Does renewable electricity generation reduce electricity prices?

Victoria
Energy Policy
Centre

VICTORIA
UNIVERSITY
MELBOURNE AUSTRALIA

Agenda

- Introduction to Victoria Energy Policy Centre
- South Australia price study
- Extension to rest of the NEM
- Some comments on coal closure and market power

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About VEPC

- Academic Centre within Victoria University. Foundation funding from Government of Victoria.
- Research team
  - **Steven Percy** – PhD (electrical engineering)
  - **Stephanie Rizio** – economics, PhD (social psychology)
  - **Dong Wang** – electrical engineering and economics, PhD (economics)
  - **Bruce Mountain** – electrical engineering, PhD (economics)
- Research agenda
  1. Retail markets
  2. Wholesale electricity market design in context of rapid decarbonisation
  3. Economics of storage.

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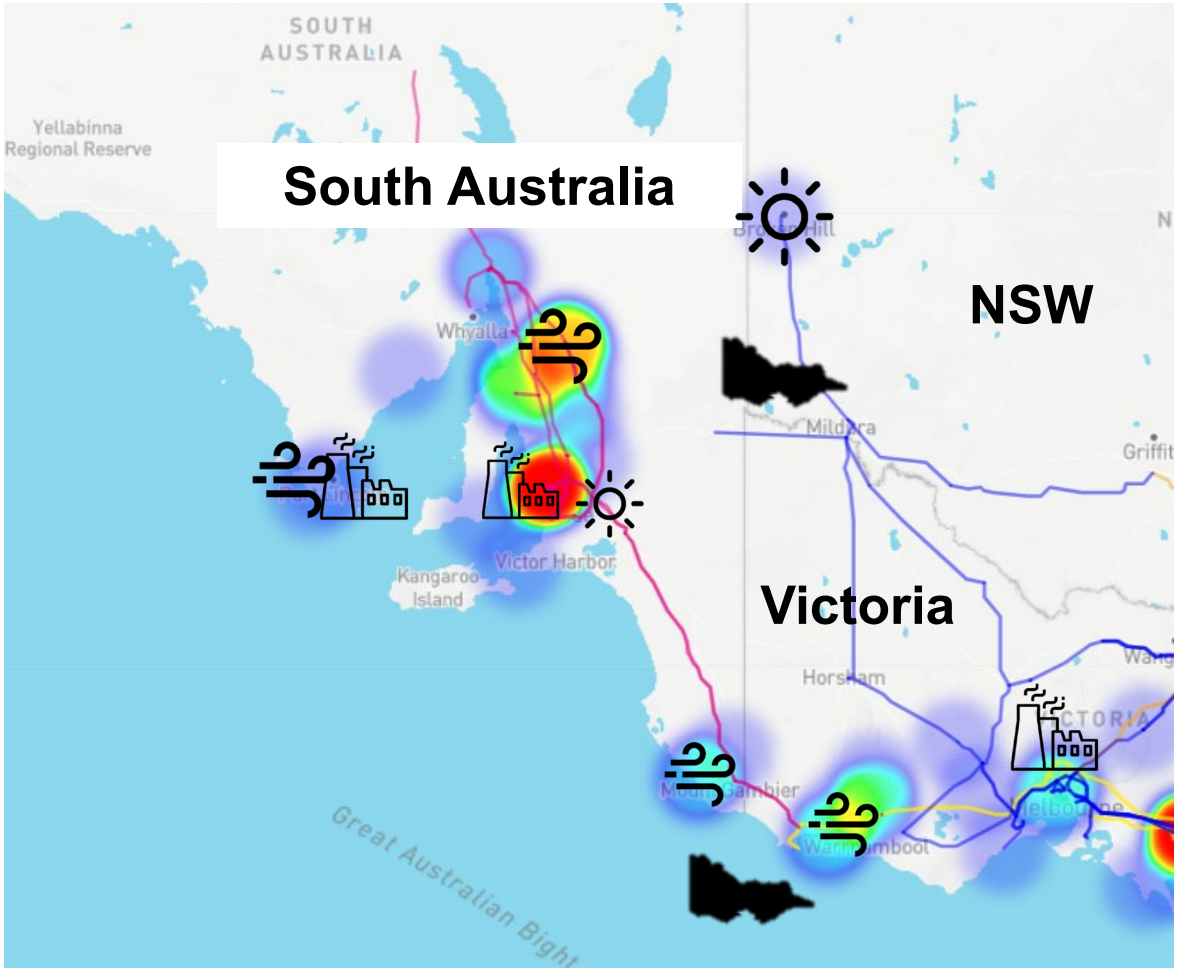
South Australian Energy Generation in 2018



Source: http://www.aemo.com.au/aemo/apps/visualisations/map.html

3 GW Gas Capacity

Two interconnectors with Victoria.

0.6 GW of Liquid Fuel Generation

1.9 GW Wind Capacity

0.2 GW large scale solar and 0.6GW of rooftop solar

No coal generation

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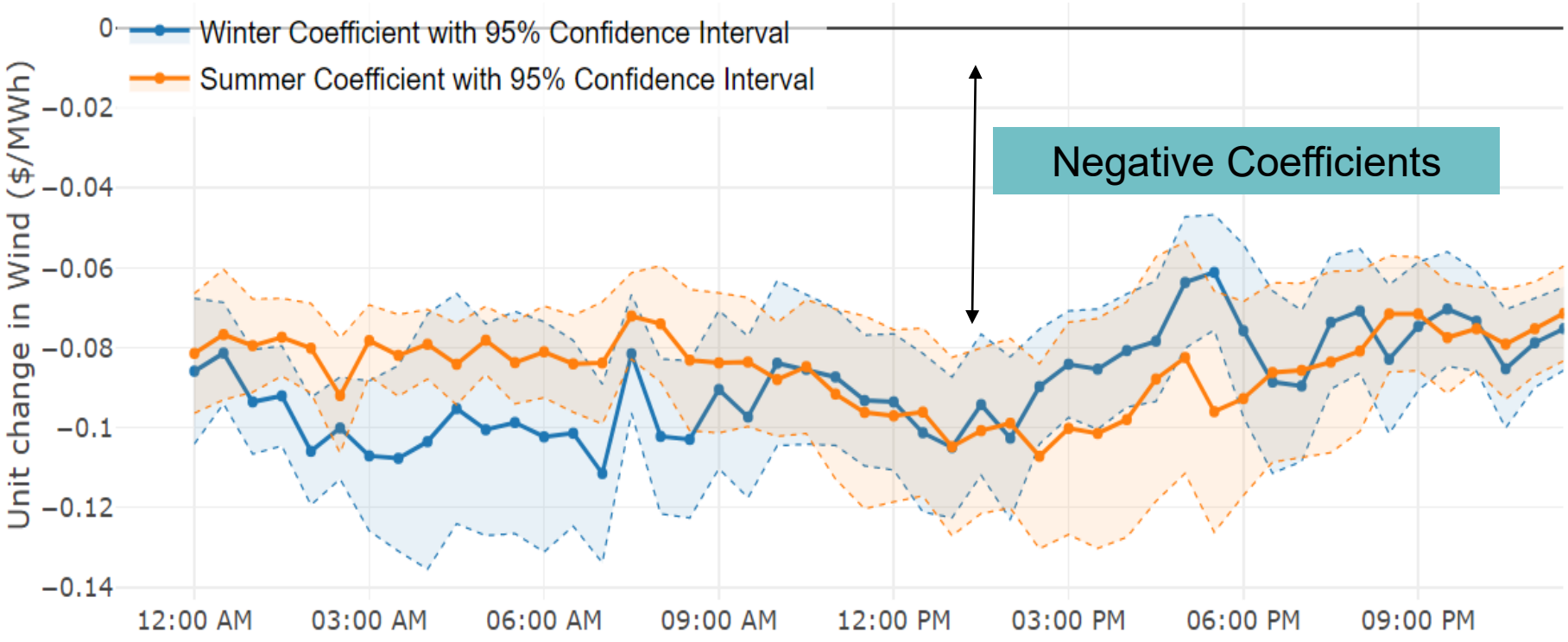
Wind energy reduces wholesale prices



1MWh of wind generation would reduce wholesale energy prices by $0.09/MWh

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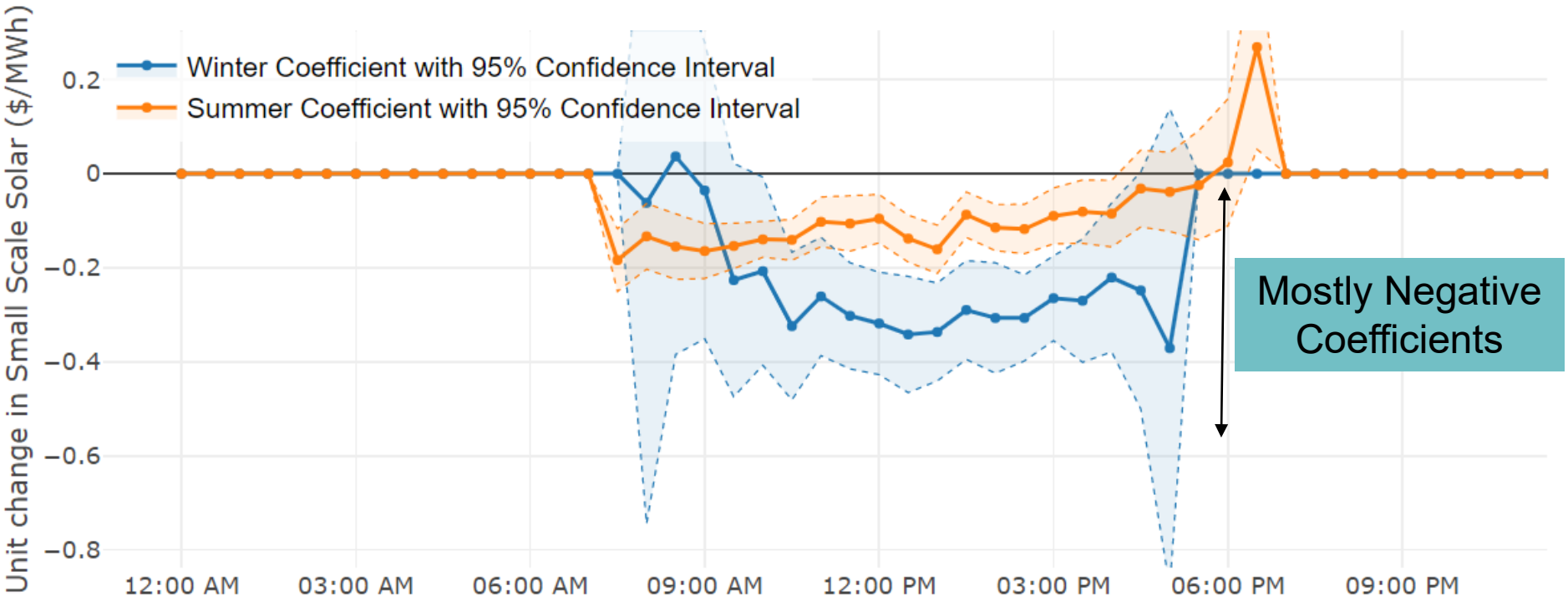
Rooftop solar reduces wholesale prices



1MWh of Solar generation would reduce wholesale energy prices by $0.21/MWh

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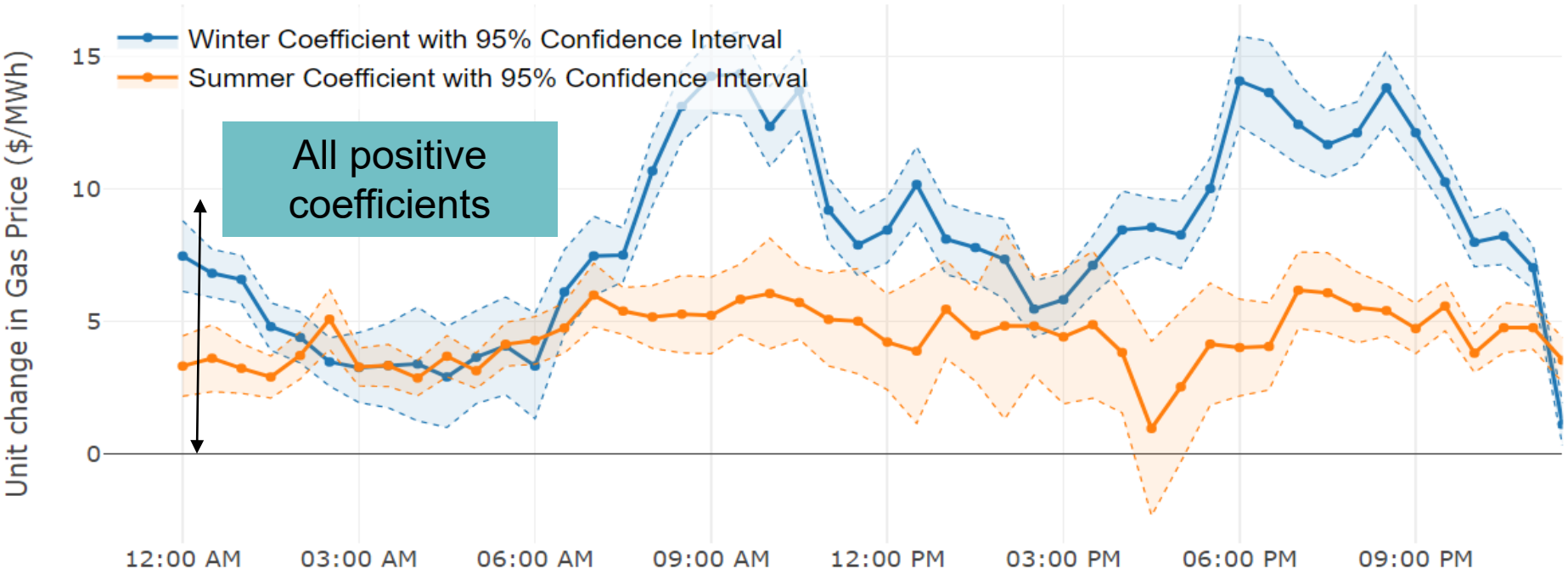
Gas Price increases wholesale prices



On average $1/GJ change in gas price increases electricity prices by $6/MWh

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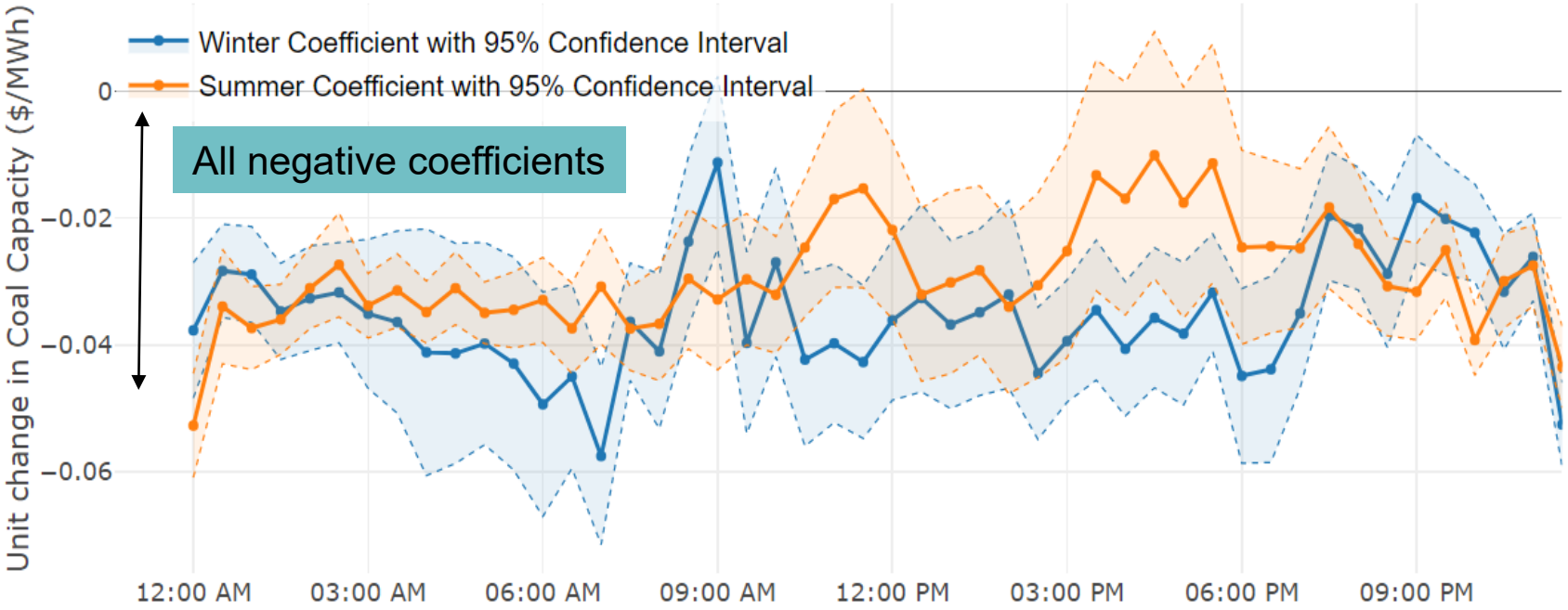
Available Coal Capacity Reduces Prices



On average 1MW reduction in available coal capacity increases electricity prices by $0.03/MWh

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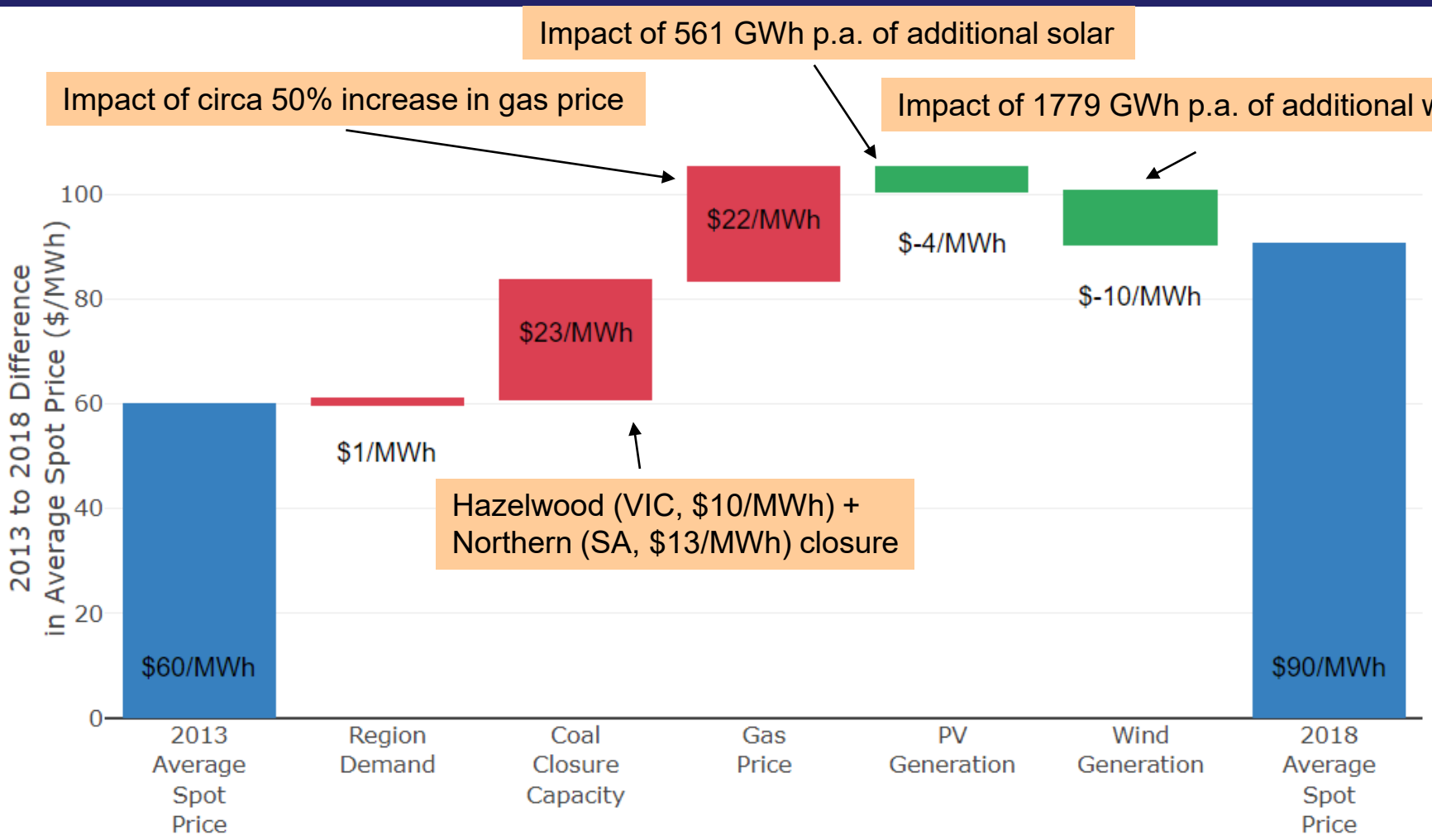
How do we explain the 50% increase in spot prices from 2013 to 2018 ?



- **Average cost of renewables subsidy from 2013 to 2018: $11/MWh.**
- **Price reduction attributable to renewables in 2018: $38/MWh.**

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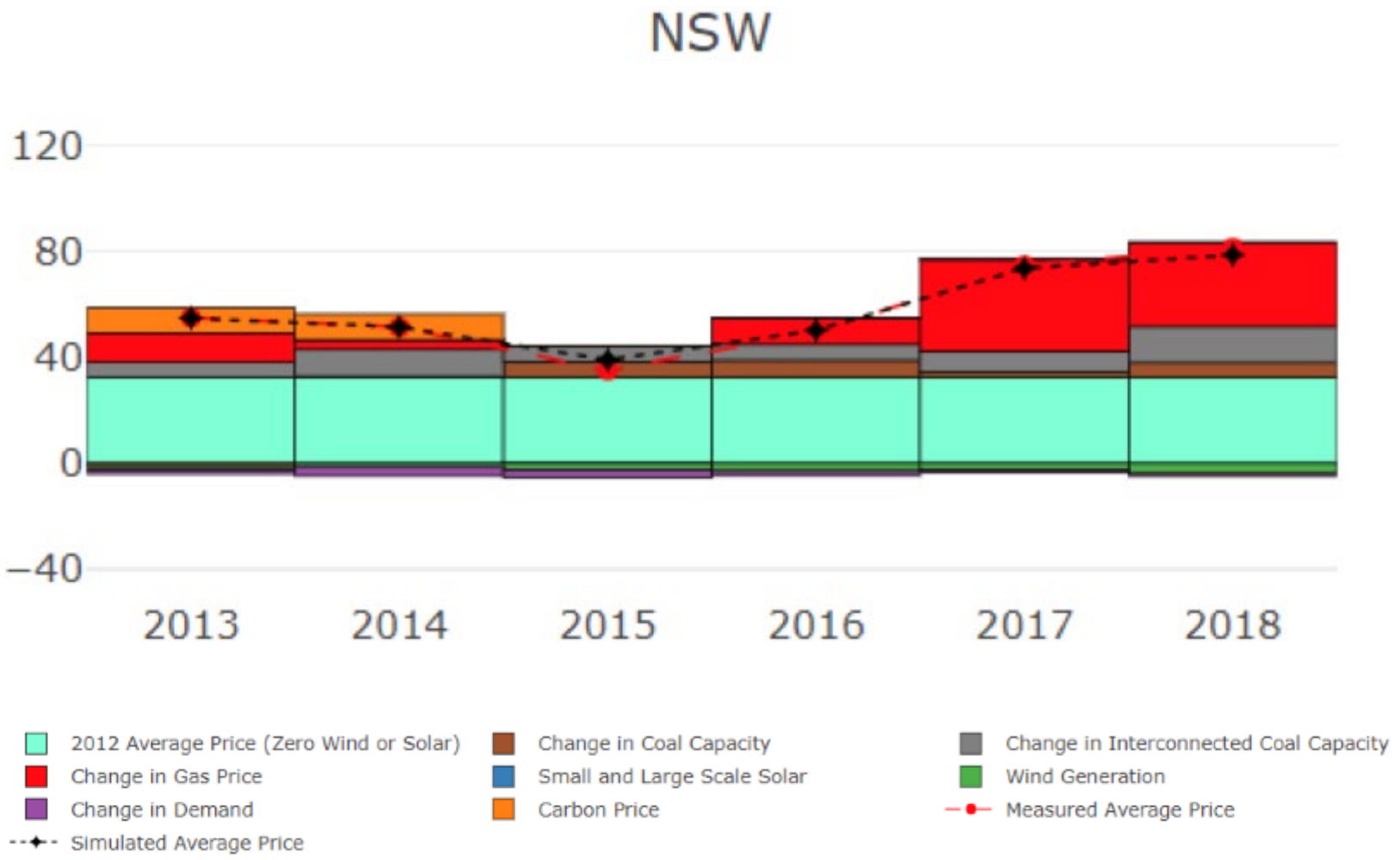

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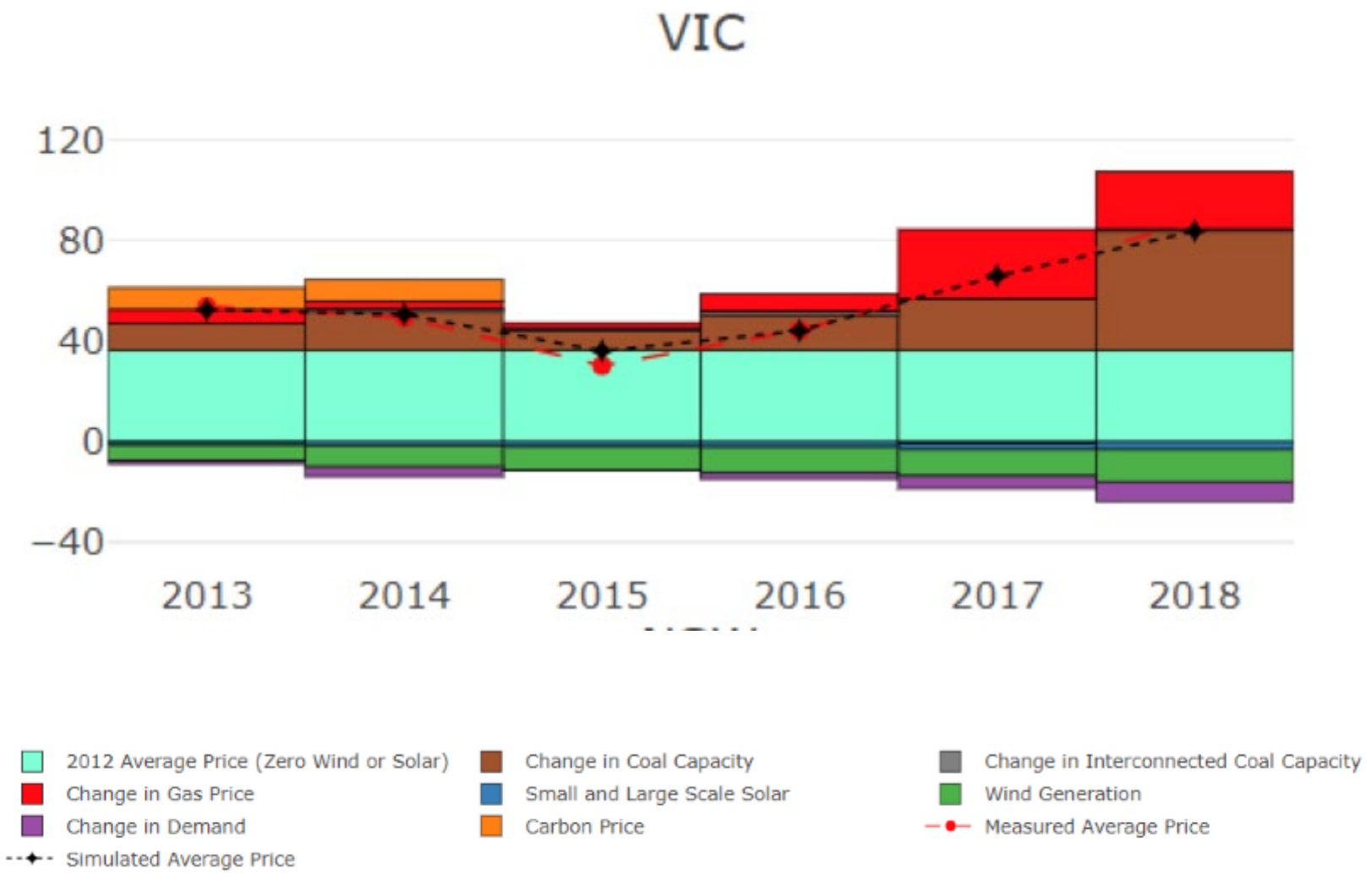

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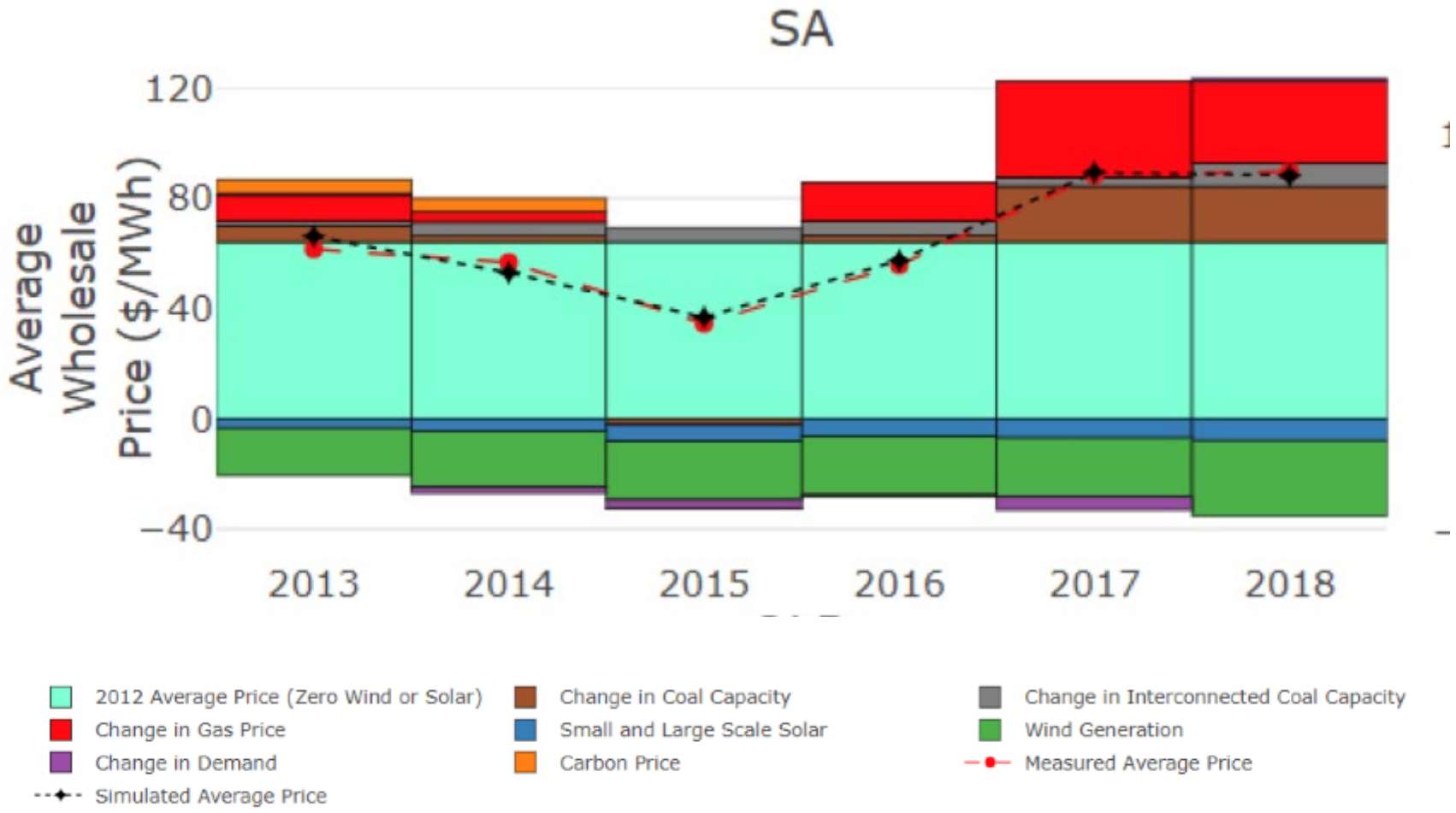

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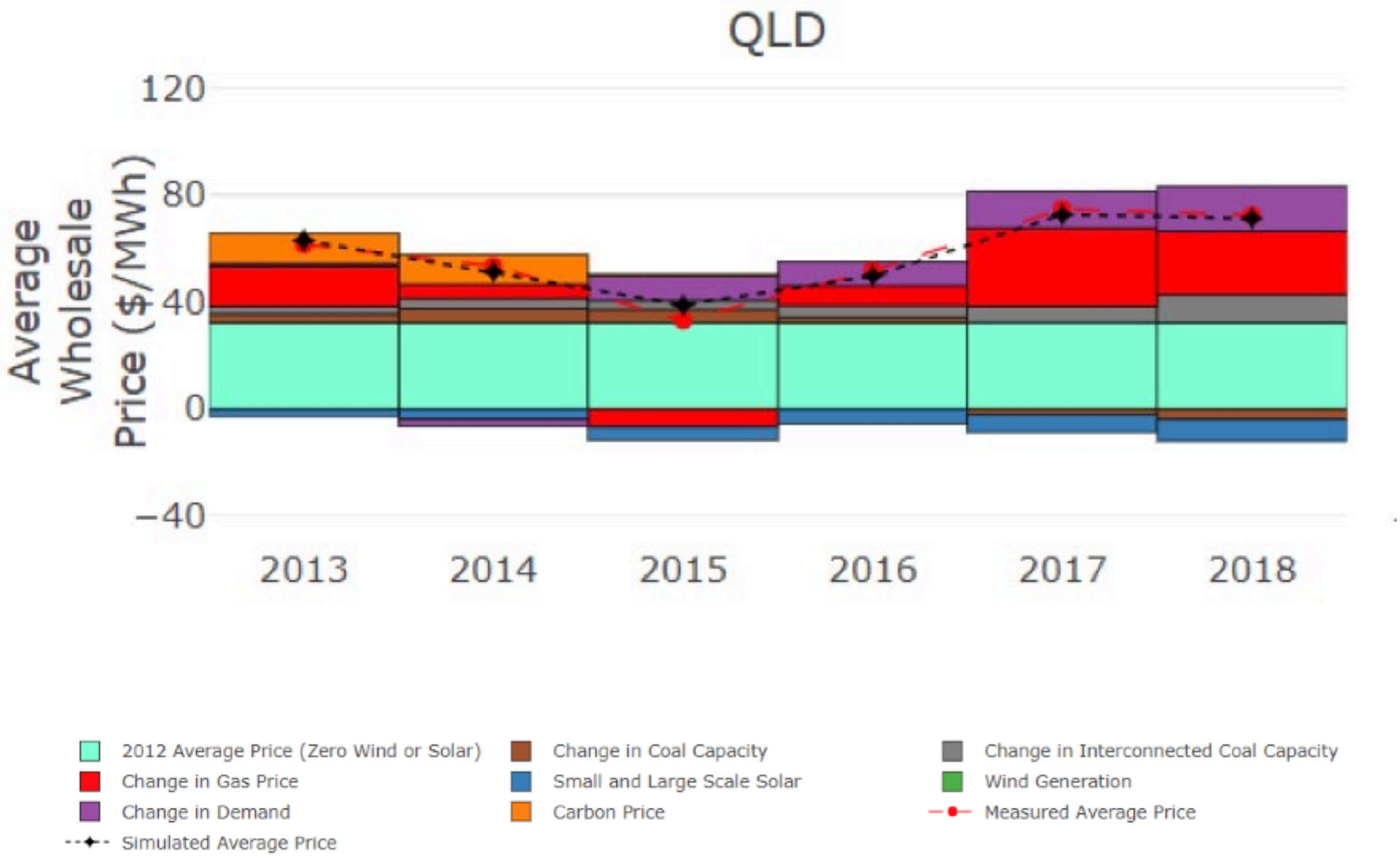

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Average Model coefficients

	SA	VIC	QLD	NSW
Intercept (2012 Average Price)	64.1	36.6	32.3	32.7
Unit change in Gas Price	6.9	4.7	5.9	6.3
Inclusion of a Carbon Price	5.1	8.7	11.3	9.8
Unit change in Region Demand Before Small Scale Solar	0.11	0.03	0.03	0.02
Unit change in Interconnected Coal Capacity	-0.0039	-0.0015	-0.0034	-0.0064
Unit change in Coal Capacity	-0.05	-0.025	-0.012	-0.008
Unit change in Wind Generation	-0.087	-0.056	-	-0.028
Unit change in Small and Large Scale	-0.165	-0.072	-0.062	0.005

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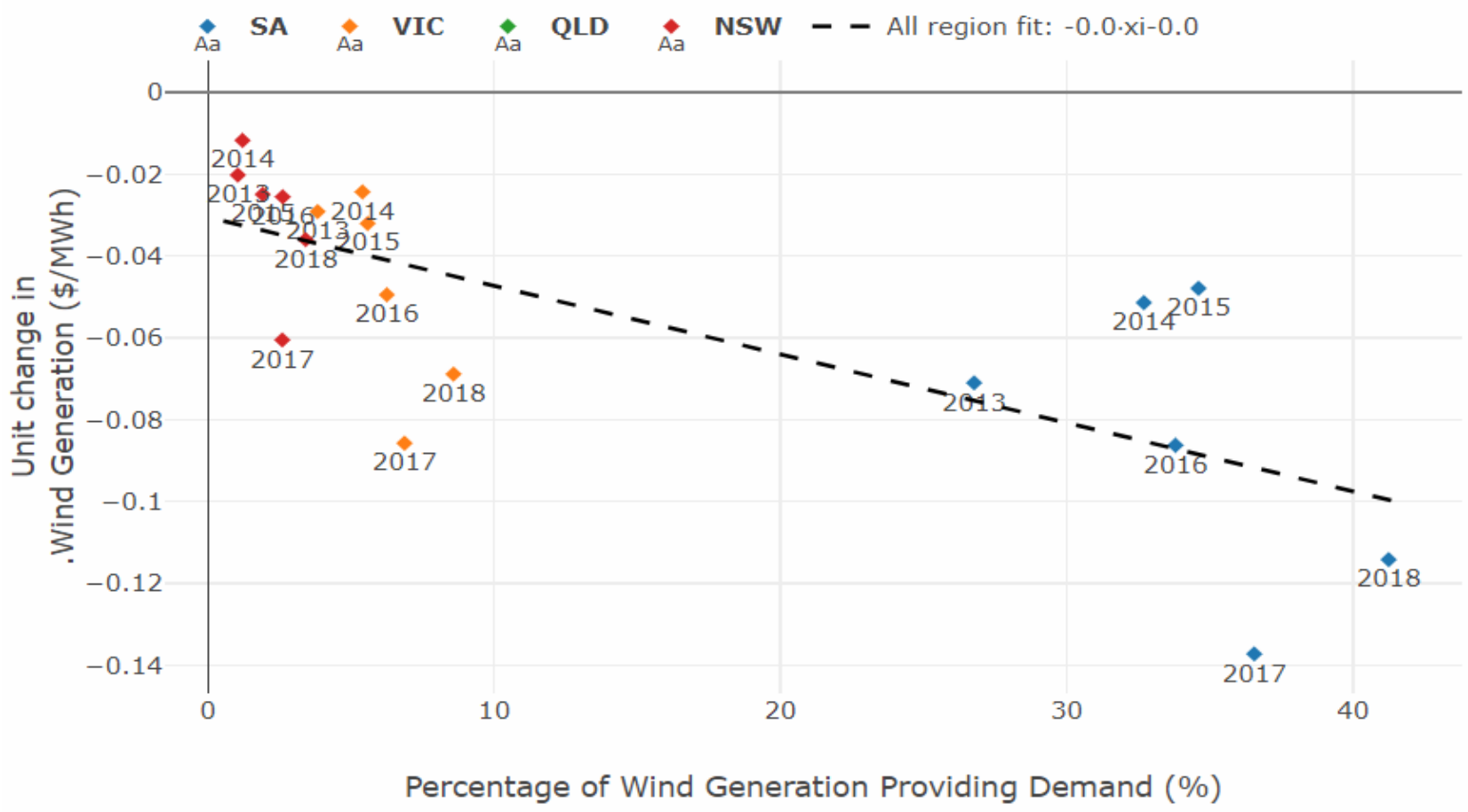

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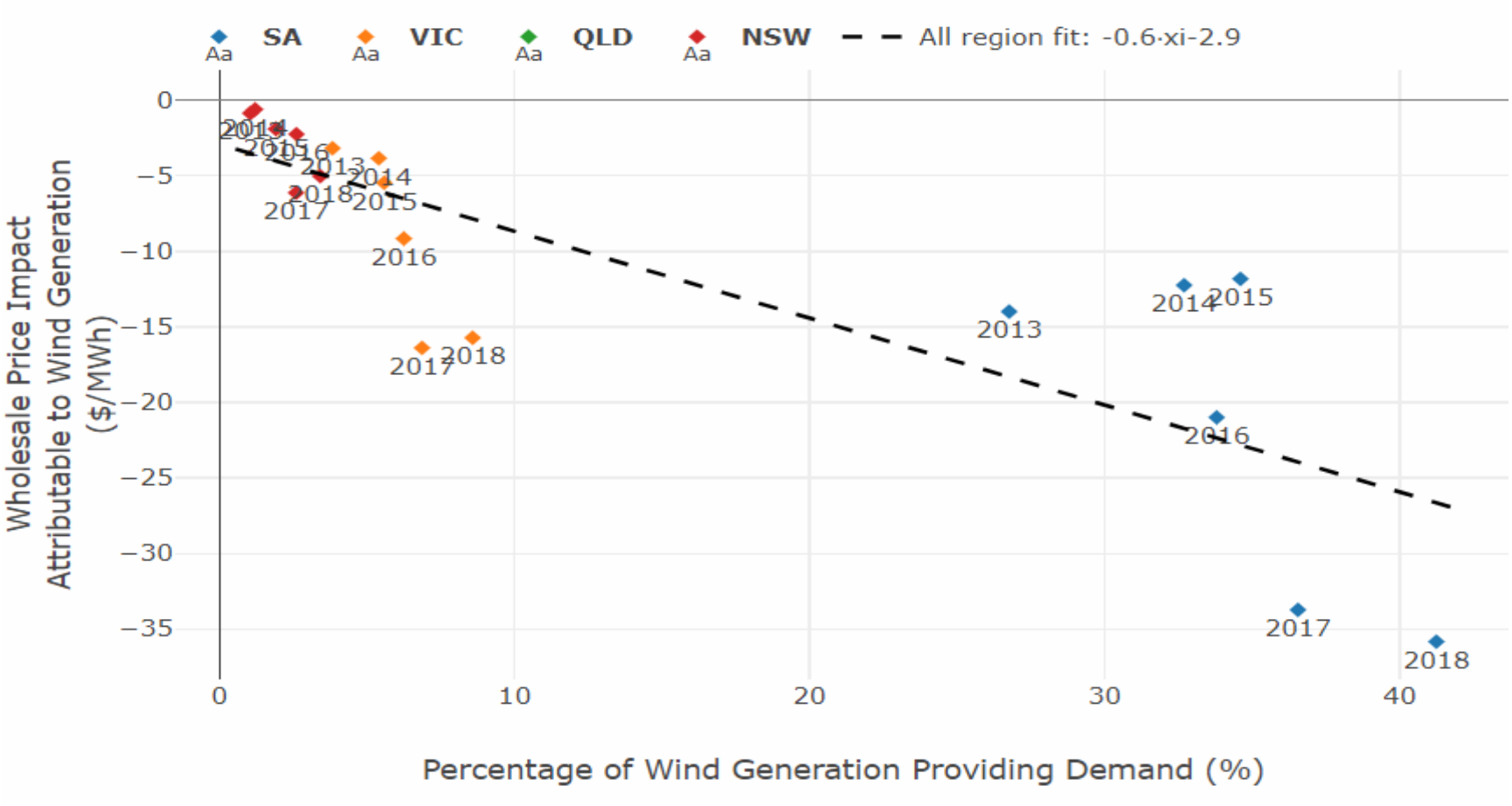

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Market power and coal closure