



# THE COST OF ENERGY REVIEW

DIETER HELM

PROFESSOR OF ECONOMIC POLICY, UNIVERSITY OF OXFORD

# AGENDA

## THE BUILDING BLOCKS

- Objectives
- Legacy
- Multiple interventions
- Technology



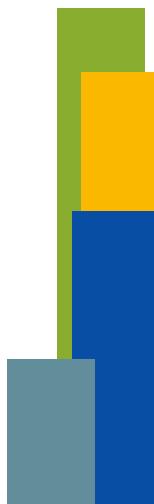
## LONG TERM FRAMEWORK

## THE ENERGY COST CHAIN

- Generation
- Networks
- Supply
- Taxes and levies
- Default tariffs



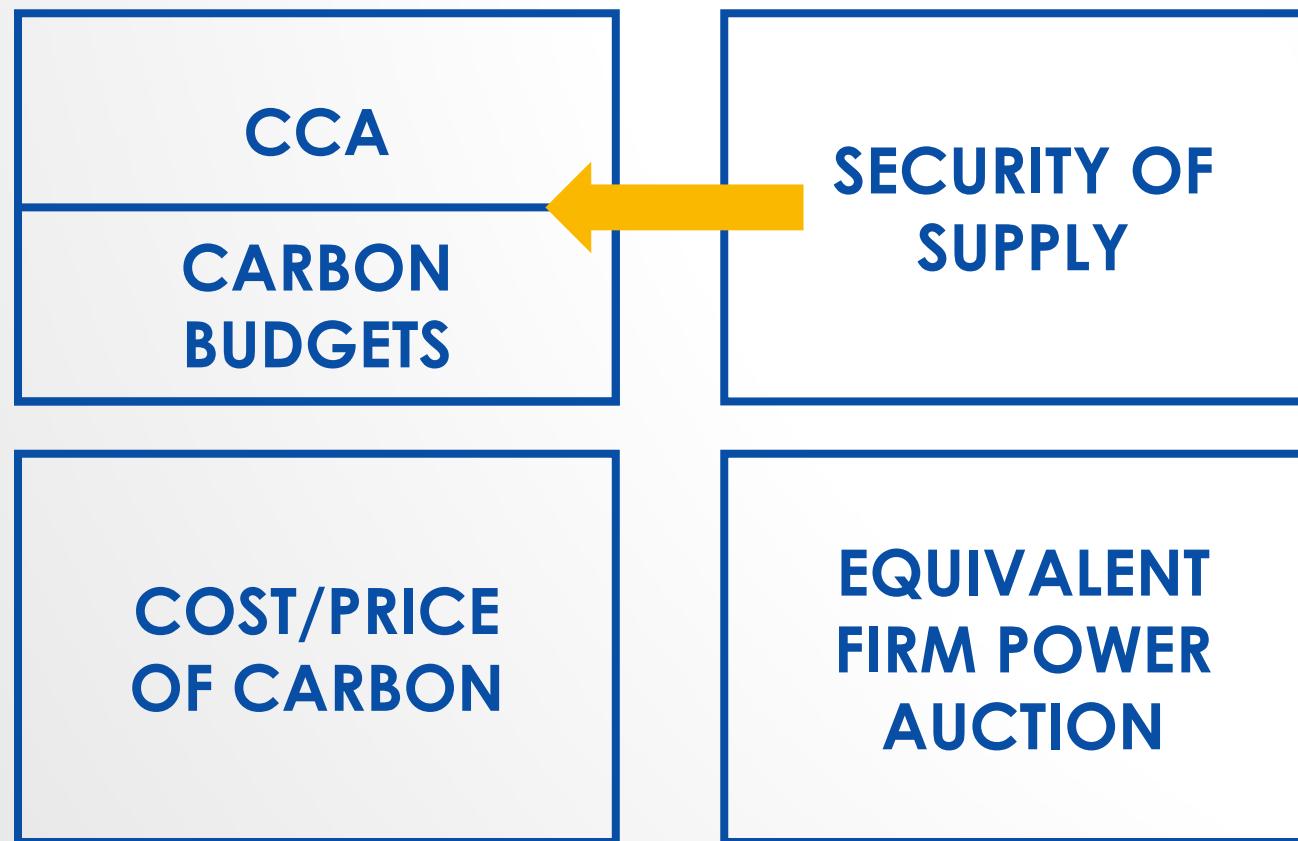
## IMMEDIATE ACTIONS



# TERMS OF REFERENCE

1. The government has the ambition for the UK to have the lowest energy costs in Europe, for both households and businesses.
2. The UK was the first country in the world to set a long-term, legally binding target for emission reduction. The Climate Change Act commits the UK to reduce emissions by at least 80% by 2050, and sets a framework for the setting of rolling five-year carbon budgets. Parliament has recently approved the 5th carbon budget, for the period 2028–32, at a 57% reduction on 1990 levels.
3. The carbon targets need to be met, while concurrently ensuring security of supplies of energy, in the most cost-effective way. The rapid closure of coal, the ageing of the existing nuclear fleet, the intermittency of some renewables, the scope for demand management and new storage, the coming of electric vehicles and the timing of future nuclear capacity coming on stream will be taken into account in considering how best to meet the overall objective of system security of supply.
4. The specific aim of this review is to report and make recommendations on how these objectives can be met in the power sector at minimum cost and without imposing further costs on the exchequer. In that context the review will consider the implications of the changing demand for power, including from industry, heat and transport.
5. The review will report on the full supply chain of electricity generation, transmission, distribution and supply, and consider the opportunities to reduce costs in each part, taking into account the roll-out of smart meters and the work already underway to underpin the transition to a smarter energy system.
6. The review will set out options for a long-term road map for the power sector, and consider how technological change in the wider economy, as well as in the energy sector, may transform the power sector, and how energy policy can best facilitate and encourage such developments, consistent with the overall objectives of decarbonisation and security of supply, and with its industrial strategy.
7. The review will consider the options for enhancing and extending the scope for auctions and other competitive mechanisms, and for reducing the complexity across the full supply chain of electricity generation.
8. The review will consider the key factors affecting energy bills, including but not limited to energy and carbon pricing, energy efficiency, distributed generation, regulation of the networks, and innovation and R&D. The review will not propose detailed tax changes.
9. The review will focus on system issues and will not comment on the status of individual projects.
10. The review will provide recommendations as to how best to minimise the costs of energy consistent with the overarching objectives, taking account of the costs and benefits of the recommendations. It will set out options for developing and enhancing energy policy. Where the issues the review covers fall to other players, for example Ofgem, it will make recommendations about how government can best work with them to reduce costs.
11. The review will report at the end of October 2017.

# OBJECTIVES

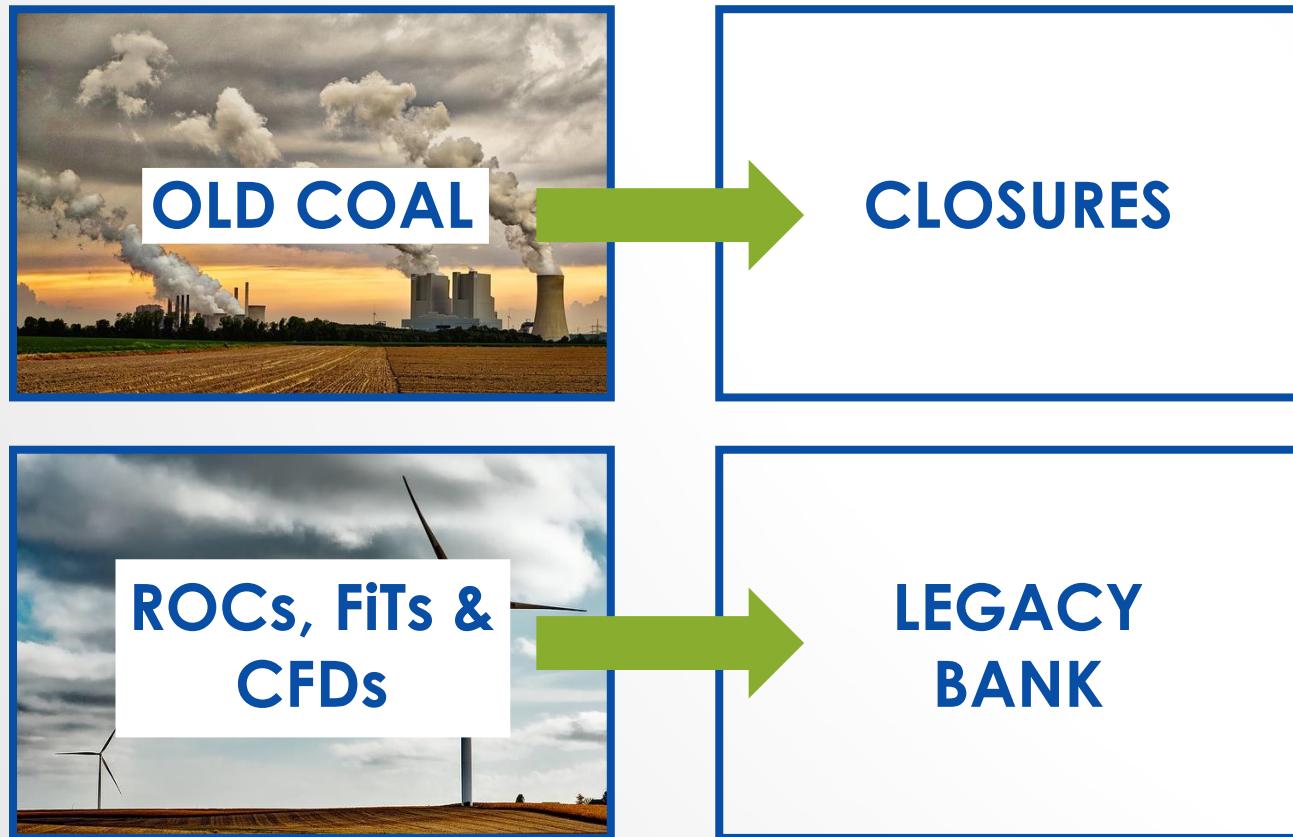


# MULTIPLE INTERVENTIONS

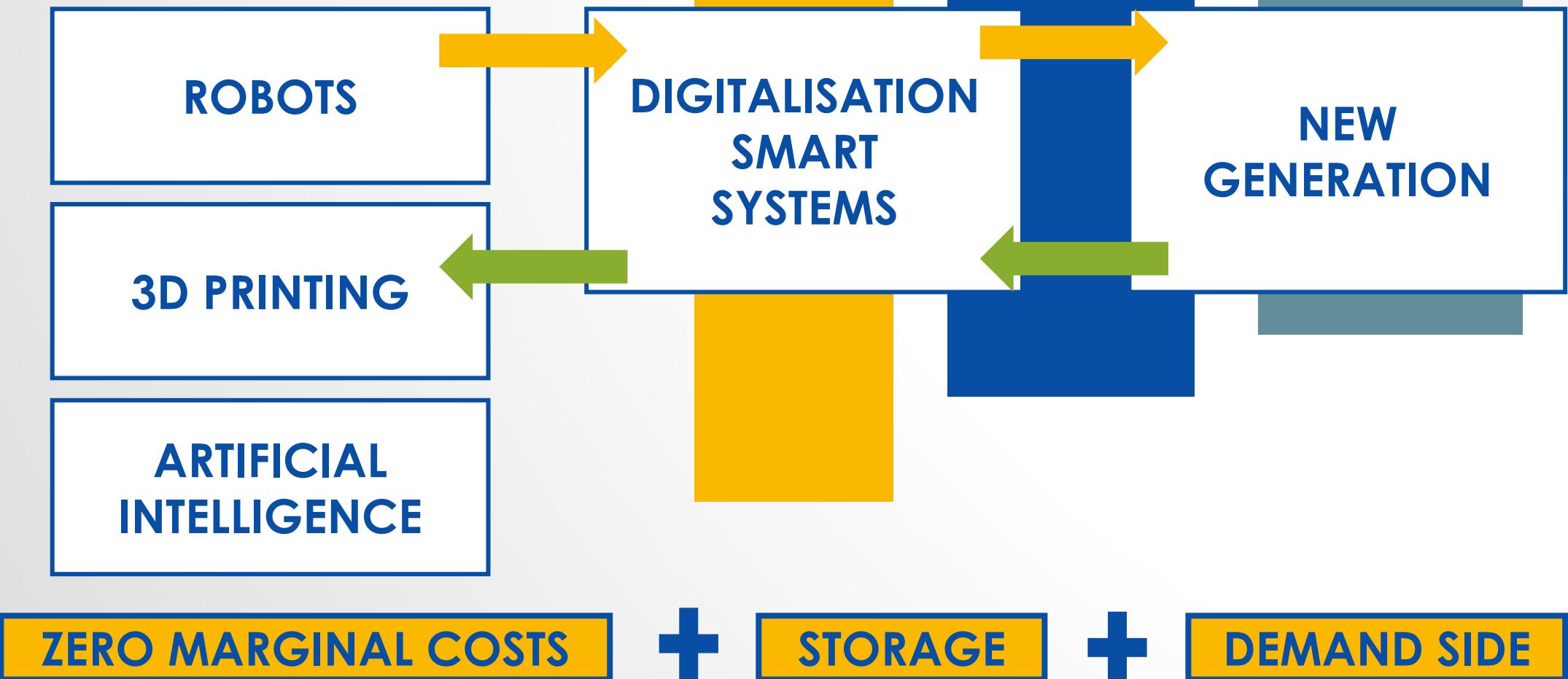
TABLE 1: CURRENT POLICIES AND INTERVENTIONS

	Start	End	Start	End	
<b>Small-scale Feed-in Tariff</b> – introduced in 2010 under the Energy Act 2008 to encourage deployment of small-scale low-carbon electricity generation by households and organisations not traditionally involved in energy. Technologies supported are: solar photovoltaics, onshore wind, hydropower, anaerobic digestion, and micro combined heat and power	April 2010	Current budget covers the period to March 2019	Environmental regulations – various environmental regulations also cover installations in the power sector, such as the Large Combustion Plant Directive and the Industrial Emissions Directive	Various	Ongoing
<b>Renewables Obligation</b> – an obligation on UK electricity suppliers to source a specified proportion, set each year for the year ahead, of the electricity they supply to customers from renewable sources; it is administered by Ofgem, which issues Renewables Obligation Certificates to generators in relation to the renewable electricity they generate. Closed to new entrants on 31st March 2017 with limited grace periods	April 2002	Closed to new entrants on 31st March 2017	<b>Emissions Performance Standard</b> – A regulatory backstop to the National Planning policy and ensures that not only are new coal plant built with carbon capture and storage, but operated in accordance with emissions requirements	2015	Ongoing
<b>Contracts for Difference</b> – introduced in 2014 under the Energy Act 2013, this is a private law contract between a low-carbon electricity generator and the Low Carbon Contracts Company, a government-owned company; a generator is paid the difference between the strike price and the reference price; the cost is met by consumers via a levy on electricity suppliers. To date, Contracts for Difference have been allocated through: <ul style="list-style-type: none"> <li>- Final Investment Decision enabling Round</li> <li>- Pot 1 auction for established technologies</li> <li>- Pot 2 auction for less established technologies</li> <li>- Bilateral negotiations for Hinkley Point C</li> </ul>	2014	Ongoing	<b>Connections</b> – Connect and Manage policy allows new generation to connect to the grid faster, with wider network reinforcement carried out after they have been connected	May 2009	Ongoing
<b>Carbon price floor</b> – Price charged on CO <sub>2</sub> emissions, the Treasury is considering the appropriate mechanism for determining the carbon price in the 2020s	April 2013	Frozen until 2021	<b>Third Energy Package</b> – EU legislation that provides the basis for the European internal energy market	March 2011	Ongoing
<b>Capacity market</b> – BEIS establishes security of electricity supply by ensuring that regular payments are available to reliable sources of capacity, so that energy is reliably delivered when needed	First auction 2014	Auctions annually	<b>Smart Metering Implementation Programme</b> – government mandate on energy suppliers to take all reasonable steps to roll out smart meters to all homes and small businesses by 2020, putting consumers in control of their energy and contributing to the modernisation of the UK's energy system	2011	2020
			<b>Current RIIO (Revenue = Incentives + Innovation + Outputs) Price Controls</b> – Ofgem's framework for determining the allowed expenditure and associated revenues, for the monopoly electricity and gas network companies	2013	2023
			<b>Interconnection</b> – BEIS promotes interconnection where it is in the interest of consumers. Ofgem provides a 'cap and floor' system, which facilitates a predictable rate of return for interconnectors	2013	Ongoing
			<b>Market liquidity</b> – Ofgem's measures to improve liquidity in the wholesale market by committing the Big 6 to trade a proportion of their power station output in the day ahead market	March 2014	Ongoing
			<b>Sharper market signals</b> – Making wholesale prices more responsive to scarcity by ensuring cash-out prices are reformed, creating the correct signals for the market to balance	April 2015	Ongoing
			<b>Reform of the System Operator</b> : Ofgem is working with National Grid to make the electricity system operator a legally separate company within National Grid	January 2017	April 2019
			<b>Locational pricing</b> – Ofgem has confirmed implementation from April 2018 of the Competition and Markets Authority's recommendation for location pricing for network losses	April 2018	Ongoing
			<b>Codes and licences</b> – there are various codes and licences managed by Ofgem and the system operator	Various	Ongoing
			<i>Source: [BEIS].</i>		
					Industry Code Governance reform – Ofgem is leading implementation of Competition and Markets Authority recommendations to support strategic industry change
					Coal power and clean growth – end use of coal for electricity generation by 2025
					RIIO-2 price control – Ofgem's planning for the next round of price controls, for monopoly electricity and gas network companies
					Industry technical standards – Standards across electricity and gas were designed many years ago and may be encouraging overinvestment given improvements in technology. For example, P2-6 electricity standards, or GB gas quality specifications
					Switching – Ofgem and BEIS are taking forward a number of initiatives designed to make it easier for customers to switch energy suppliers
					Extending competition in transmission – Proposals to extend competitive tendering in the delivery of onshore electricity transmission assets
					Network charging – Ofgem is responsible for making changes to the way that network costs are recovered, to ensure recovery is cost-reflective; eg, reduced 'embedded benefits'. Ofgem's targeted charging review proposes alternatives for residual network cost recovery
					Locational signals – Ofgem will publish a working paper in autumn on how to provide users with improved signals as to the incremental costs and benefits of their network usage, either through charging signals, changes to market design, or market access reform
					Smart Energy – BEIS is working with Ofgem to manage the transition to a smarter system, where the department's role is to establish the policy and legal framework, enabling Ofgem to regulate the sector accordingly
					BEIS and Ofgem (November 2016), A smart, flexible energy system: Call for Evidence
					BEIS and Ofgem (July, 2017), A smart, flexible energy system: question summaries and response from government and Ofgem
					BEIS and Ofgem (July, 2017), Upgrading our energy system: smart systems and flexibility plan
					See summary of the plan below: <ul style="list-style-type: none"> <li>- Removing barriers to smart technologies – providing regulatory clarity and a fairer charging system to encourage growth of the</li> </ul>

# LEGACY

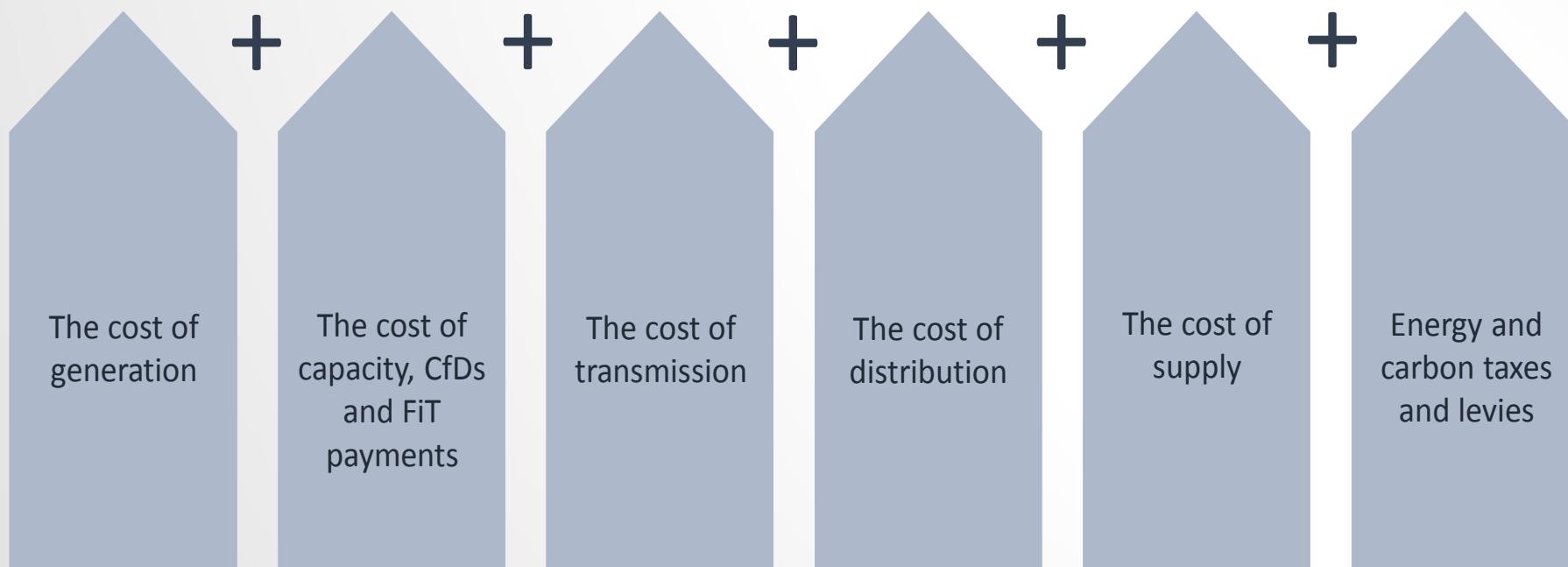


# TECHNOLOGY

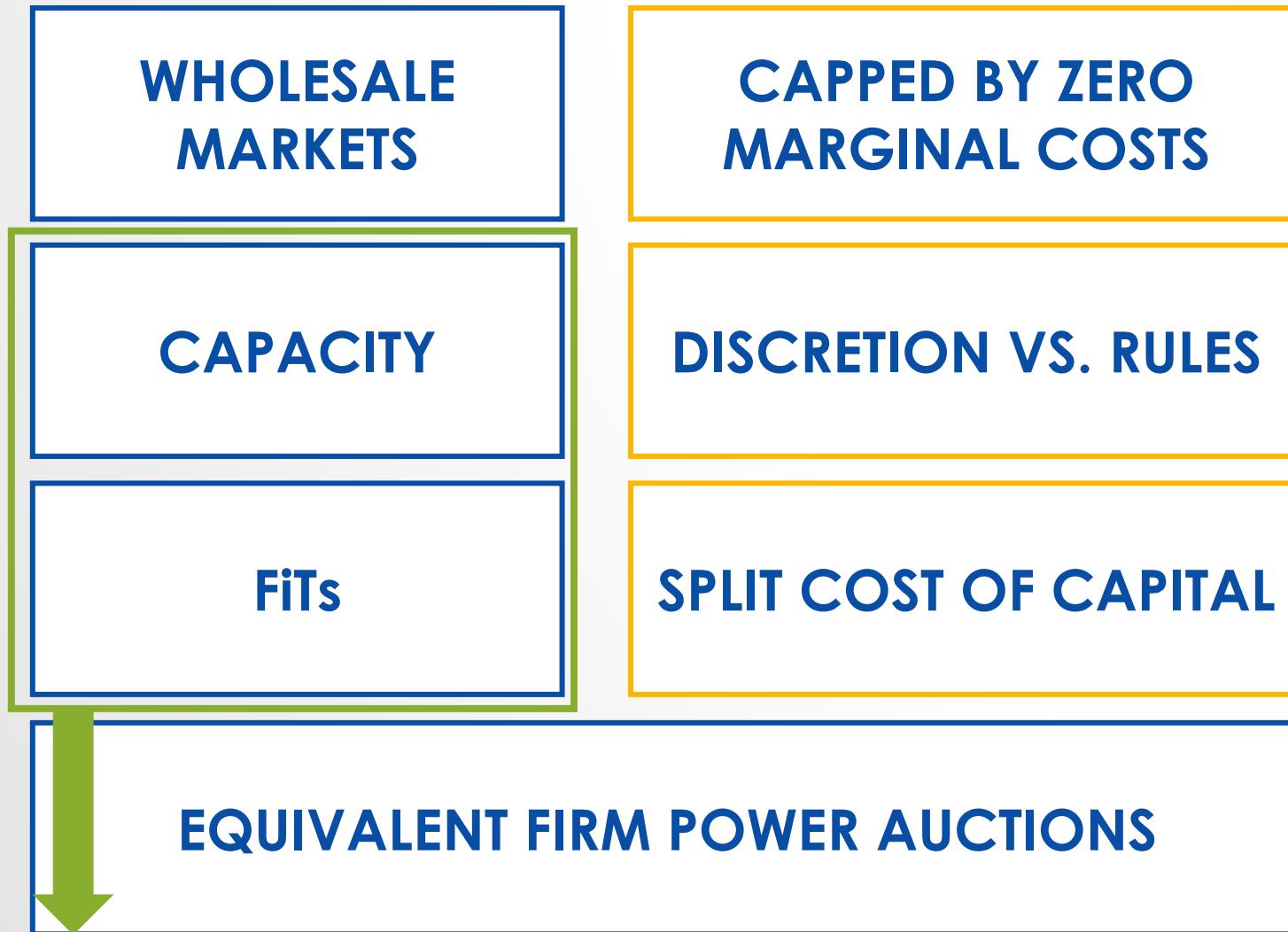


# THE ENERGY COST CHAIN

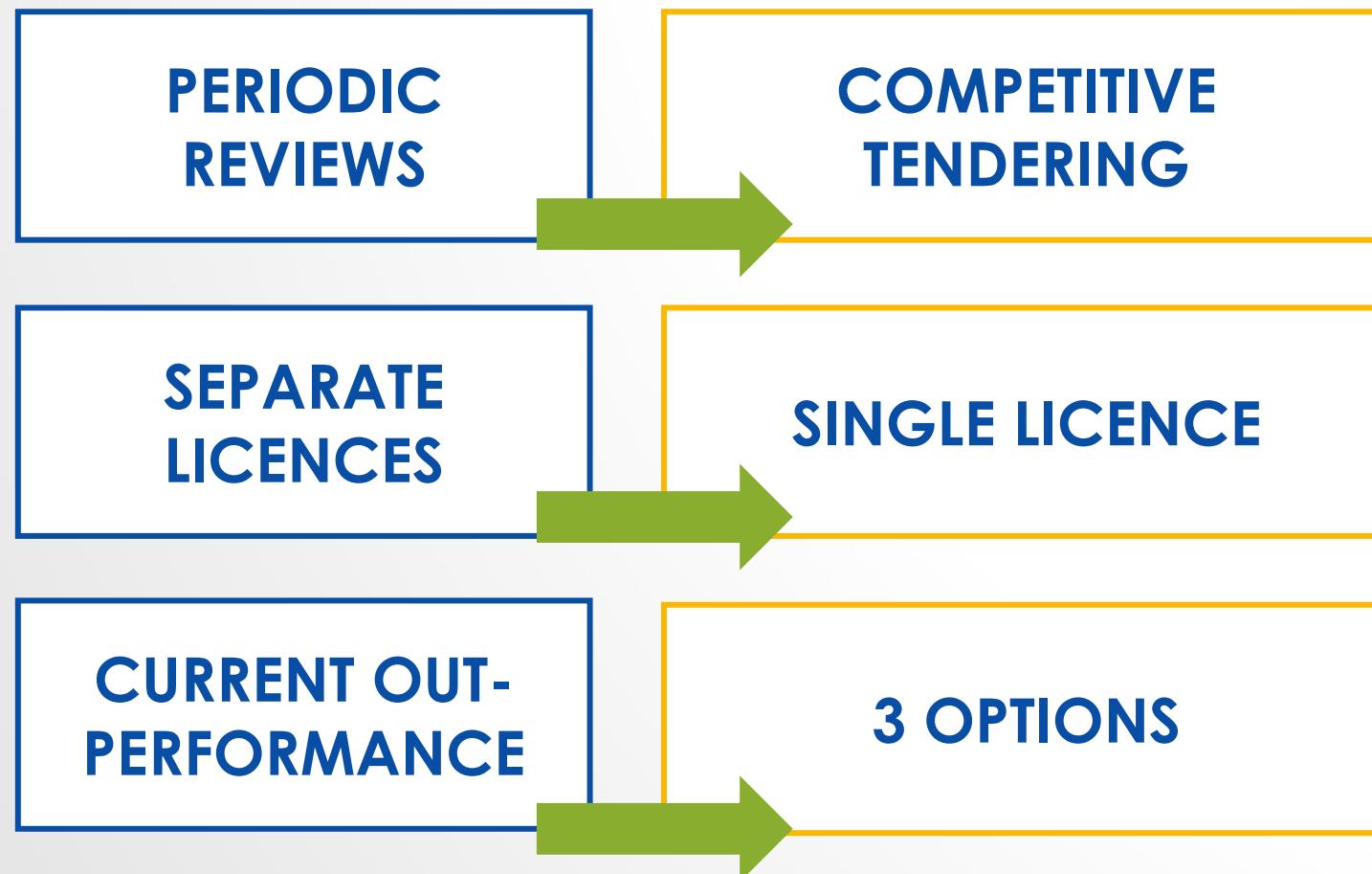
The cost of electricity =



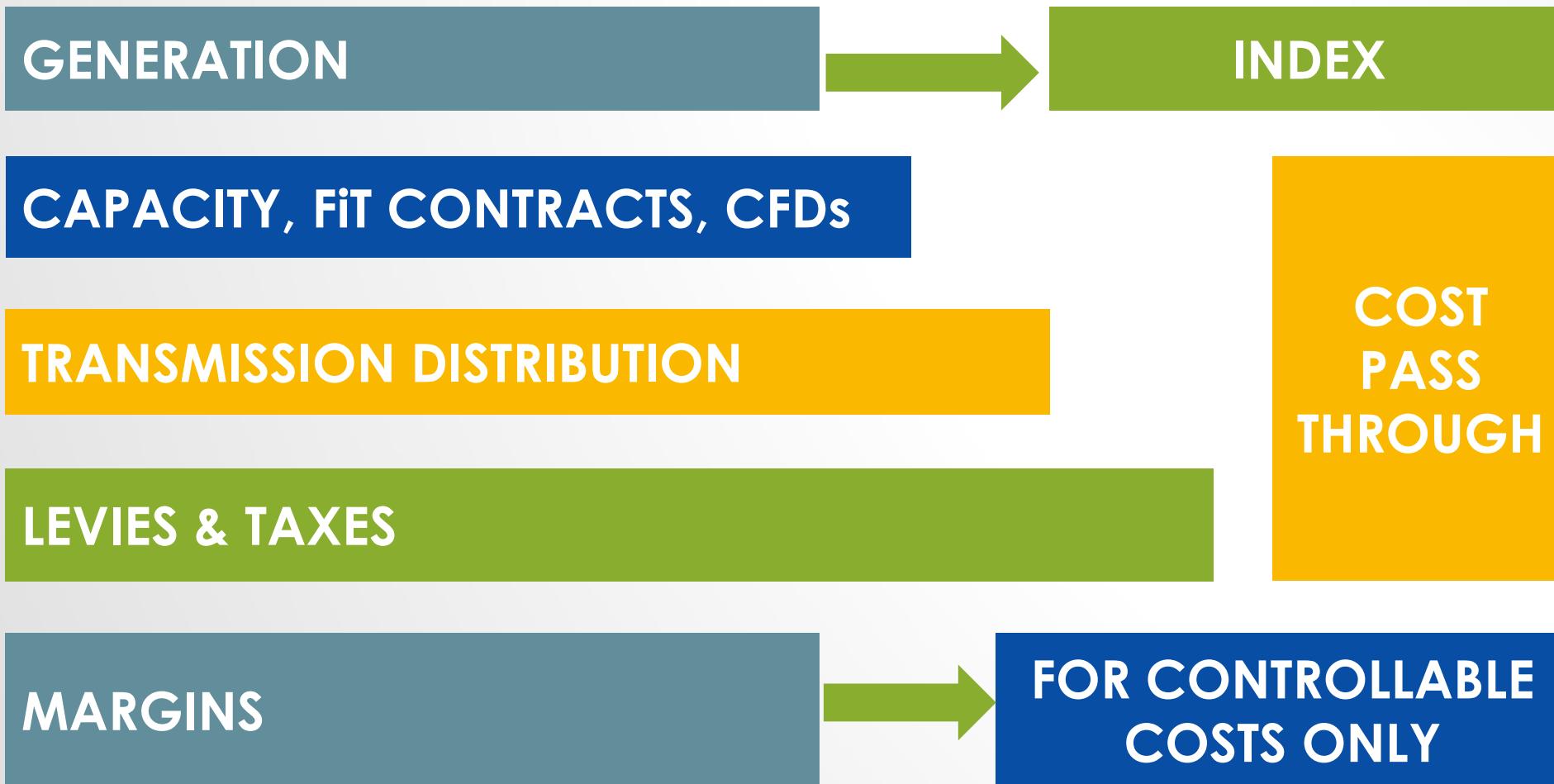
# GENERATION



# NETWORKS



# SUPPLY



# TAXES AND LEVIES

VAT

FUEL DUTY

EUETS

CFP

CCC

HARMONISED PRICE OF CARBON

TRADE ADJUSTMENTS

# DEFAULT TARIFF

INDEX GEN

CAPACITY, FiT CONTRACTS, CFDs

TRANSMISSION DISTRIBUTION

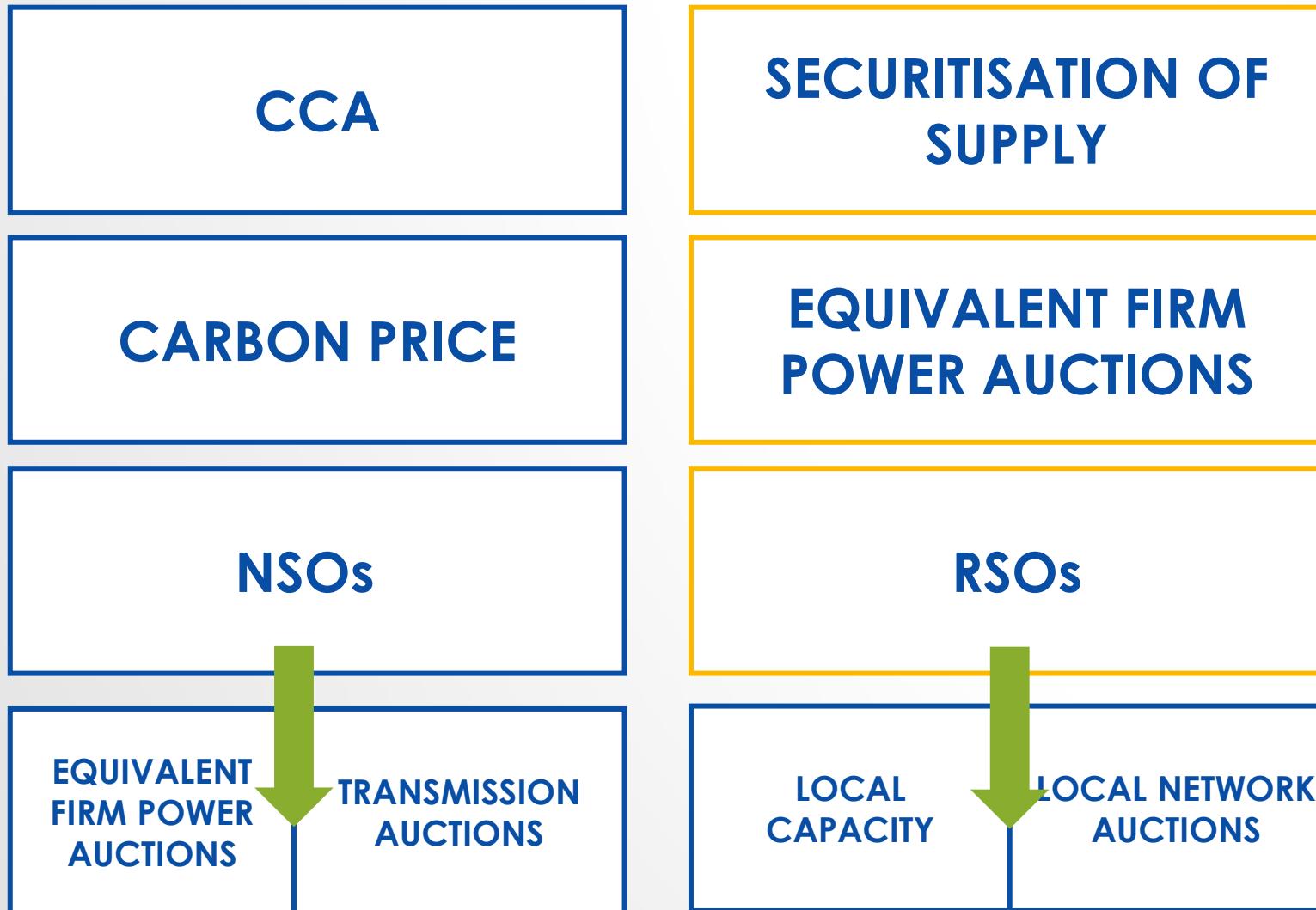
LEVIES & TAXES

PUBLISHED MARGINS

FOCUS OF  
COMPETITION

SECOND BEST CAP

# LONG RUN FRAMEWORK



# IMMEDIATE ACTIONS

- Create Legacy bank
- Set capacity margins to 2030
- Set out pathway to firm power auctions
- Review transmission and distribution RIIO caps
- Full separation of NSO
- Start setting up RSOs
- Put in place default tariff and maximum margins
- Review carbon prices and harmonisation options
- Address carbon trade distortions



# THANK YOU

THE COST OF ENERGY REVIEW

DIETER HELM

PROFESSOR OF ECONOMIC POLICY, UNIVERSITY OF OXFORD