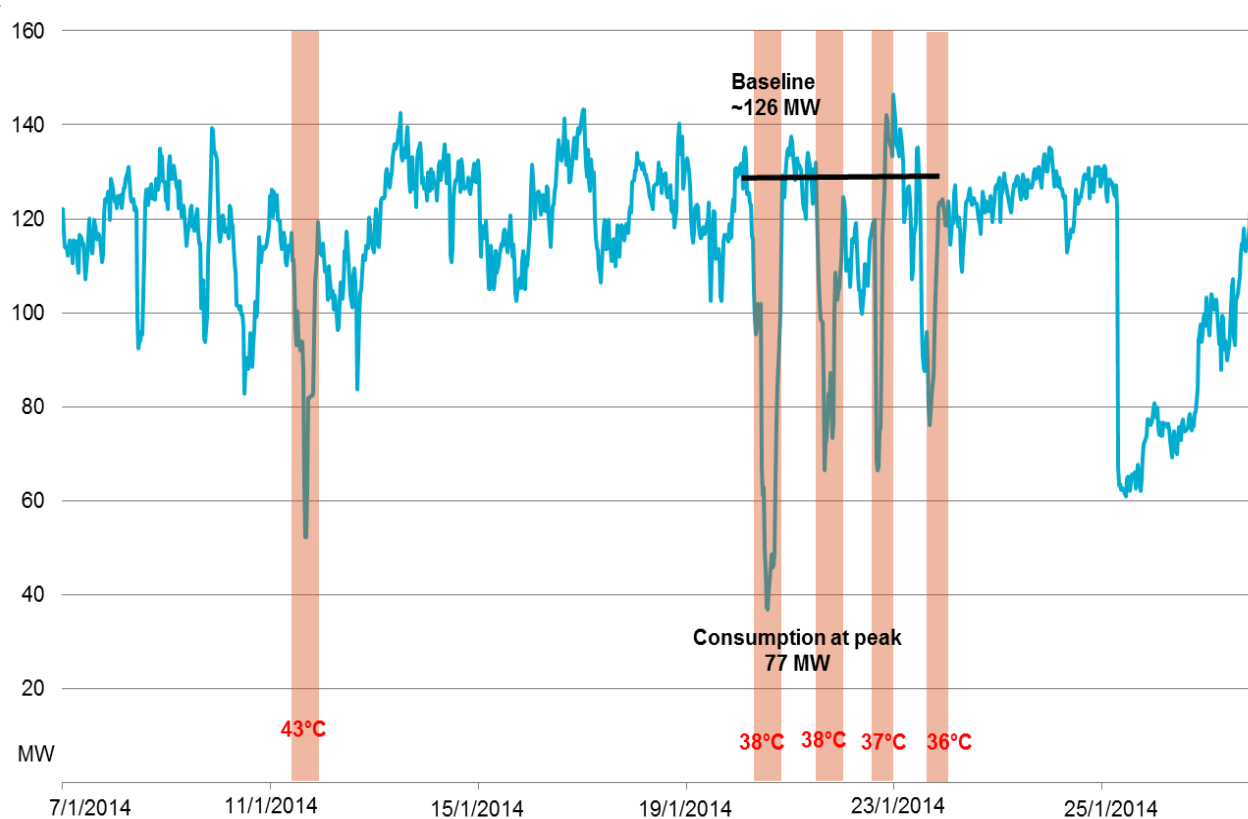
- ~2.5% of the total SWIS energy requirements
- ~9% of residential energy requirements

\*Estimated according to Synergy records – non-exhaustive  
\*\*A1 and SM1 customers



# Customer behaviour changing rapidly

SWIS – 2014 IRCR effect



## IRCR Mechanism – effect on peak demand

Customers exposed to the IRCR mechanism have an incentive to reduce consumption at times of system peak to minimise their contribution to funding capacity in the SWIS.

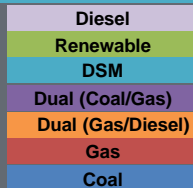
It is estimated that the 2014 summer maximum demand peak was about 50 MW lower because of action taken by large customers to reduce their IRCR exposure.

Over 2012/13 and 2013/14 91 unique customer loads have reduced consumption because of the IRCR mechanism.

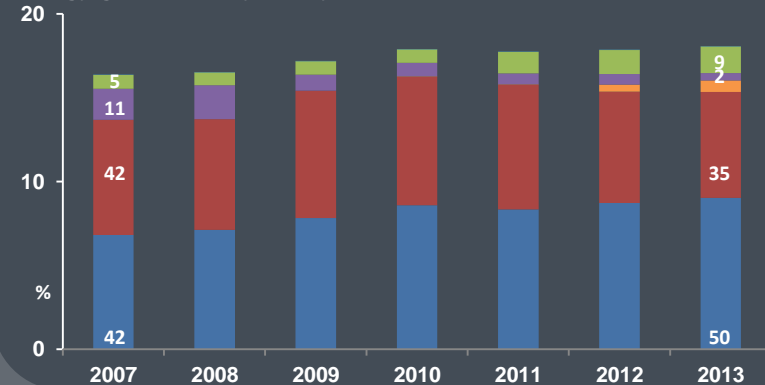
On average, customers in both 2012-13 and 2013-14 reduced demand by 1.1 MW each. If each of these customers responded at this average rate, the maximum reduction from this behaviour could be over 100 MW.



# Generation continues to diversify



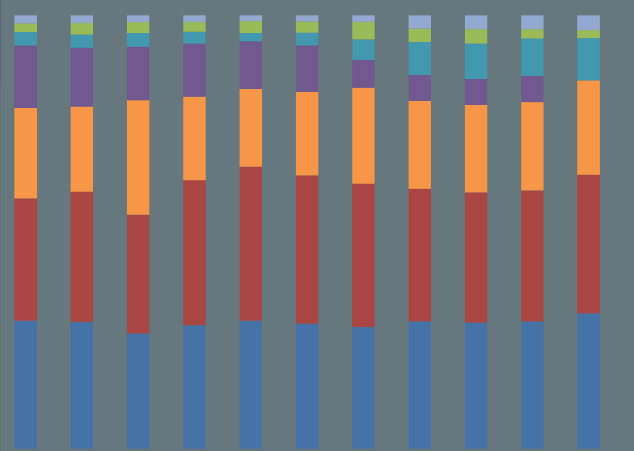
Energy generation by fuel type - 2007-2013 ('000 GWh)



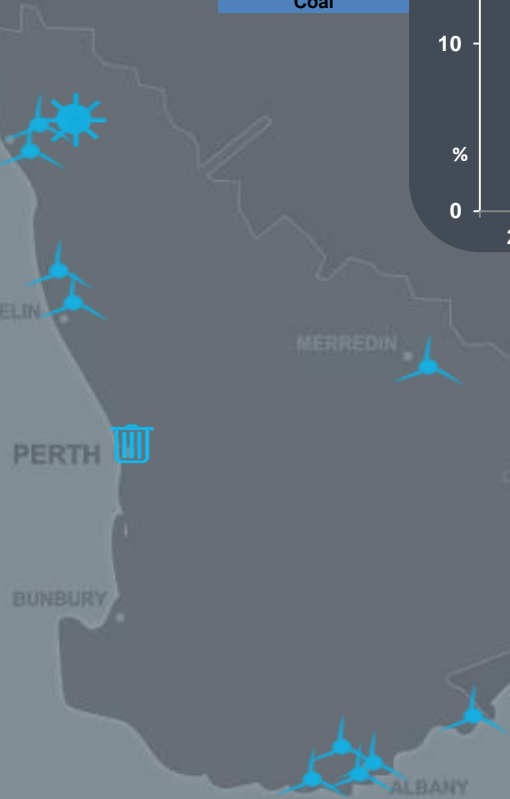
SWIS Rooftop PV



Capacity credits by fuel type - 2005/06-2015/16 (%)



2005-06 2007-08 2009-10 2011-12 2013-14 2015-16



There are now 19 renewable energy facilities in the SWIS:

Resource	Number	Nameplate (MW)	Capacity Credits
Wind	11	477	89
Landfill gas	7	21.9	14.1
Solar	1	10	4
Rooftop PV*	~140K	336	0
<b>Total</b>	<b>19</b>	<b>508.9</b>	<b>107.1</b>

\*As of Jan 2014 – Clean energy regulator

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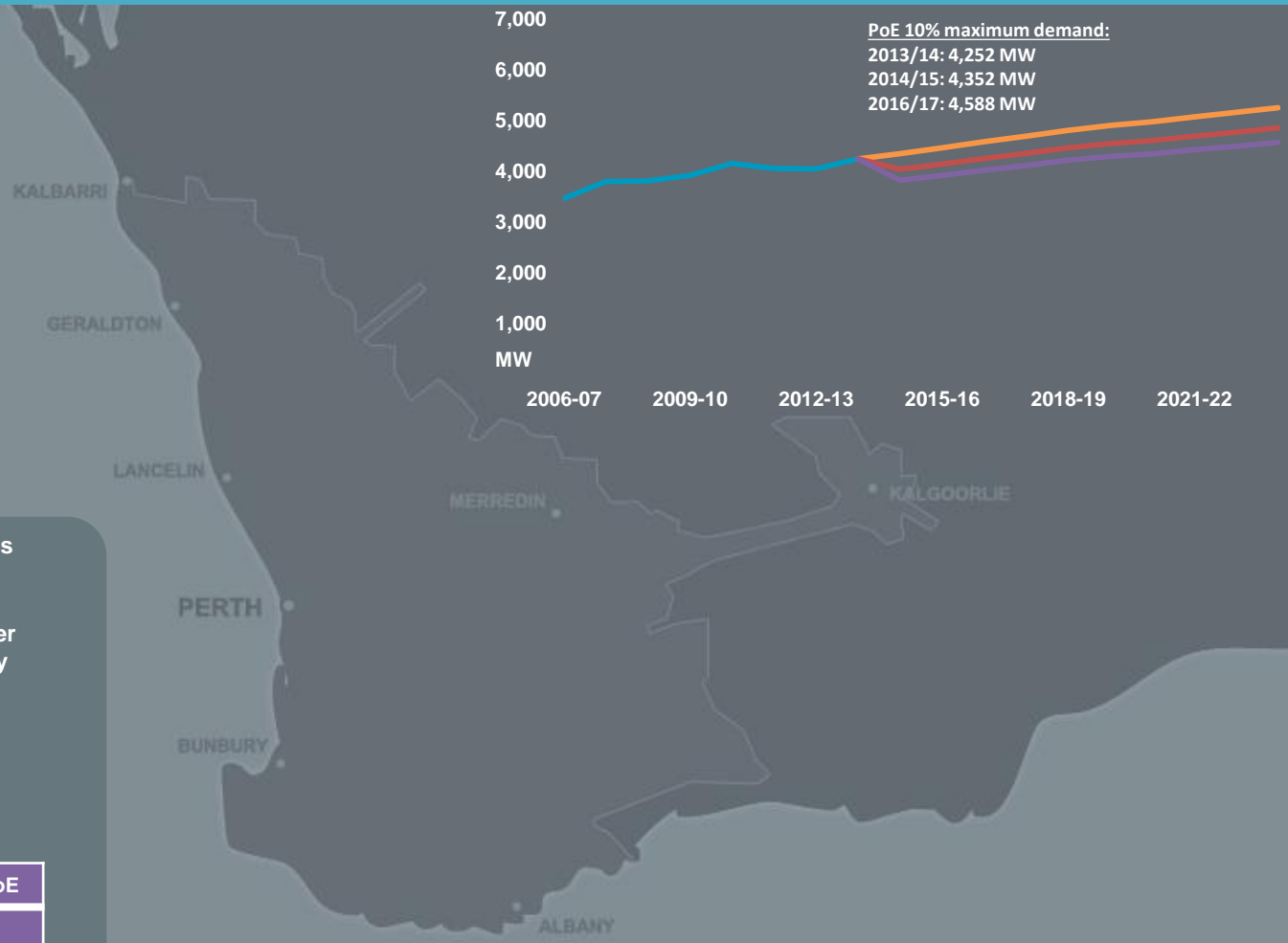
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# Maximum demand forecasts – Weather scenarios



## Maximum demand forecast – PoE scenarios

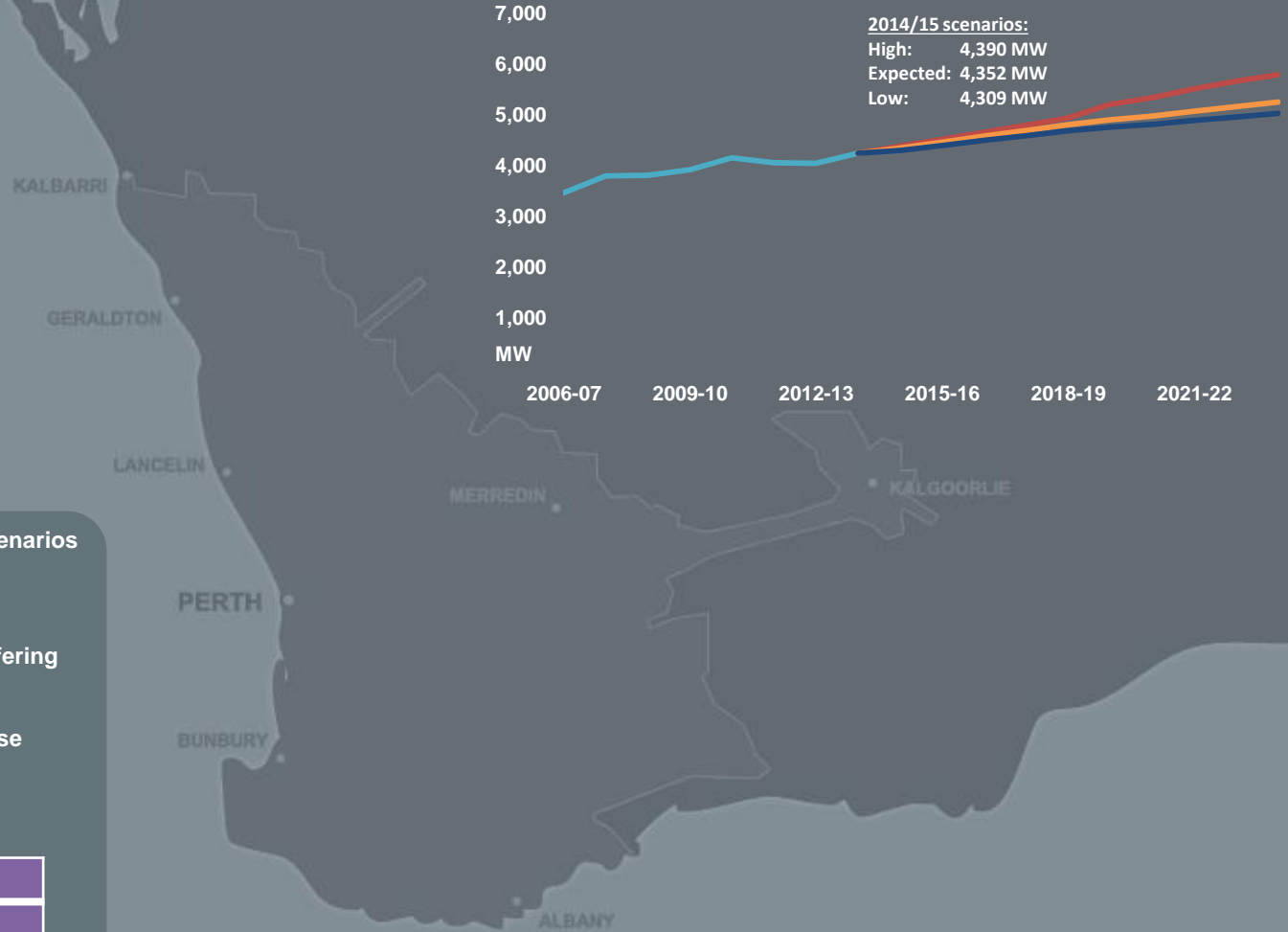
Continued strong growth in GSP (~3.3% to 23/24) is tempered by increases in customer demand response due to increasing energy prices and decreasing technology costs.

Weather scenarios forecast to grow at a comparable rate, with short-term growth closer to historic average

%	10% PoE	50% PoE	90% PoE
5-yr	2.6	2.5	2.5
10-yr	2.1	2.1	2.0



# Maximum demand forecasts – Economic scenarios



## Maximum demand forecast – Economic scenarios

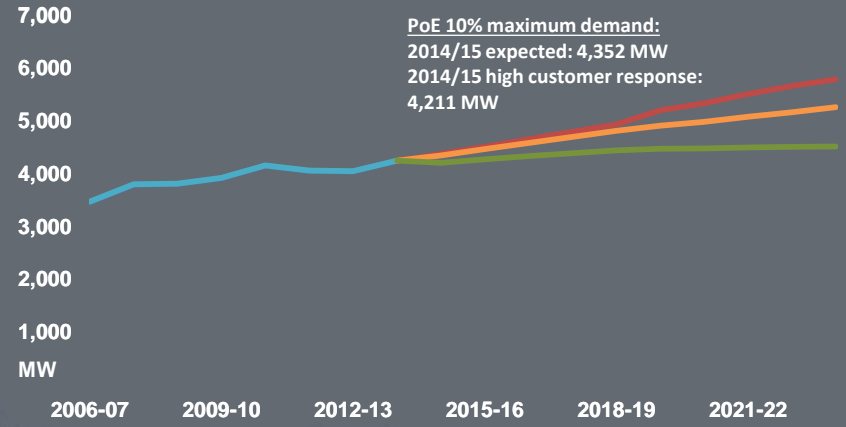
Economic scenarios are differentiated by different growth rates in GSP, population growth and private investment etc, and differing assumptions for large load forecasts.

The major cause of variance in the high case (2019/20) is the inclusion of a specific commercial load.

%	High	Expected	Low
5-yr	3.0	2.6	2.2
10-yr	3.1	2.1	1.8



# Maximum demand forecasts – High customer response



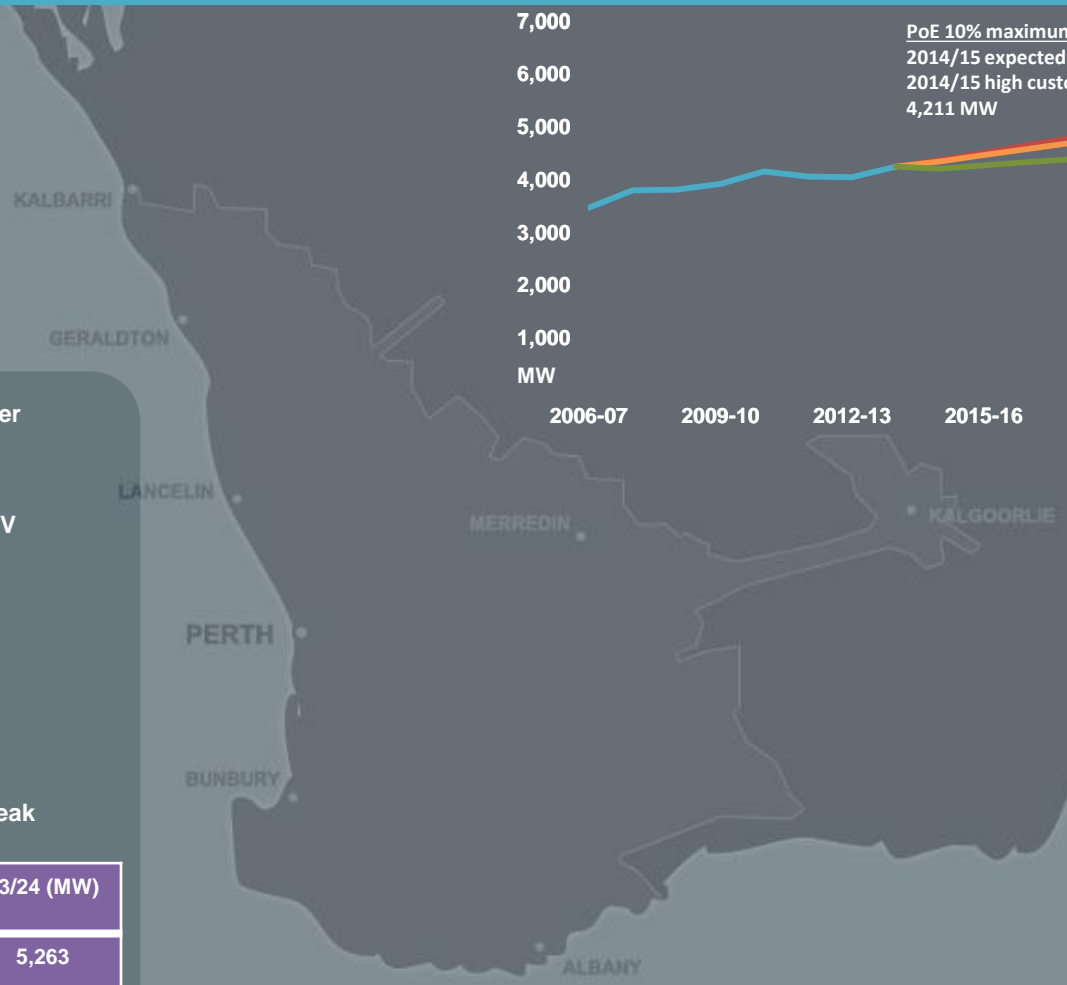
## Maximum demand forecast – High customer response

High customer response represents continued strong growth in rooftop solar PV and participation in the IRCR mechanism.

- This model assumes:
- Growth to 50% saturation (35% of customers)
  - No inclusion of marginal technology

- Under this scenario, by 23/24:
- 2.5 GW of PV is installed,
  - 430 MW is curtailed at time of system peak

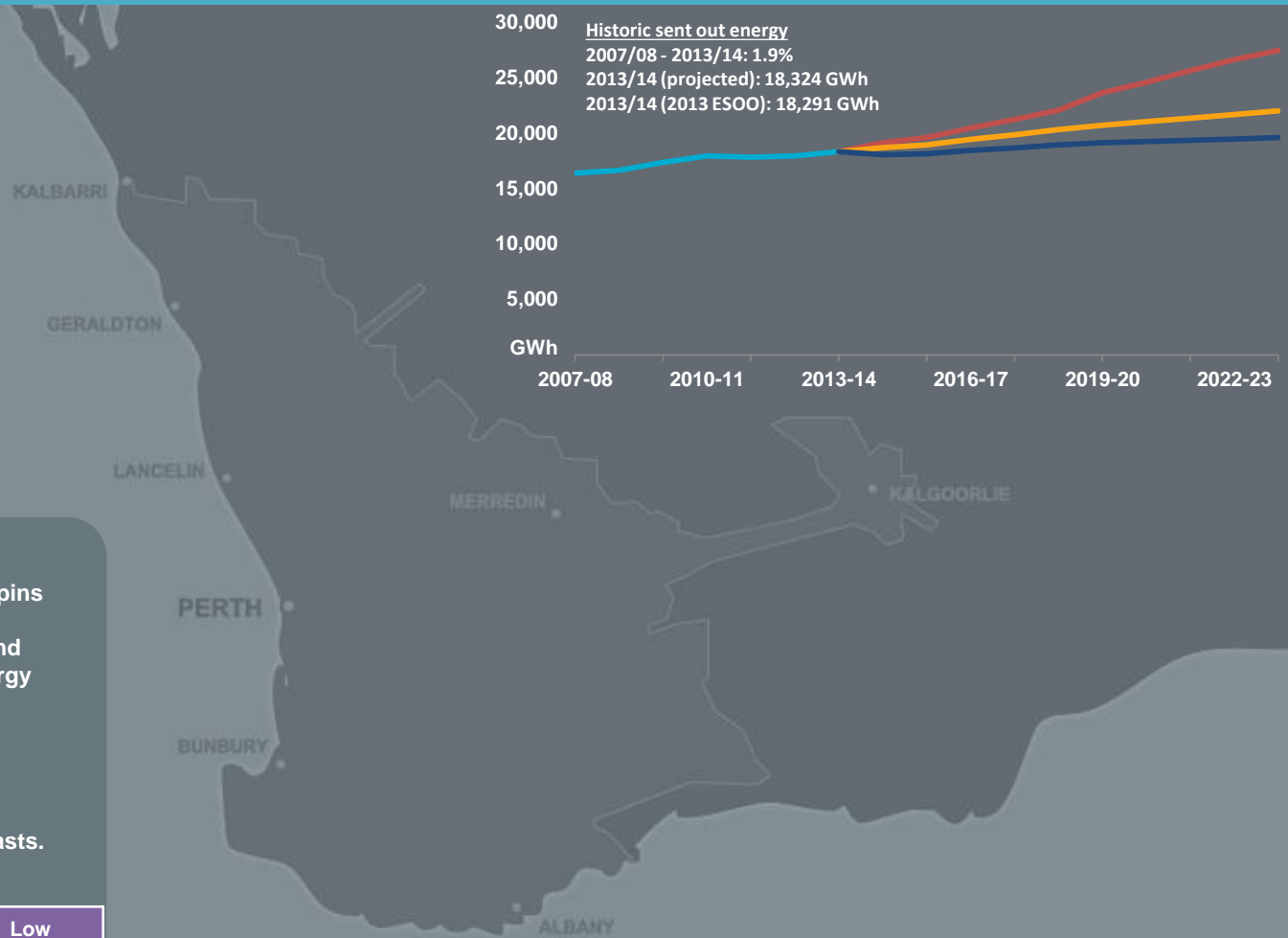
%	Annual growth %	16/17 (MW)	23/24 (MW)
Expected case	2.1	4,588	5,263
High response	0.8	4,337	4,522







# Sent out energy forecast – Economic scenarios



## Sent out energy forecast

Continued strong economic growth underpins growth in energy consumption. Growth in population (2.3%), dwelling stock (2.5%) and SFD contribute to moderate growth in energy in the expected case.

Economic scenarios are differentiated by different growth rates in GSP, population growth and private investment etc, and differing assumptions for large load forecasts.

%	High	Expected	Low
5-yr	3.6	2.1	1.2
10-yr	4.1	1.8	0.9

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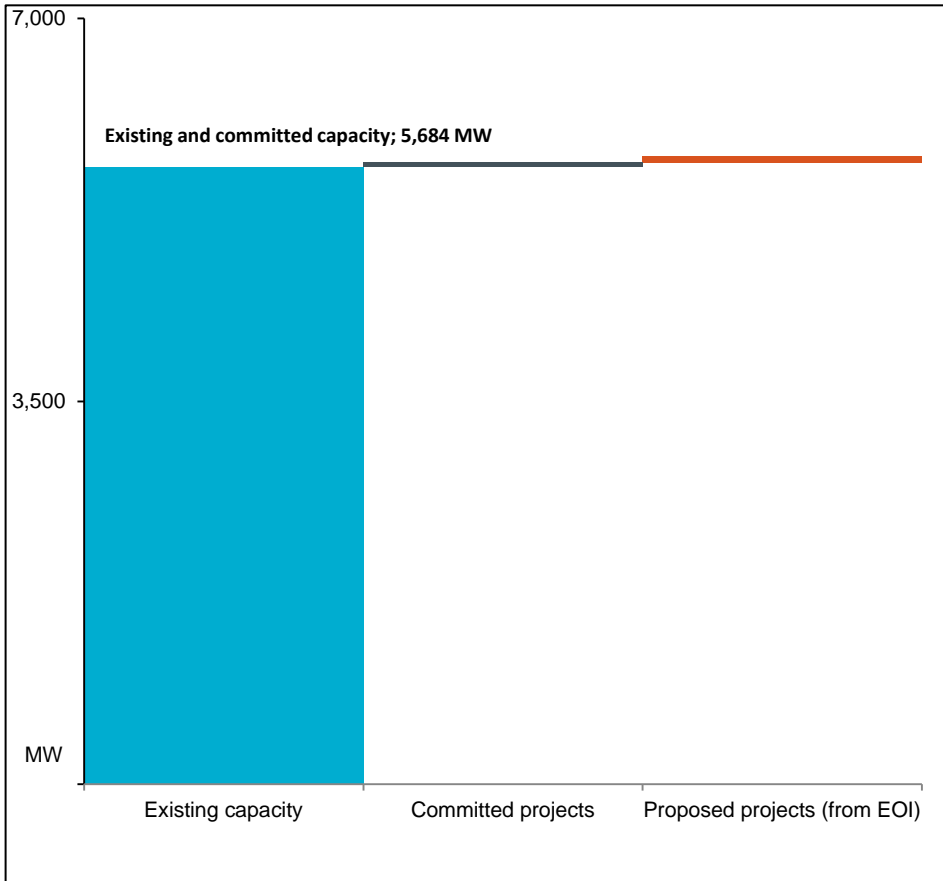
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# Capacity in the SWIS



## Capacity outlook 2016/17

The estimated reserve capacity requirement for 2016/17 is ~5,000. Existing and committed capacity totals 5,684, leaving a capacity margin of ~684 MW.

## New capacity

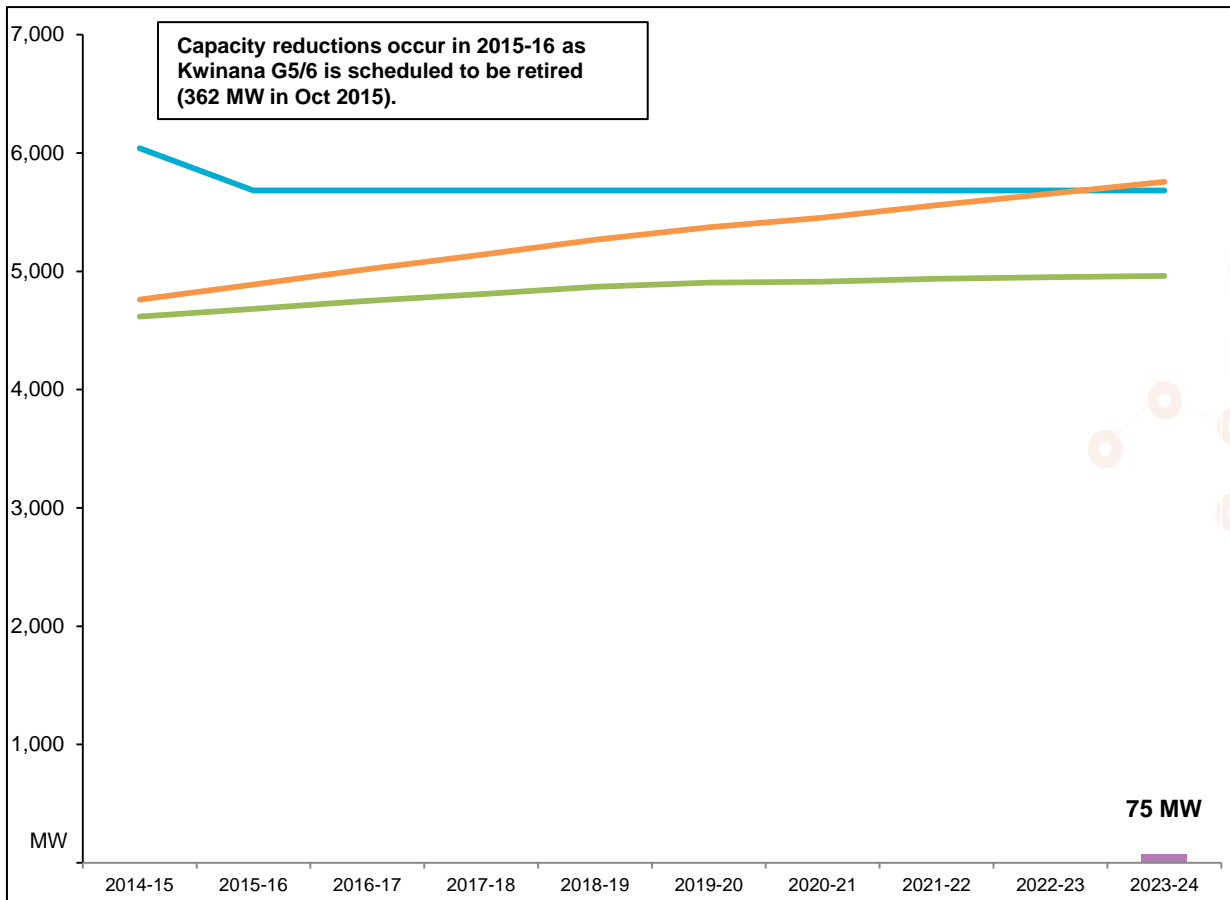
The volume of new capacity has been decreasing steadily, both:

- Capacity offered under the EOI process which has eventually been certified; and
- Capacity not offered under the EOI process that has been certified for the first time

Year	2007	2008	2009	2010	2011	2012	2013	2014
Capacity offered EOI (MW)	1,192	1,036	1,279	644	337	214	59	56
Capacity offered and certified (MW)	370	24	284	475	7	0	0.4	NA
Total capacity certified (MW)	535	137	544	446	54	48	36	NA



# Capacity in the SWIS



## Supply demand balance

Reductions in forecast growth from previous years has postponed the need for new generation capacity.

According to the 2014 forecasts contained in the SEDO, new capacity is not required until 2023/24.

The high customer response scenario is shown to contemplate the effect of potential strong growth in customer response technologies.

### Note:

No adjustment has been made for potential regulatory changes to DSM standards that may affect available capacity in the future.

High customer response scenario + margin PoE 10% expected case maximum demand + margin Installed capacity



Questions?

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