Incentivising reliability through capacity payment mechanisms

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Capacity - why worry?

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Figure: The missing money problem

Capacity - why worry?

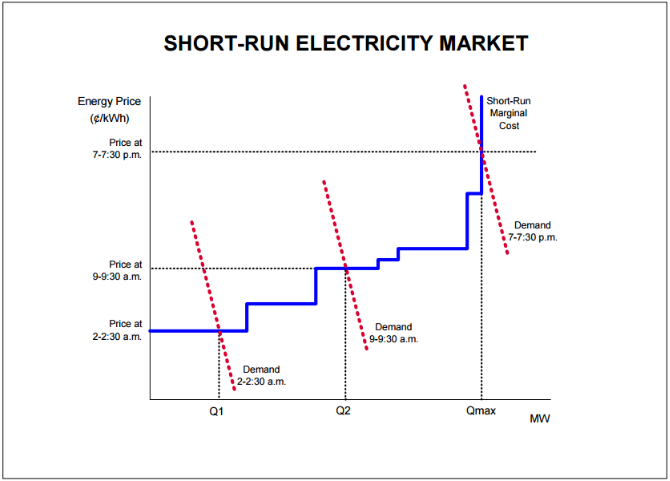

Figure: Lack of an active demand side

Introduction

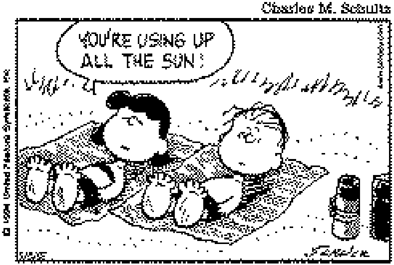

Figure: Public good characteristics

Capacity payment mechanisms design

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- Incentivises generation when you need it
- Considers reliability/adequacy contribution
- Mitigates against strategic behaviour

Revelation of reliability

- Generator reliability is usually private information
- Regulators often ‘scale’ capacity payments (of RES and thermal) to account for outages
- Design capacity payments to induce truthtelling
- Mechanism design problem

Our approach

Use mechanism design to **incentivise** generators to **reveal their (best estimate of their) own reliability** to the regulator

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An analogy

Figure: Car insurance excess

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Use Mixed Complementarity Problems (MCP) to find the scaling factor α and the penalty factor τ

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Compare with and without refurbishment decisions, and with and without our scaling mechanism.

Some results

Truthtelling is induced in all firms for all units

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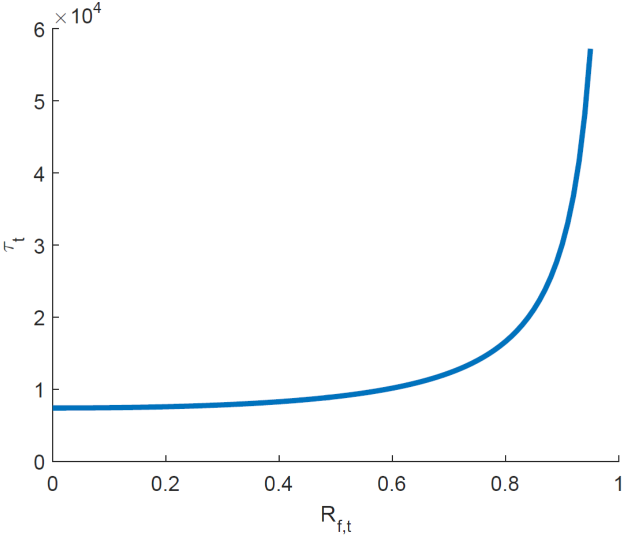
	Reliability	Without mechanism	With mechanism
Baseload	0.965	4583	4578
Mid merit	0.955	4583	4550
Peaking	0.985	4583	4634

Table: Capacity revenues with and without truthtelling mechanism

Optimal τ_t



Allowing refurbishment

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High scarcity prices dominate over savings in capacity payments

Conclusions

- Truthtelling can be induced
- Regulator can reduce resources allocated to determining reliability
- Benefits (including refurbishment) depend on market concentration
- Market exit, entry and risk aversion can be incorporated in future work

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Thank you!

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Questions?
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