

Markets and networks

Lessons from the European Union

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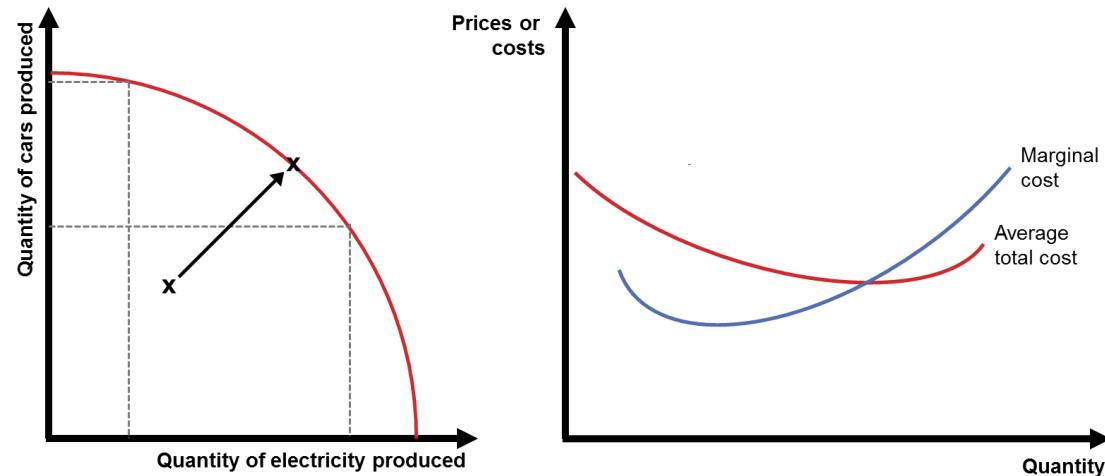
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The theory: competition is assumed to deliver best outcomes in terms of promoting economic efficiency – with regulation needed due to market failures.

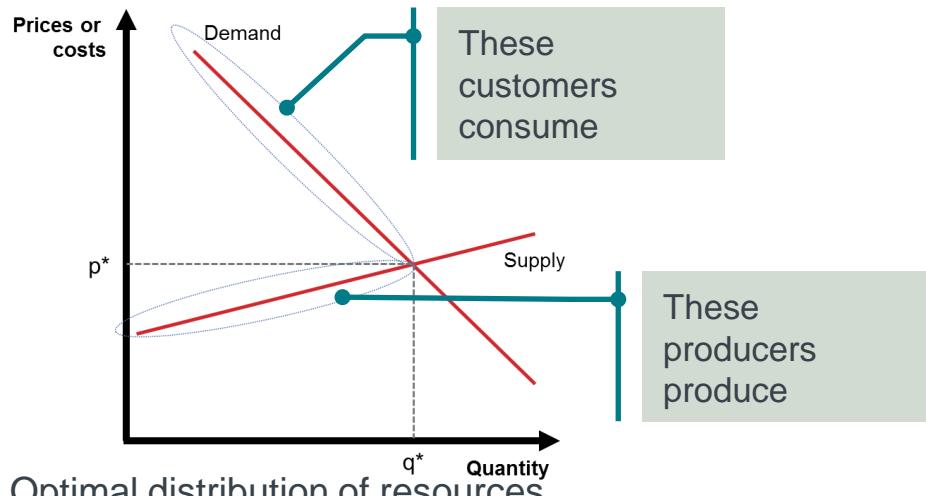
Productive efficiency



Efficient use of resources.

- Maximise outputs for a given set of inputs.
- Minimise costs – firms are operating at the lowest point on their average total cost curve.
- Means optimal investment & operating decisions have been made.

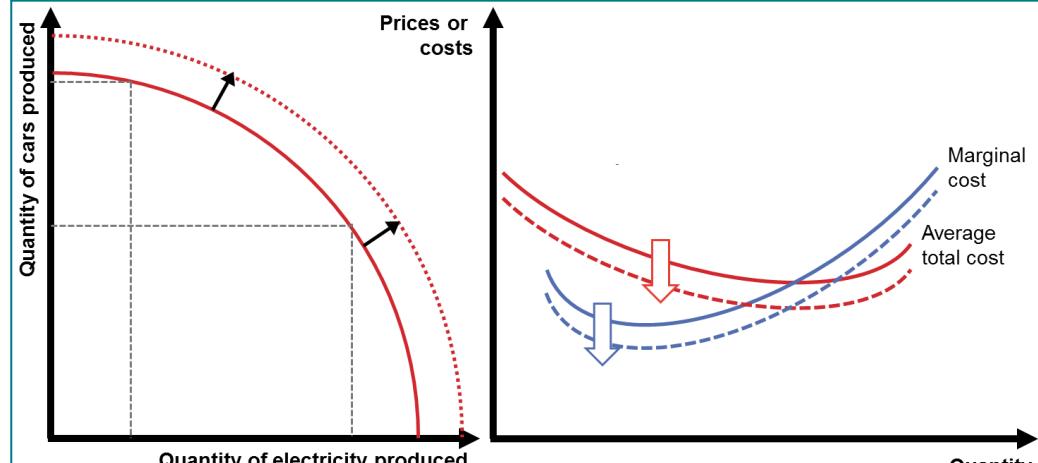
Allocative efficiency



Optimal distribution of resources.

- All consumers willing to pay the marginal cost for the product are able to consume it.

Dynamic efficiency



Increases production possibilities.

- Competition drives innovation to reduce costs or increase production possibilities.

The practice: where does liberalisation bring benefits.

Benefits from wholesale markets

Placing the risk of technology choice, construction and operations onto generation developers ...

- Helps to reduce construction and operating costs for generation.
- Encourages the right type of generation to be developed, properly taking account of the cost of capital.
- Encourages innovation in generation.

Benefits from retail markets

Allowing consumers the right to choose retail supplier ...

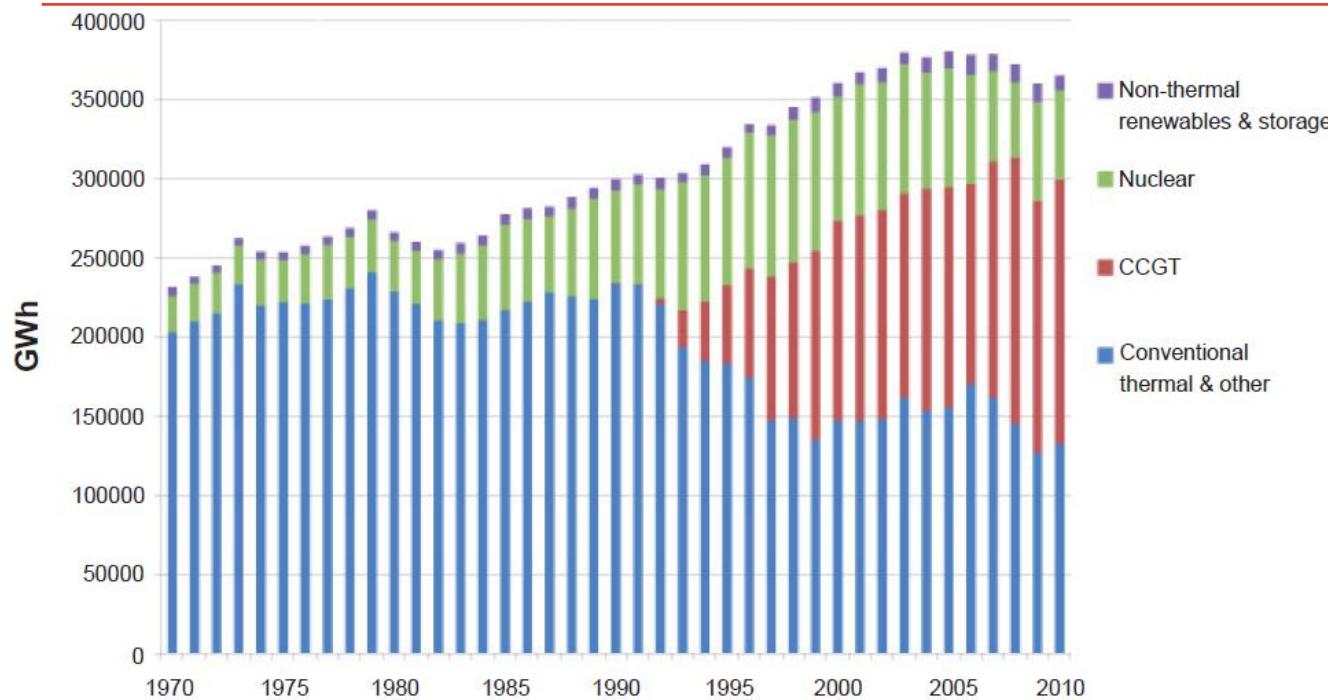
- Enables consumers to choose the price / service quality combination to suit their needs (but they cannot choose the most important service quality indicator!).
- Encourages innovation in retail products offered, e.g. green power, risk management, demand management, metering etc.
- Puts pressure on retail margins (but these are a small part of the value chain).

Transmission and distribution

Transmission and distribution are natural monopolies and are regulated.
Incentive based regulation ...

- Helps to reduce costs and ...
- ... improve quality.

The practice: liberalisation of the GB power market provided net benefits.



- Replacement of coal fired generation by gas fired generation. In 1984/85 over 240,000 coal miners were employed in England and Wales. By 1994 this had fallen to 7,000.
- Abandoning the nuclear generation expansion plan in 1996.
- Operating cost savings.

The main costs came from ...

- Paying a higher price to France for electricity imported to Britain.
- Restructuring costs.

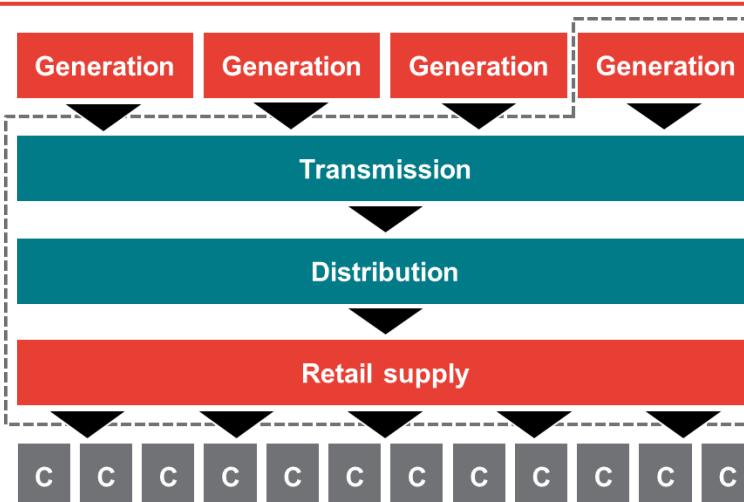
**TABLE 1 THE NET BENEFITS OF PRIVATIZING THE CEGB
RELATIVE TO TWO COUNTERFACTUALS, 1995–2010**
(£ billions at 1994–95 prices; at a 6 percent discount rate,
discounted to April 1995)

	Relative to privatization counterfactual	Relative to pro-CEGB counterfactual
<i>Fuel and investment effects</i>		
End of nuclear expansion program	3.3	2.8
Effect on price of French imports	-2.6	-1.5
Net fossil fuel costs	2.9	-2.1
Total	3.6	-0.7
<i>Externality benefits</i>		
Reductions in sulfur dioxide emissions (£125 per metric ton)	1.0	0.7
Reductions in carbon dioxide emissions (£12 per metric ton of carbon)	1.4	1.2
Total	2.3	1.9
<i>Restructuring</i>		
Costs	-2.8	-2.8
Cost savings	8.8	7.6
Total	6.0	4.8
Total net benefits	11.9	6.0
Total net benefits (pence per kWh)	0.21	0.09

David M. Newbery and Michael G. Pollitt (1997)

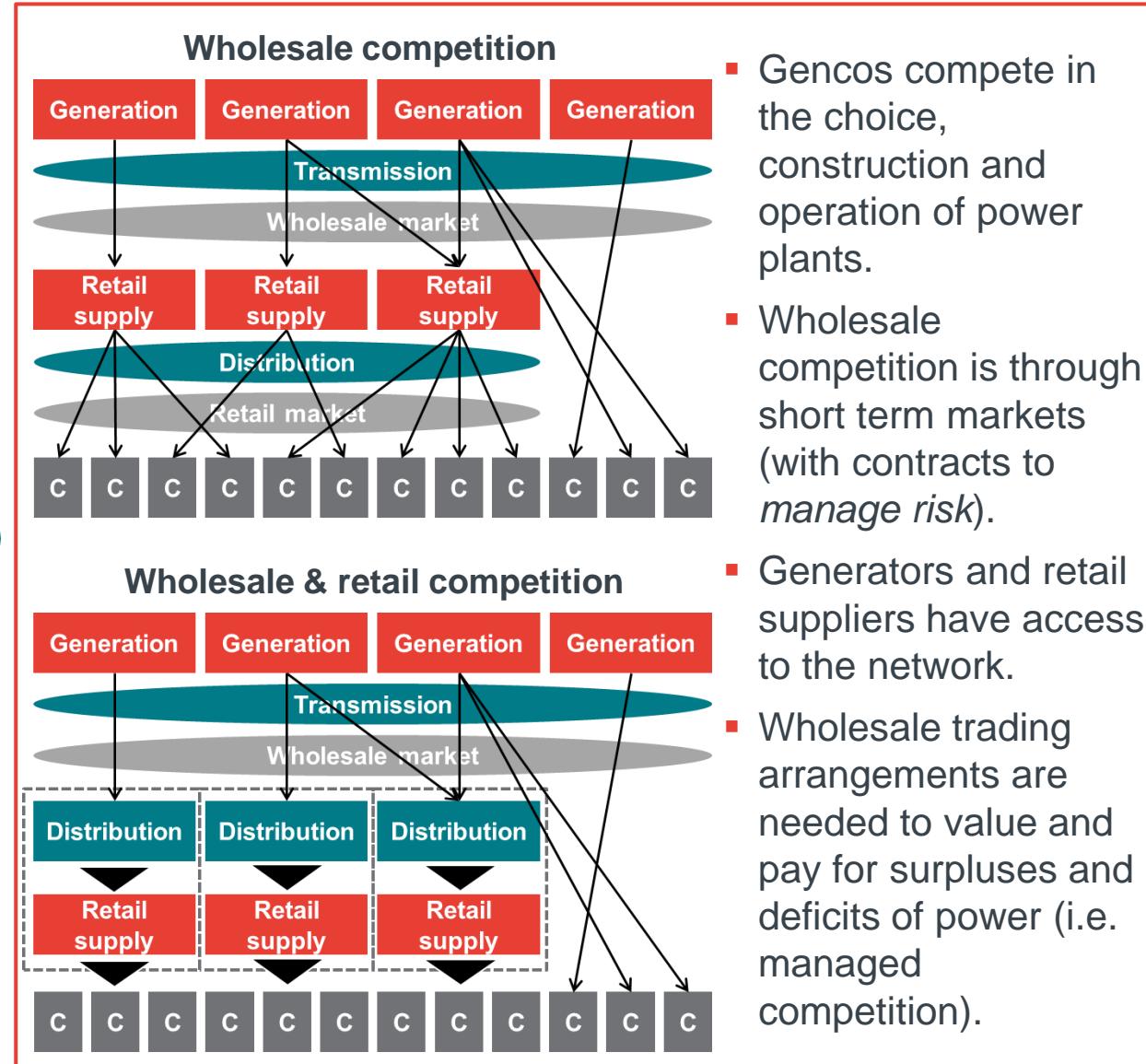
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Liberalisation means introducing or deepening managed competition.



Single buyer model.

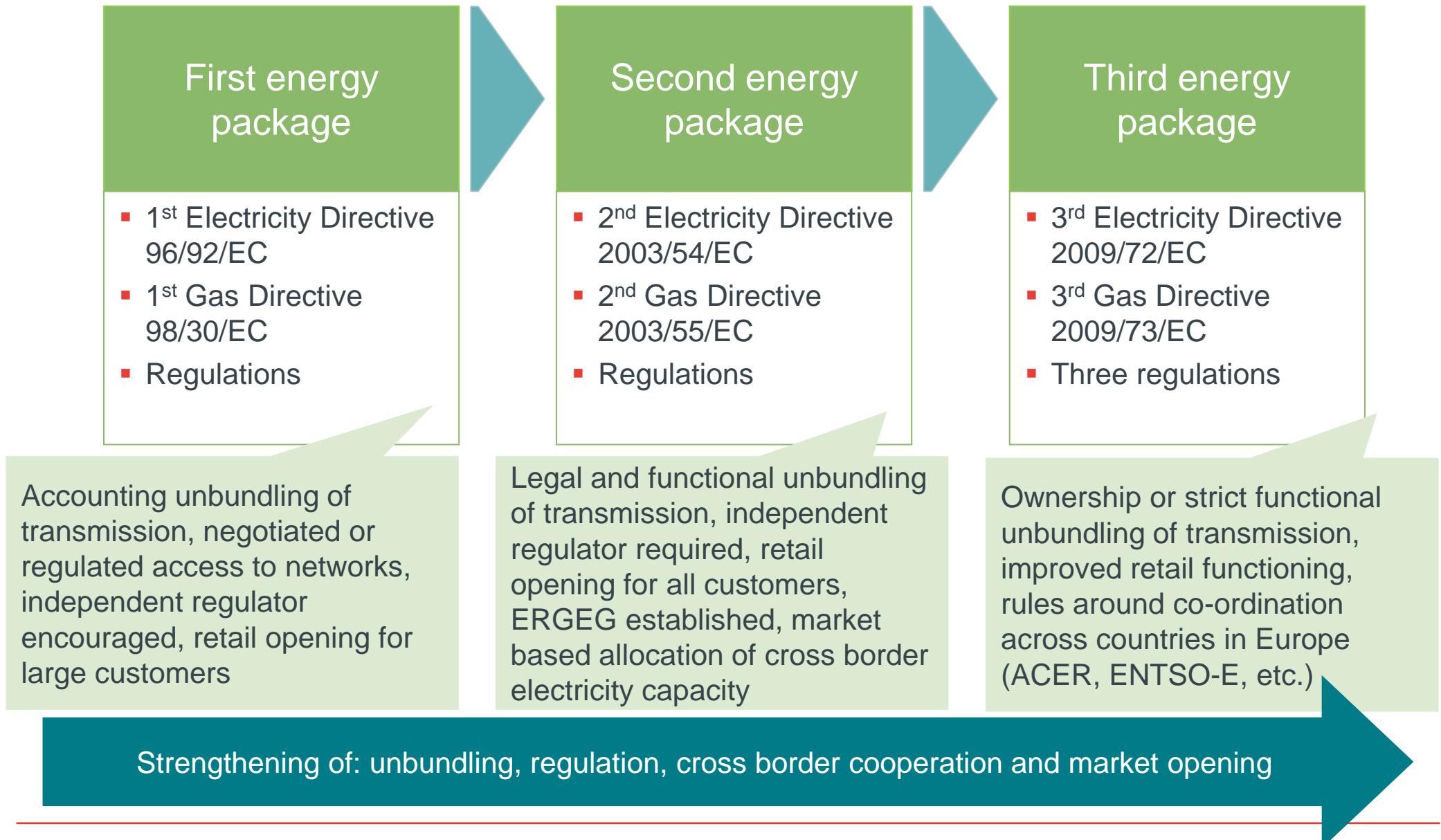
- Gencos compete to sell to the single buyer – competing in the construction and operation of power plants.
- Competition is through bidding the terms in a long term power purchase agreement (PPA).



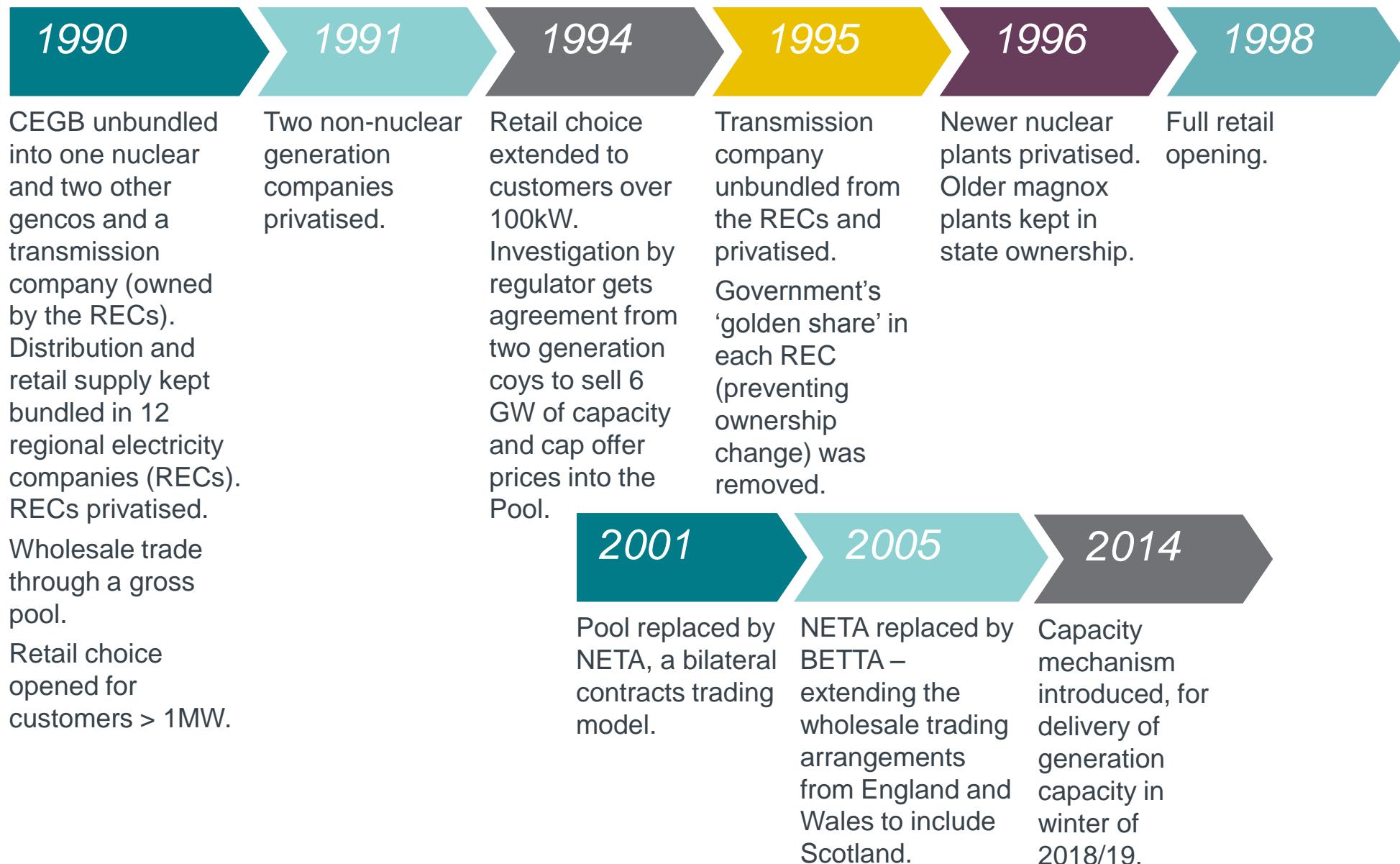
Standard elements of power sector liberalisation (not necessarily in this chronological order)

Privatise	▶	<ul style="list-style-type: none">Creates hard budget constraints and incentives to improve performance.Reduces ability to use firms for political objectives.
Unbundle networks	▶	<ul style="list-style-type: none">Reduces ability to cross subsidise between competitive and monopoly segments.Avoids incentive to foreclose access to the networks to competitors of the generation or retail business affiliated to the network owner.
Create multiple generators	▶	<ul style="list-style-type: none">Mitigates market power and allows competition to work between generation companies.
Create a single system operator	▶	<ul style="list-style-type: none">Allows generation and demand to be balanced efficiently across the whole network.Allows efficient planning of transmission investment across the whole network.
Create a balancing market	▶	<ul style="list-style-type: none">Sets out efficient rules to value and pay for surpluses and deficits of power.Incentivises generators to produce only when it is efficient to do so.Signals to demand the value of power.
Create retail suppliers	▶	<ul style="list-style-type: none">Allows competition to work between retail companies (may need regulation of information and of the switching process).Or, if no retail competition then regulate the retail margin.
Create an indept. regulator	▶	<ul style="list-style-type: none">Regulate prices or revenues and service levels for the networks to encourage cost reduction and quality improvement.Regulate access to the networks, allowing competition to work and signalling the marginal costs of the networks.

The EU's energy packages are aimed at creating an integrated European energy market.



The practice: GB liberalised by introducing wholesale and retail competition (some consider this a textbook reform).



A small selection of what not to do ...

Prevent retail prices from reflecting costs	<ul style="list-style-type: none">▪ In California, retail suppliers were unable to pass through high wholesale costs and were unhedged.▪ In Spain, the tariff deficit peaked at about €26 billion, financed by promises from the Govt. to pay.
Prevent wholesale prices reflecting costs	<ul style="list-style-type: none">▪ A price cap below the value of loss load (VoLL) may result in over consumption in the short run and ...▪ ... dis-incentivise investment in generation in the long run.
Liberalise without competition in generation	<ul style="list-style-type: none">▪ If a competitive market ownership structure is not in place, interventions and work-arounds will be required to mitigate market power.
Leave networks bundled	<ul style="list-style-type: none">▪ Transmission system operators will favour affiliated generation and retail companies, e.g.<ul style="list-style-type: none">▫ procurement of ancillary services,▫ re-dispatch of generation to manage congestion,▫ provision of connection rights.
Ignore transitional arrangements	<ul style="list-style-type: none">▪ Transitional arrangements may be necessary to<ul style="list-style-type: none">▫ facilitate the introduction of competition (e.g. new entry),▫ run off existing arrangements (e.g. PPAs),▫ compensate incumbents for the loss of existing rights.

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Procure renewables efficiently and make support for renewable generation transparent.

The appropriate type of renewable support varies

- For larger scale, mature renewable technologies ...
 - Auctions have been driving costs down.
 - But, appropriate penalties are required to ensure the auction is not a free option.
- For small scale facilities or less mature technologies ...
 - Feed in tariffs may be more appropriate, e.g. households are unlikely to want to participate in an auction.
 - But, costs may change very quickly and therefore the support mechanism needs the flexibility to adapt – we have seen several cases (Spain, Czech Republic) where costs fell below support levels, causing problems.

Renewables should bear the same costs as other generators

- Renewables should bear the same cost reflective charges as other generators, e.g. connection charges, balancing costs, etc.
- Otherwise, renewable developers will not make efficient decisions about location, operation etc. and overall system costs could increase.
- In an auction, the renewable support level will adjust to take account of the efficient level of these system costs.

Argument for allowing some consumers to avoid paying for renewables

- The cost of renewable support needs to be recovered.
- If there are no cost drivers, this is a purely cost recovery exercise.
- Economic efficiency implies recovering costs in a way that minimises distortions to market outcomes.
 - This may justify exempting price sensitive customers from contributing to the cost of renewable support (subject to equity considerations).



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