



Smart Grid Introduction

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Business Development Director

6th Smart Grids & Cleanpower Conference
3-4 June 2014, Cambridge, UK
www.hvm-uk.com (link enabled)

SMART GRIDS & CLEANPOWER 2014 BRIEFING DAY JUNE 3

10:15 - 11:00 Session 1: Introduction Smart Grids & Energy - led by Gavin Jones, Business Development Director, ElectraLink

10:15 Introduction to Day 1
10:20 Definitions
10:30 Basics
10:40 Trends and Drivers
10:50 Review & discussion



Coffee break

11:15 - 13:00 Session 2: Technology led by Dr Andy Stanford Clark, CTO Smart Energy, IBM

11:15 Demand Side Management (DSM) - the key to the smart grid
11:30 Case studies
11:40 Smart Meters & AMI | Interoperability
12:00 Distributed generation - Alan South, Commercial Director, Solar Century
12:30 Renewables and storage, markets and intermittency - Graham Ford, Mansion Partners



13:00 - 14:00 Lunch networking & meetings

14:00 - 16:00 Session 3: Markets led by Mike Wilks, Director Smart Energy, Poyry

14:00 Social & Innovation Cartography in grids and energy
14:15 Key players - visions, strategies and what they are doing
14:30 Porter's Market Characteristics & Forecasts
14:45 Demand Response Economics - Asheya Patten, Poyry
15:00 Big Data, Data sharing & privacy - Gavin Jones, Business Development Director ElectraLink
15:20 Monetisation of energy management systems - Pilgrim Beart, Founder AlertMe & 1248.io
15:40 The Industrial Internet - Dr Amyas Philips



16:05 Tea break

16:30 - 17:30 Session 4: Innovation Challenges - led by David Pitcher, Member, Smart Grids GB

16:30 Energy & grids challenges - David Pitcher
16:45 Case study: LCNF funding and innovation in energy storage - Panagiotis Papadopoulos UK Power Networks
17:00 The value & funding of innovation - Steve Dawson, VP Consulting, Sentec
17:15 Discussion
17:30 Summary of Day



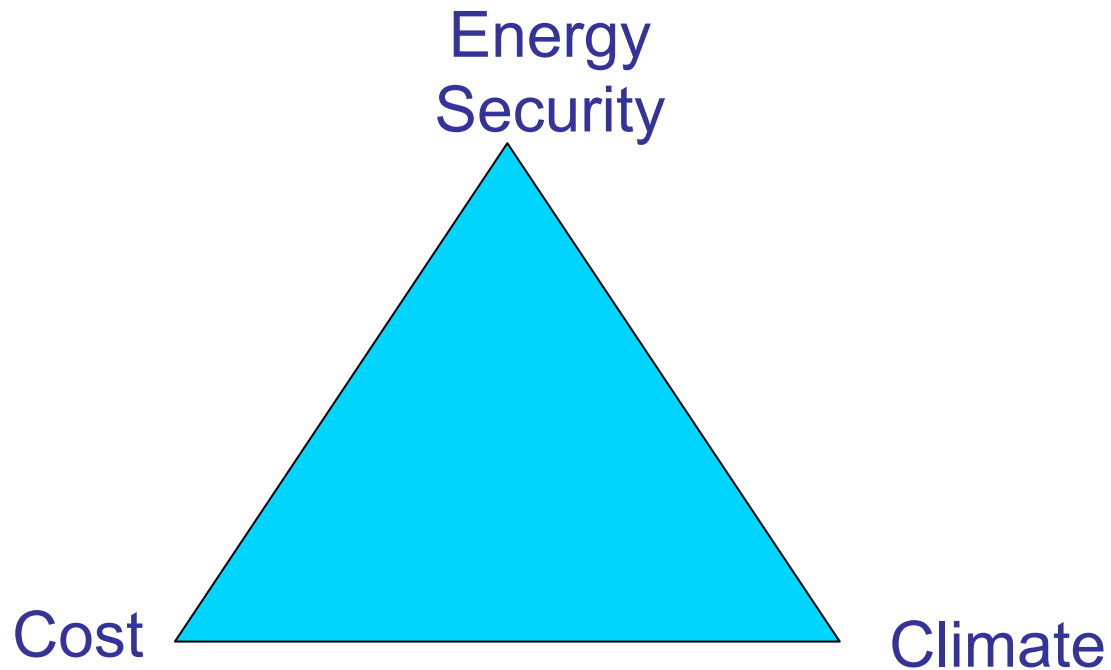
18:45 - 20:45 Roundtable Dinner at King's College, Cambridge



The Questions

- Why?
- What?
- When?
- Where?
- How?

Why? - The Energy Trilema

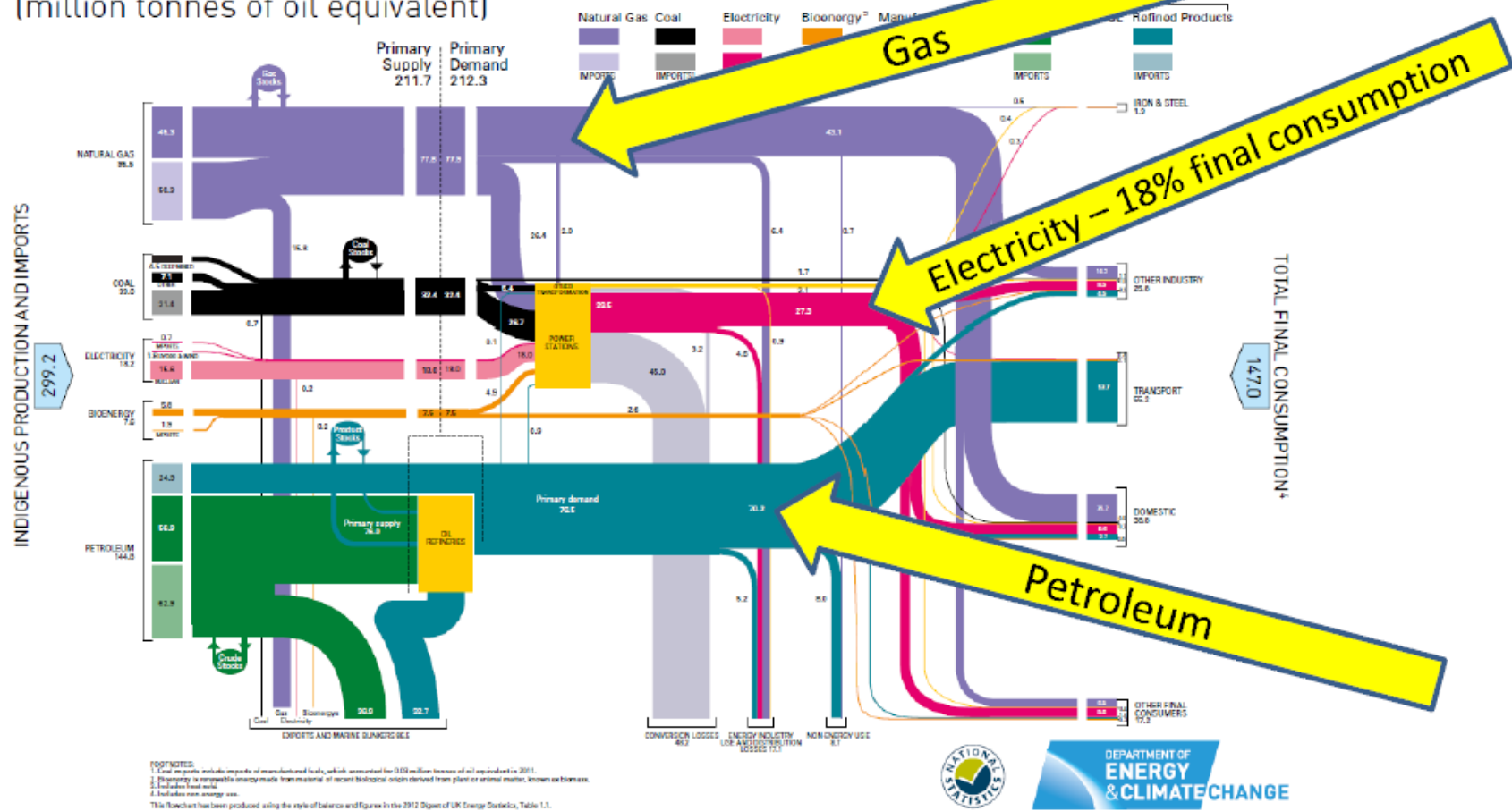


Energy Security

- Total UK energy production in the second quarter of 2013 was 9.5% lower than over the same period last year. Oil experienced a steep fall in production, at 14% and coal production fell by 24%. (out-law.com)
- **Two years ago the UK had a buffer between energy supply and demand of 16%, but this winter that will fall to 5% and it could hit 2% by 2015, according to the National Grid.(BBC)**
- SSE boss Ian Marchant warns of risk of 'lights going out' (BBC)
- **Mr Buchanan feared we will be dangerously close to not having enough power in the grid to keep Britain's lights on. (Telegraph)**

Electricity is only part of the energy system

Energy Flow Chart 2011
(million tonnes of oil equivalent)

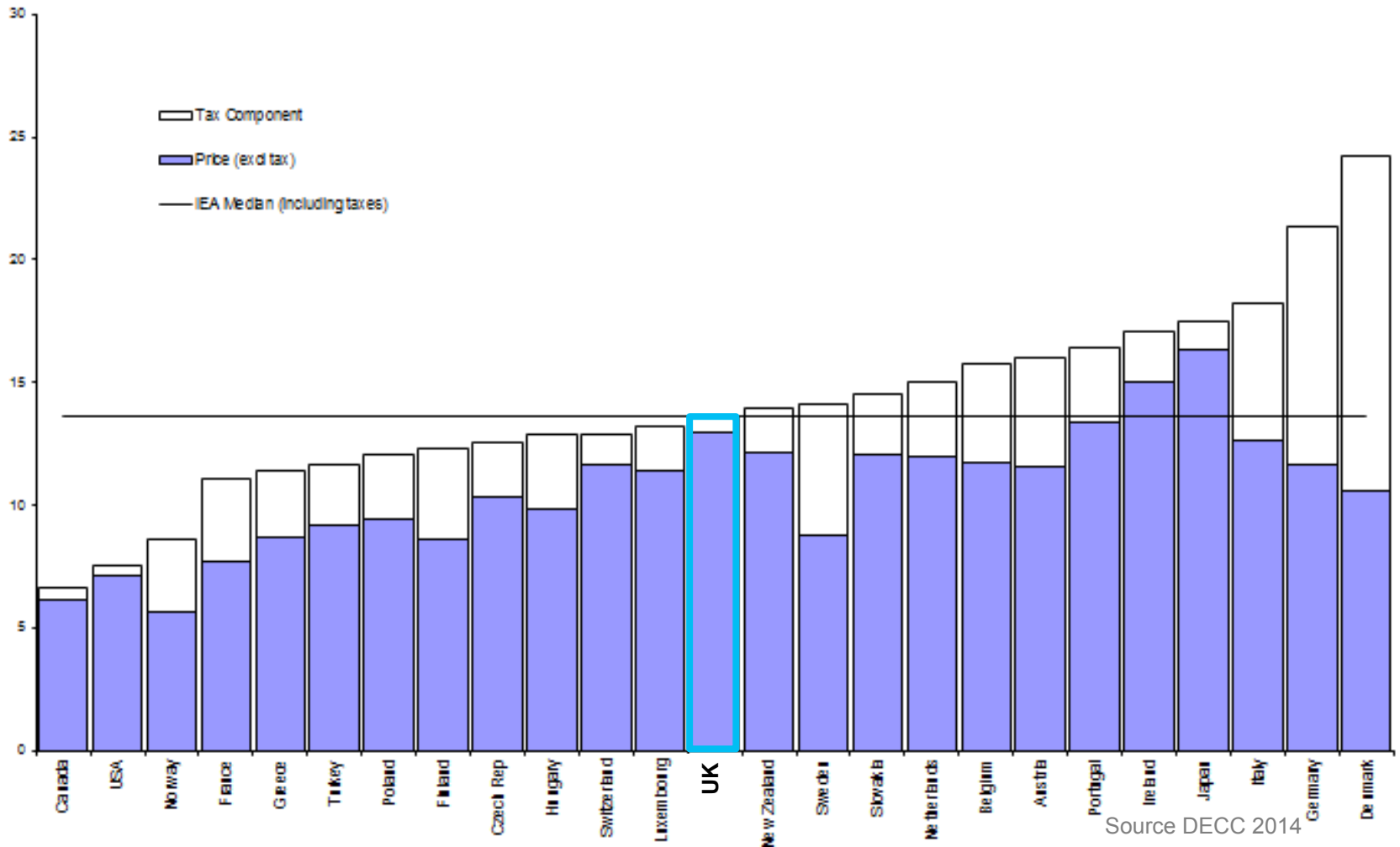


FOOTNOTES:
 1. Coal imports include imports of manufactured fuels, which accounted for 0.03 million tonnes of oil equivalent in 2011.
 2. Bioenergy is renewable energy made from natural or recent biological origins derived from plant or animal matter, known as biomass.
 3. Includes non-energy use.
 * This flowchart has been produced using the style of balance and figures in the 2012 Digest of UK Energy Statistics, Table 1.1.



Cost

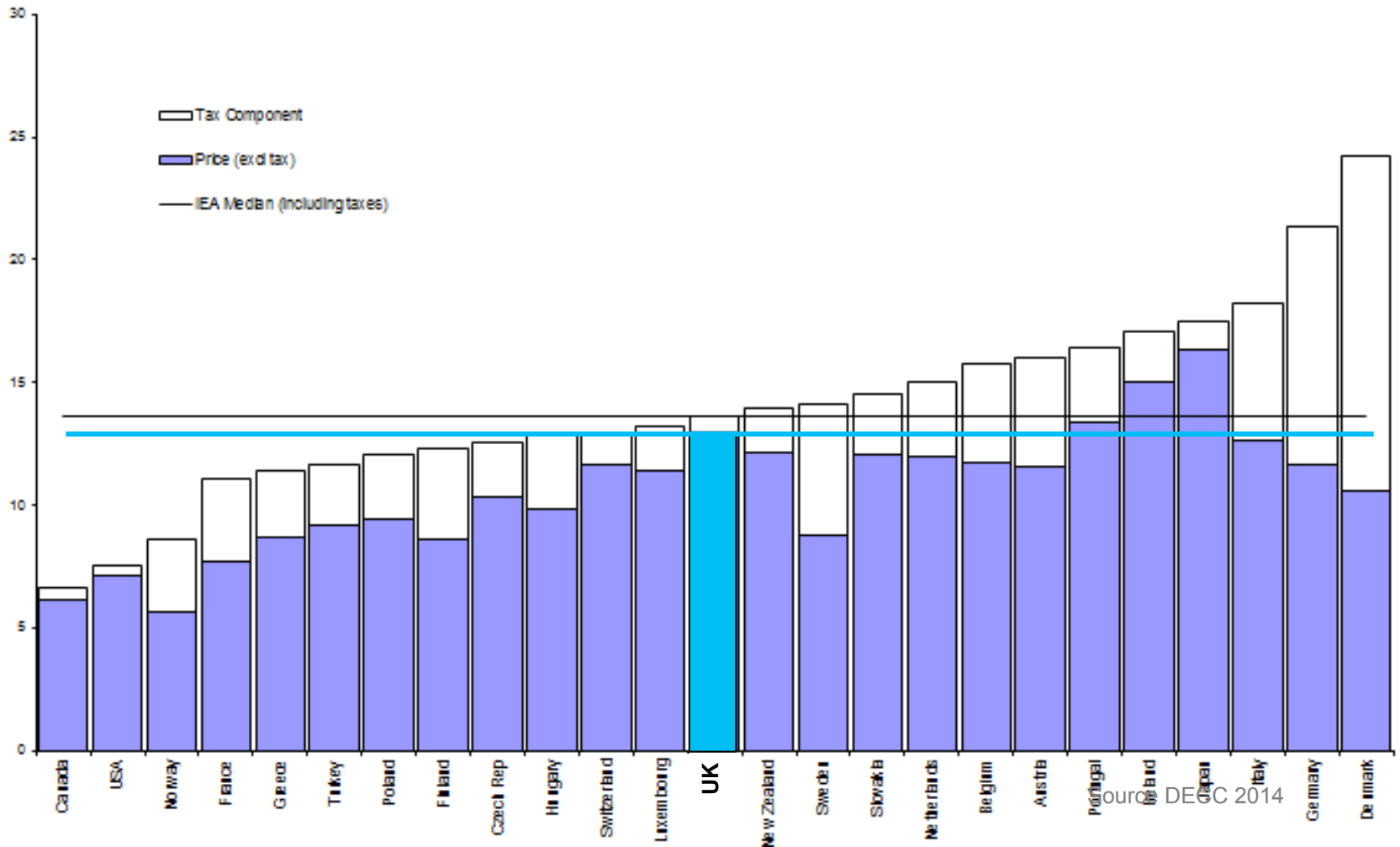
Average IEA Domestic Electricity Prices in 2012



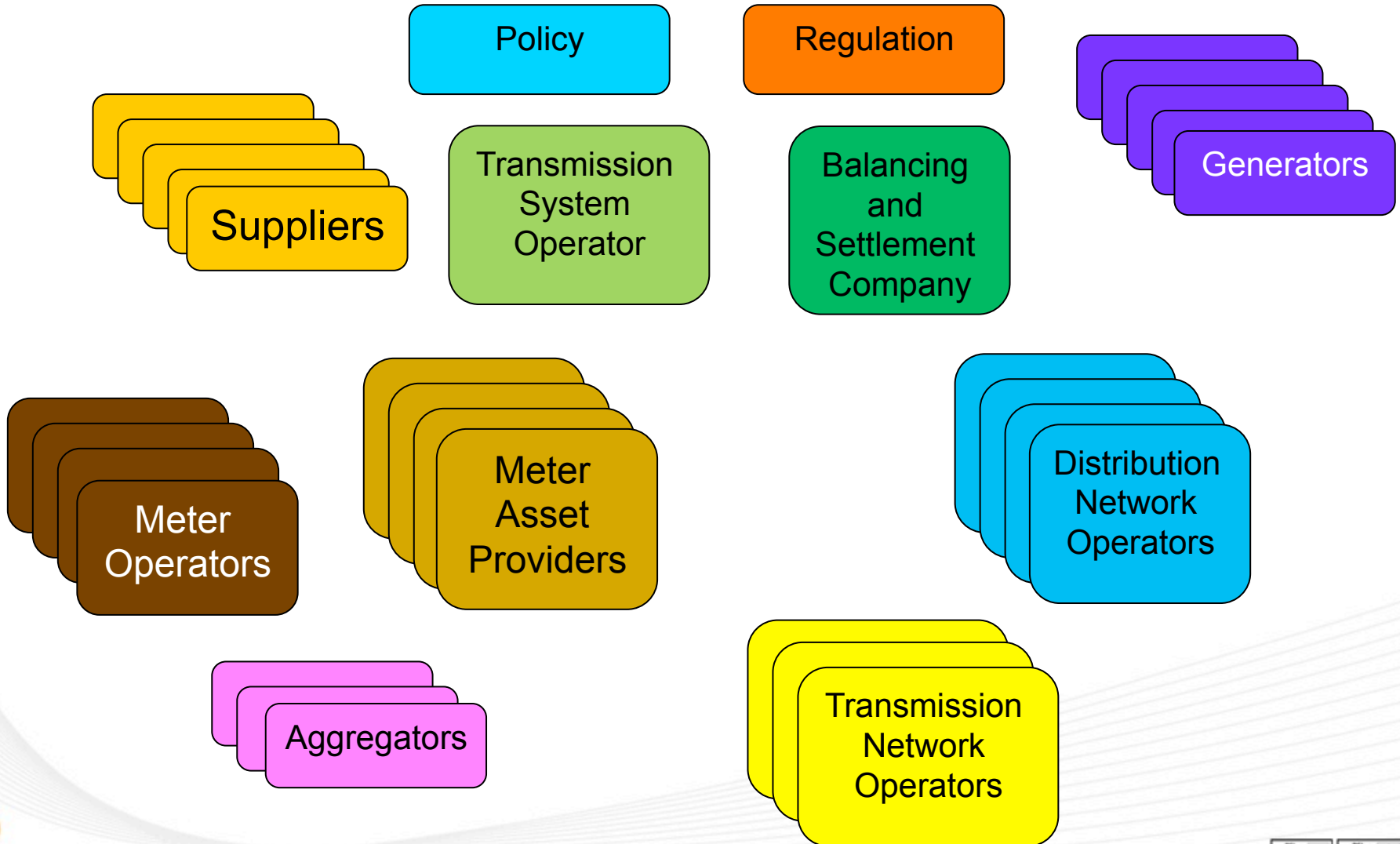
Source DECC 2014

Cost

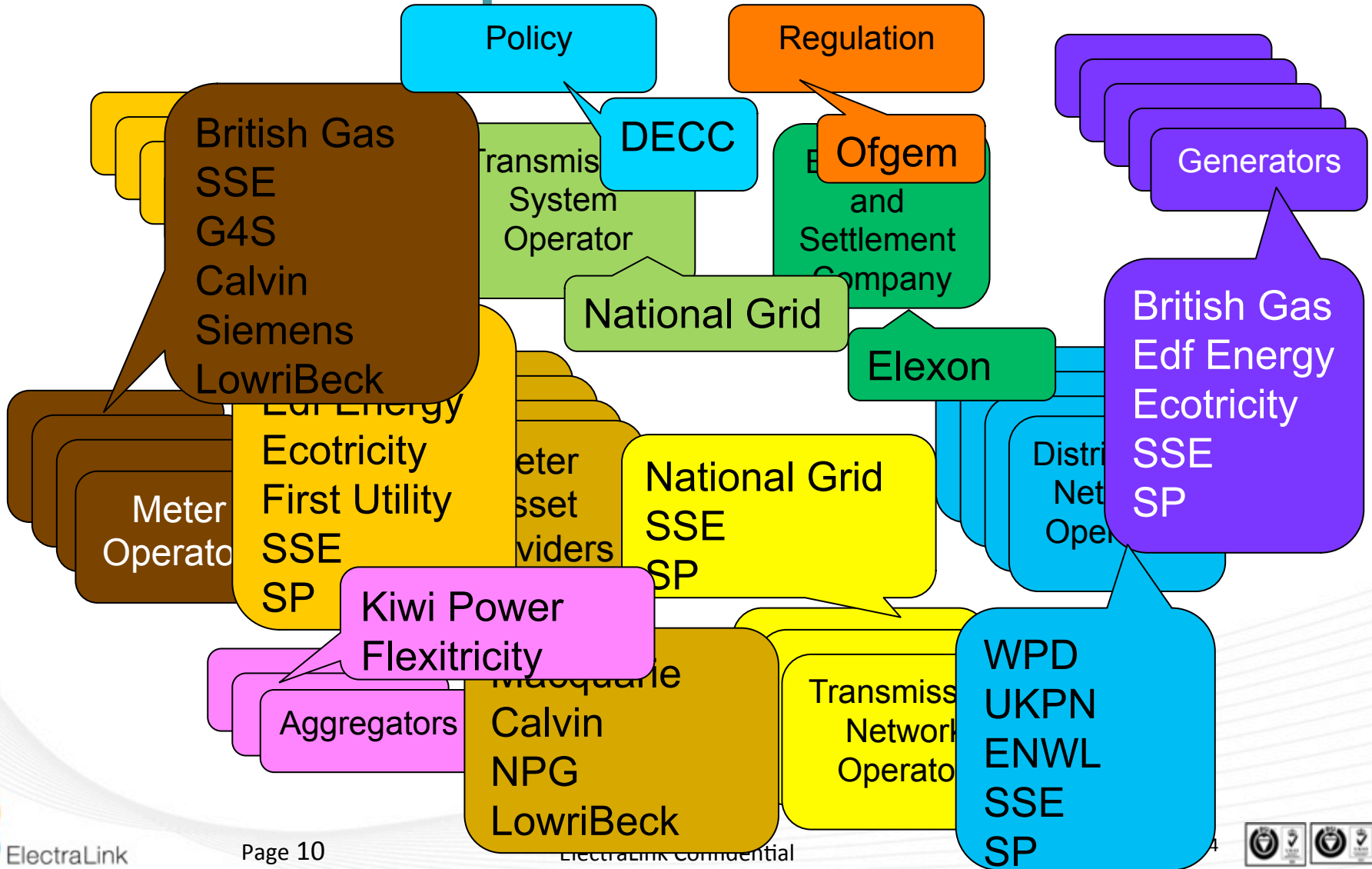
Average IEA Domestic Electricity Prices in 2012



Roles



Roles - Examples



Terminology 1

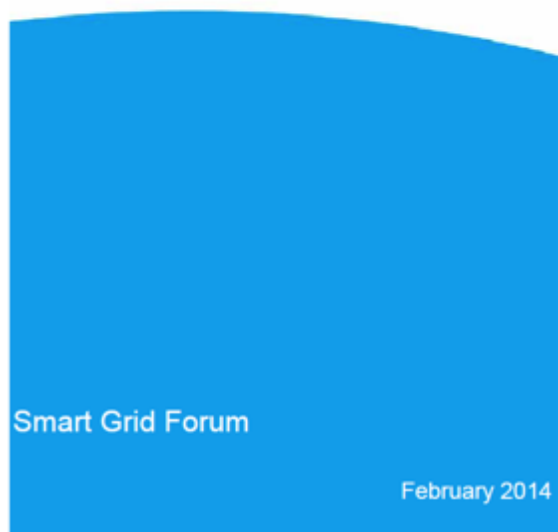
- Smart Grid – An intelligent electricity network that matches supply and demand
- ESCO – Energy Services Company
- DSR – Demand Side Response
- DSM – Demand Side Management
- Smart Meter – Meter that has 2-way communications
- CHP – Combined Heat and Power
- RIIO – (Revenue=Incentives + Innovation + Outputs)

What Does The Smart Grid Need to enable us to manage?

- Overall Demand
- Peak Demand
- Frequency
- Voltage
- Active Power
- Reactive Power
- Temperature
- Asset Life
- Reliability
- Cost

Smart Grid Forum

Smart Grid Vision and Routemap



Member	Affiliation
Sandy Sheard (co-chair)	DECC
Hannah Nixon (co-chair)	Ofgem
Roger Critchley	BEAMA
John Mulcahy	British Gas
Professor Nick Jenkins	Cardiff University
John Scott	Chiltern Power
Tim Rotheray	Combined Heat and Power Association
Ash Pocock	EDF
Gavin Jones	ElectraLink
Steve Johnson	Electricity North West
Duncan Botting	Global Smart Transformation Ltd
Chris Welby	Good Energy
Marina Hodd	Kiwi Power
Mike Calviou	National Grid
Phil Jones	Northern Powergrid
Steve Unger	Ofcom
Richard Bruce	Office of Low Emission Vehicles
Mark Mathieson	Scottish & Southern Energy
Jim Sutherland	Scottish Power
Judith Ward	Sustainability First
Dave Openshaw	UK Power Networks
Robert Symons	Western Power Distribution

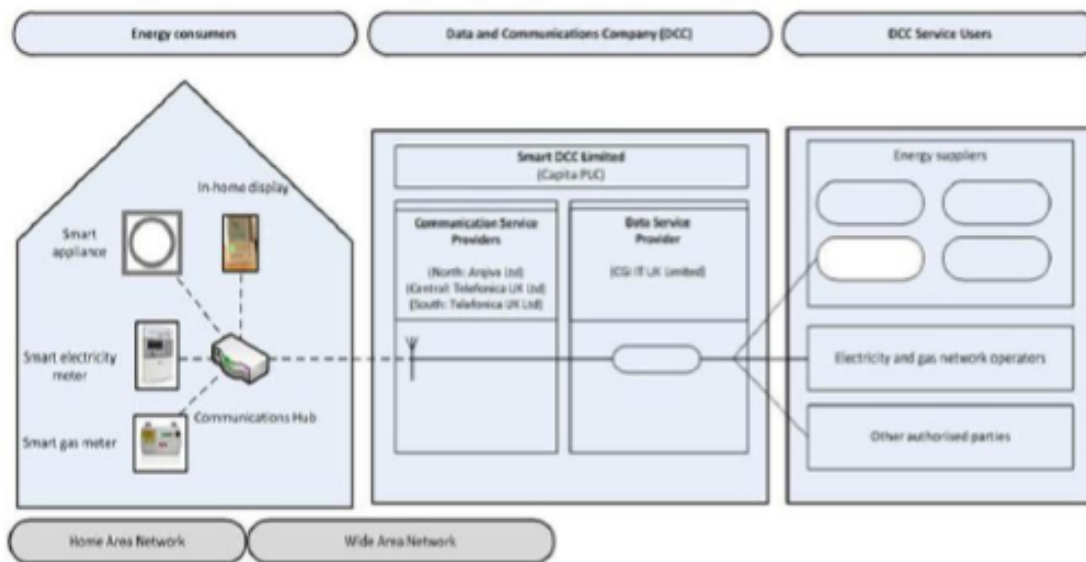


UK Leading Europe in Smart Grid Investment



Source: Joint Research Centre, European Commission

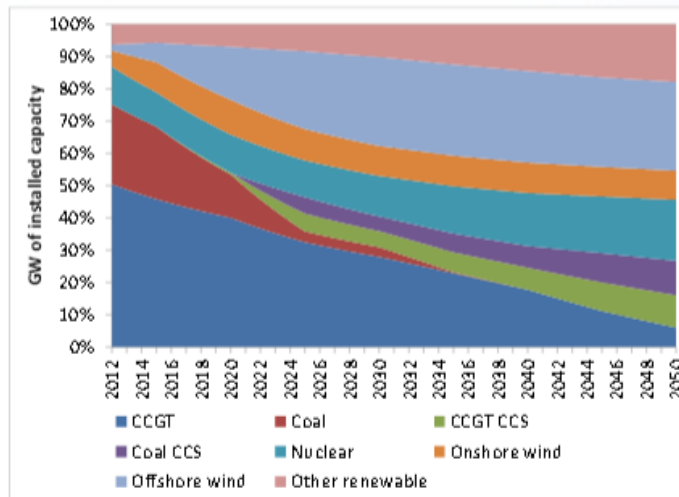
Smart Meters In Britain



Source: DECC

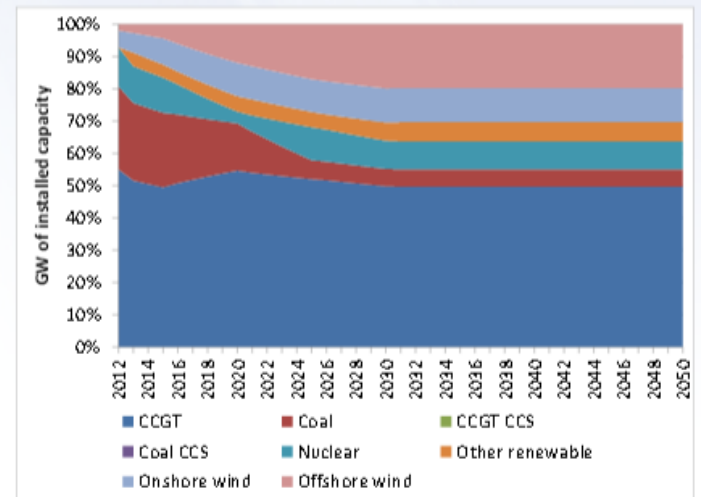
When? The future is unclear

Installed capacity: medium decarbonisation scenario



Source: Redpoint analysis for the ENA, based on National Grid 'Gone Green' scenario

Installed capacity: low decarbonisation scenario

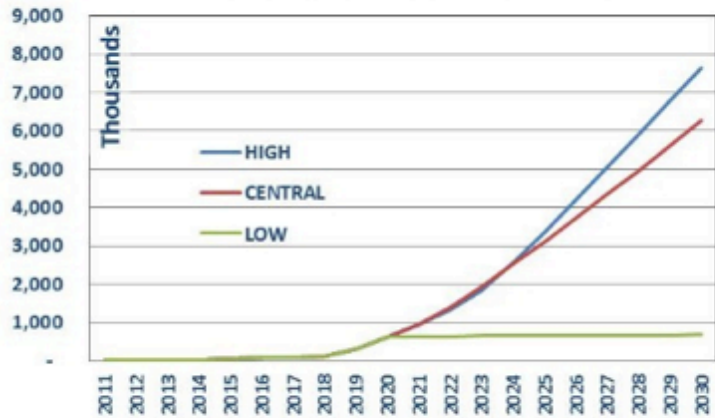


Source: Redpoint analysis for the ENA based on National Grid 'Slow Progress' scenario to 2030 and extrapolated to 2050

When? The future is unclear

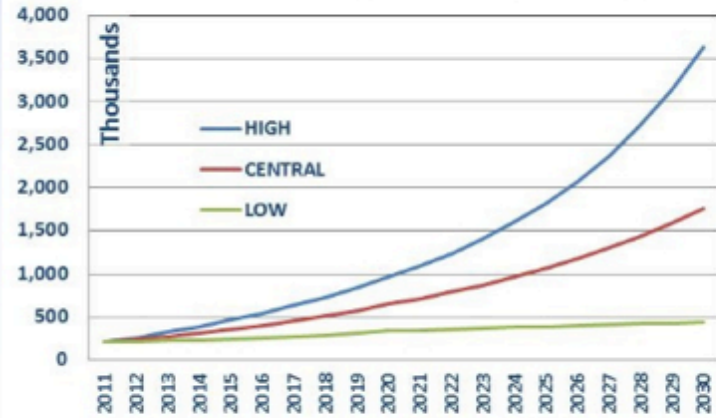
Residential HP : GB uptake scenarios
(number of units deployed - all sizes and types)

A



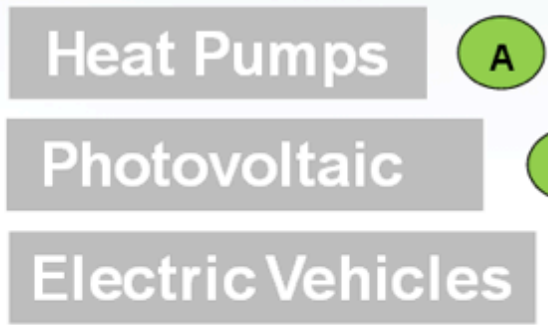
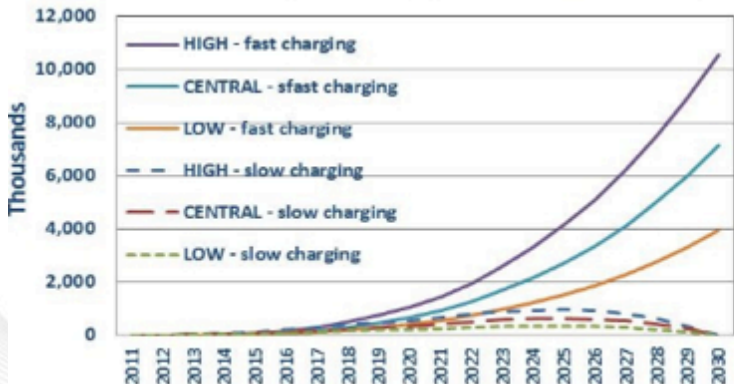
PV : GB uptake scenarios
(number of units deployed - all sizes and types)

B



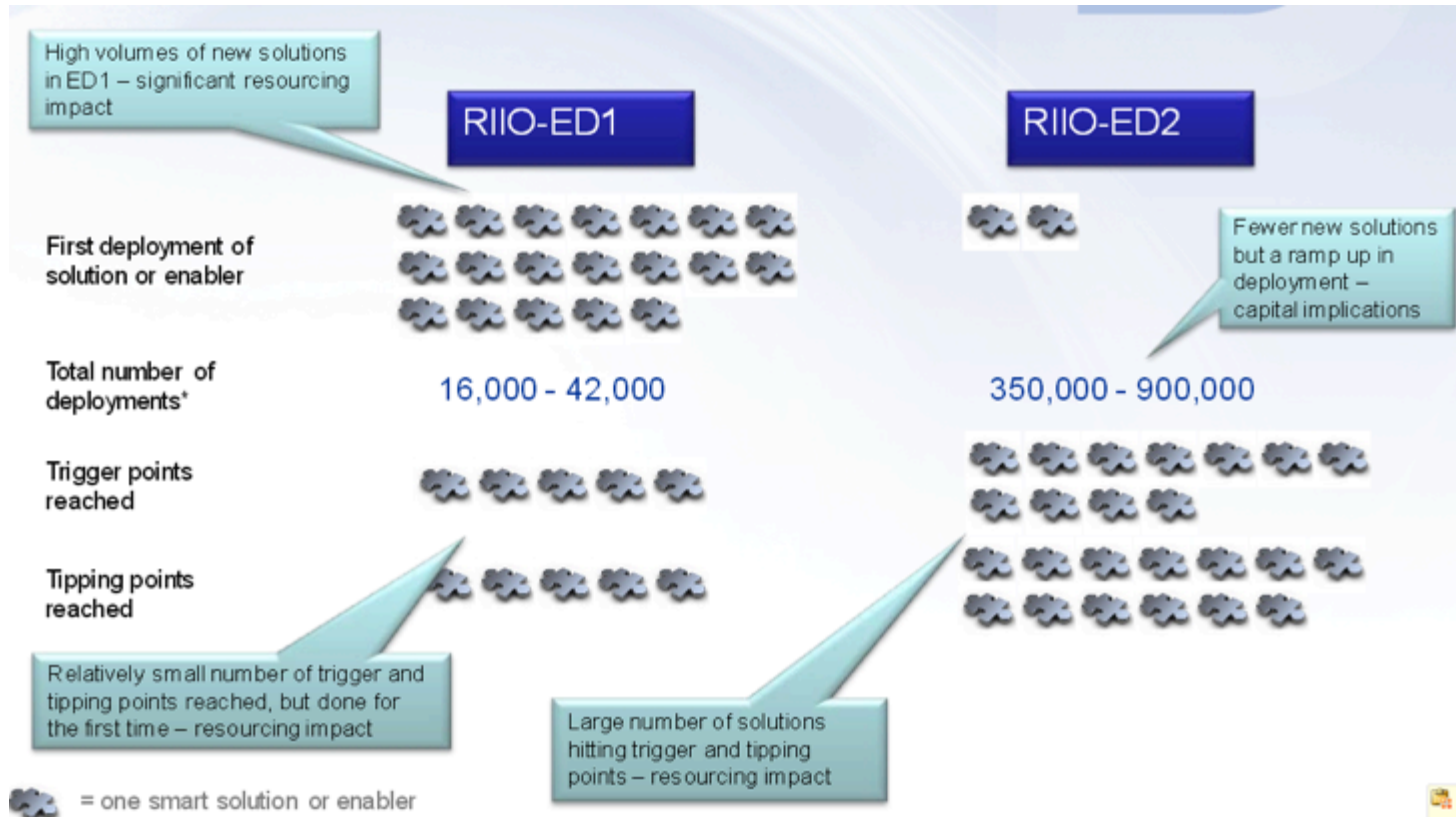
EV : GB uptake scenarios by charging type
(number of units deployed - all sizes and types)

C



Source: SGF, WS1, DECC, Dec 2011

When? The lead times are long



When? - DECC's Timetable

Development Phase (2014 to 2020) : Building on success and preparing for the 2020s

- Moving from projects to business as usual
- Developing regulatory and commercial frameworks
- Developing standards and growing a supply chain
- Roll out of smart meters across GB

Rollout Phase (2020-2030) : The empowered consumer

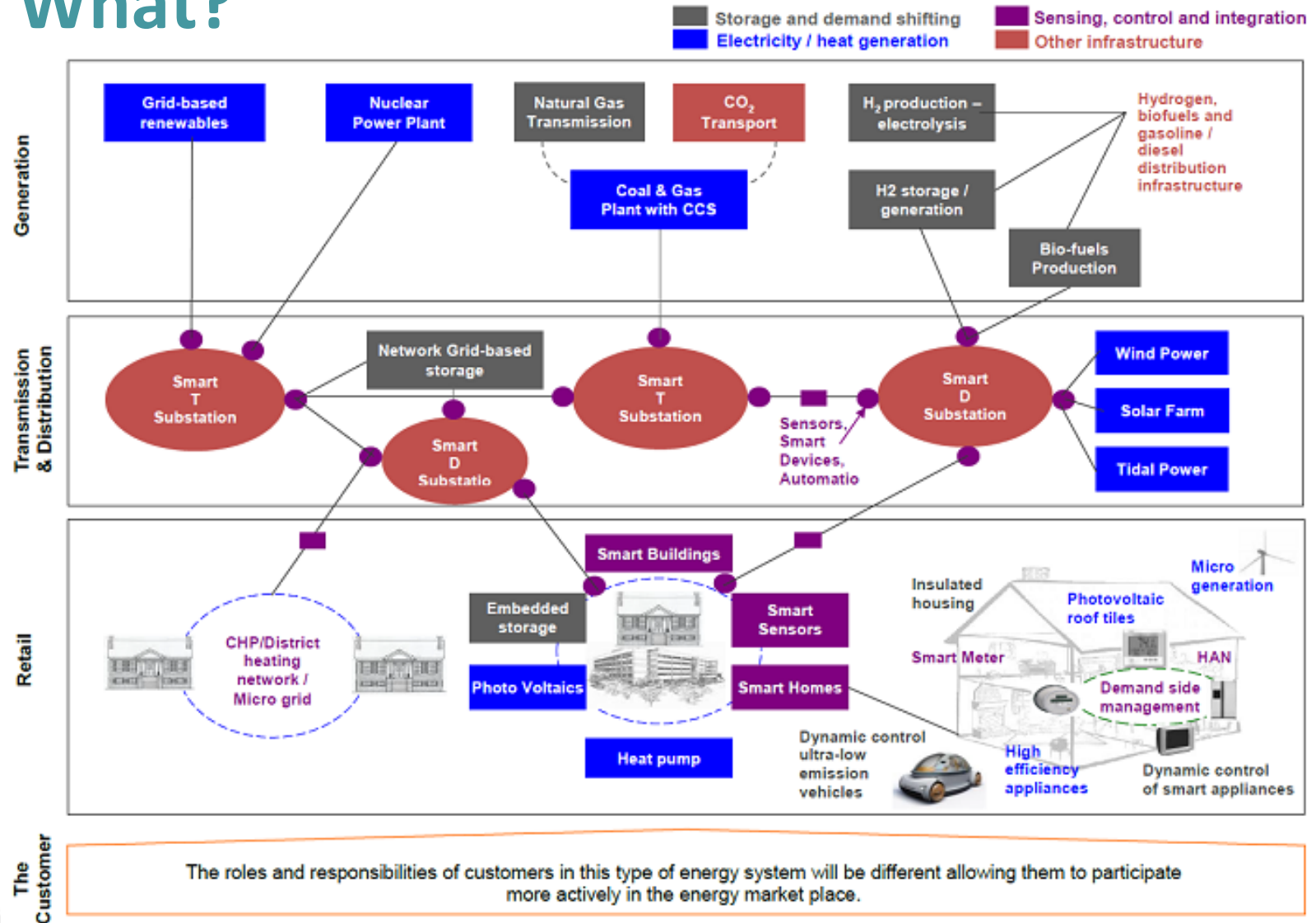
- Mainstreaming smart meters, DSR and storage
- Commercial development of smart appliances
- Potential DNO-DSO transition
- Supply chain in place

Developed Phase (2030s onwards): Realising our vision

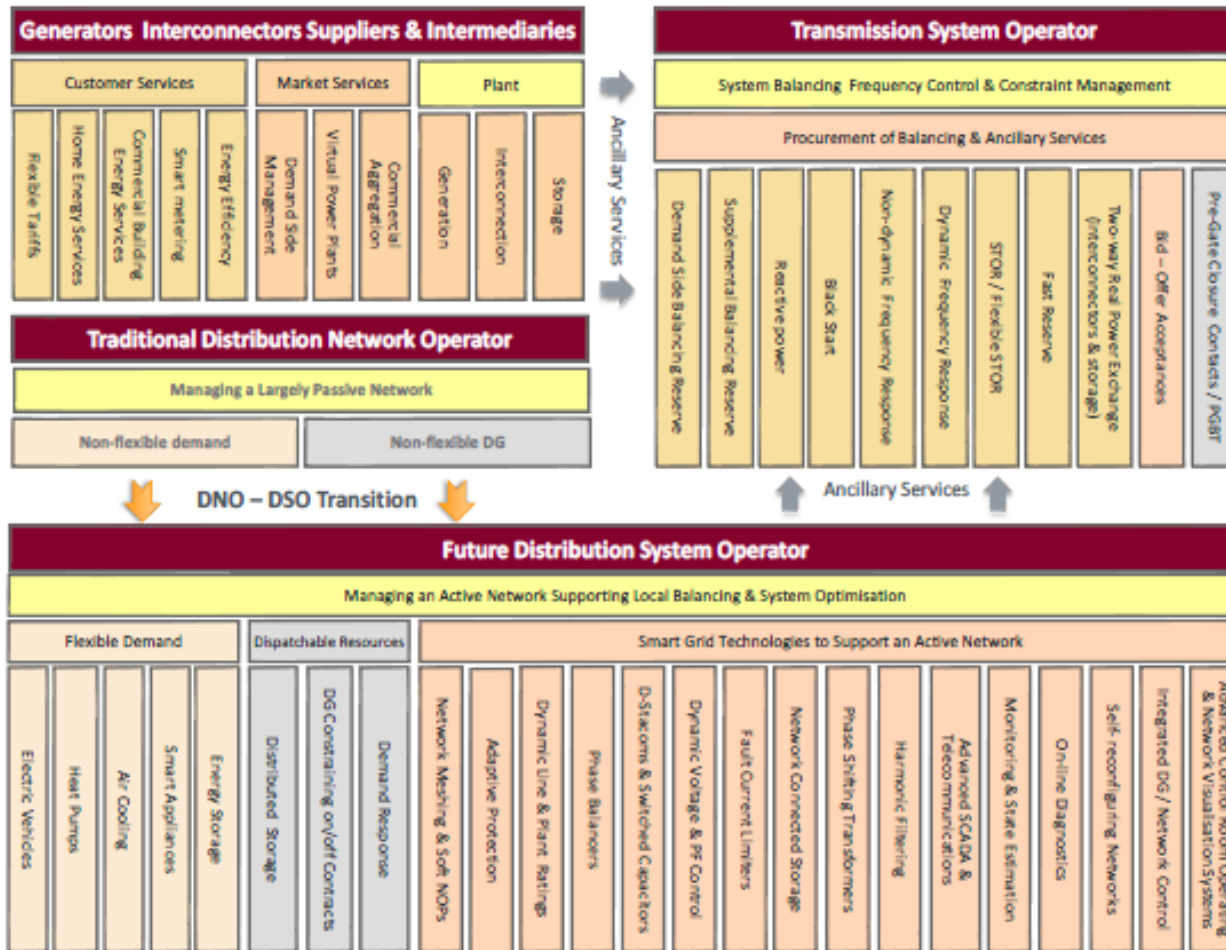
- Integrated energy system
- Consumers empowered
- Supply chain growing wealth from exports



What?



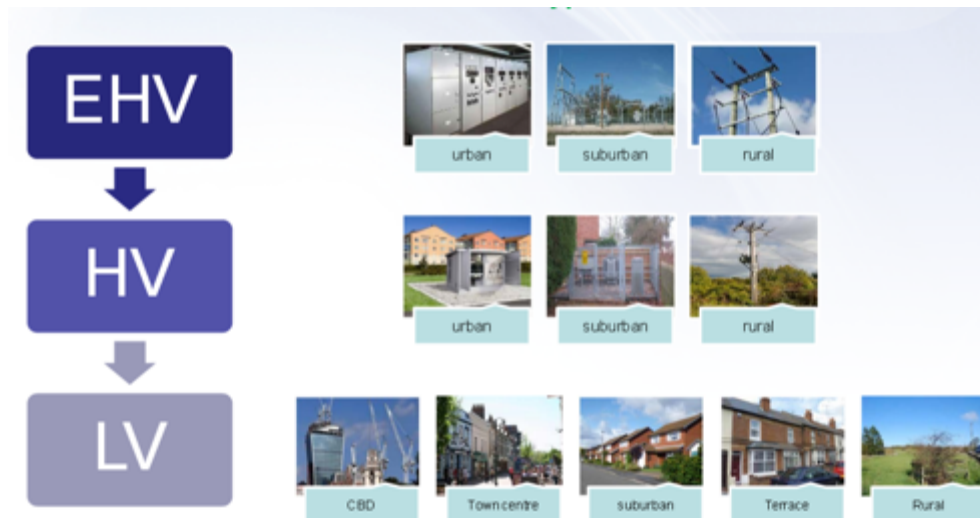
The Role of the Distribution Network Operator is Changing



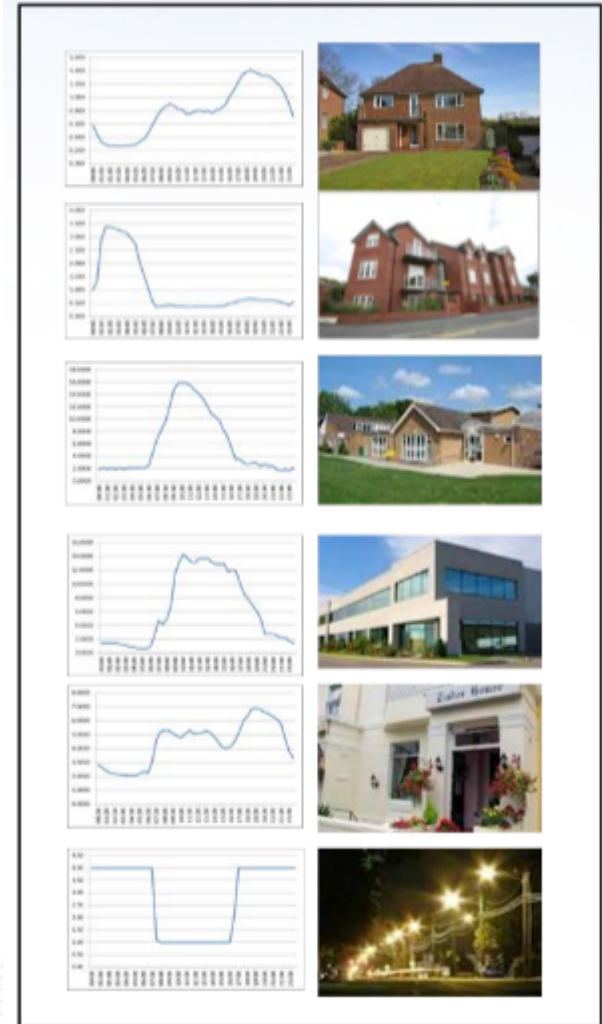
Source: UK Power Networks

Where?

Networks and Consumers Vary considerably



Demand profiles



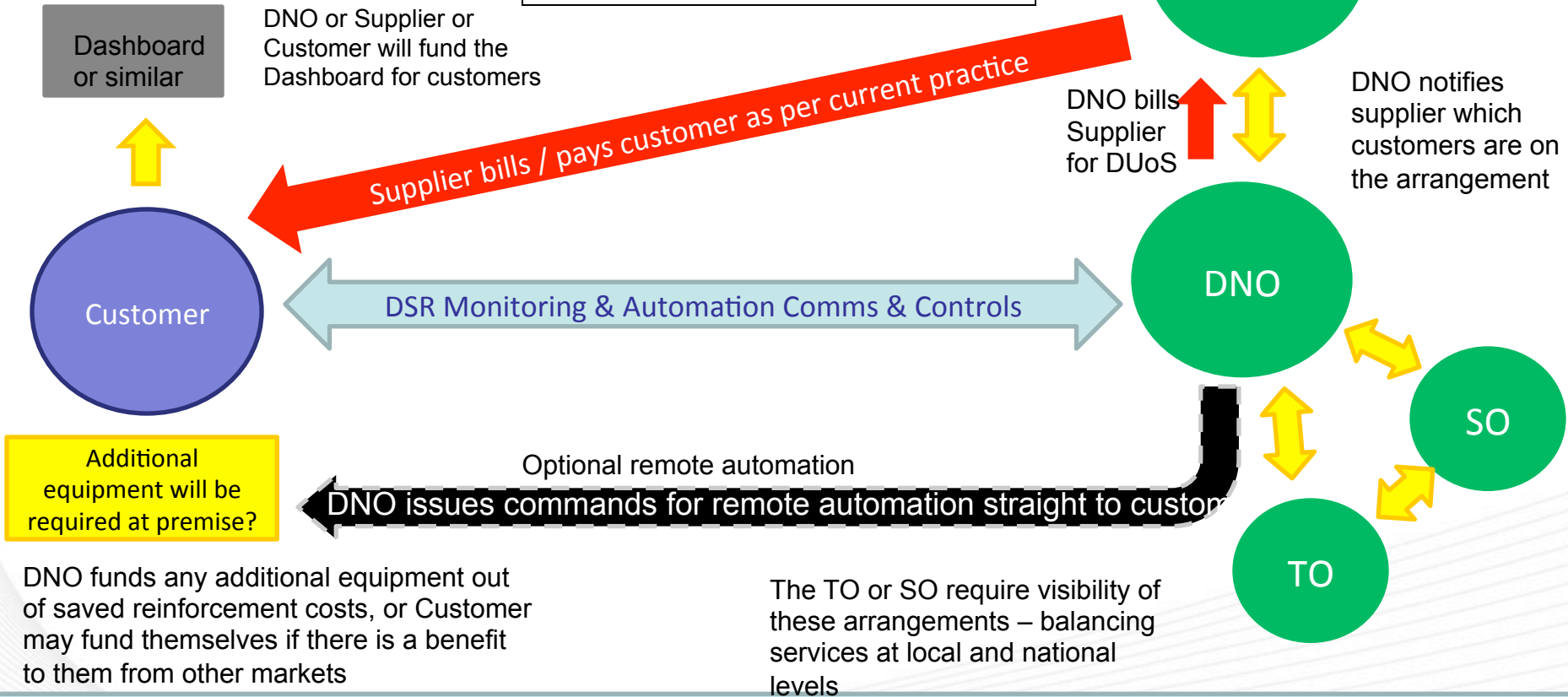
How? – One of many potential routes

Barriers

* Current metering system policy does not permit DNOs to remotely control devices – changes needed

Restructuring of DUoS Charge via Supplier (remote automation)

Suppliers require visibility of when arrangement enacted for balancing mechanisms



Supplier leads engagement (or pay 3rd party) with customer and holds responsibility for signing customer up and providing support

Summary

- Its complicated!
- A lot is happening
- More is needed

Lets hear the answers!



Thank You

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