



National Audit Office

Eurosai WGEA Seminar, 22-24 April 2015

Household energy efficiency – Energy efficiency obligation schemes and smart metering – The UK experience

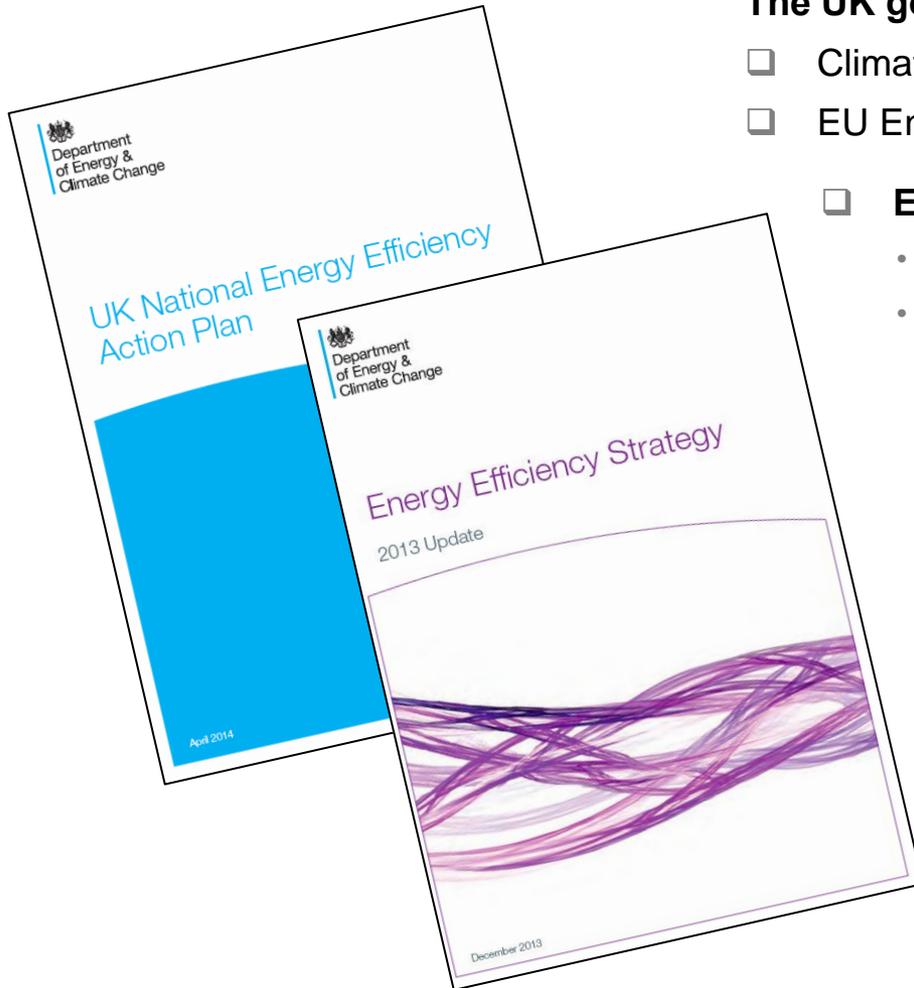
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Introduction

- ❑ The UK energy efficiency landscape
- ❑ Green Deal & Energy Companies Obligation (ECO)
Background to policy and progress against plans
- ❑ Smart Metering Background to policy and progress against plans

The UK energy efficiency landscape

UK energy efficiency landscape



The UK government's energy efficiency strategy

- ❑ Climate Change Act (2008); and Energy Act (2013)
- ❑ EU Energy Efficiency Directive (2012/27/EU)
- ❑ **EU Energy Efficiency Directive (Article 7)**
 - Binding energy consumption target notified to EU in 2013
 - Requires new savings of **1.5% a year** to 2020 compared to average final energy consumption between 2010 and 2012

UK energy efficiency and saving policies (excluding transport)

- ❑ Domestic policies
 - Green Deal and Energy Efficiency Obligation schemes (ECO)
 - Home appliance labelling
 - Smart Metering
 - New home Building Regulations – Energy performance standards
- ❑ Industry, businesses and public sector policies
 - EU Emissions Trading Scheme
 - Climate Change Levy & Agreements
 - CRC Energy Efficiency scheme
 - Energy Savings Opportunity Scheme (ESOS)

Domestic energy efficiency

Domestic energy efficiency obligation policies expected to deliver cumulative energy savings of **127 TWh**

UK has targeted overall cumulative energy savings of **324 TWh**

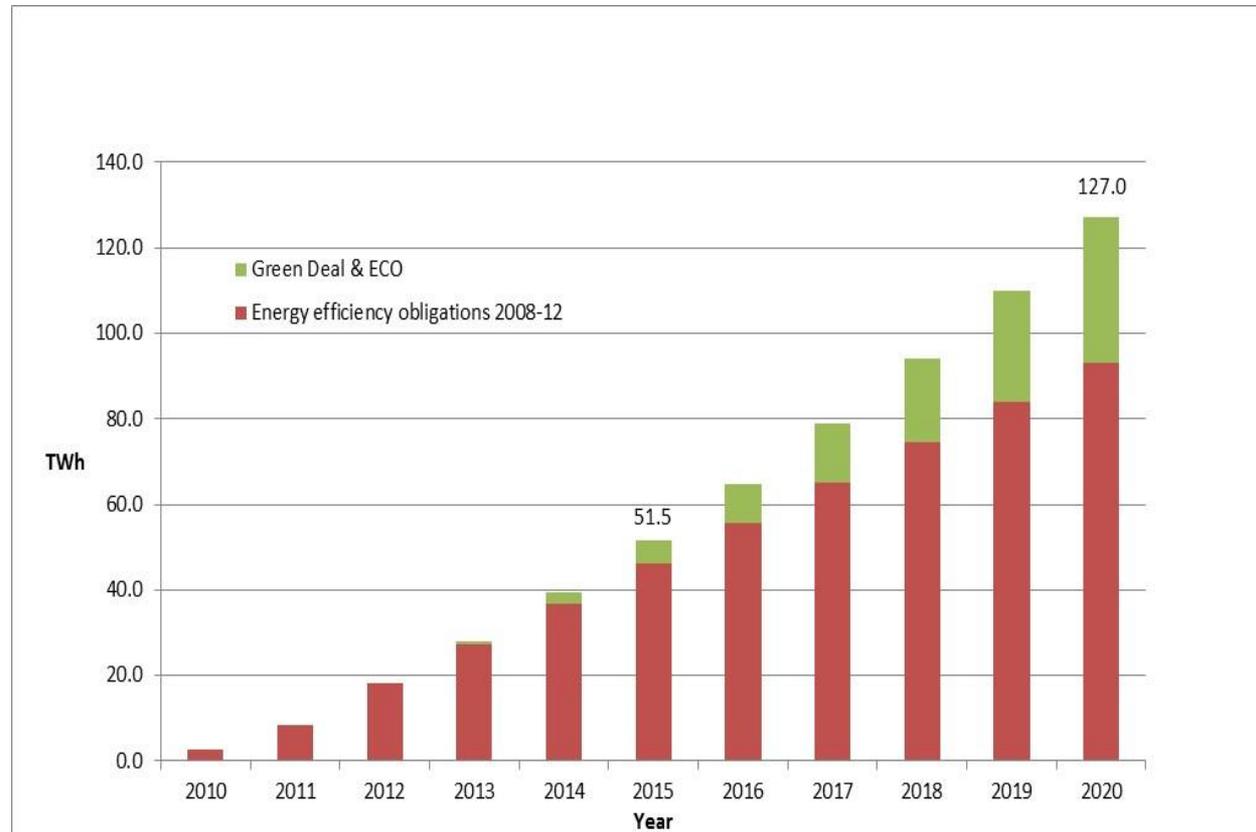
- ❑ Excluding transport, which the UK opted to exclude from the target, average final energy consumption 2010-12 = **1,028 TWh**
- ❑ Cumulative savings target for the UK set at **324 TWh**

UK government expects its domestic energy efficiency obligation policies to deliver cumulative energy savings of **127 TWh** by 2020

- ❑ Most of the savings, **93 TWh (73%)**, are from (expired) 2008-12 energy efficiency obligation policies* that continue to provide legacy energy savings

* Carbon Emissions Reduction Target (CERT) and Carbon Energy Savings Programme (CESP)

Energy consumption savings - Green Deal & energy efficiency obligation policies, 2010-20 (cumulative TWh)



Source: DECC, National Energy Efficiency Action Plan 2014, Table 2

The UK has not quantified the contribution of smart meters – expected to reduce energy consumption by 2.0-2.8% for the average consumer – towards the target.

Green Deal & Energy Companies Obligation (ECO)

Background to policy

Green Deal & Energy Companies Obligation (ECO)

What are they?

Innovative government policies launched in 2013 that combine market and subsidy to upgrade the energy efficiency of the UK's housing stock, reduce carbon emissions and tackle fuel poverty

The Green Deal is little more than a loan with interest

- ❑ Consumers can buy energy saving improvements for their homes through a Pay-As-You-Save model
- ❑ Improvements funded through Green Deal loans repaid through expected energy bill savings
- ❑ Repayments attach to properties, not individuals, and are paid through the electricity bill
- ❑ Supplemented by taxpayer funded grants – Green Deal Cashback and Home Improvement Fund – to help kickstart the scheme

ECO is a subsidy for energy-saving measures funded through a levy on all consumers' energy bills

- ❑ ECO places obligations on larger energy suppliers to provide support to vulnerable & low income households and those living in hard to treat homes
- ❑ DECC estimates that measures delivered under ECO will cost energy companies **£1.3bn a year**

Policy objectives

- ❑ To reduce carbon emissions by improving the energy efficiency of the UK's building stock
- ❑ To tackle fuel poverty by subsidising heating and energy efficiency measures for vulnerable and low income households

Green Deal & Energy Companies Obligation (ECO)

What are they?

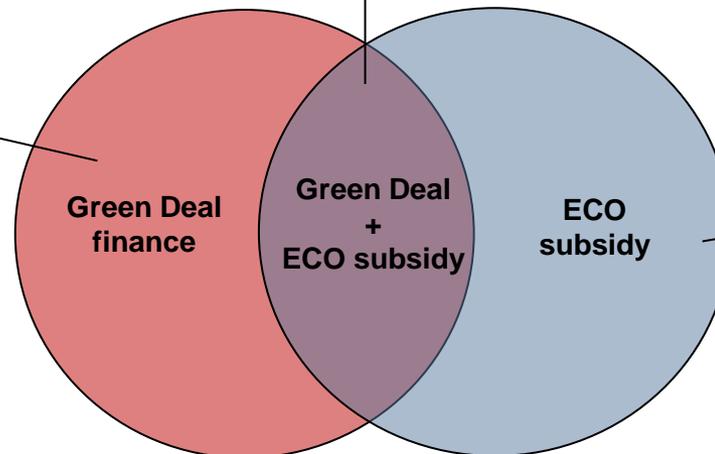
Green Deal & ECO are a complex mix of market and regulation

The next most cost-effective measures – mix of market and subsidy

Eligible measures that cost more than they save – e.g. hard to treat homes which ordinarily could not be financed solely through the Green Deal because they don't meet the Golden Rule – get full or partial ECO subsidy.

Measures must meet the Green Deal 'Golden Rule'

*Total cost of measures and finance to the consumer \leq expected savings on energy bill over a period up to **25 years**.*



Full ECO subsidy for heating and energy efficiency measures to help vulnerable and low income households

Market

Market & subsidy

Subsidy

Green Deal & Energy Companies Obligation (ECO)

Progress against plans

Green Deal & Energy Companies Obligation (ECO)

Progress against plans



Progress reported in the following publications

- Energy & Climate Change Committee's 2014 report*
- DECC monthly and quarterly statistical bulletins

Mixed progress so far

- Overall, more than **1.3 million** energy saving measures installed in over **1 million** homes
- Green Deal & ECO are delivering reductions in energy consumption & bills; and carbon emissions
- But
 - take up of Green Deal finance extremely low
 - annual ECO costs exceed initial estimates

* House of Commons Parliamentary Committee

Green Deal & Energy Companies Obligation (ECO) Energy efficiency measures installed in over 1 million households

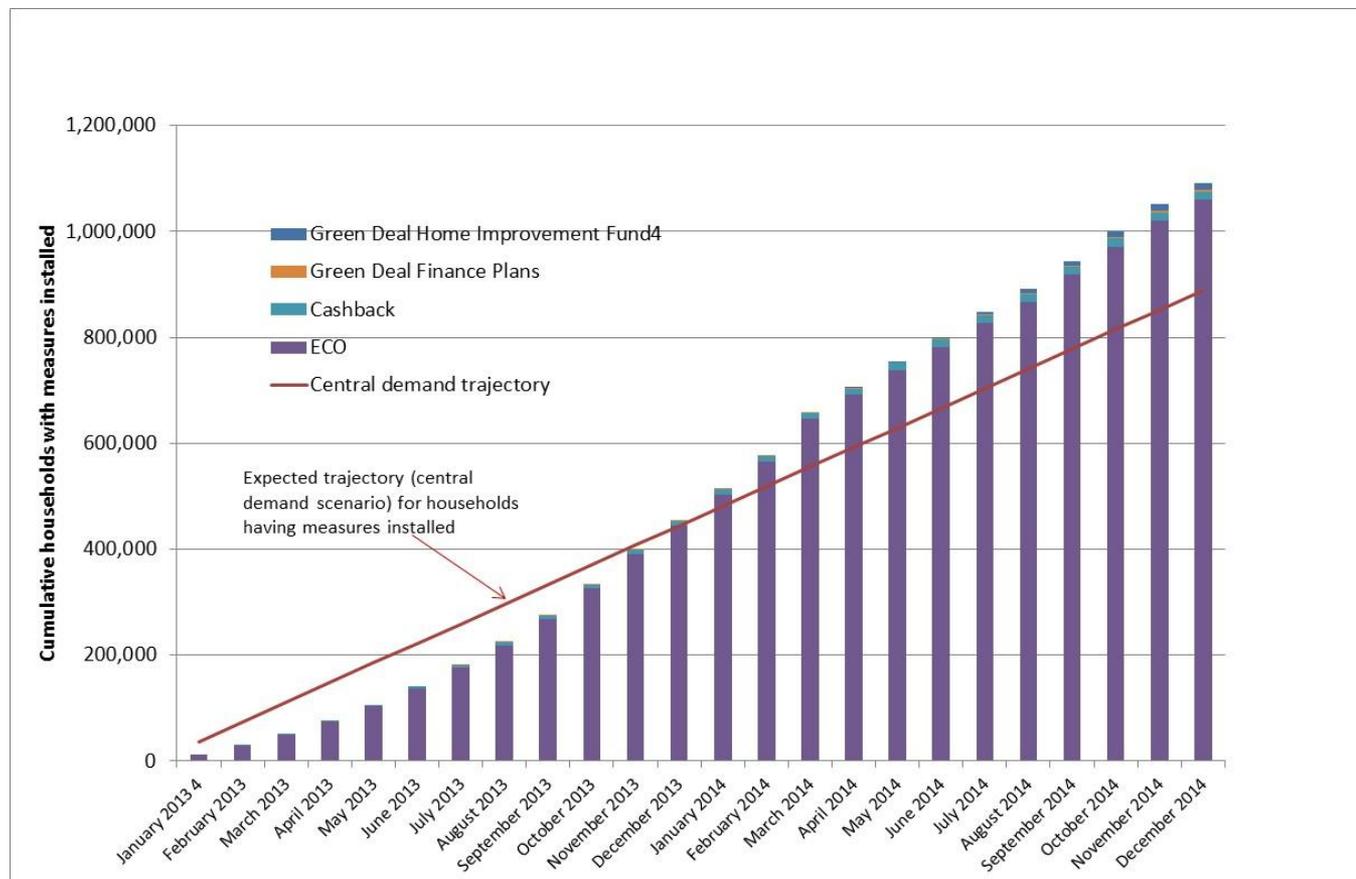
By December 2014, 1.3m measures installed in 1.1m homes

- ❑ Ahead of DECC's trajectory of 1m households by March 2015
- ❑ **1.3m (97%)** measures installed under ECO
- ❑ Only **40,000** measures, delivered under Green Deal schemes

Annual ECO costs exceed initial estimates

- ❑ Annual estimated cost to suppliers of delivering ECO (**£1.5bn**) exceeds initial projections (**£1.3bn**)

Cumulative households with measures installed through Green Deal & ECO



Source: DECC, GD & ECO monthly statistical release Feb 2015

Green Deal & Energy Companies Obligation (ECO) Green Deal & ECO are delivering energy and carbon savings

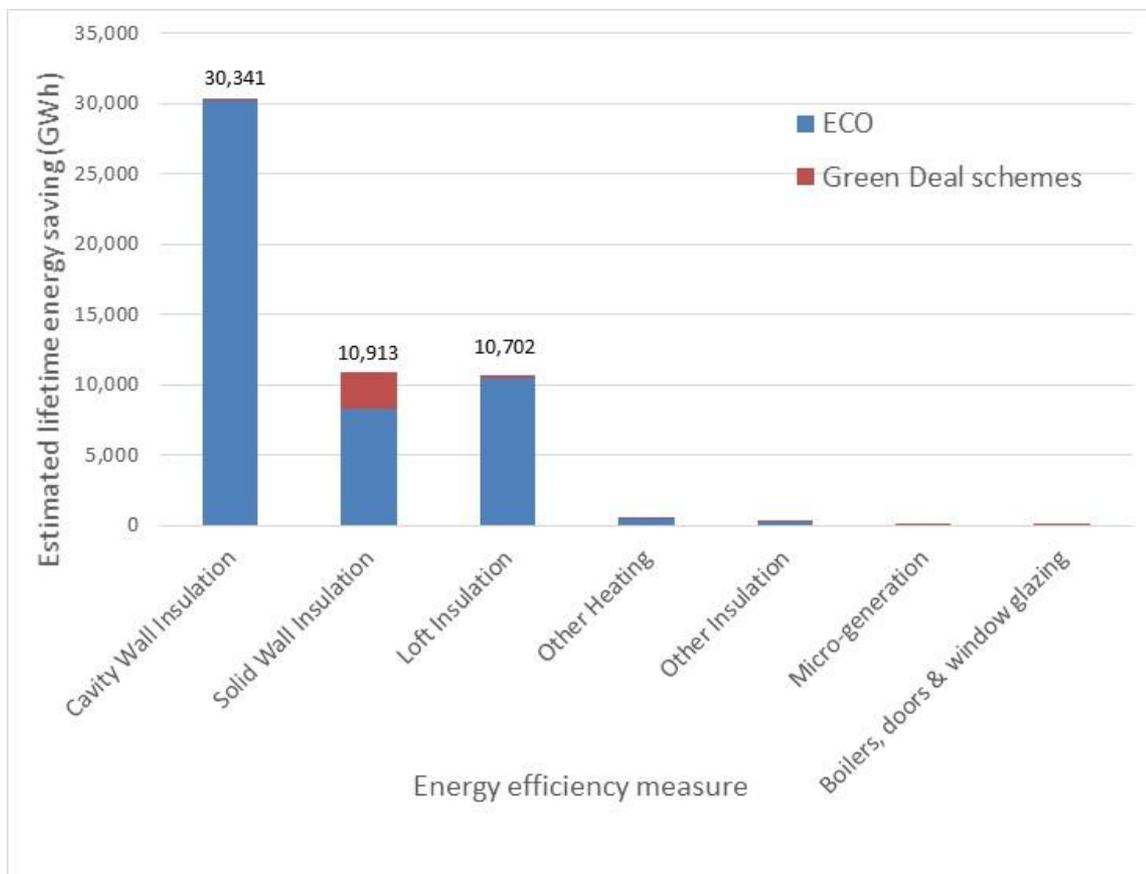
Green Deal & ECO are contributing towards the government's energy efficiency targets

- ❑ DECC estimates that the energy efficiency measures installed will generate lifetime energy savings between **49.6-52.9 TWh**; and reduce (lifetime) carbon emissions by **11.1-11.7 MtCO₂**
- ❑ Largest single energy efficiency measure contributor to these lifetime savings is cavity wall installation – **30.3 TWh and 6.7 MtCO₂**
- ❑ DECC estimates that the **380,000 measures** installed under Affordable Warmth will lead to **£4.5bn** worth of (notional) lifetime energy bill savings

But, savings delivered through Green Deal are negligible

- ❑ Around **3.3 TWh** and **0.6 MtCO₂**

Estimated lifetime energy savings (cumulative up to 30 September 2014)



Source: DECC, GD & ECO quarterly statistical release December 2014

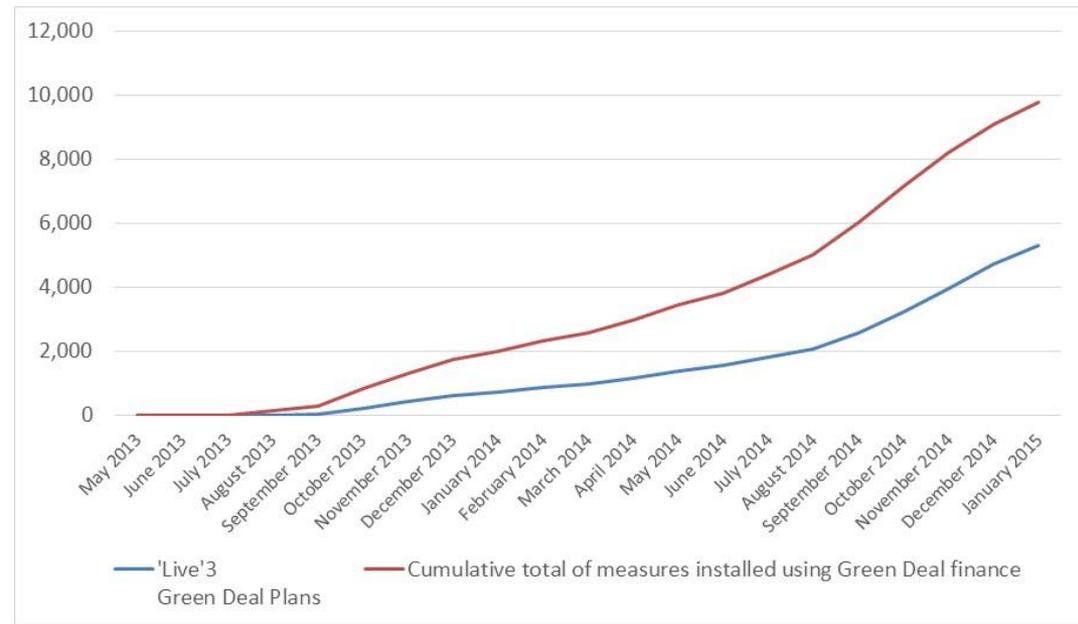
Green Deal & Energy Companies Obligation (ECO) Take up of Green Deal has fallen well below the government's expectations

Only 40,000 measures installed under Green Deal

- ❑ Two years after launch, **5,300** Green Deal finance plans were 'live'* (against expectation of **10,000** in first year)
- ❑ Almost **9.800** measures installed using Green Deal finance
- ❑ Further **30,000** measures installed under taxpayer funded Green Deal grant schemes – 'Cashback' and 'Green Deal Home Improvement Fund' (GDHIF)
- ❑ Almost **£100m** paid under Cashback and GDHIF at the beginning of 2015
- ❑ Green Deal & ECO designed to work together, but in practice operating as different and distinct schemes
- ❑ Green Deal process considered to be overly complicated; and too few organisations are offering Green Deal
- ❑ Cost of Green Deal finance perceived to be high

* That is, measures installed and repayments started or about to start

'Live Green' Deal finance plans and measures installed



Source: DECC, GD & ECO monthly statistical release Feb 2015

- ❑ Low take-up has affected the viability of the Green Deal Finance Company which received **£50m** of extra funding in 2014
- ❑ All main political parties likely to reconsider Green Deal after election

Smart Metering

Background to policy

Smart metering What is it?

Smart electricity and gas meters, together with in-home displays, provide consumers with near-real time information on their energy use

- ❑ The EU third energy package mandates the deployment of **electricity** smart meters by 2020 if there is a positive CBA.
- ❑ In the UK, following a positive CBA, suppliers have been mandated to complete the roll-out of smart electricity **AND** gas meters by 2020.



Positive CBA
Estimated benefits of **£17.1bn**; and costs of **£10.9bn**

Deployment led by energy suppliers. Costs passed on to consumers

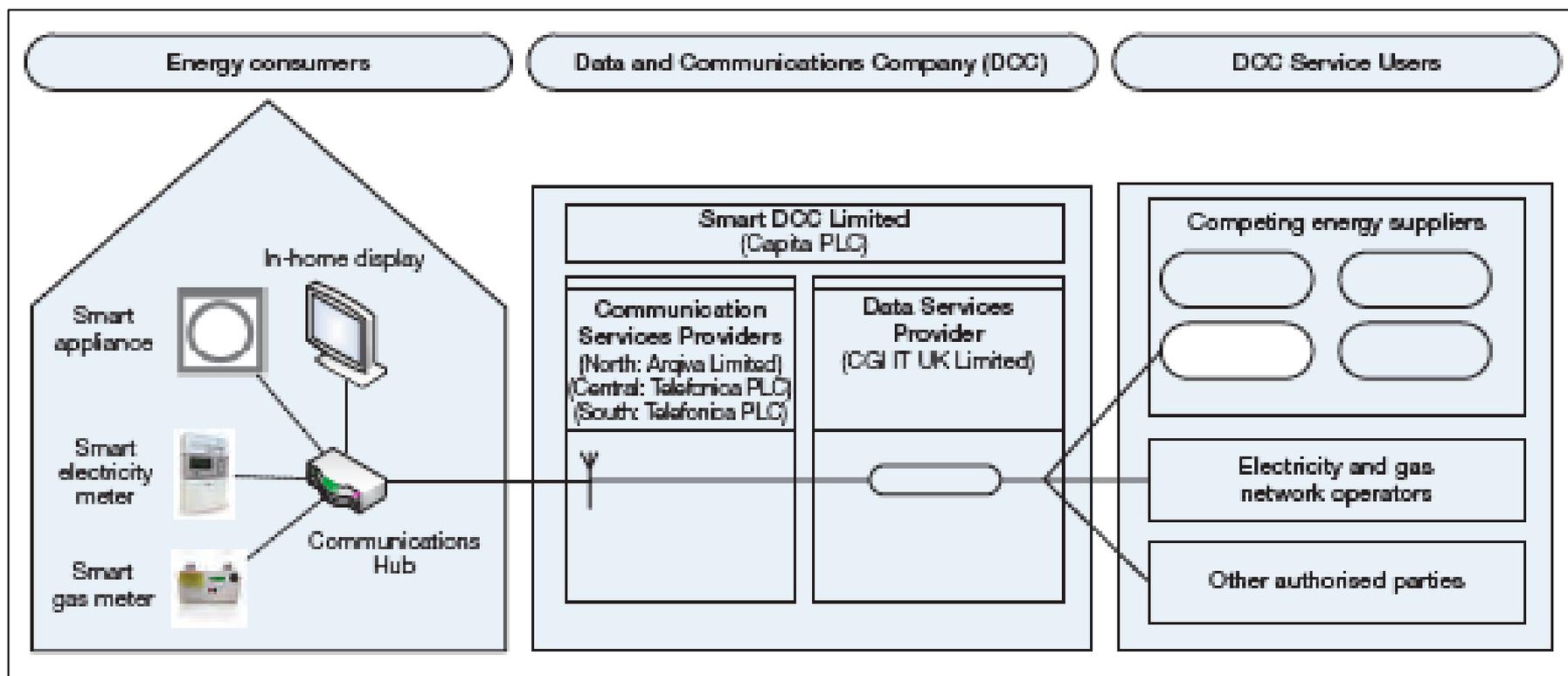
53 million gas and electricity meters to be installed in **30 million** premises

Start of mass rollout delayed until 2016. **100%** of meters smart by 2020

Smart metering What is it?

Complex national roll-out led by suppliers in a deregulated market

The main components of the smart metering system



DCC acts as intermediary between consumers and service users

Smart Metering

Progress against plans

Smart metering Progress against plans

Progress so far

- ❑ **Over 1 million smart & advanced meters now operating in households and smaller non-domestic premises**
 - Only **2 out of 7** of the larger energy suppliers have installed significant numbers of smart meters

Remaining challenges

- ❑ **Mass roll-out has been delayed**
 - The installation challenge is huge
 - Mass roll-out was planned to start from Q2 2014; and then moved to end of 2015
 - Current consultation on communications might delay initial live operations to Q2 2016
- ❑ **Technical communication problems**
 - Current wireless technology is not expected to work in **30%** of homes.
- ❑ **Estimated benefits are uncertain**
 - Reliance on consumers changing their behavior; and smart meters being rolled-out to virtually all homes by 2020



Smart metering Remaining challenges

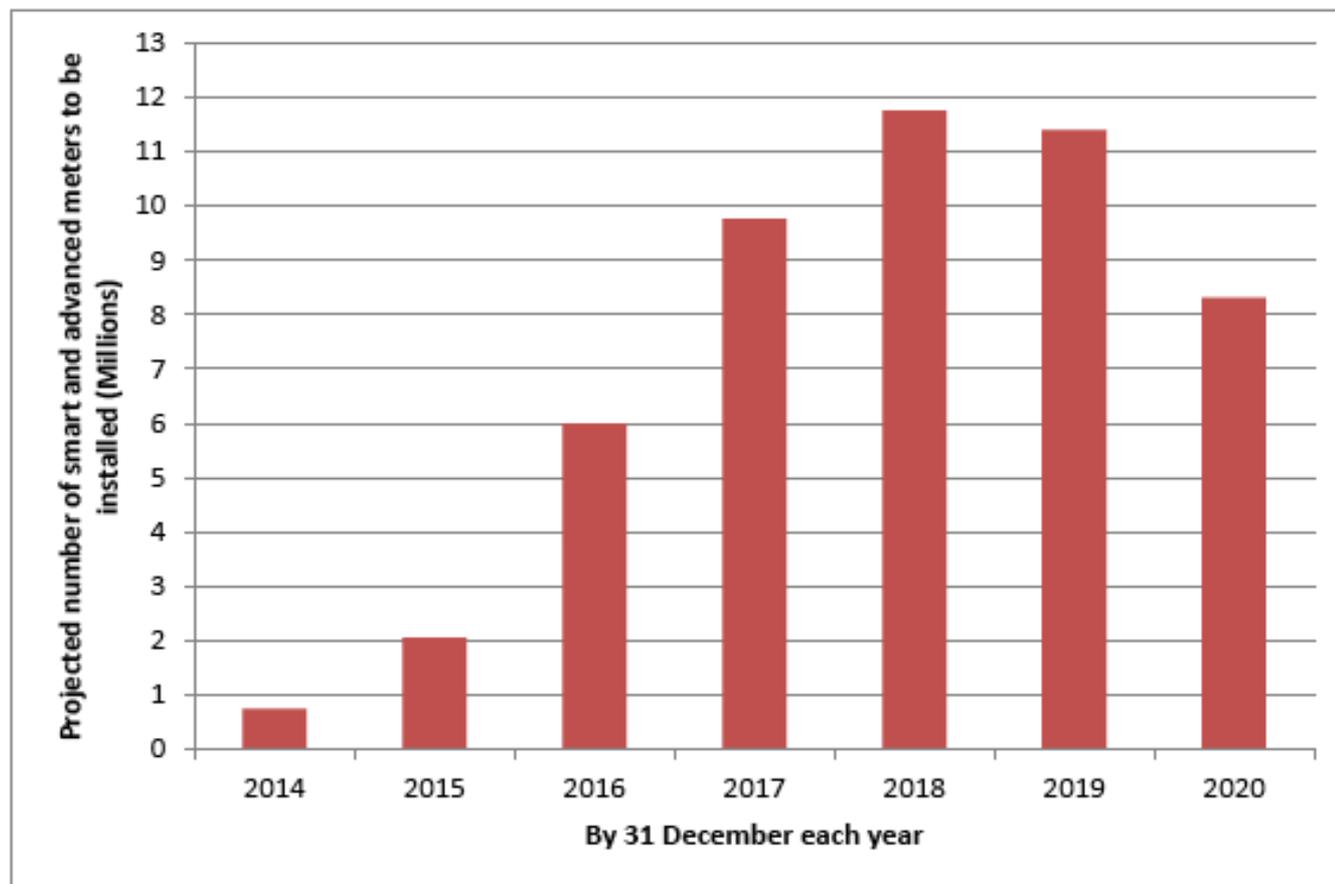
Larger energy suppliers' projections of the number of smart meters to be installed per year in domestic and non-domestic properties between 2014-20

The scale of the logistical challenge is huge

- ❑ **47 million** meters must be replaced by 2020
- ❑ The roll-out profile peaks in 2018 at almost **12 million** installations
- ❑ Equivalent to around **32,000** installations a day

Start date for mass roll-out has slipped but completion date is fixed

- ❑ Roll-out profile does not take into account the latest delay to the delivery programme which proposes a new go-live date of April 2016



Source: DECC 3rd annual progress report, 2014

Smart metering Remaining challenges

Technical communications

- ❑ Smart metering Home Area Network enables energy users to connect in-home displays and other consumer devices to their smart meters
- ❑ Current wireless technology (operating at 2.4GHz) unsuitable for **30%** of homes. (Mainly multi-occupancy and tall buildings.)
- ❑ Proposed wireless solution (868MHz) expected to increase coverage to **95%**, but unavailable for at least a year after start of mass roll-out
- ❑ Solutions for remaining **5%** of premises yet to be developed

Uncertainty of benefits

- ❑ Estimated benefits of **£17.1bn** to 2030 (PV to 2030) rely on behavior change and smart meters being rolled out to virtually all consumers
- ❑ Stakeholders and evidence from trials support DECC's assessment that consumer energy savings (**2.0-2.8%**) are realistic and achievable
- ❑ But, evidence for behaviour change in the longer term is limited because technology is new and most trials have not yet been in place very long
- ❑ Suppliers must show they have 'taken all reasonable steps' to roll-out smart meters to all their customers