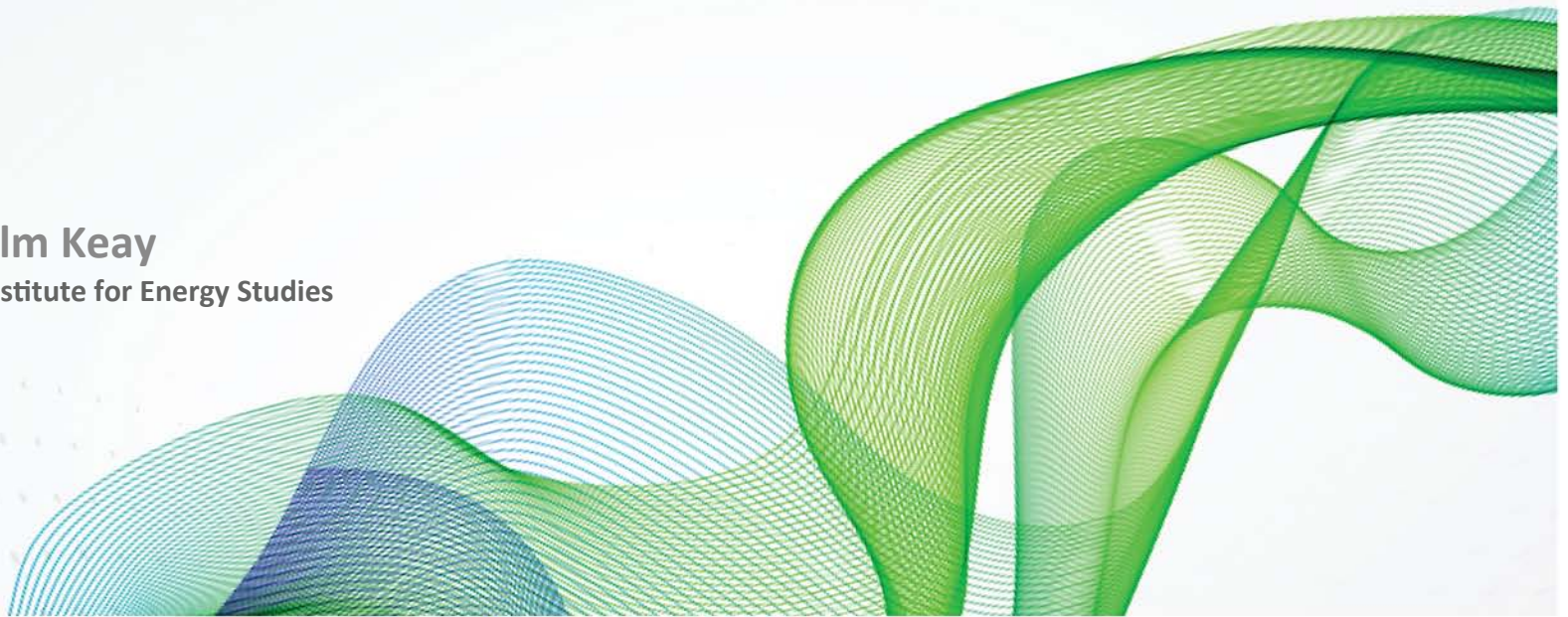


# Electricity markets are broken; can they be fixed?

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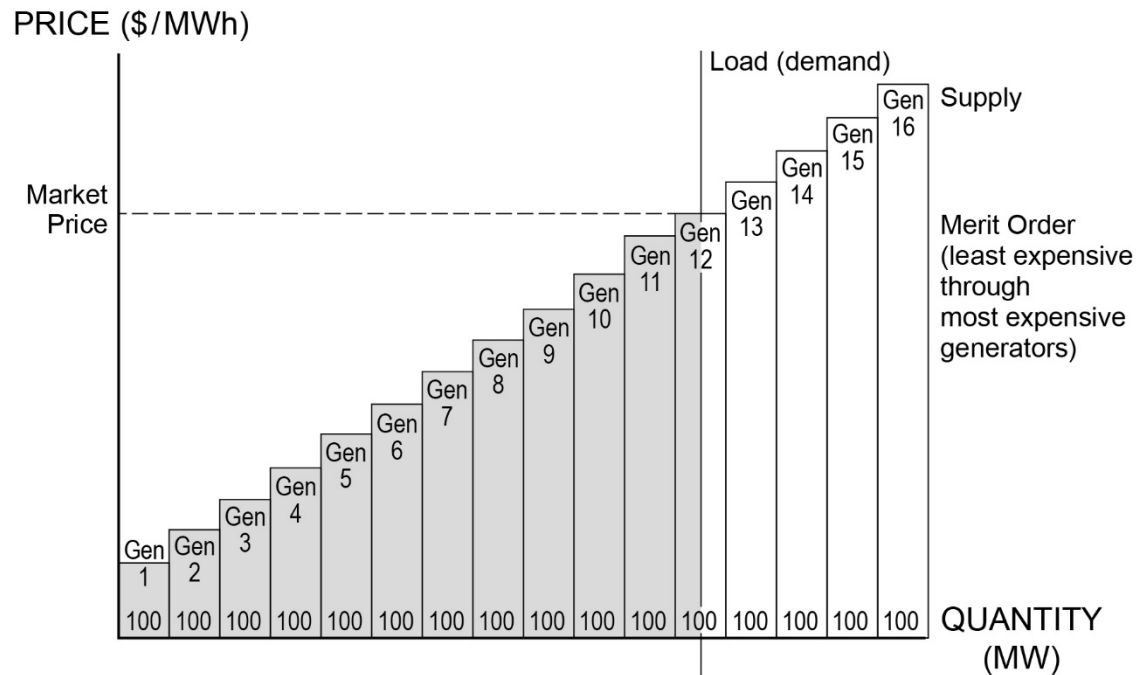


# The electricity industry is “turning upside down”

	NOW	FUTURE
Generation and storage	Mainly central	Increasingly decentralised
Cost structure	Mainly marginal	Mainly capital
Pricing	kWh	?
Planning and operation	Flex supply to match demand	Flex demand to match supply
Control and dispatch	From centre	Throughout system (cf internet)
Role of demand-side	Passive	Interactive
Role of grids	Neutral conduit	Smart player



# The traditional view of wholesale electricity markets



# There were always problems – *but now they are unmanageable*

- Many system and generation costs fixed; marginal costs may not give the right signals for investment

*No signals for investment renewables penetration depresses prices below LRMC*

- Clustering and herd behaviour – discourage diversity.

*The cluster is now at zero and non-dispatchable; no signals for operation.*

- Consumer prices – not designed to encourage active response.

*No useful signals for demand-side. Consumer price signals administratively determined – yet demand flexibility is now a priority*

- *No system optimisation*

- *No exit strategy ('pecuniary externalities')*

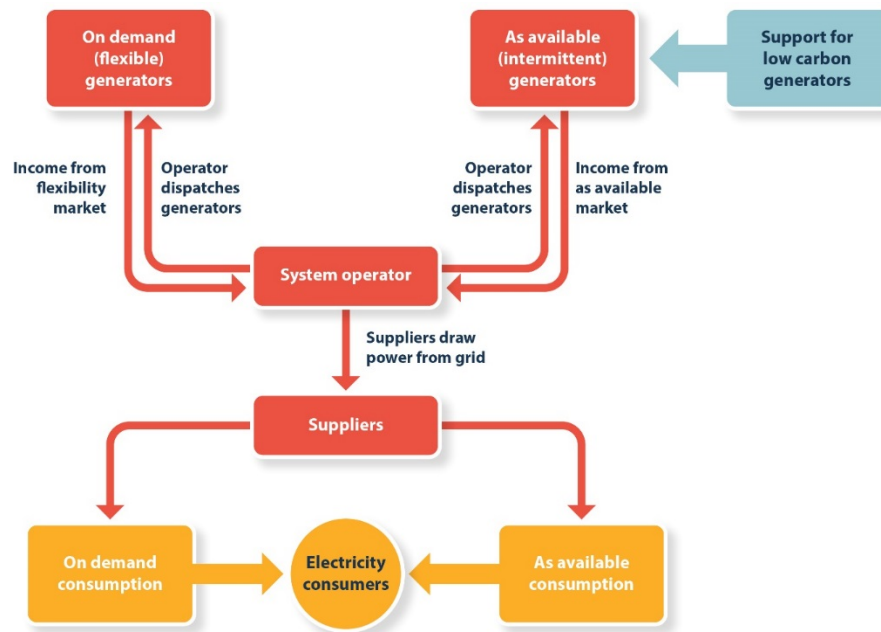


# Possible solutions

- Stop supporting renewables
- Central planning
- Greater use of TOU pricing, flexibility markets etc
- Fixed cost elements in prices and renewables support
- Capacity/investment markets
- Transactive pricing
- Two market approach



# The two market approach



# Capacity markets

- Rely on arbitrary centralised judgements about the level of security people want
- Don't involve consumers; pass on price signals in an arbitrary administrative manner
- Don't take advantage of different VOLLs (Valuations of Lost Load) on the consumer side
- Distort options by specifying product (which always seems to look like a power station)



# The problem with VOLLs

- Huge range ( £300 - £44,000/MWh) <sup>(LE)</sup>
- Methodological issues at level of detail (WTA vs WTP)
- And with overall approach –  

‘people aren’t good at judging their reactions to hypothetical future states –we tend to over-predict the intensity of our feelings about them. Furthermore, our valuations can vary significantly according to how the questions are phrased and the context in which they are asked’ (Keay 2016)
- No longer need single marginal figure because of IT and metering developments anyway
- **So – let consumers decide for themselves!**





# Conclusions

- Electricity markets are no longer fit for purpose
- But any redesign must address all the problems, not just pick one or two
- Electricity wholesale markets will be at the centre of system optimisation – which will be much more complex in future
- Consumers, not system operators, need to be at the centre of electricity markets

