



# 100% Renewables – will the electricity market work?

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# The long term – 100% renewables

- Studies indicate 100% renewables is technically feasible and reasonably affordable

## UNSW

*Elliston, MacGill, Diesendorf (2013)  
Least cost 100% renewable electricity  
scenarios in the Australian National  
Electricity Market. Energy Policy (in  
press)*

Average cost:  
\$104 - \$173 /MWh

## AEMO

*Australian Energy Market Operator (April  
2013) 100 per cent renewables study –  
draft modelling outcomes*

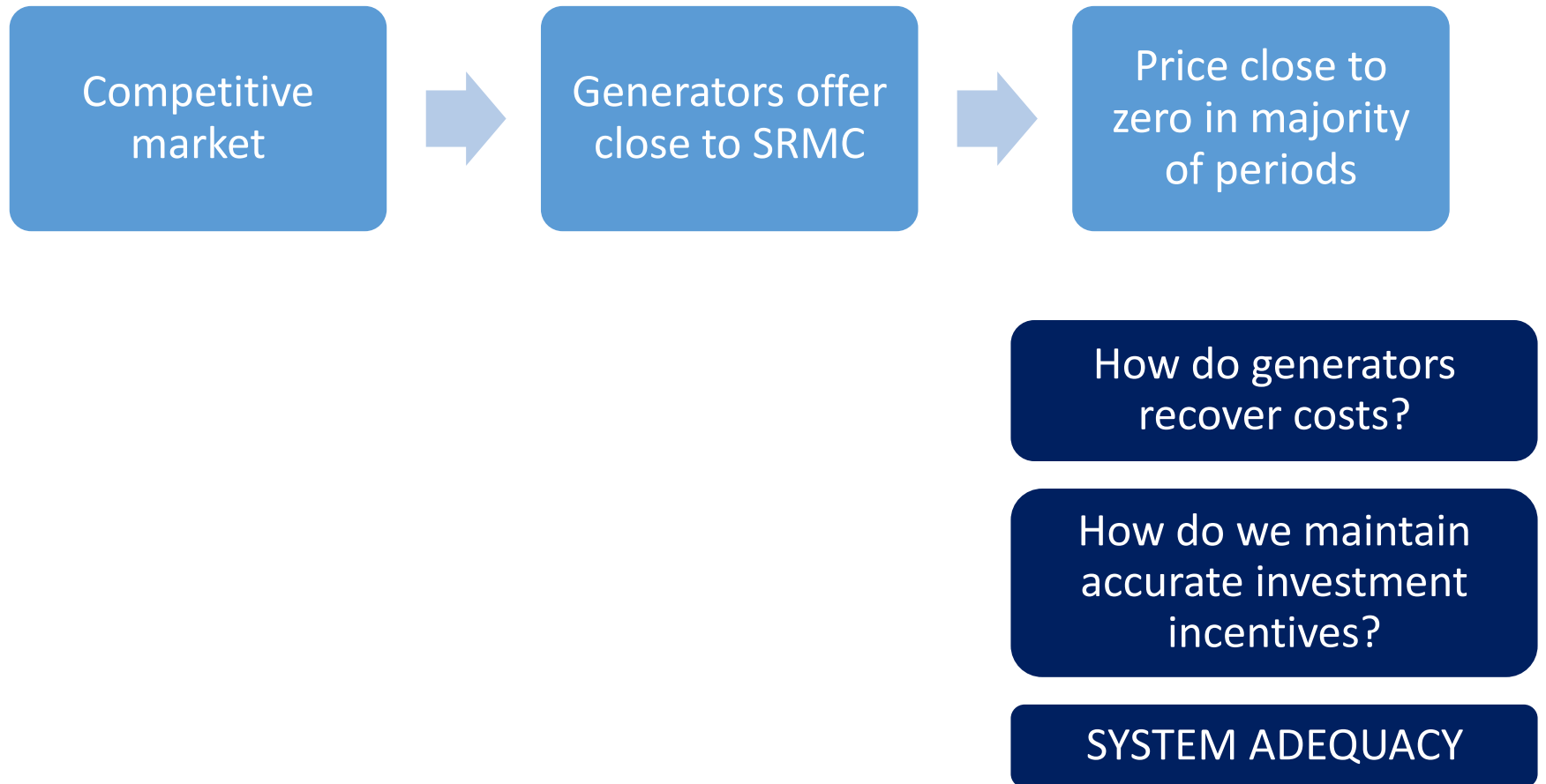
Average cost:  
\$111 - \$133 /MWh

Present average wholesale price: \$55 /MWh

2 - 3 times increase  
in wholesale prices  
(~30% of retail bills)

# Market impacts of renewables

- Will the *market* work with 100% renewables?



# Managing system adequacy in the NEM

## Determine Market Price Cap (MPC)

Simulate future market

adjust installed capacity to meet 0.002% USE

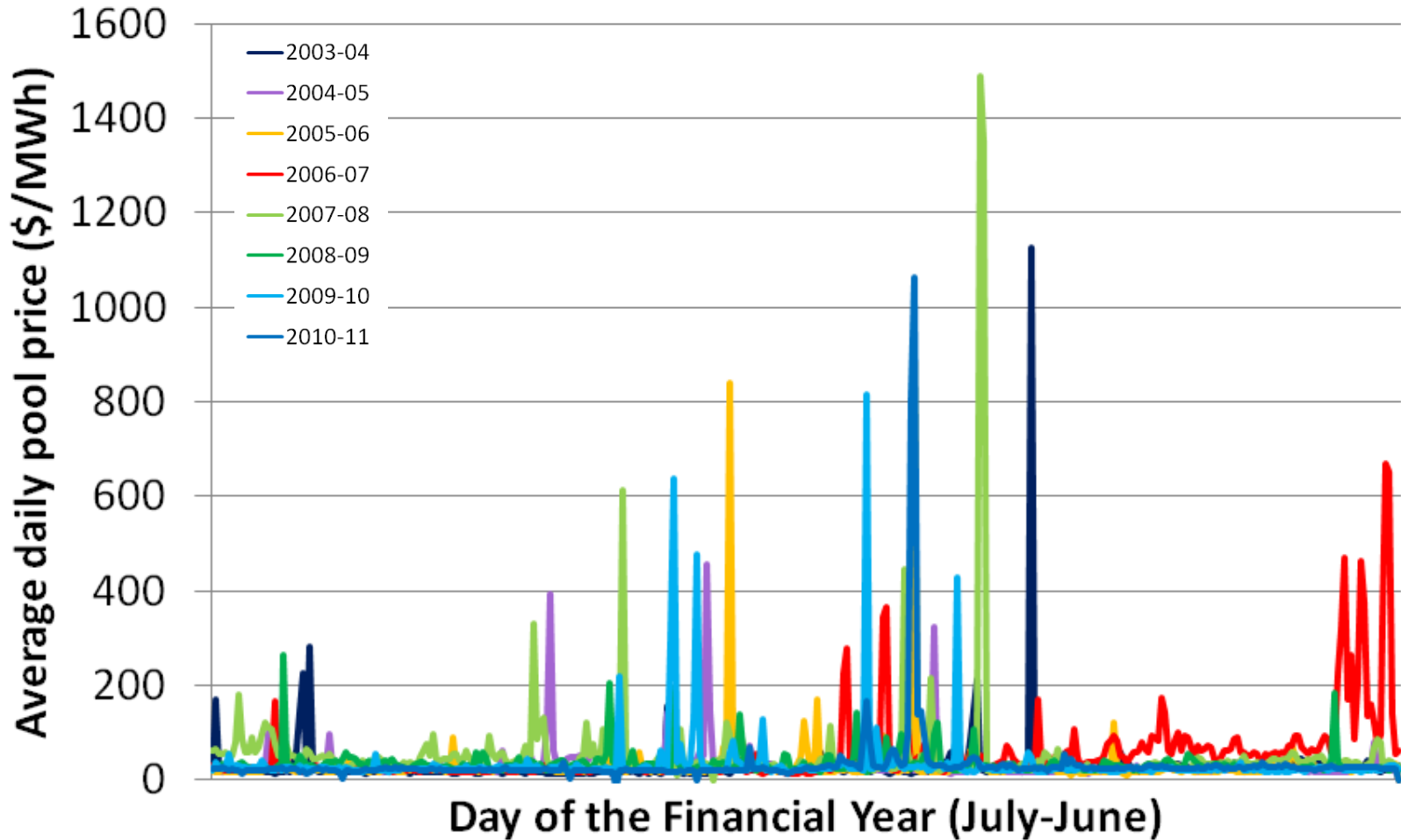
Adjust MPC to allow last generator to meet costs

Market participants make investment decisions

- Higher MPC rewards more investment

# Price volatility

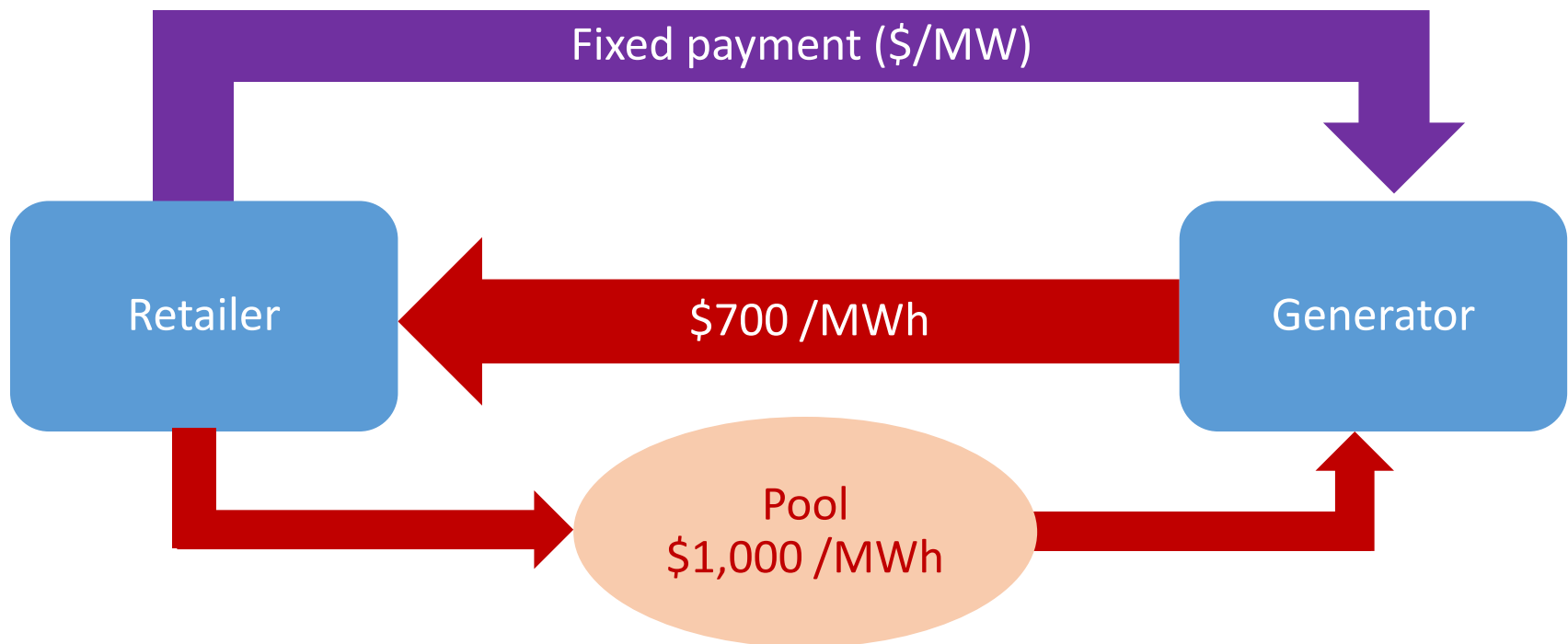
Generators already earn 20-50% of annual revenue in top 20 days of the year



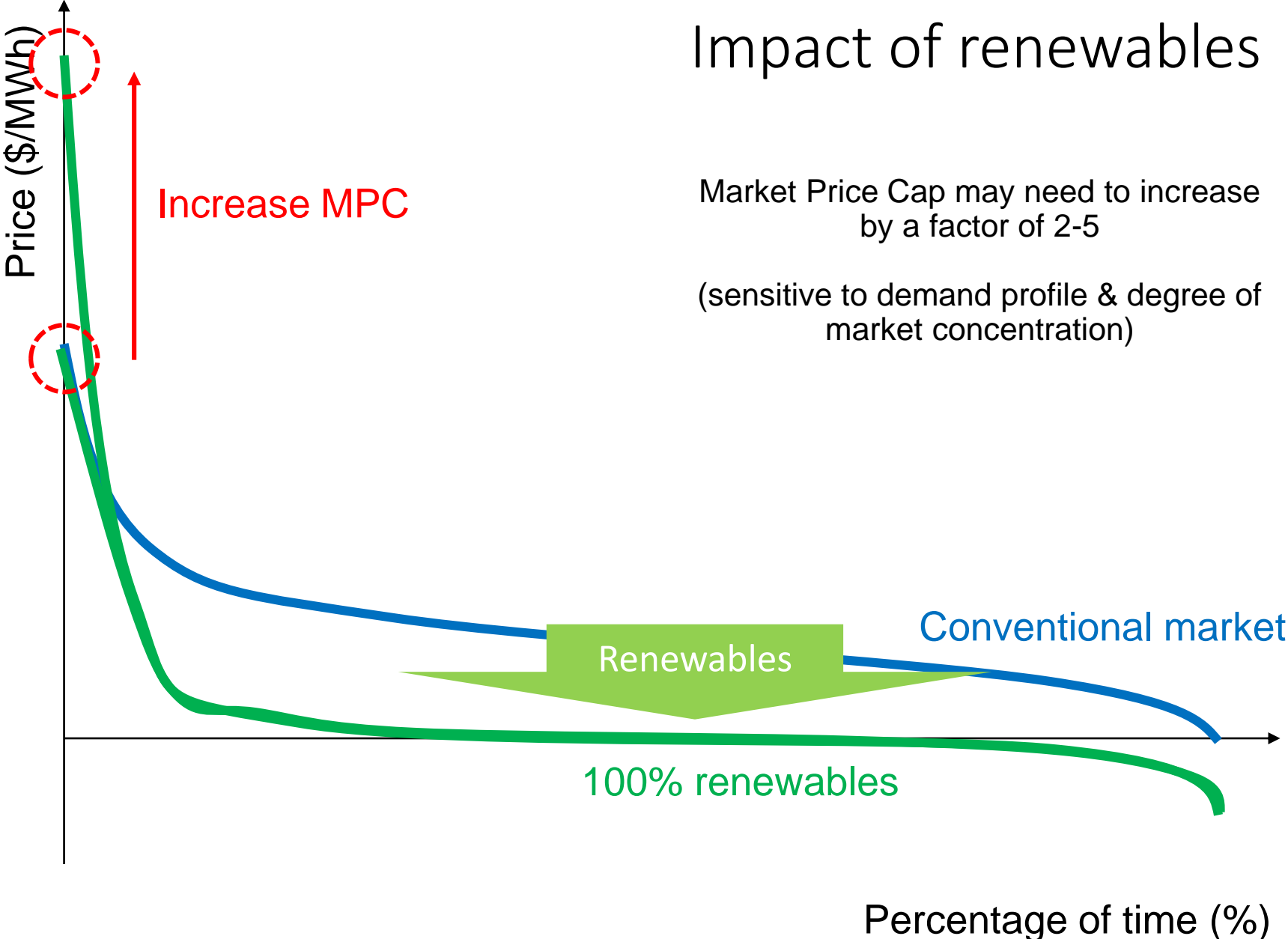
# Managing price volatility

- Market participants manage price volatility via:
  - Contractual arrangements – mature derivatives market
  - Vertical integration

Cap contract:  
(\$300 strike price)



# Impact of renewables



Market Price Cap may need to increase by a factor of 2-5

(sensitive to demand profile & degree of market concentration)

# Issues with increasing the Market Price Cap

Increased costs of hedging

Increased prudential obligations

- Increased barriers to entry

Discouragement of inter-regional contracting

- May interfere with generation locational decisions



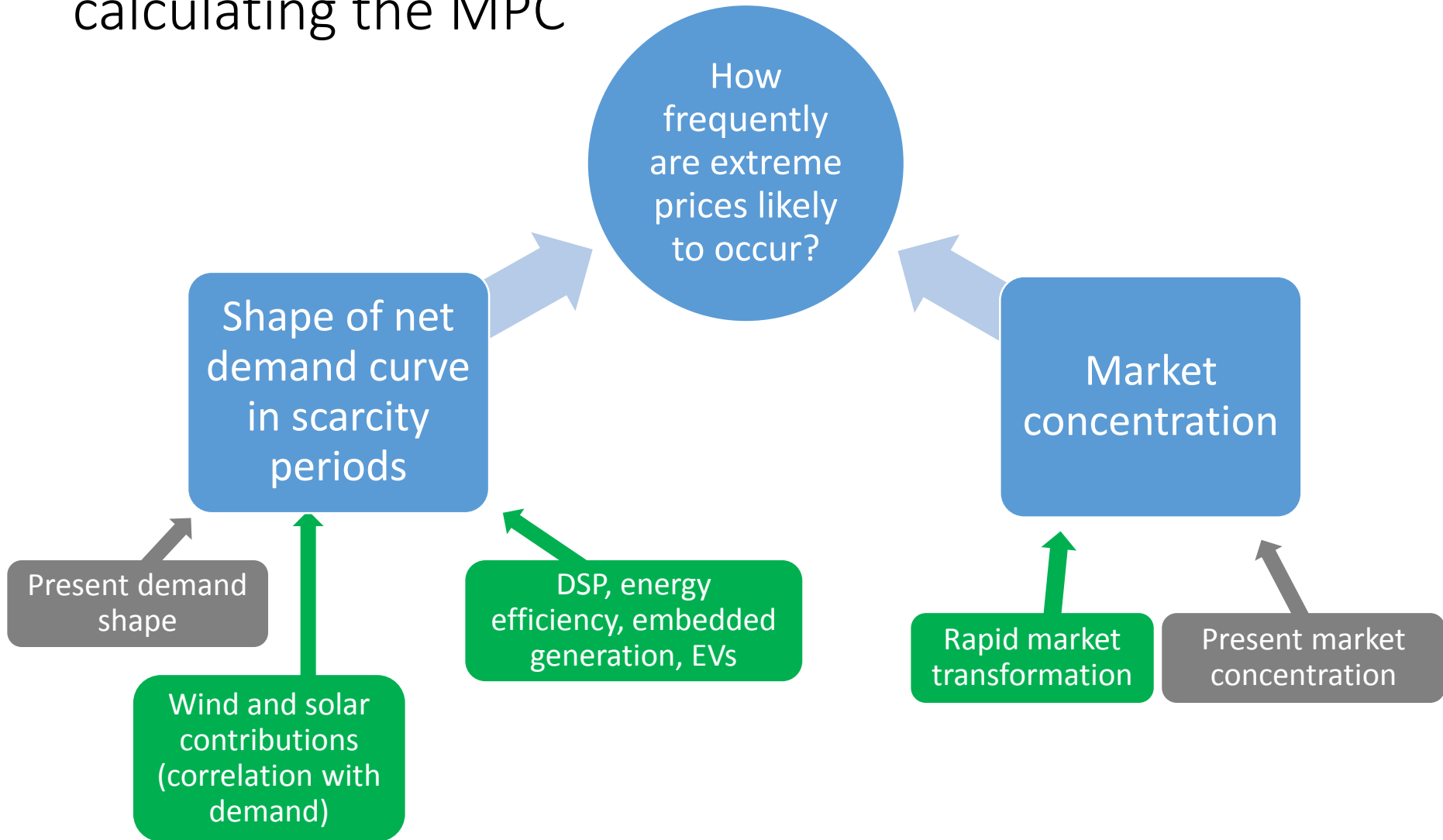
# Increasing importance of the contracts market



## Consider:

- Close monitoring
- Mechanisms for increased transparency
- Disincentivise vertical integration
  - Reduces liquidity and contracting options

# Increased challenges in calculating the MPC



# Demand Side Participation

Why have a  
Market Price  
Cap?

- Demand is inelastic
- Need to protect consumers

Increase DSP  
sufficiently



True representation  
of “value of lost  
load” in market, for  
each consumer



No MPC required

# Conclusions

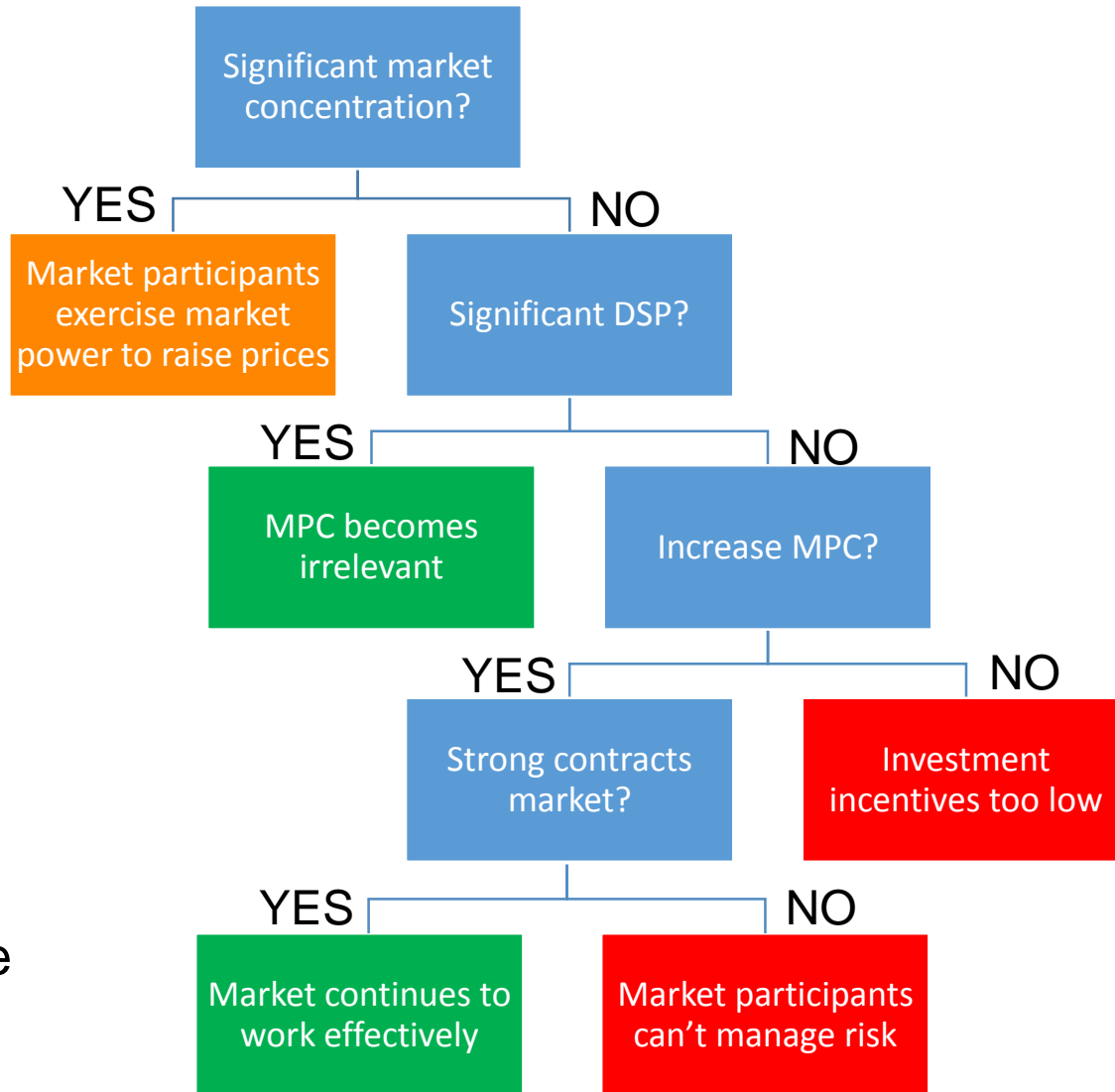
More renewables



Prices close to zero in majority of periods

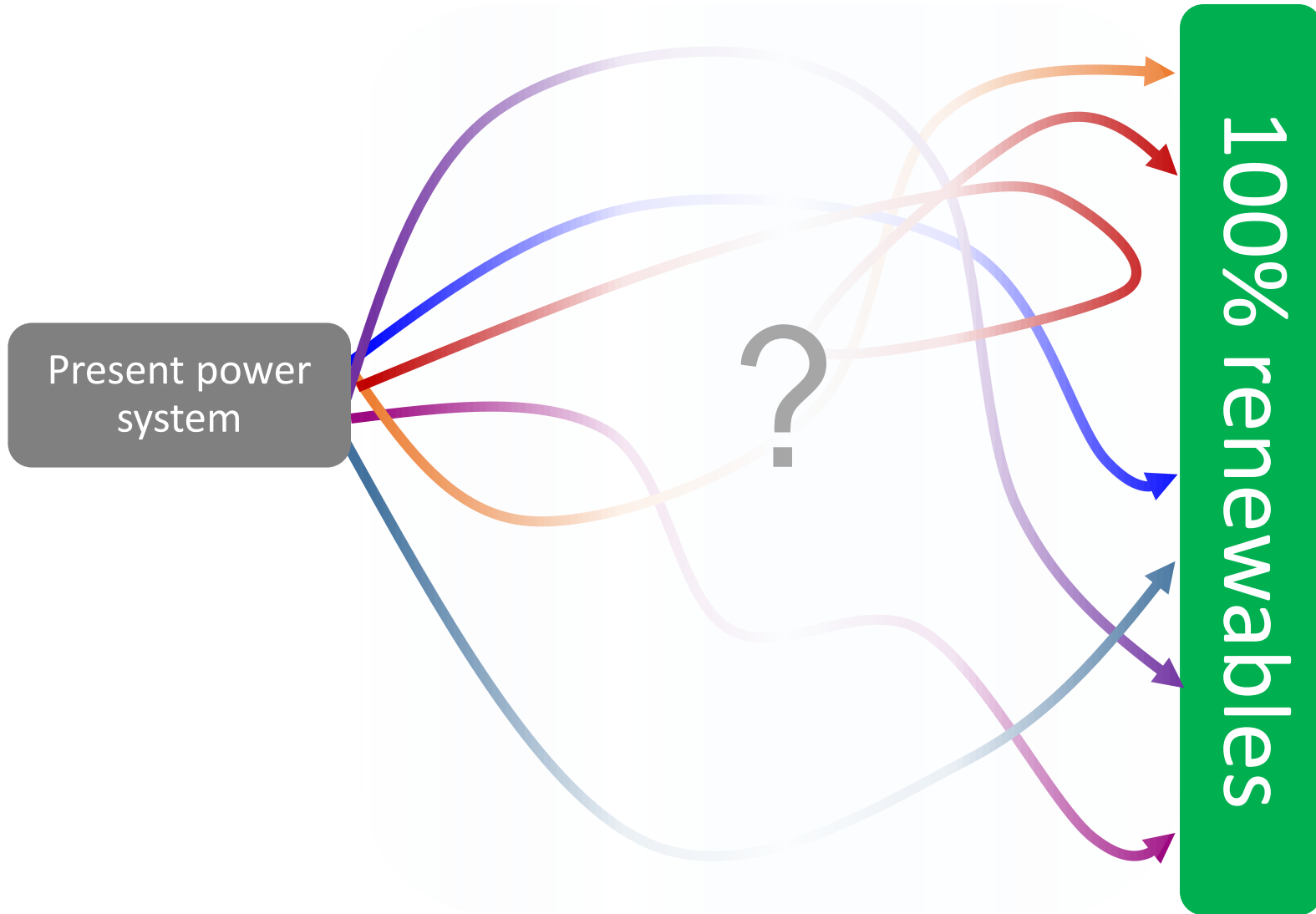
- Not that different from the present NEM
- Already:
  - High price volatility
  - Market Price Cap » generator SRMC
  - Participants manage risk via contracts or vertical integration

# Will the energy-only market work?



Constant monitoring is wise – new issues will arise over time

# A journey of discovery





Centre for Energy and  
Environmental Markets

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Thank you

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