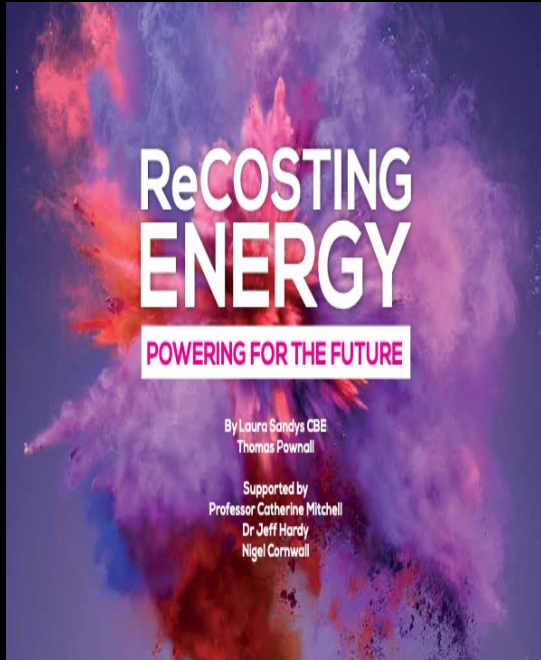


ReCosting Energy Launch



- Welcome
- Jonathan Brearley, CEO of Ofgem
- Laura Sandys Report Overview
- The Rt Hon Anne-Marie Trevelyan MP
- Panel Discussion:
 - Prof Catherine Mitchell
 - Dr Jeff Hardy
 - Nigel Cornwall
 - Thomas Pownall

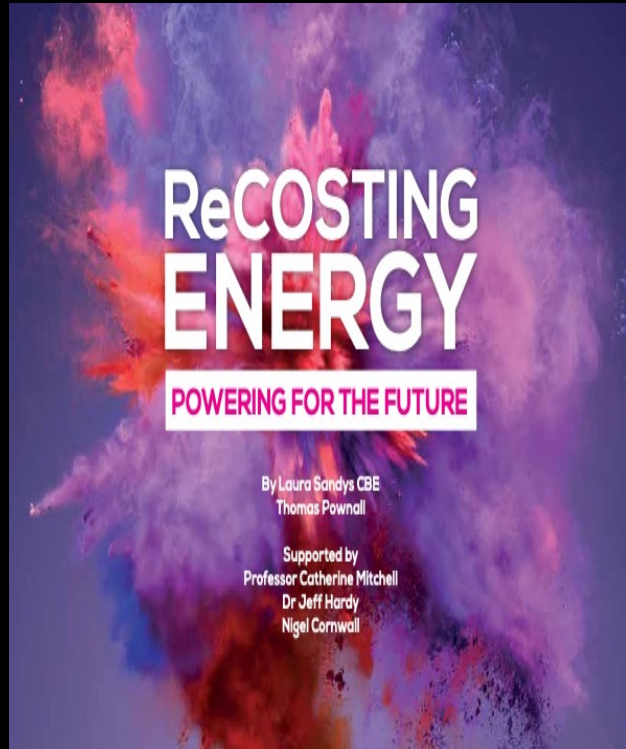
Reports all available at www.challenging-ideas.com/publications
Comment, challenge, critique: recostingenergy@gmail.com

Tweet throughout #RecostingEnergy & tag @Laura_Sandys

Huge thanks to the support
from



ReCosting Energy Overview



We have been trying to squeeze a decarbonised energy system into a fossil fuel structure.

It doesn't FIT!

There is a big Decarbonisation Dividend to capture if we cost, value and sell energy differently!

Reports all available at www.challenging-ideas.com/publications
Comments, challenges, critiques and to find out more please email
on recostingenergy@gmail.com

Huge thanks to the support
from



The Challenge: A New Cost, Value & Price

Capital Assets changing the
COST base of energy
throughout the system



Blended Assets



Free feedstock, high CAPEX,
low OPEX

Blended Assets & Services
the new VALUE



**Multi-actor
Management**



Demand and Supply equally
valuable

Consumer Models changing
how energy is PRICED



Varied Business Models



Tailored Services & Products
replacing commodity pricing

MIND THE
VALUE GAP

MIND THE
VALUE GAP

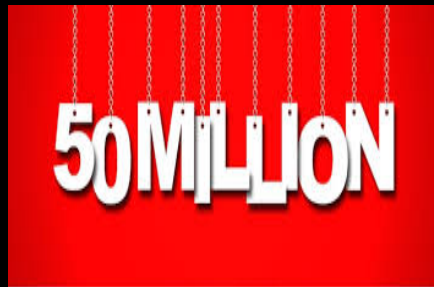
Planning From the Future



Very different economic driver to “consumption”



Requires citizens to invest in decarb transport



Min 50 million actions & assets not able to be managed as today



Requires citizens to invest in new heating systems & energy efficiency



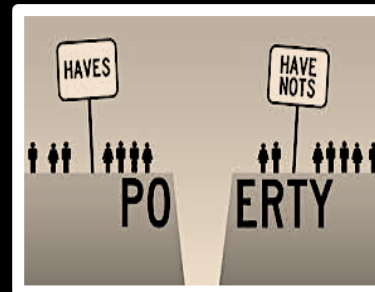
£20bn investment p.a. required throughout the system not just generation



New requirements & products due to climate change



Reducing value of kW - like data from \$1m to \$0.001 for MB



Growing inequality with new losers / winners

V
E
T
O

Getting More From Less

Accelerate
Decarb

Reveal
True Value

Reward
Customers

Unlock
Investment



Optimisation
Not
Consumption



Whole System
Costing



Demand &
Supply Equal



Capital &
Services Not
Commodities

Different
Outcomes &
Drivers

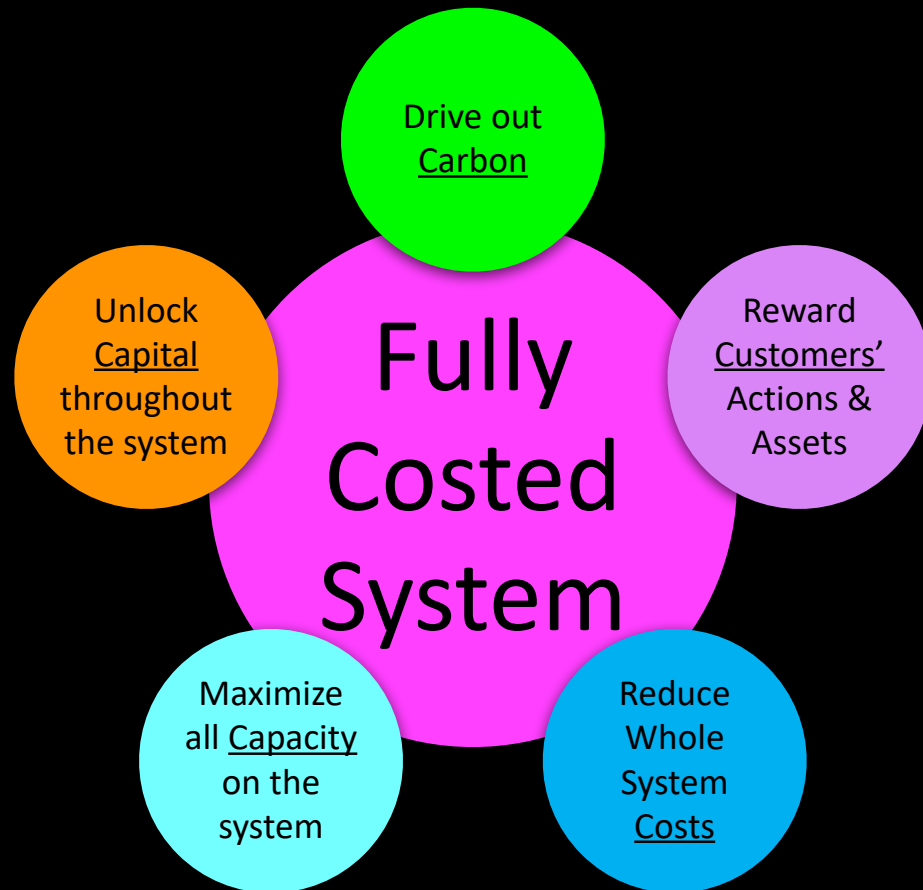
New Processes
& Assessments

Changed
Competitive
Tensions

Support where
Investment
Risk Really Lies

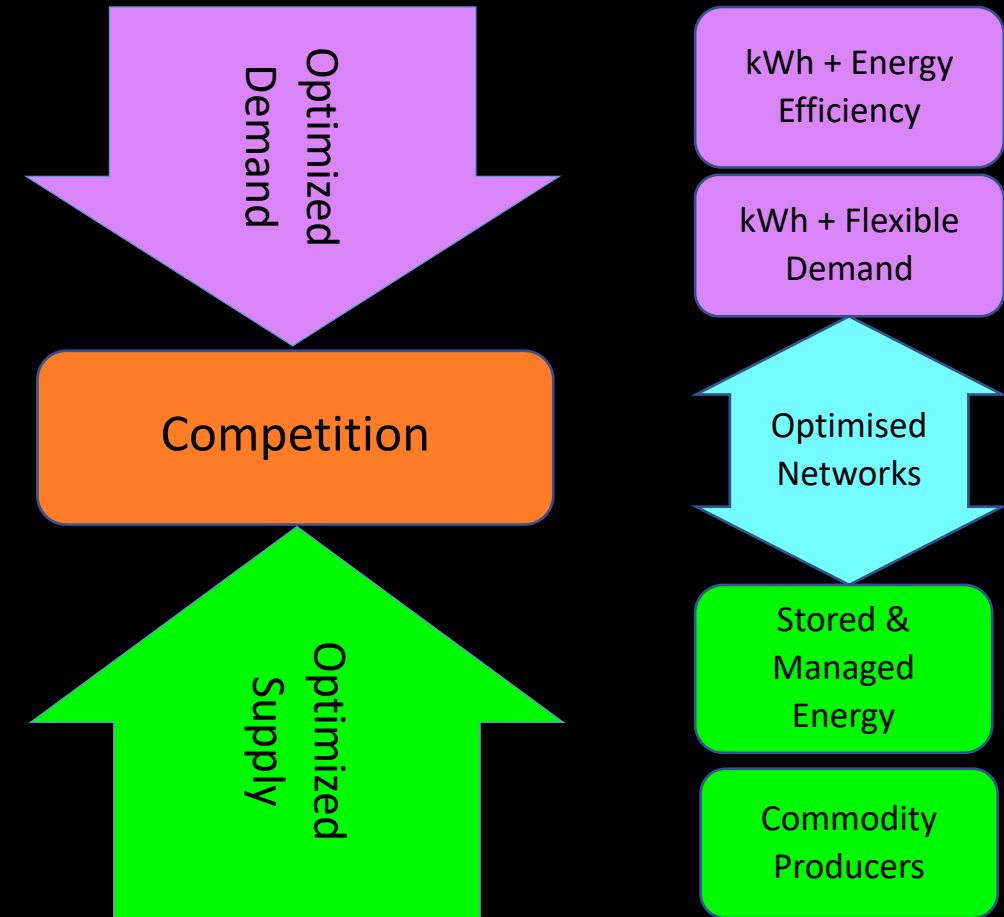
Delivering a Citizens Dividend

Optimisation Not Consumption



The 5 C's becoming the Policy & Regulatory Drivers

New Competitive Pressure



New Market Design

Overview of All Recommendations

Objective

More from Less
From Consumption to Optimization

Outcomes

Reward Customers

Reveal Value

Unlock Investment

Building Blocks

Carbon Busting
From Fossil to Net Zero

Fully Costed
From Silo to Whole System

Deep Digitalisation
From Brawn to Brain

Citizen Dividend
From the Few to Many

System Changes

Demand is
Equal to Supply

**From Supply to
Demand**

Unlock
Consumer &
System Value

**From
Commodities
to Services**

Stop Passing
the Buck

**From Spreading
Risk to Owning
Risk**

Move to Market
Solutions

**From
Subsidies to
the Market**

Start the Heavy
Lifting

**From Mature to
Immature
Technologies**

Fully Costed: From Silos to Whole System

Unlock
Capital
throughout
the system

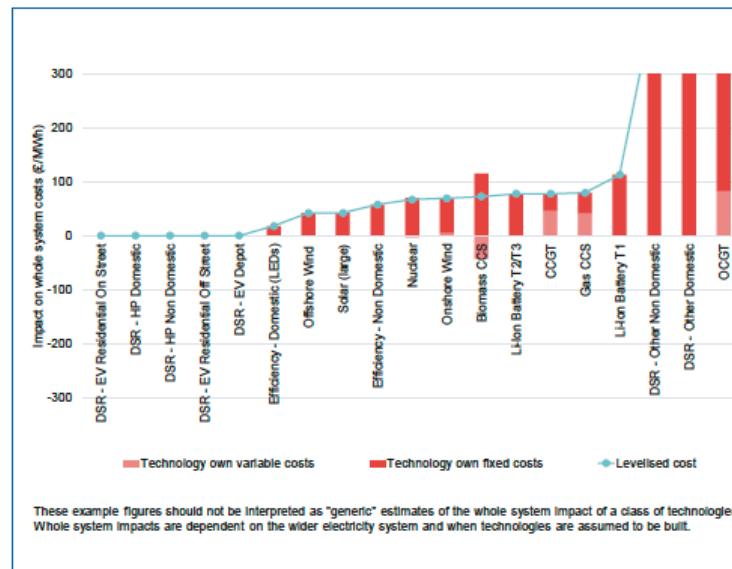
Fully
Costed
System

Why? Cost is moving from commodity to the supply chain & its interaction

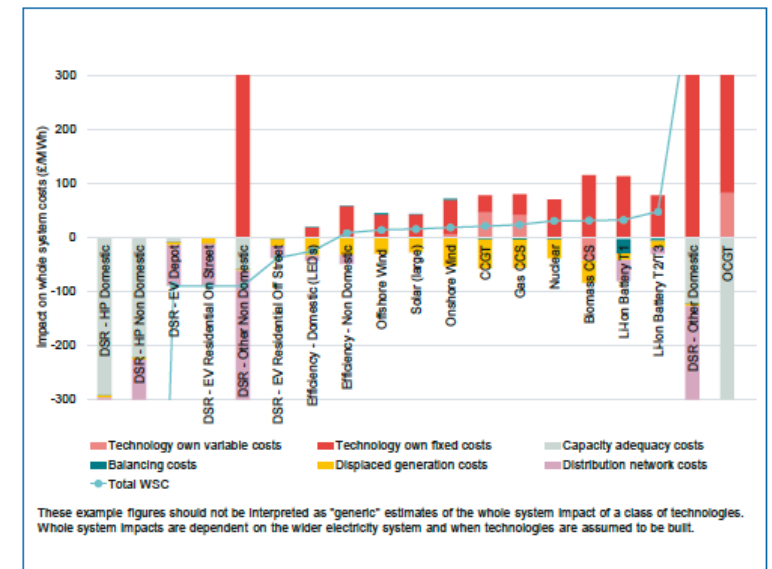
New Metrics Commissioned by ReCosting Energy
Possibly a world's first comparing demand & generation equally across whole system costs

- **Value and Waste Unlocked:** Sitting between the silos
- **Accountable for Total Costs:** Key players accountable for all system costs
- **Demand Important:** Demand actions & assets equally valued
- **No Place to Hide:** No pass the parcel
- **Total Cost Reduction:** Productivity & efficiency up
- **Avoided Cost of Energy:** These metrics reveal an avoided cost

TODAY: LEVELISED COST



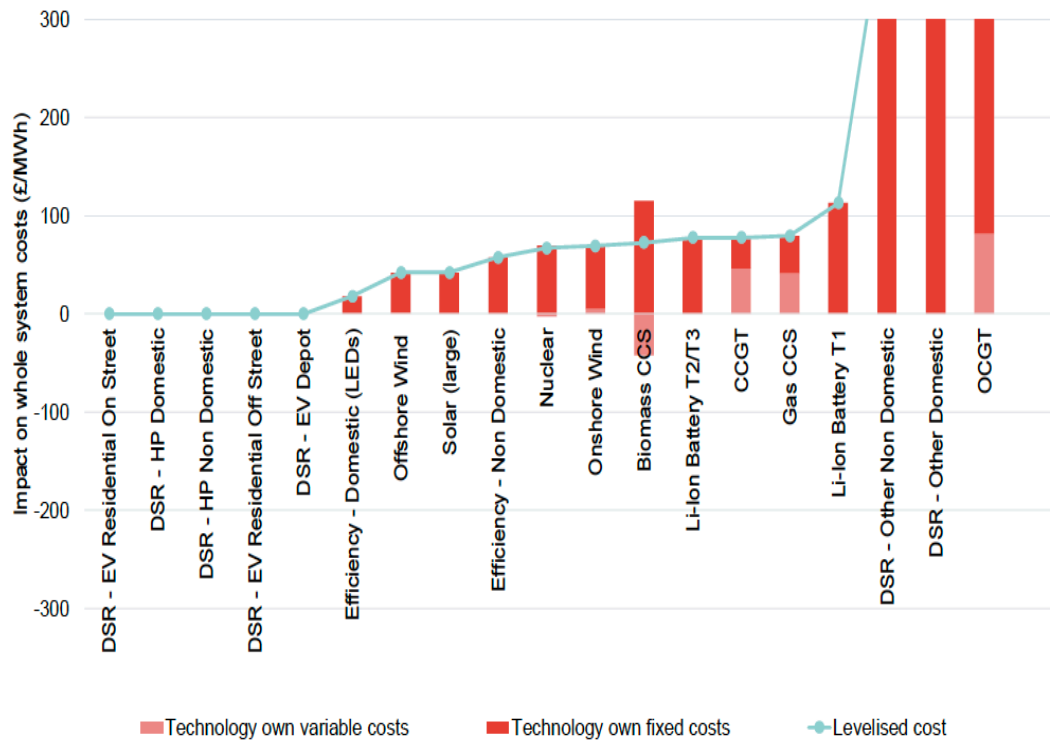
TOMORROW: WHOLE SYSTEM COSTS



Revealing different outcomes for all forms of demand and flexibility assets and generation assets, showing LCOE is not able to reflect the overall value or cost to the system

Huge thanks to BEIS modelling team, Frontier Economics & LCP

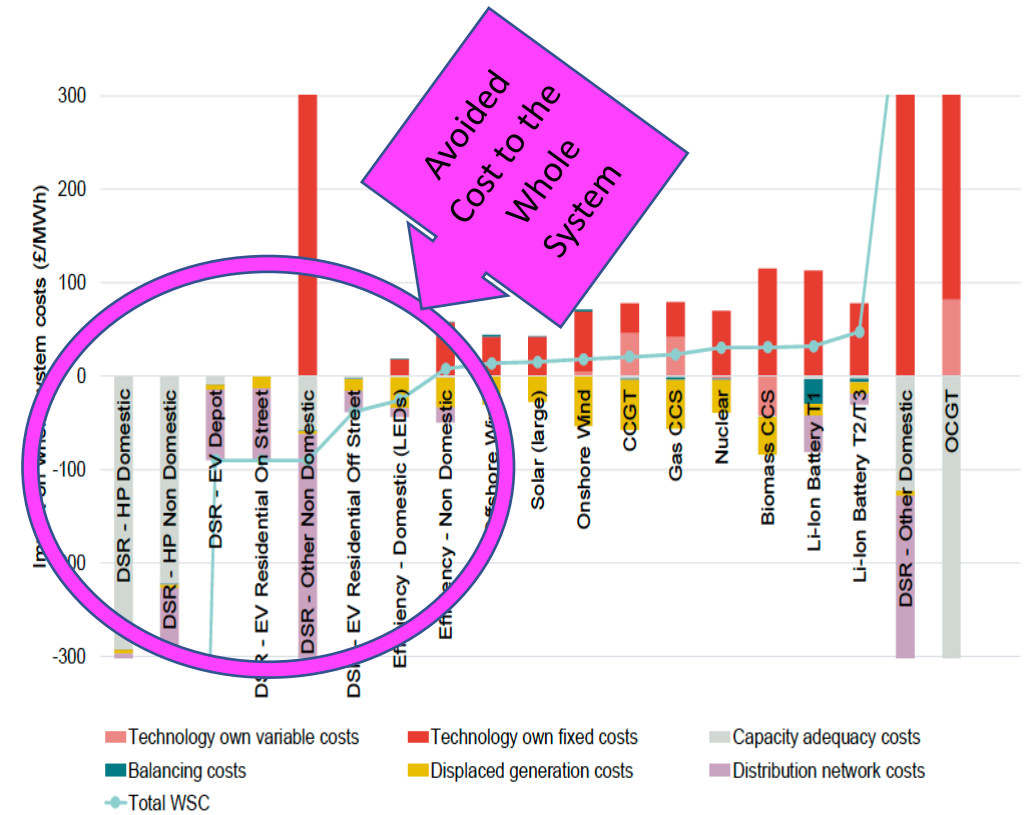
Figure 4 Example LCOE



These example figures should not be interpreted as "generic" estimates of the whole system impact of a class of technologies. Whole system impacts are dependent on the wider electricity system and when technologies are assumed to be built.

Source: Frontier

Figure 6 Example WESC, including illustrative distribution network benefits



These example figures should not be interpreted as "generic" estimates of the whole system impact of a class of technologies. Whole system impacts are dependent on the wider electricity system and when technologies are assumed to be built.

Source: Frontier

Drive Out Carbon: Carbon Busting

Drive out
Carbon

Unlock
Capital
throughout
the system

Why? There is an unconscious fossil bias across regulation, policy & markets

- **Destination Clear Accelerating Investment:** 2030 80% decarbonisation supplier mandate
- **Merit Order Change:** Demand first, low carbon /flexibility second
- **Fossil Fuel Bureaucracy:** Increased burden for fossil fuel choices
- **Restack the Deck:** Reform all policy, markets & regulation to be Net Zero compliant



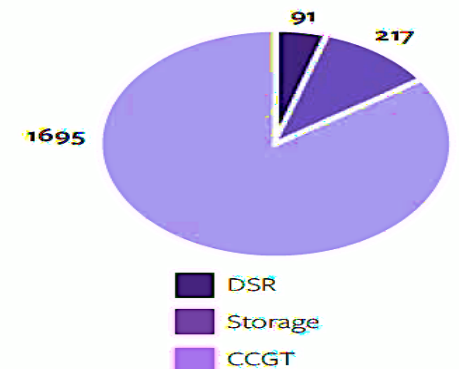
CALL TO ACTION!
Email us all the carbon bias you can identify

Carbon Intensity across all Flexibility Markets 2019

Market	Value (2019)	Size (2019)	Carbon intensity
Balancing mechanism	£590m	Abs: 20,000 GWh Net: 630 GWh	Fossil fuels >99% of turn up
Short term operating reserve (excl spin gen)	£50m	2000 GWh	>99% fossil fuel contracts
Fast reserve	£90m	220 GWh	85% fossil fuel contracts
Firm Frequency Response	£40m	3250 GWh	20% fossil fuel contracts
Mandatory Frequency Response	£30m	2500 GWh	Large units only. Will be primarily fossil fuel generation
Capacity market (delivery 2021/22)	£500m	55 GW (de-rated)	70% fossil fuel contracts
DNO tenders	£1.5m	c. 850 MW (MWh unknown)	>80% fossil fuel contracts
Wholesale Market	£13,000m	219,000 GWh	~40% fossil fuel generation

ELECTRICITY DISTRIBUTION LICENCE: CONDITION 4
Needs to be changed to prioritise demand, low carbon and flexibility as currently it is not Net Zero compliant and requires technology neutrality.

Total funding allocation for DSR, Storage and CCGT in Capacity Market Auctions between 2015-2019 (£m)



Demand is Equal to Supply

Why? Demand actions & assets reduces whole system costs - capacity, local constraints, peaks & curtailment

- **Design around optimised Demand:** Change Policy & Regulatory focus
- **Unlock Storage:** through the system
- **Energy Efficiency as a key player:** it has big value to total systems costs



Self Supply

Capital Assets delivering flexibility, capacity or generation



Demand Shifting

Assets or actions contributing value to the system



Energy Efficiency

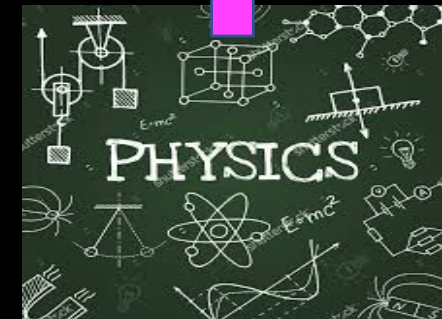
Permanent reduction of total energy needs

MEGA WATTS

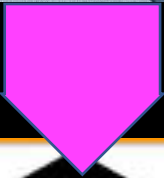
Reward Customers' Actions & Assets

Reduce Whole System Costs

Maximize all Capacity on the system



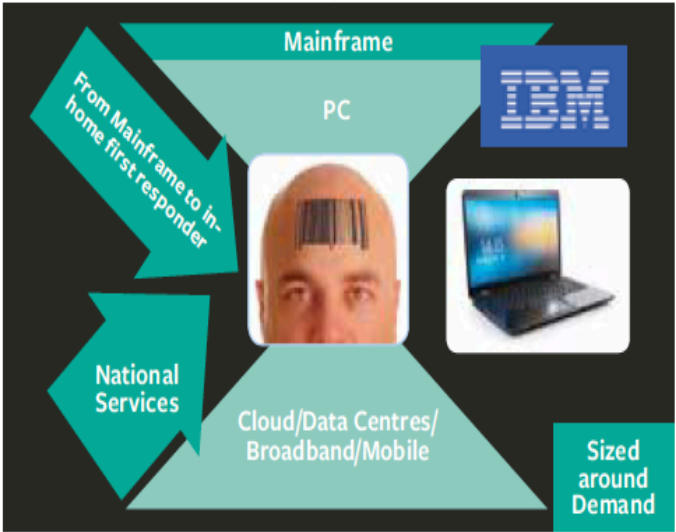
Optimising Demand: Data and Food



What is Optimised Demand?

From Mainframe to PC
Data provision has moved from a central mainframe system to one designed around the storage capacity of the PC and consumer facing Cloud services, drawing on national and local services to meet and provide additional services against “optimised demand”

Customer-centric Food
Customers have wide choice blending supermarkets with specialist providers, local markets and eating out. Crucially fridges are integral to the food system. Without fridges in homes, supermarkets would need to be three times the size – fridges are energy’s equivalent of distributed “storage”



Frozen Food is the interseasonal storage we need in energy



Without Fridges (distributed “storage”) supermarkets would be 3 times bigger

Powering Up Customers

Equal Access to Markets & Support Mechanisms

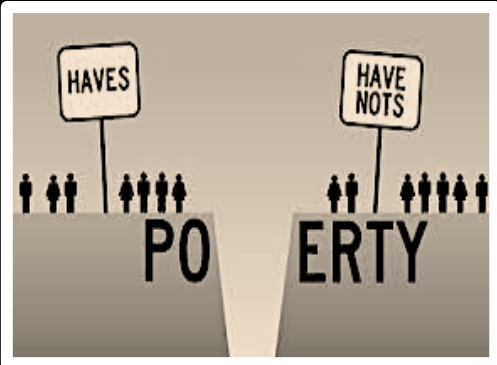


HM Treasury

Net Zero Report

“Liquidity constraints occur where people are willing to make an investment that is cost saving but do not have access to the capital to pay for it”

10s of millions of assets “required” by hard pressed consumers



Maximize all Capacity on the system

Reward Customers' Actions & Assets

Reduce Whole System Costs

Capacity Market

Increase access for efficiency, all storage types, self-supply & DSR

All Markets

Equal access for demand & flexibility assets & actions

Mini Contracts for Difference

Contract for Difference miniaturized

Energy Efficiency

Fully loaded value of Avoided Cost of Energy & Carbon

Flexibility Purchase Agreement

Suppliers, DNOs, ESO and generator buying Demand as they do Supply

Services

2019 Allocation of Resources

Supply Assets & Actions 2019

Demand Assets & Actions 2019



Capacity
Market: £3.85
bn

Balancing &
System Costs:
£1.94bn

CfDs: £600m

Network
Reinforcement
: £2bn



Capacity Market:
5.6% storage /
2.35% DSR

Balancing : 0.29%
DSR

Avoided Cost of Peak Energy



Customer
Assets

Energy
Efficiency

Less than 10% of
all support going
to demand side
assets

From Commodities to Services

Why? Capital decarb assets don't respond to commodity price signals, & complexity & system optimisation sits with companies not consumers

- **Open Up to Consumer Services:** Review retail license to unlock services
- **Consumer Protection:** new and appropriate safeguards required
- **Develop New Service Agreements:** develop a new range of services throughout the supply chain



Incentives in the Right Place to optimize & drive efficiencies



Maximize all Capacity on the system

Reward Customers' Actions & Assets

Reduce Whole System Costs

Fully Costed System

Unlock Capital throughout the system

Unlocks Investment & Innovation



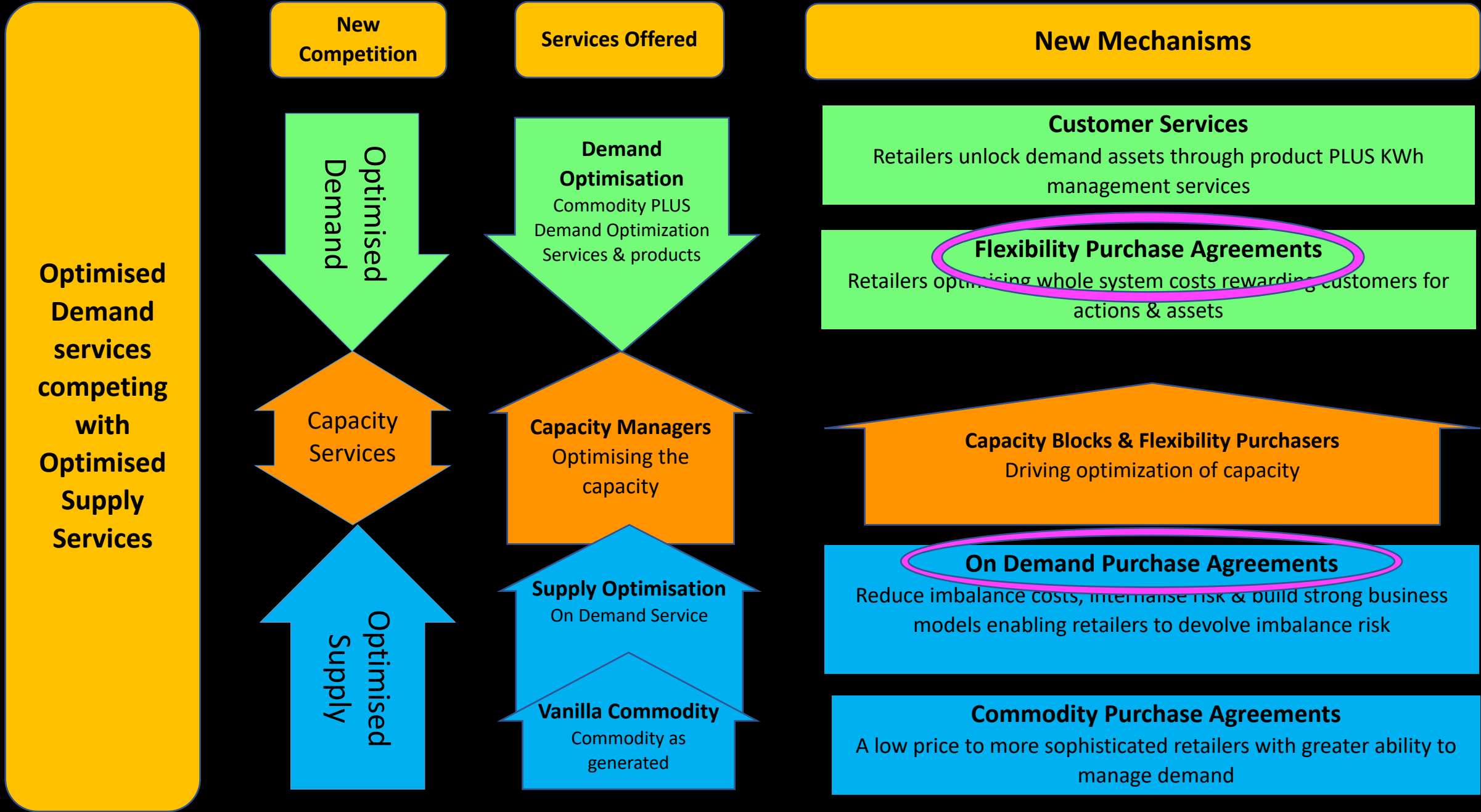
Example for EV's (Mobile phone model)



Recognition of new Business Models by Regulation

Appropriate protections for consumers

Linkage between leasing arrangements, financial services regulation and energy regulation



From Subsidies to the Market

Why? Support the market, focus on capital & unlock investment support for immature technologies

- **Carbon Busting:** Policy on decarbonisation reducing risk and fossil fuel competition
- **Support the Market:** As much policy focus on supporting the unsubsidised market
- **Low Powered Floor Price:** move mature technologies to the market
- **Unlocks Post Subsidy Assets:** a floor price will enable assets coming out of support regimes to continue generating
- **On Demand Services:** will build stronger business models with added value

£20bn every year



Public Goods In Food

Even in a competitive sector like food there is a derisking component sitting with the farmer rewarding Public Goods. This support does not reward “revenues” but does derisk embedded “capital” that delivers societal benefits



Unlock Capital throughout the system

Reward Customers’ Actions & Assets

Policy Measures PLUS low floor price reduces risk to capital



From Mature to Immature Technologies

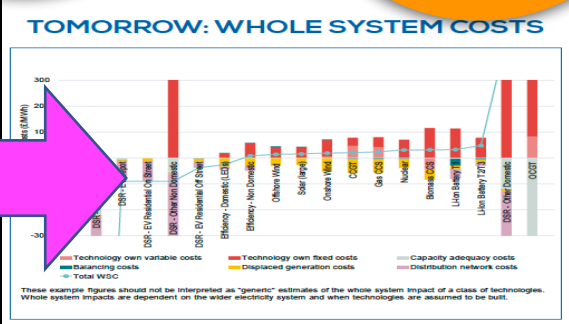
Why? To start the heavy lifting & drive support to immature technologies including consumer facing assets



**Reward
Customers'
Actions &
Assets**

Fully Costed System

**Unlock
Capital
throughout
the system**



- **Short Term Changes to CfDs:**
 - Revenue stacking promoted
 - Mandate storage for large projects
 - Reduce constraint payments
- **Medium Term Changes to CfDs:**
 - Focus on immature technologies
 - Spread the Joy: miniaturise for demand side assets & EE
 - A Citizen Share – reward for derisking capital
- **Attract New Investors:**
 - An Investment Sandbox unlocking new funding models



INFRASTRUCTURE INVESTMENT IN SMART METERS

Infrastructure investors have financed the deployment of smart meters showing that “distributed assets” with clear revenue projections can be appealing to big capital if an appropriate regime is established

INFRASTRUCTURE INVESTMENT IN SMART METERS

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From the Few to the Many: The Citizen Dividend

From Silo to
Whole System

From Supply to
Demand

From
Commodities to
Services

From Spreading
Risk to Owning
Risk

Citizen Dividend

Cost Reduction

With total visibility
of the Whole
System Costs
action will be
taken to reduce
whole system
costs

Customers Benefits & Rewards

Access to all
markets, rewards
and support
mechanisms for
customer assets
and actions

Unlocks Access to Assets

Business Models
enable customers
to access
expensive capital
decarbonization
assets

Cost Reduction

With businesses
owning their own
risk they will be
incentivized to
manage the risk
as cost effectively
as possible

Citizen Share embedded in support mechanisms

A transformation
fund supporting
communities and
sectors facing
greatest challenge
to decarbonise

Outcomes we would love to see!



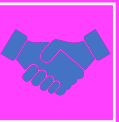
A Carbon Busting Review: Drive out carbon in policy and regulation



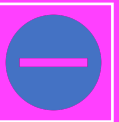
Whole System Costings:
Acceptance the commodity price can no longer be the proxy for whole system costs



Demand equal to Generation:
Equally rewarded, supported & fairly accessible

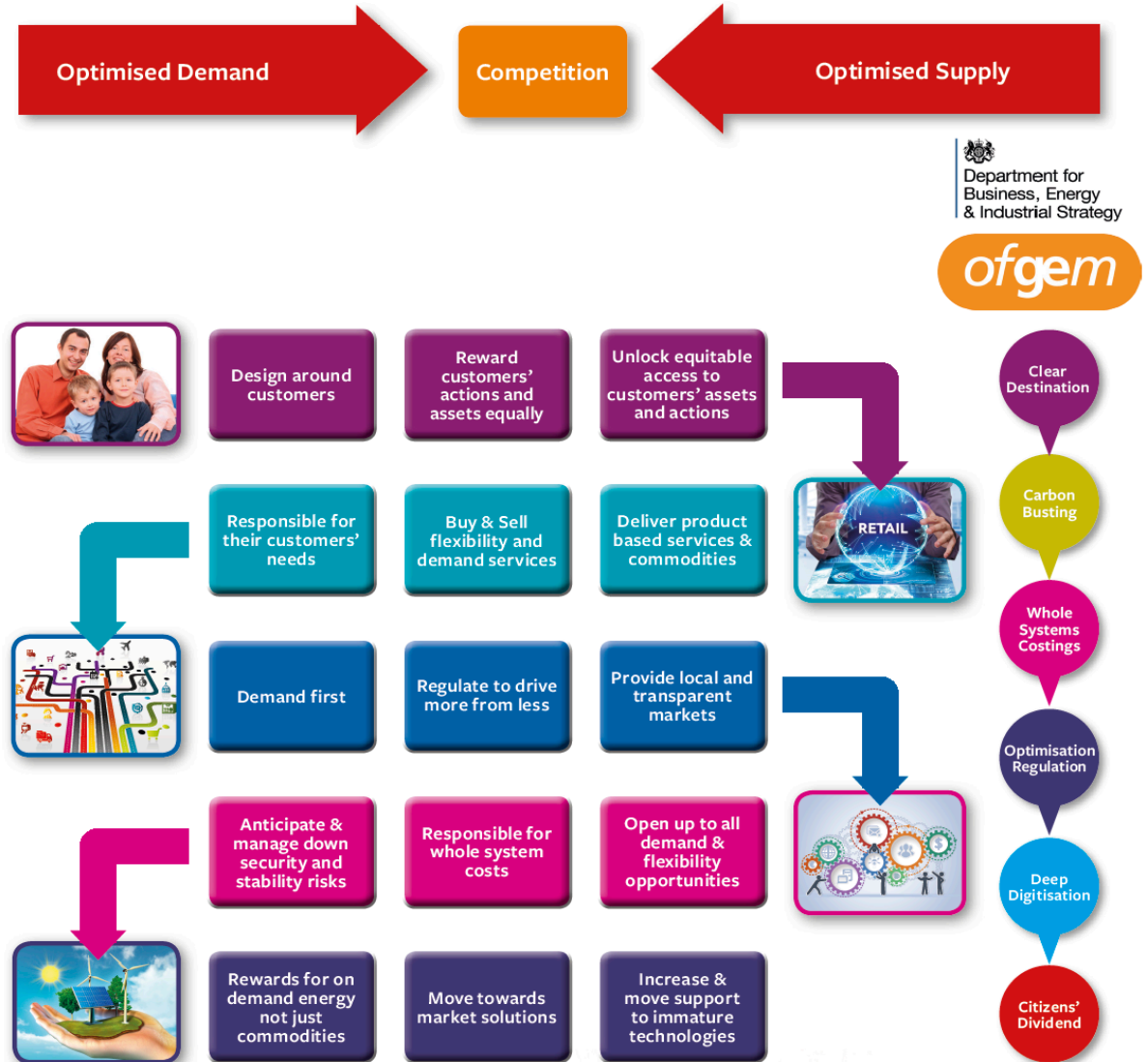


New Service Agreements: Retail Services, Flexibility Purchase Agreements, Capacity Services, Energy on Demand services and Commodity as Generated



Low Powered Floor Price: To accelerate and derisk capital in the unsubsidized market

Optimising the System





Welcome
The Rt Hon Anne-Marie
Trevelyan
Minister of State for Energy

Wonderful Advisors: Panel Discussion



Professor Catherine Mitchell

UK's first female professor of energy policy. A mover and shaker in energy policy, governance guru & regulation reformer!



Dr Jeff Hardy

Leading brain at Grantham Institute, the Energy Rev, & best in business on consumer energy systems A great co-conspirator!



Nigel Cornwall

One of the most respected energy analysts in the UK with a detective mind identifying problems & solutions to Net Zero

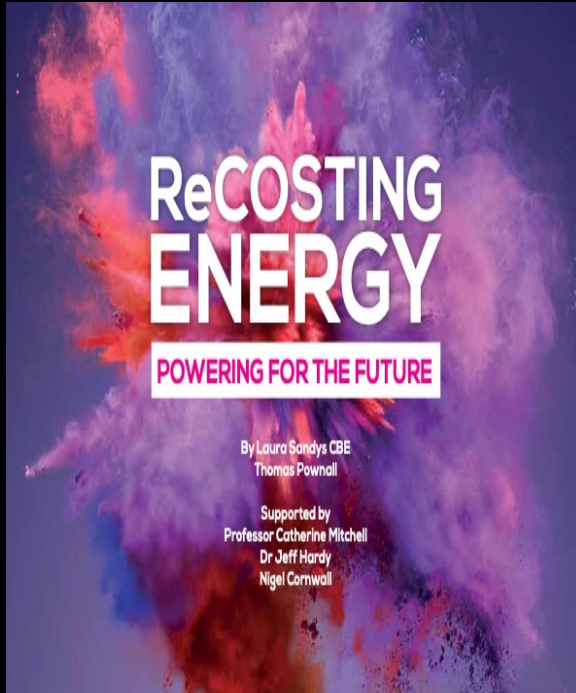


Thomas Pownall

A great co-author who has a brilliant overview of system and market needs. A joy to work with & good luck for his PhD

Thank you so much for joining us

Huge thanks to the support
from



This is the start not the finish...

- Mini reports will be developed
- Podcast from experts on the themes
- Responses to consultations
- Significant engagement
- Welcome push back, push forward, rejection even!

Three Box Set Episodes Available at www.challenging-ideas.com/publications

Comments, challenges, critique: recostingenergy@gmail.com

