The UK renewables sector – achievements so far, future direction and opportunities

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@NinaSkorupska @REAssociation

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Who we are

Sector groups

Our various sector groups enable us to focus on sector-specific issues. Members can join our various groups concentrating on individual renewable technologies, energy market sectors, or cross-cutting issue forums.

Subsidiaries

WHA is the UK trade association for the modern biomass heating industry

Renewable Energy Assurance Ltd carries out a range of certification and consumer protection activities all of which promote sustainable energy.

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UK Renewable Energy Targets

There are a number of legally binding targets driving forward decarbonisation

Renewable Energy Directive – EU (Subject to Brexit Negotiation)

- 15% of all energy to come from renewables by 2020
- Will require 30% power, 12% heat and 10% Transport demand to come from renewables

Climate Change Act (2008) - UK

- 80% reduction in carbon emissions from 1990 levels by 2050
- 5th Carbon budget will require 57% reduction by 2032, abatement of 1725 $MtCO_2e$. Passed through parliament in July 2015

Cop 21 Paris 2015 & COP 22 Marrakesh – UNFCCC

Agreed to aim for no more than 1.5°C warming

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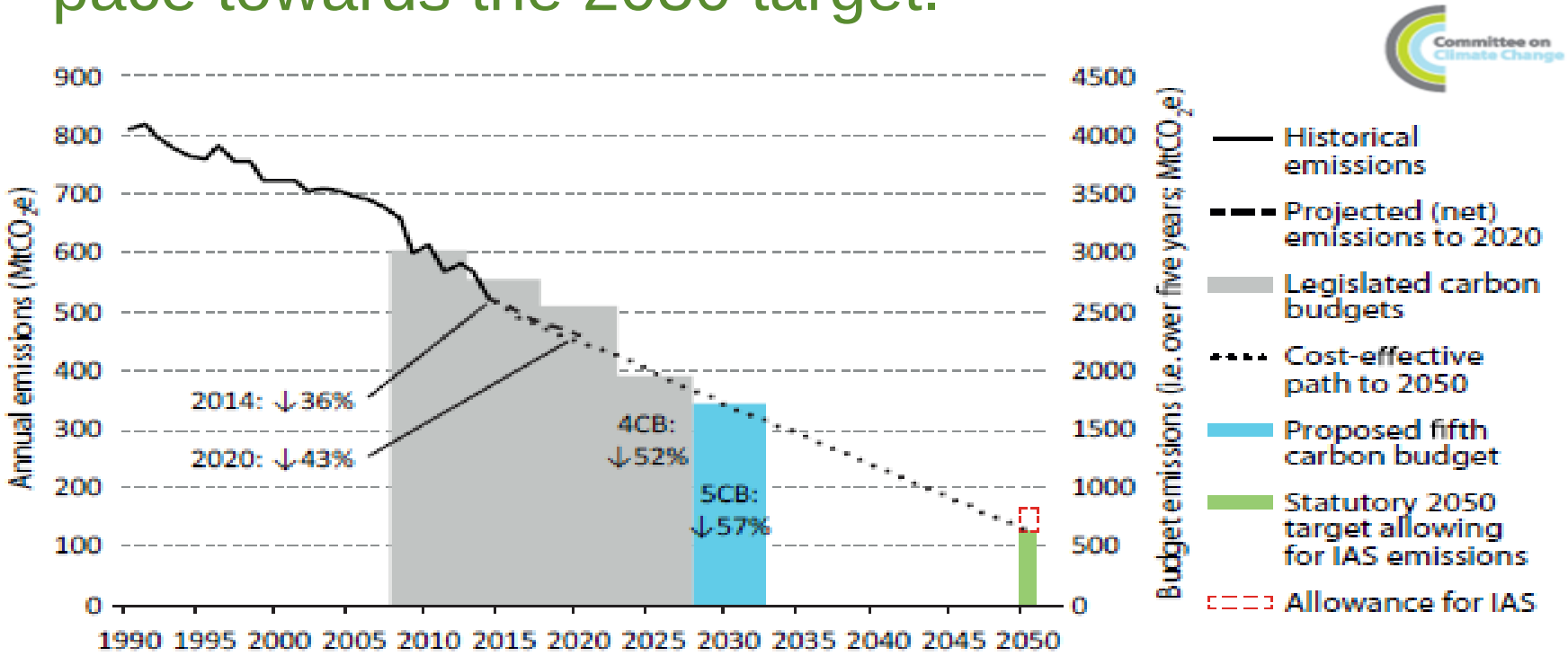
Carbon Budgets: 2050 Target guides

Currently legislated UK carbon budgets

Carbon budget (years)	Emissions limit ($MtCO_2e$)	Equivalent reduction vs. 1990
1 (2008-12)	3,018	26%
2 (2013-17)	2,782	32%
3 (2018-22)	2,544	38%
4 (2023-27)	1,950	52%
5 (2028-32)	1,725	57%

Source: Committee on Climate Change Oct.2016 UK Climate action following the Paris Agreement
https://www.theccc.org.uk/wp-content/uploads/2016/10/UK-climate-action-following-the-Paris-Agreement-Committee-on-Climate-Change-October-2016.pdf

The UK should to progress at a steady pace towards the 2050 target.



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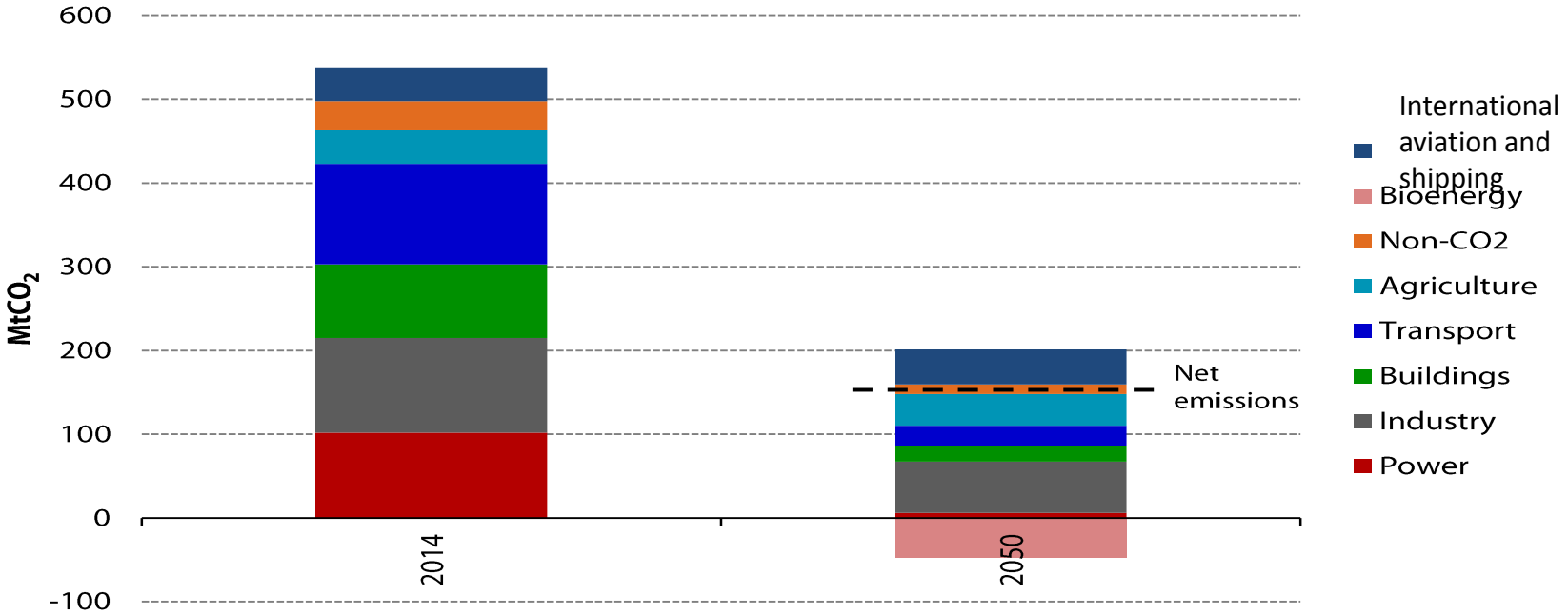
Source: Committee on Climate Change Oct.2016 UK Climate action following the Paris Agreement
https://www.theccc.org.uk/wp-content/uploads/2016/10/UK-climate-action-following-the-Paris-Agreement-Committee-on-Climate-Change-October-2016.pdf

In 2050 total emissions from surface transport are most likely to be minimal.

Figure: Residual emissions in 2050 under CCC Central scenario, including IAS.



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Emissions in 2050

- **The 2050 target is currently around 126 $MtCO_2$**, excluding an allowance international aviation and shipping.

- **Decarbonisation of the power sector** is key to reaching this target**.**

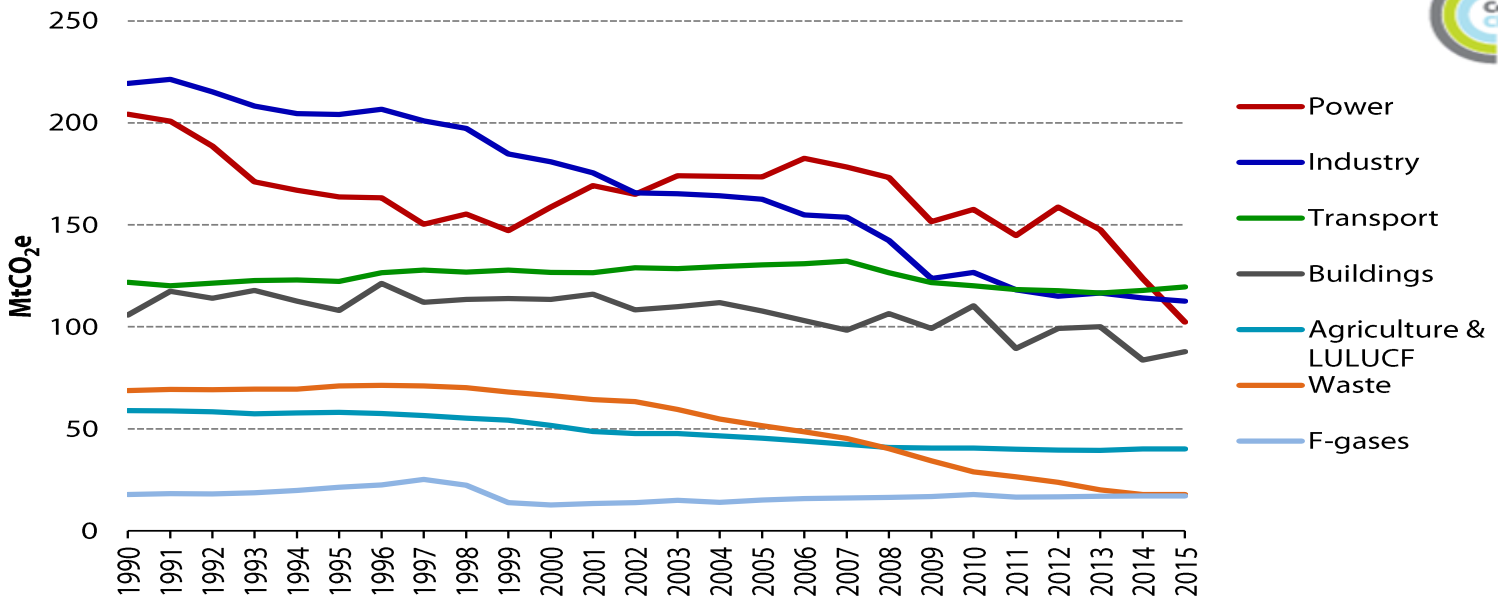
- **Some sectors are very challenging** to decarbonise:
  - *Industry*: Even with some CCS, we anticipate residual emissions around 65 $MtCO_2$.
  - *Agriculture*: Options are limited and residual emissions could be around 30 $MtCO_2$.

- **CCS is very important**:
  - CCS with bioenergy could provide negative emissions of around 20 $MtCO_2$/yr.
  - Without CCS, meeting the 2050 target would be very challenging.

- It is therefore sensible to plan now to keep open the possibility of near-full decarbonisation of both **buildings** and **surface transport** by 2050.

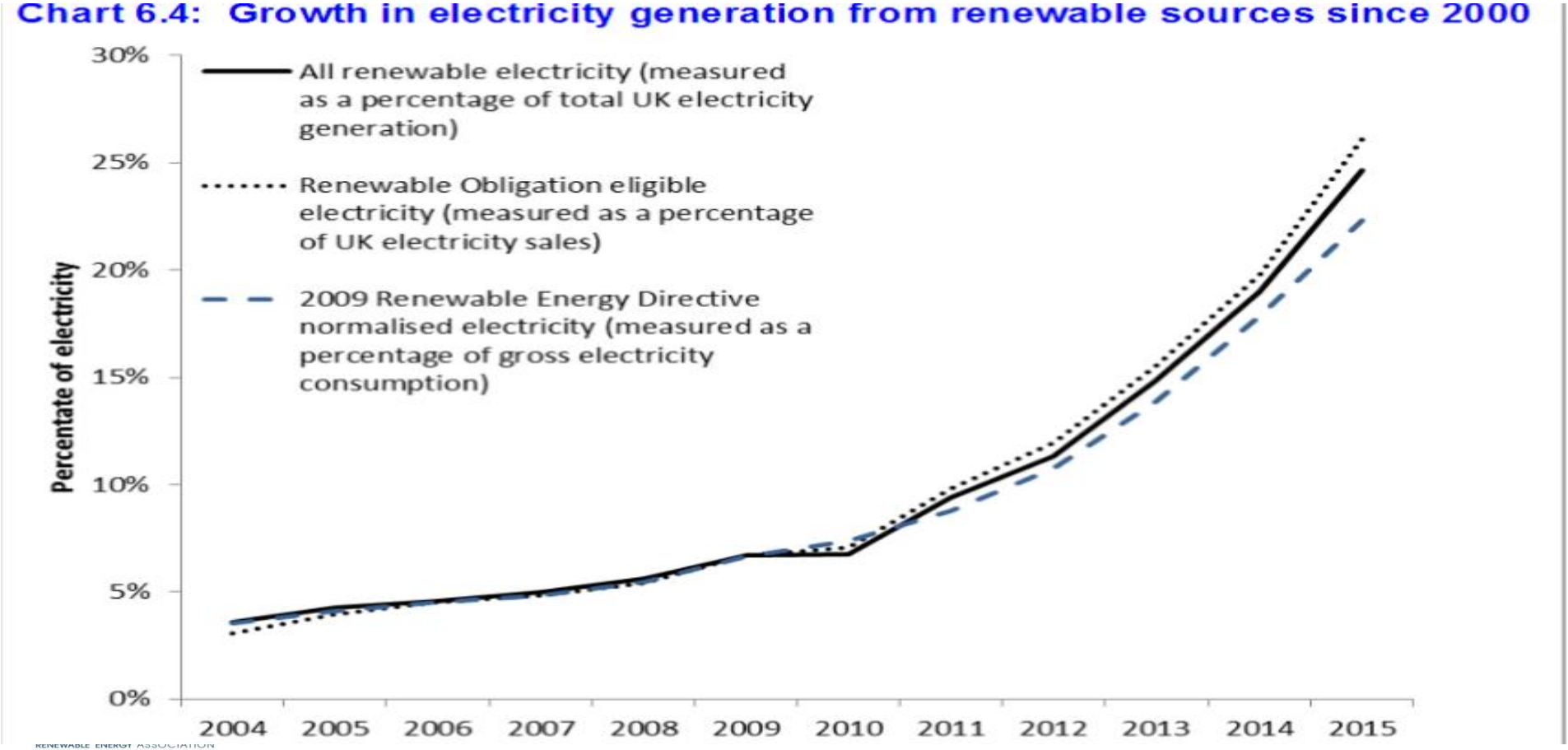
Source: Committee on Climate Change Oct.2016 UK Climate action following the Paris Agreement
https://www.theccc.org.uk/wp-content/uploads/2016/10/UK-climate-action-following-the-Paris-Agreement-Committee-on-Climate-Change-October-2016.pdf

Transport is now the biggest emitting sector



Source: Committee on Climate Change Oct.2016 UK Climate action following the Paris Agreement
https://www.theccc.org.uk/wp-content/uploads/2016/10/UK-climate-action-following-the-Paris-Agreement-Committee-on-Climate-Change-October-2016.pdf

Renewable Electricity, as a percentage of total electricity production



Source: **BEIS** ***Digest of United Kingdom Energy Statistics (DUKES)***

Extensive resetting of the Renewable Policy Framework

Renewable Obligation - Set to close to applicants in March 2017. Already closed to onshore wind and Solar.

CfD - heavily delayed. Was promised Pot 2 Auction by the end of 2016, although with change of ministers postponed to spring 2017. £290 million for next auction. No Pot 1!

FiTs – heavily reformed with tariff cut and deployment caps introduced. Micro generation, particularly solar, seen significant decrease in deployment. Anaerobic Digestion (AD) & micro CHP considerations only released a few weeks ago! *The headline announcements were a small increase in the tariffs, the reinstatement of the 500kw band for AD, and the intention to introduce the sustainability criteria as set out in the consultation.*

RHI - Conclusion to consultation on reform to the RHI has seen significant cuts to small scale biomass projects, though solar thermal feared to be cut completely, reinstated. Good support for Biomethane for heat

Impact of Referendum: Brexit
New Government – Key Positions

Prime Minister

Theresa May MP

- Very few public statements on Renewables/ Climate Change

Chancellor of the Exchequer

Phillip Hammond MP

- Strong on Paris COP
- Redefined Conservative Argument on Climate

Secretary of State for Exiting the European Union

David Davis MP

- Seen as a climate sceptic
- Voting history of voting *against* or missing key votes

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New Government Department – Business, Energy & Industrial Strategy (BEIS, "*Bays*")

Greg Clark MP

BEIS Secretary of State

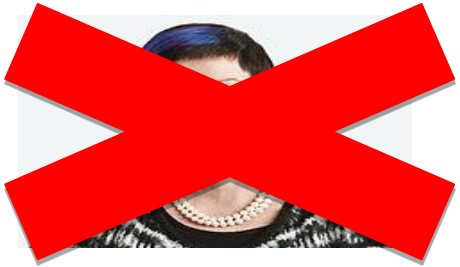
- Historic support
- Former DECC Shadow Secretary
- Authored reports on Climate Change, Sustainability and Environment
- Recent history in CLG of concern

Nick Hurd MP

Minister of State for Climate Change and Industry

Conservative Environmental Group

- PMB on Sustainable Communities
- Key in DfID on Solar in Africa projects as Development Minister
- Former Chair of the APPG on Environment



Baroness Neville-Rolfe

Minister of State for Energy and Intellectual Property

- Former MAFF Civil Servant
- Director of Tesco
- IP Junior Minister

Jesse Norman MP

Minister for Industry and Energy

- Deputy to Baroness Neville-Rolfe
- Former Director of Barclays
- Also former Senior Fellow of Policy Exchange where he wrote on green cities

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Brexit - Article 50

Two-year timetable once the article is triggered:

"The Treaties shall cease to apply to the State in question from the date of entry into force of the withdrawal agreement or, failing that, two years after the notification"

Decides the terms of separation

- Ends the obligations and responsibilities of being an EU member
- Not a trade deal
- Needs approval from at least 20 member states with 65% of the population

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Brexit – Renewables Regulation/EU law

The ECA gives precedence to the Treaty for the European Union.

Article 192 – energy efficiency of buildings and products, market competition measures, and other environmental legislation.

Article 194 - covers the majority of energy related legislation, including renewables.

EU Secondary legislation (eg directives, decisions) – are implemented in UK law via Primary or Secondary regulations, usually via the ECA Section 2(2) SI

- Renewable Energy Directive
- Energy Efficiency Directive
- EU ETS
- EU 2030 Climate and Energy Framework
- Circular Economy Package

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Immediate impact on energy sector: Investor confidence

Speeding up of nearer term projects
- avoid negotiation uncertainty

Likely increase in risk profile, could mean fewer projects getting to financial close
- Increasing supply chain, feedstock & capital costs
- Uncertainty on Passporting arrangements
- Unpredictable power revenue
- Impact on UK economy, inflation and growth.

Potential for greater energy policy stability as Brexit negotiations take priority e.g. launch of Industrial Strategy
- **Dependant on political sensitivity of macro level issues. E.g. cost to consumer, energy security, climate change**

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Next for the Industry….

- Brexit Unit discussions
- Article 50 triggered – March 2017
- Expansion of Civil Service
- New Ministers -
  - “Business as Usual”
    - Consultation Renewable Transport Fuel Obligation
    - Renewable Heat Incentive Changes
    - Business Rates
    - Contracts for Difference (CfD) auctions
    - Enhanced Capital Allowances
    - “Flexibility” call for evidence key for Energy Storage

- New Scottish Referendum / UK General Election?

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REA Working Group for Brexit

The REA has developed a Brexit working Group in order to examine the impacts of Brexit negotiations on renewables and clean technology economy and further develop our position and key messaging as the UK's position in energy negotiations becomes clearer. The working group will also feature a set of sub groups designated to look at specific issues in relation to Brexit.

REA Brexit Working Group

Remit: to formulate the REA's position and messaging in relation to key Brexit issues, based on assessments made by targetted sub-groups.

Group members: 10 to 12 members from a range of technology sector groups and finance organisations.
Will look to develop the REA's position, having examined the impacts prescribed by sub groups.

So HUGE opportunities are still available...

New Commercial Rooftop Solar models

2025 Coal “closure” Pledge

Energy Storage

Renewed focus on renewable heat and transport

5th Carbon Budget & UK Emissions reduction plan

New Decentralised Energy models

Rise of Electric Vehicles

INDUSTRIAL STRATEGY

Cop 21 Paris Agreement

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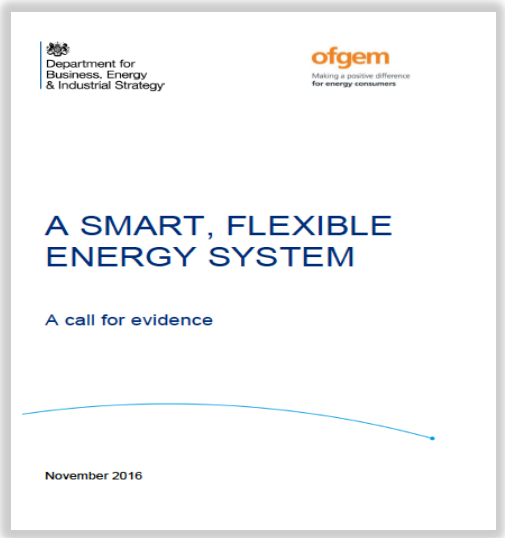
And much more.....

UK Government decisions impacting a Decentralised Energy *future* & Energy Storage: 1st step

BEIS/Ofgem Call for Evidence for Smart Flexible Energy

- Definition for energy storage established
- Half hourly metering, domestic bills confirmation
- Smart meter target met
- Size of renewables budget beyond 2020/21
- New-build ("Zero-carbon" homes) policy
- Implementation of CMA Market Review Findings
- ' Next stage' Contract for Difference (CfD) policy (?)
- Regulator 'Non-Traditional Business Models' work programme – lighter touch regulation
- Grid connection/system use charges reformed
- Wider Market education
- Industry standards & guidelines



Closed 12th January 2017

Clear aim for REA is to work with BEIS/OFGEM to develop a ROADMAP to remove all the barriers

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Industrial Strategy

Important to Showcase ALL ELEMENTS as value propositions in the Government's "Industrial Strategy"

Ambition to "Move towards a low-carbon energy system",

- especially support laid out for energy storage and electric vehicles

Encouraging businesses to decarbonise their own electricity, heat and transport

- especially having a more co-ordinated cross government effort to reduce barriers

Closing 17th April 2017, REA will submit a response and invite Ministers and REA members to roundtable to shape the prospects for the Industry
In parallel to work with National Grid, OFGEM and other key stakeholders to truly understand the future capabilities and develop improved insights

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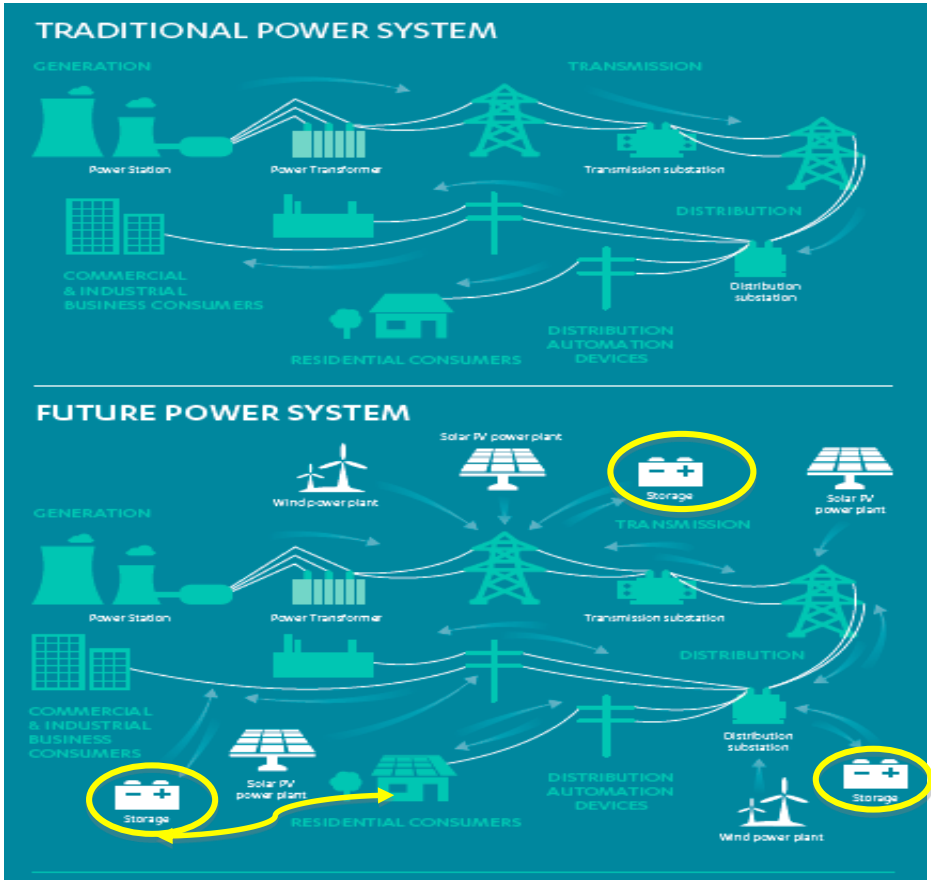
Changing Energy Landscape



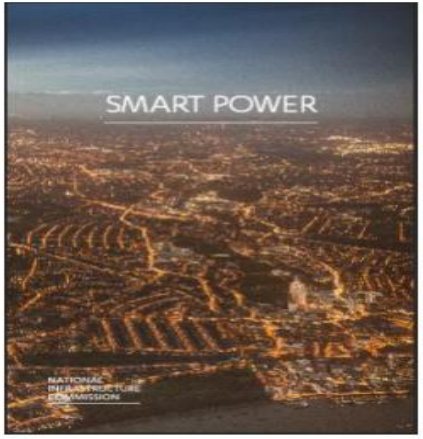
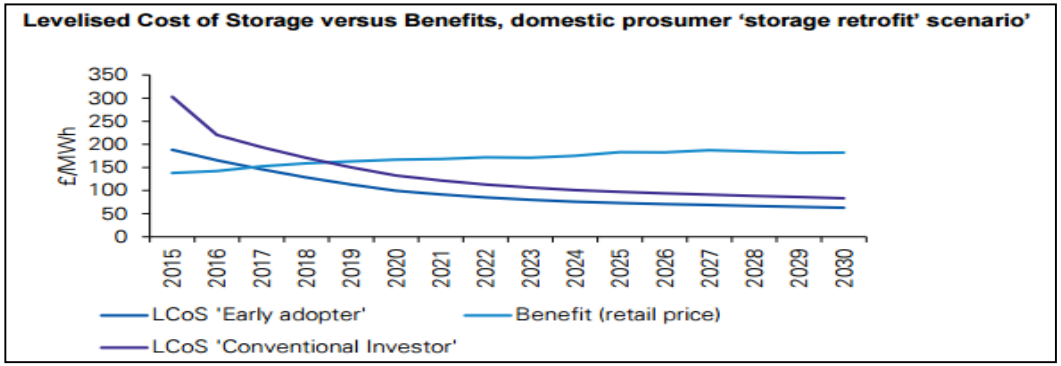
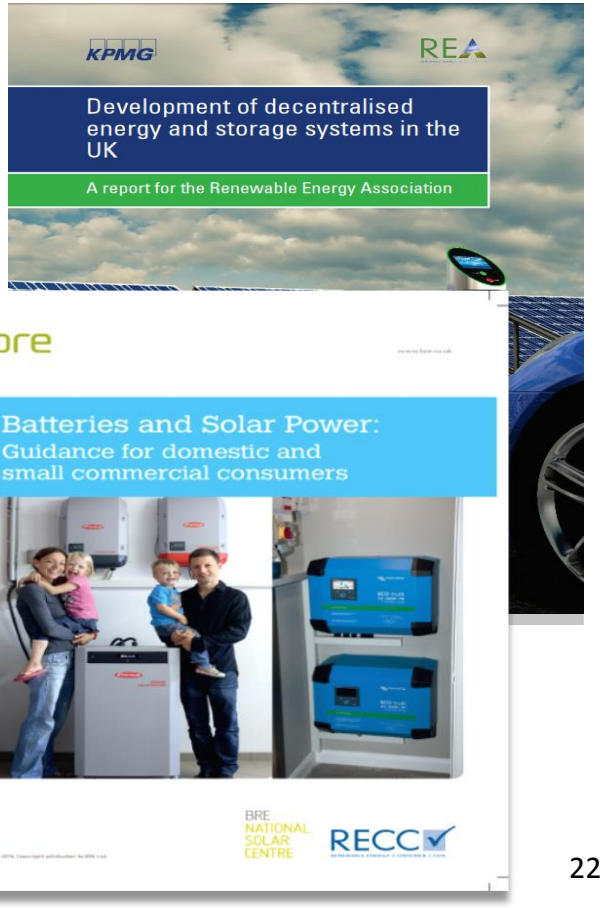


Figure courtesy of National Infrastructure Commission (NIC): SMART POWER report, February 2016
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/505218/IC_Energy_Report_web.pdf

Future low carbon electricity market models
- centralised or decentralised?

- "Competition" between low carbon generation forms to "complement" the variability of solar and wind and deliver secure energy systems
- Is it gas generation, biomass power or something else?
- 



REA/KPMG report Jan 2016
http://www.r-e-a.net/news/rea-kpmg-report-shows-battery-storage-already-attractive-for-households-and-businesses
BRE/RECC report 2016
www.bre.co.uk/filelibrary/nsc/.../88031-BRE_Solar-Consumer-Guide-A4-12pp.pdf

Not just our opinion but views of our members

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Authoritative views too…

Steve Holliday, CEO National Grid: "The idea of large power stations for baseload is outdated"

September 11, 2015 by Karel Beckman — 3 Comments

675 559 3

Steve Holliday, CEO of National Grid, the company that operates the gas and power transmission networks in the UK and in the northeastern US, believes the idea of large coal-fired or nuclear power stations to be used for baseload power is "outdated". "From a consumer's

Print

unmistakable, says Holliday. "The world is clearly moving towards much more distributed electricity production and towards microgrids. The

publication of the World Energy Council produced by Energy Post. The chief of National Grid also notes that energy markets "are clearly moving towards much more distributed production and towards microgrids".

ofgem | future insights

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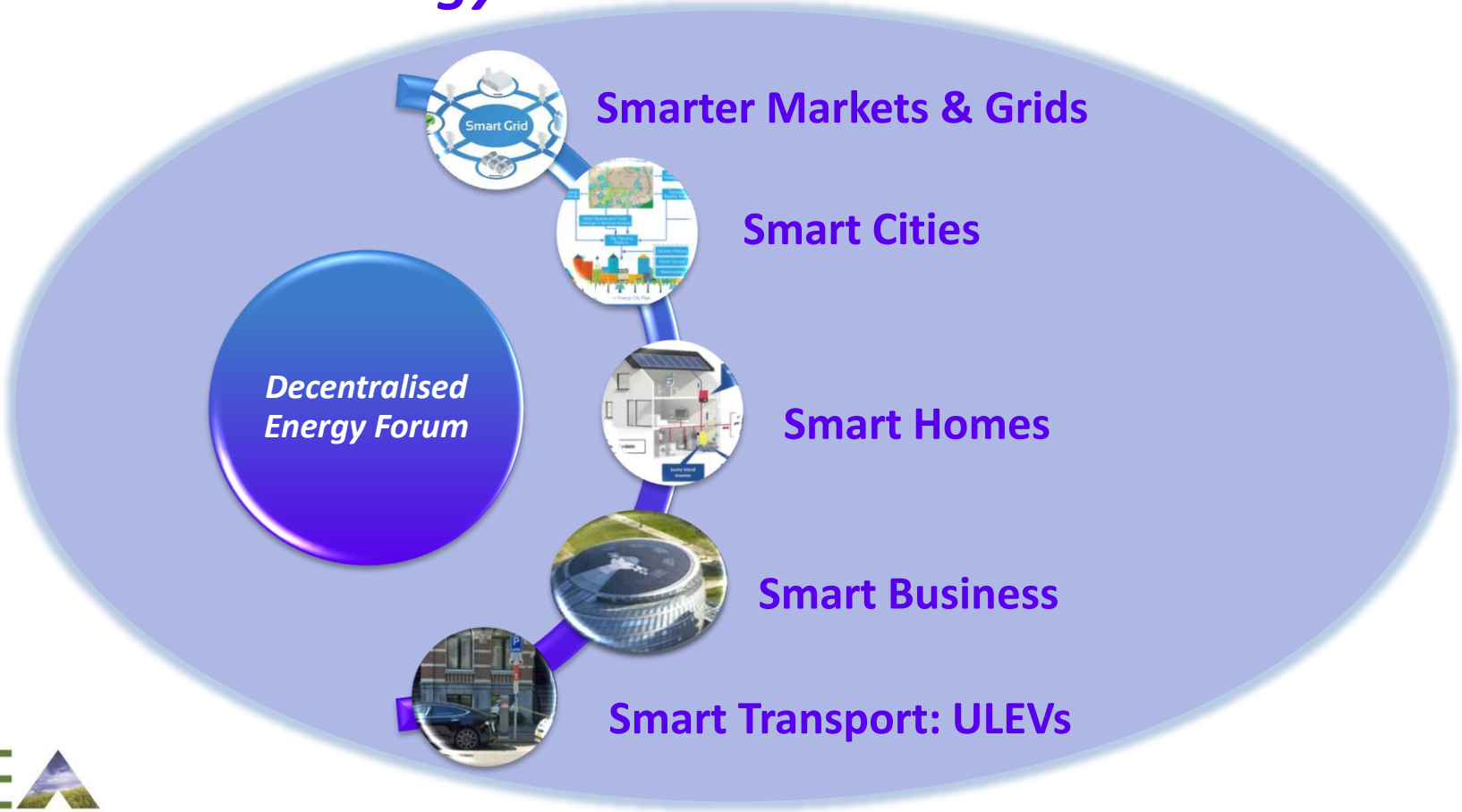
Decentralised Energy & the REA



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Decentralised Energy:

Smarter grids & markets

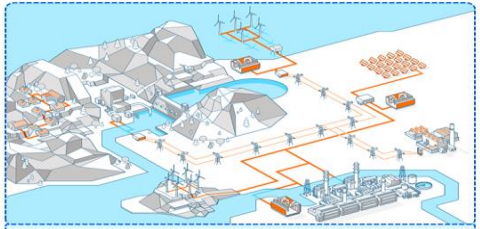
- Companies like ABB, DNV GL and Siemens are actively progressing smart solutions tailored to different situations
- Example ABB

Global energy trends
Meeting the energy challenges - with microgrids

Growing global energy demand and access to electricity

Universal need for resilient power

Increased deployment of renewable energy



Microgrids are key to addressing the energy challenges.

Microgrid overview
Market segments with different main drivers

			Main drivers				
			Social	Economic	Environmental	Operational	
	Segments	Typical customers	Access to electricity	Fuel & cost savings	Reduce CO2 footprint and pollution	Fuel independence	Uninterrupted supply
Off-grid	Island utilities	(Local) utility, IPP*		✓	✓	✓	(✓)
Weak grid	Remote communities	(Local) utility, IPP, Governmental development institution, development bank	✓	✓		✓	
Grid-connected	Industrial and commercial	Mining company, IPP, Oil & Gas company, Datacenter, Hotels & resorts, Food & Beverage		✓	(✓)	✓	✓
	Defense	Governmental defense institution		(✓)	(✓)	✓	✓
	Urban communities	(Local) utility, IPP			(✓)		✓
	Institutions and campuses	Private education institution, IPP, Government education institution		(✓)	✓		(✓)

IPP: Independent Power Producer

✓: Main driver
(✓): Secondary driver

ABB

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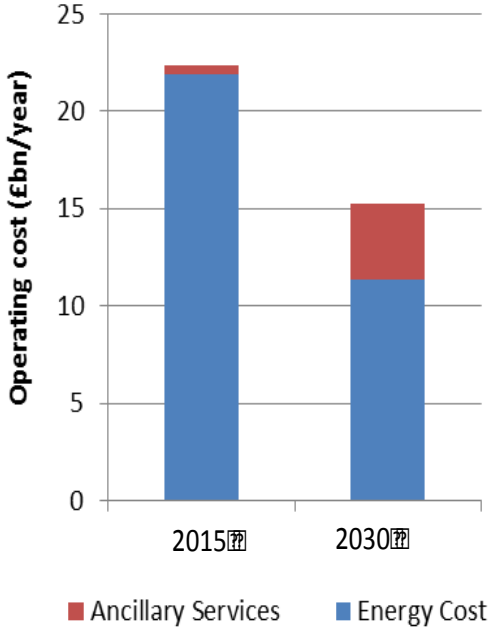
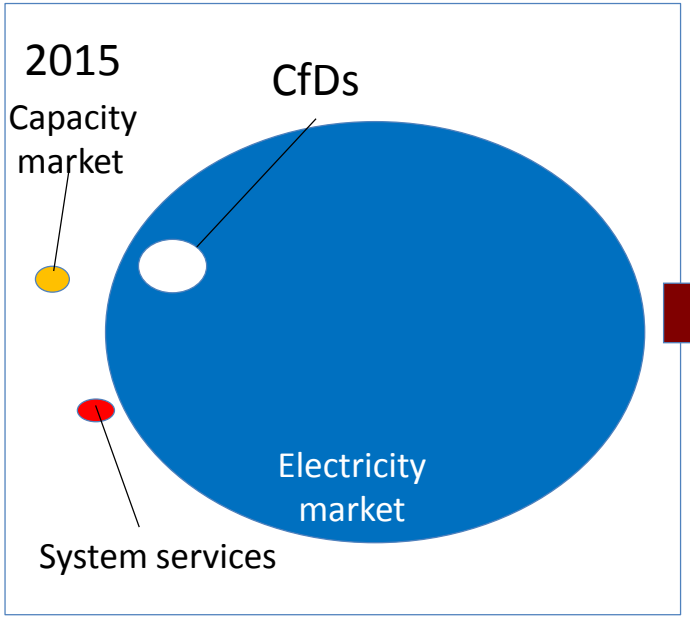
Decentralised Energy:

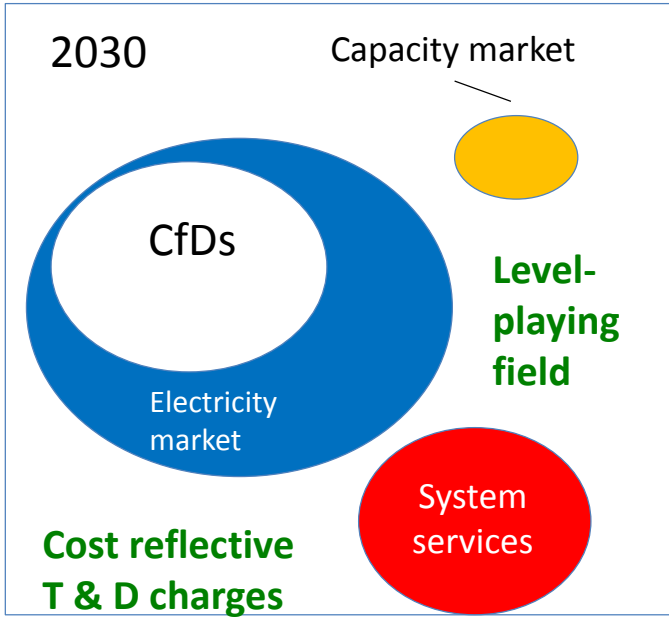
Smarter Markets

Imperial College London

Courtesy Prof G.Strbac, Feb.2107 ESCS 2017







Historically, policy focus has been on the energy only:

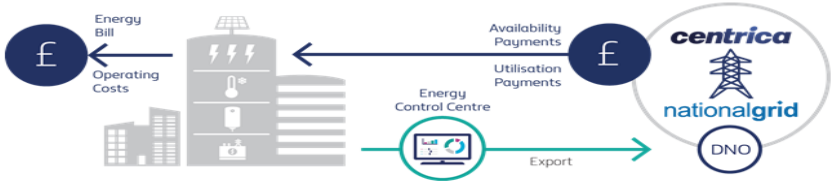
Significant change is needed to recognise SERVICES!

Decentralised Energy:

Smart Business

- Total solution providers such as British Gas support business to a low carbon economy

The Distributed Energy model



1,020MW
Assets currently managed

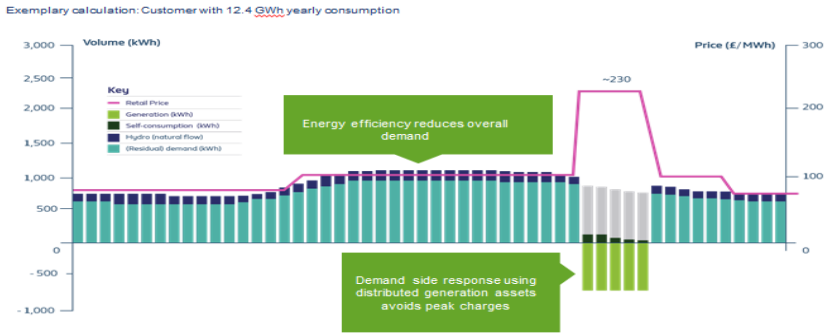
£780M
Investment across UK and US by 2020

Over 1000 customers across 3700 locations

British Gas | DISTRIBUTEDENERGY | centrica

Peak avoidance - Distribution Use of System Charges (DUoS)

High charges (Red band rates) are typically applied between 4:00-7:00pm Monday to Friday to disincentivise consumption in that period.



British Gas | DISTRIBUTEDENERGY | centrica

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Decentralised Energy:

Smart Business – Storage for commercial buildings

- Commercial buildings that operate 24/7 can have a variety of electricity pricing levels
- Storage allows the shifting of electricity from low cost points to high cost times and so reduce overall electricity costs
- Solar on roof with storage allows greater capacity to be installed and all electricity generated used in the building

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Decentralised Energy:

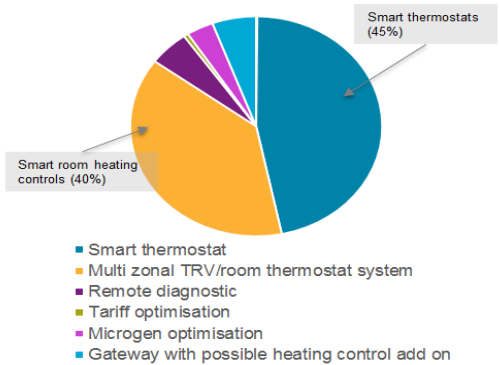
Smart Homes

Companies like Delta show how different products can improve energy consumption in homes and play a part in demand management of systems

More than 1.3M European households equipped with connected home energy products in 2015

DELTA Energy & Environment

Shares by types of products



Smart thermostats and room heating controls account for around 85% of the installations – they are led by EQ-3, Hive and Quby

Other niche products start to emerge with Home Energy Management functionalities

Smart thermostats

Connected room heating controls

Others

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Decentralised Energy:

Smart Homes

- 2 million new homes required
- Pressure coming to make the houses eco
- Solar will be specified by many Planners
- Modular housing is happening with Solar fitted in the factory
- Storage can also be integrated

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Decentralised Energy:

Smart Homes : linking homes, storage and EVs

- Charge in daytime (at work)
- Using Renewables for totally clean energy/battery power
- Plug in at home and power your house in the evening
- Or run your fuel cell car at night from *Hydrogen* (clean, no pollution and silent)

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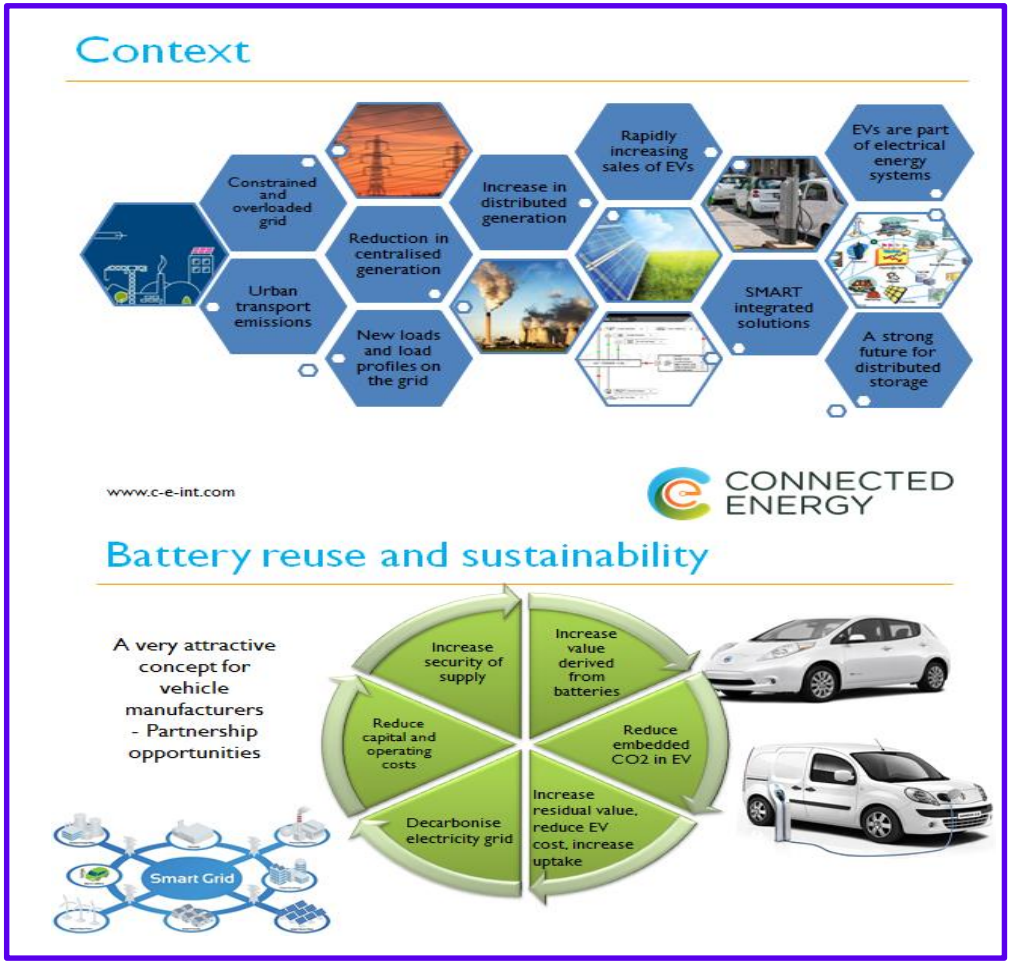
Decentralised Energy:

Smart Transport

Ultra Low Emission Vehicles

Companies like Connected Energy show how Electric Vehicles and storage can play a part in smart businesses and wider smart cities infrastructure



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BEIS Committee : Call for Evidence (announced yesterday)

Electric vehicles : developing the market

Aims:

- **To look at key barriers to development**
- **Does the Industrial strategy sufficiently address the challenges and opportunities?**
- **What support for purchase costs post 2018 need to be provided?**
- **How best can the Government ensure that there is consistent provision of charging infrastructure?**
- **Is the Government's road transport decarbonisation sufficiently flexible enough to adapt to disruptive technology developments?**

Closing 13th April 2017, REA will submit a response and invite Ministers and REA members to roundtable to shape the prospects for the Industry

In parallel to work with SMMT, OLEV, City transport leaders, and other key stakeholders to truly understand the future capabilities and develop improved insights

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Announcing:
2017 Renewable Energy Deployment Survey

Carried out in conjunction with APSE Energy

https://www.surveymonkey.co.uk/r/REAAPSE2017

Conducted as part of the work of the REA's Decentralised Energy Forum & by Charul Joshi, REA's intern from Kings' College London as part of her MSc in Climate Change: Environment, Science and Policy

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apse energy

Invitation to enter a nomination:
British Renewable Energy Awards 2017

In its12th year, with16 amazing categories, the awards are held to recognise the remarkable achievements of all the players in the renewable energy and clean technology Sector

The awards will be celebrated at The Savoy Hotel, London at the Gala Dinner on the 15th June 2017

Enter now here:

https:/www.surveymonkey.co.uk/r/BRITREAWARDS2017

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