Presentation and discussion of UK instrument – Enhanced Capital Allowance (ECA) Scheme

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The Carbon Trust

CARBON TRUST

We work with governments, multilateral organisations, businesses and the public sector, helping them contribute to and benefit from a more sustainable future

- We cut through uncertainty to provide insights that support better decisions
- We design and manage projects that overcome financial and behavioural barriers
- We recognise clients through assurance and certification of positive outcomes

19

nineteen years of global experience

30+

over 30 nationalities on our expert team

5

working across five continents

Working across the globe on product policy

9

working with nine nations on technology list and/or MEPS; and nations across Africa on energy access.

The Carbon Trust is an active member of the *United for Efficiency initiative* lead by UNE and ICA, and a technical advisor to the Kigali Cooling Efficiency Partnership (K-CEP) and other intergovernmental partners

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Enhanced Capital Allowance (ECA) Scheme

For energy saving technologies

The ECA scheme was an essential element of UK product policy to deliver business investment in energy efficiency

- UK barriers that inhibited transition to a lower carbon economy in 2001 included:

1. Poor access to partial or full project financing
2. Information asymmetry between buyers and sellers
3. Lack of accessible technical expertise
4. Manufacturers & suppliers unclear of credible market opportunity
5. Manufacturers & suppliers unclear of what products to make and sell
6. Customers unaware that cost-effective energy efficiency/low carbon opportunities existed
7. Uncertainty on what constitutes good quality energy efficient technology

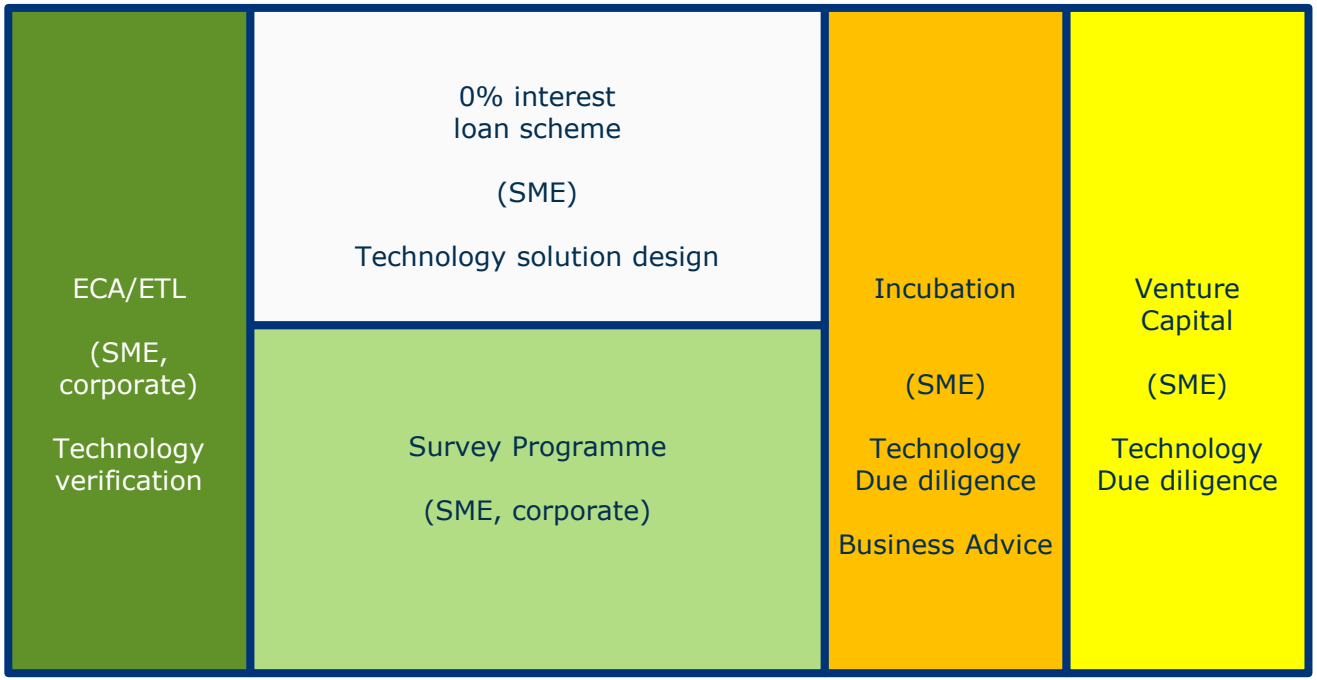
Solutions to address these barriers that were developed by the Carbon Trust in collaboration with the UK Government.

- *Accelerated tax relief* and 0% SME loans to reduce or mitigate 1
- *Awareness raising* and *energy survey* programmes to reduce or mitigate 3, 4, 5 and 6
- *Product verification service* to reduce or mitigate 2 and 7

UK goal was to stimulate significant market adoption of pre-existing energy efficient technologies that were not being used in industry

- Stimulate markets for technologies such as frequency inverters, efficient lighting, efficient heating, CHP
- Combine accelerated tax relief with a product verification service to deliver:
  - fiscal / information benefits
  - Trickle down innovation effects leading to massification effects
- **UK Enhanced Capital Allowance Scheme for Energy Saving Technologies**

Contextualising the ECA scheme within 2001 - 2010 UK low carbon market development activities



Rudder effect

- The tax benefit from buying ECA scheme qualified energy efficient technology is not sufficient to spontaneously encourage businesses to buy it

- However, if a business was already buying new equipment then the tax benefit is a sufficient rudder effect to encourage business to buy more efficient versions of that equipment

Policy basis for the Enhanced Capital Allowance Scheme for energy saving technologies

- The **ECA scheme** was a core component of the **UK Climate Change Levy Programme** (CCLP), itself a core industrial component of UK action on the Kyoto Agreement
- The **Energy Technology List** provides product qualification for business to access Enhanced Capital Allowances (ECA) for the purchase of energy saving technologies
- ECA Scheme was enshrined in the **UK Finance Act,** and amendments thereafter
- **ECA Scheme aim** was to :
  - Influencing the design, availability, and uptake of the most energy-efficient equipment types within the remit of the scheme
  - Encourage businesses of all sizes to use the ETL as a principal procurement tool for purchasers of energy-saving capital equipment
  - Supports existing energy saving technologies that have NOT deeply penetrated the customer markets into which they are sold

Eligible technologies for ECA support

Three principle qualification rules:

1. Energy-saving criteria ensure equipment represents a significant improvement in energy performance over standard equipment – performance in top 25% is required (HEPS)
2. Market penetration criteria involves placing a cap so that technology will be removed once market is established (e.g. >40% market supported)
3. "New technology" are those described in 1. An ECAs is used to stimulate technologies that have come to market, but which have not yet made a major impact. It is not intended to provide market confidence for products that are yet to be proven, i.e. breakthrough innovations.

The ECA scheme seeks to encourage use by industry of existing energy saving technologies that have not deeply penetrated the market. Used by businesses of all sizes, but larger companies show more interest.

ECA reviewing criteria submitted to EU (State aid No 797/2000 – UK)

Organisational structure at set-up of the Enhanced Capital Allowances Scheme for energy saving technologies

CARBON TRUST

HM TREASURY

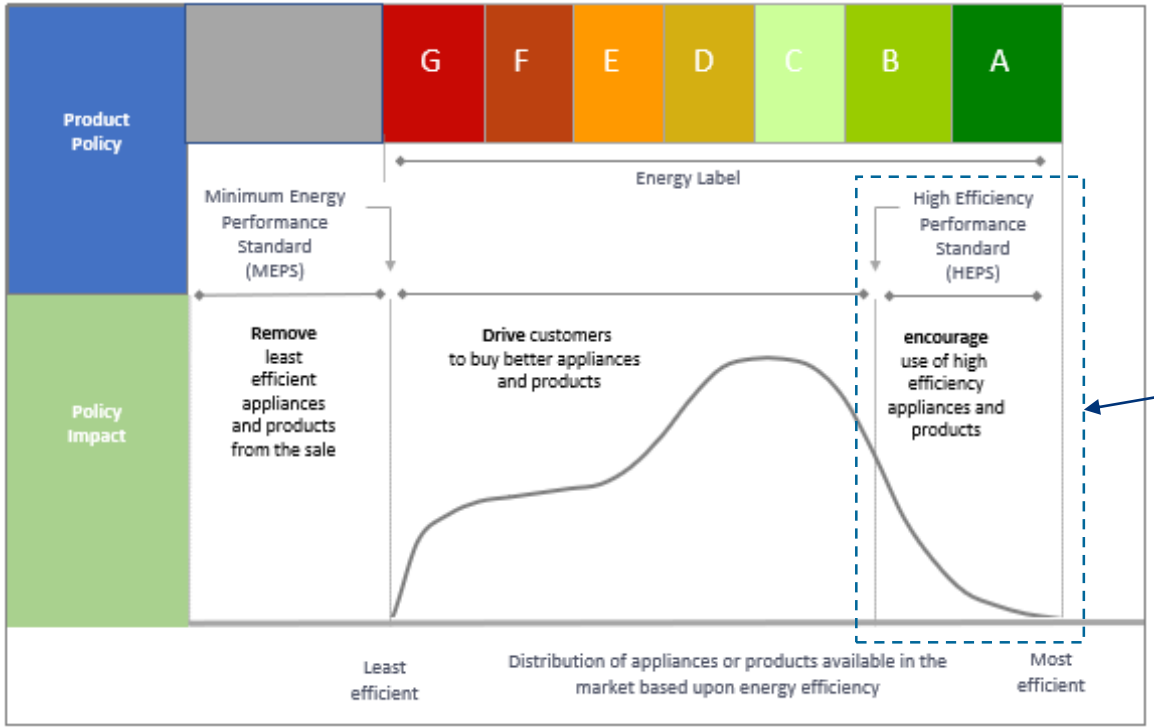
HM Revenue & Customs

DEPARTMENT OF ENERGY & CLIMATE CHANGE

(now BEIS)

- While the ETL was created to support the ECA Scheme, it is an excellent procurement tool for identifying retrofit technologies
- At the core of the ETL are :
  - Detailed product specifications
  - A product catalogue of government verified technologies

Placing the ECA Scheme within wider product policy



The ECA scheme seeks to encourage purchase of equipment with these levels of efficiency

Note: Energy Label and MEPS not applicable to all ECA qualifying products

The ECA Scheme supports ~60 technologies used by industry

Automatic Monitoring & Targeting Systems. Portable Energy Monitoring Equipment. Biomass Boilers and Roomheaters. Burners with Controls. Condensing Economisers. Flue Gas Economisers. Gas-fired Condensing Water Heaters. Heat Recovery from Condensate and Boiler Blowdown. Heating Management Controllers (for Wet Heating Systems). Hot Water Boilers. Localised Rapid Steam Generators. Retrofit Burner Control Systems. Steam Boilers. Combined Heat and Power. Flow Controllers. Master Controllers. Refrigerated Air Dryers with Energy Saving Controls. Air Source: Air to Water Heat Pumps. High Speed Hand Air Dryers. Air Source: Gas Engine Driven Split and Multi-Split (including Variable Refrigerant Flow) Heat Pumps. Air Source: Packaged Heat Pumps. Air Source: Split and Multi-Split (including Variable Refrigerant Flow) Heat Pumps. CO2 Heat Pumps for Domestic Hot Water Heating. Ground Source: Brine to Water Heat Pumps. Heat Pump Dehumidifiers. Heat Pump Driven Air Curtains. Water Source: Split and Multi-Split (including Variable Refrigerant Flow) Heat Pumps. Heating, Ventilation and Air Conditioning (HVAC) Equipment. Building Environment Zone Controls. Close Control Air Conditioning Equipment. High Efficiency Lighting Units. Lighting Controls. White Light Emitting Diode (LED) Lighting Units. Integrated Motor Drive Units. Permanent Magnet Synchronous Motors. Single Speed AC Induction Motors. Variable Speed Drives. Pipework Insulation. Biomass Fired Warm Air Heaters. Radiant Heating Equipment. Warm Air Heating Equipment. Absorption & Other Heat Driven Cooling & Heating Equipment. Air Blast Coolers. Air-Cooled Condensing Units. Automated Permanent Refrigerant Leak Detection Systems. Commercial Service Cabinets. Cellar Cooling Equipment. Curtains, Blinds, Doors and Covers for Refrigerated Display Cabinets. Evaporative Condensers. Packaged Chillers. Refrigerated Display Cabinets. Refrigeration Compressors. Refrigeration System Controls. Solar Thermal Systems. Uninterruptible Power Supplies.

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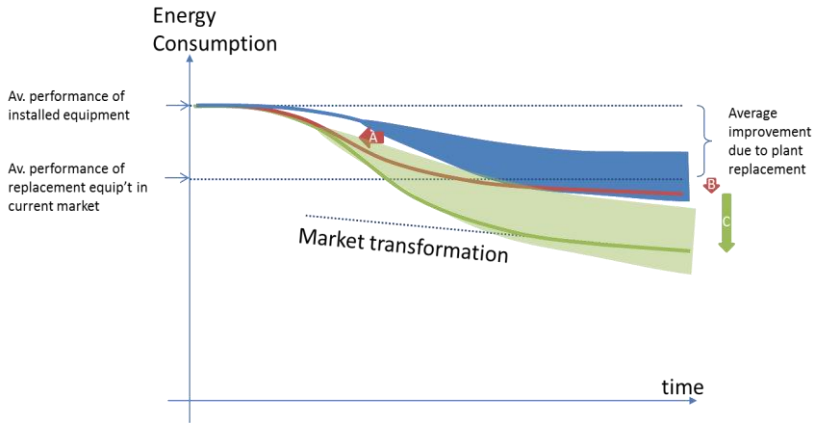
Theory of change

Technology lists deliver socio-techno market transformation

- In a technology market two different types of replacement can occur which have an effect on energy efficiency:
  - uptake of average plant replacement may be accelerated, bringing investment forward in time, and achieving savings earlier than would otherwise have occurred (the red line A to B on diagram)
  - uptake of more efficient plant available on the market, so that performance improves by more than would have been achieved based on average plant replacement.



Both types of replacement compare favourably to the base line of the *average performance of installed equipment (*shown in blue in diagram*).* Energy savings due to procurement of *average plant replacement* are shown by the blue shaded area in diagram

Energy savings due to procurement of *the most efficient plant replacement* are show by the green shaded area (labelled C)

Technology lists accelerate socio-techno market transformation by clearly defining and encouraging purchase of the *more efficient plant* available in the market, e.g. jumping to the top level of efficient performance

Ambition can be controlled to stimulate different socio-techno market transformation impacts

Technology list ambition can :

- Discourage use of the least efficient equipment available in the market – implementing Minimum Equipment Performance Standards (MEPS) (e.g. EU EcoDesign)
- Encourage use of high performance (i.e. more efficient) equipment available in the market - implementing Higher Equipment Performance Standards (HEPS) (e.g. UK ETL)
- Lighthouse use of breakthrough performance equipment which is emerging in the market - implementing Leading Equipment Performance Standards (LEPS) (e.g. Japan)

Breakthrough performance: Encourage use of break through performance plant

High performance: Encourage use of good performance plant

Minimum performance: Discourage or remove poor performance plant

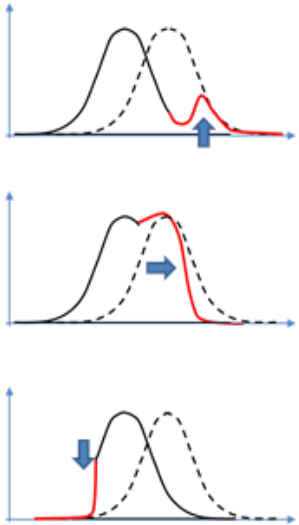


Diagram 2: Setting ambition levels for different socio-techno market outcomes

Ambition is described through defined *verification or qualification criteria* that highlight the required performance characteristics of qualifying technology or plant

Criteria are based on equipment standards so that impartial judgement of performance can be made

Ambition stimulates transformation in the supply chain

Shifting the market involves both buyers and sellers:

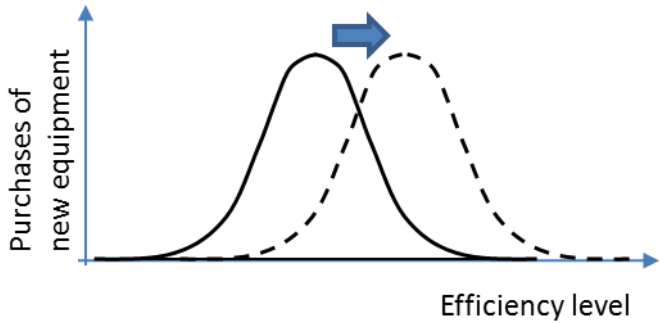
- Sellers will not introduce more energy efficient (E-E) models into their range if they do not think they will attract buyers
- Buyers will not shift to more efficient models if they are not available, or if there is considerably less choice or other trade-offs to be made in such a shift

Technology Lists reduce uncertainty in the supply chain by communicating better purchase options to buyers and highlighting to sellers preferred decisions choices

Regardless of level of ambition, use of technology lists places a *marker in the sand* which stimulates product innovation, in turn delivering efficiency improvements to all equipment supplied to the market, i.e. delivers market transformation

As more E-E equipment is supplied the E-E performance of the average product in the market increases (see diagram). Over time this leads to reduced energy use by the market

Ambition based technology lists transform both the supply of products to the market and, over time, this related market activities (e.g. servicing, maintenance, consumables)



By setting energy efficient performance ambitions, over time, the average performance of all plant supplied to the market improves.

To be successful a technology list needs to be considered in a wider context of market intervention

Achievable ambition

Ambition needs to be far enough ahead of current practice to effect transformation, but not so far as to lose touch. This means setting performance standards that are high enough above current market standards to accelerate improvements, but not so high that the list becomes irrelevant and inaccessible to local markets

Responsive to market dynamics

In order to maintain effectiveness over a period of time, technology lists must be capable of responding dynamically to changing market conditions, (e.g. tightening performance requirements or removing technologies)

Reinforcement

Market transformation is a complex process, which requires a package of different energy efficiency interventions applied together (e.g. encourage use of technology list in energy audit reports)

Technology lists are routinely used as pre-qualification requirements for environmental assessment methods (e.g. BREEAM, LEED)

Flexible and Scalable

The structure of technology list needs to be able to be easily scaled up (or down) to include (or remove) support for sectors or assessment volumes

Technology list can be used to target fiscal incentives with near pin-point accuracy

Technology lists are a powerful tool for market transformation:

- Remove differences that exist between the buyer and seller (e.g. information asymmetries)
- Set benchmark levels of performance that stimulate product innovation
- **Repeated tightening of benchmark levels** of performance encourages multiple waves of product innovation that completely transform the E-E performance of equipment supplied to the market

Tied to fiscal incentives the impact of technology lists can be expanded to enable purchase of E-E equipment at times when the business cases inhibit action

Fiscal incentives that lend themselves to this approach include:

- Tax relief – purchase of equipment specified on a technology list gains tax relief
- Loan – funding can be awarded for purchase of equipment named on the technology list
- Tariff – a change to an existing tariff or payment of a tariff can be tied to purchase of equipment named on the technology list (e.g. renewable heat incentive)

- By pre-defining eligible equipment in a technology list financial approval processes can be streamlined
- Reduces administration and transaction costs, because the assessment of whether a particular technology meets the efficiency requirements is done at the time the list is compiled
- It doesn't have to be repeated each time a financial decision is made. This helps a fiscal programme to be rapidly scaled up, and has the potential to be highly cost effective

Technology lists can be focused on 1, 2 or 3 stages of the procurement process

Supply

Technology lists can be used to identify suppliers of E-E products or services

Listed sellers can be assessed against their capability to supply equipment which meets the requirements of pre-specified E-E performance criteria or against other criteria that show the seller can supply E-E solutions

Specification

Technology lists can be used to provide specified E-E performance criteria against which equipment can be assessed for qualification

Compliance to the specified performance criteria can be confirmed by the buyer of the equipment - often the seller provides support.

This approach requires trust to have been developed between the buyer and seller

Alternatively compliance could be performed by the technology list administration (e.g. through assessment of a equipment purchase project)

Identification

Technology lists can be used to list equipment that meet or exceed specified E-E performance criteria.

Equipment compliance to the specified E-E performance criteria is performed by the technology list administrator.

Building blocks of a technology list

Market intelligence

- Focused on assessing the market opportunity of stimulating low carbon E-E technology markets
- Particularly:
  - market size, sales data
  - stimulation opportunity
  - cost-effectiveness

Management & tools

- Management process (e.g. scheme administration)
- Tools used to perform market and technology intelligence, product verification, etc

Product verification

- Technical administration and assessments processes that verify product applications made by suppliers

Technology intelligence

- Focused on understanding the size of the potential low carbon & E-E saving
- Define:
  - Supported product
  - Qualifying criteria
  - Stimulation opportunity
  - Product E-E capability

Communications

- Delivery of scheme content (e.g. end user publications, application checklists, website information)
- Dissemination of content through multiple channels (e.g. web, newsletter, trade shows)

Listing mechanisms

- Chosen mechanism for listing, which could be:
- Compliance to a set of qualification criteria
- Compliance to a set of qualification criteria and unique listing of a online registry of low carbon and E-E products

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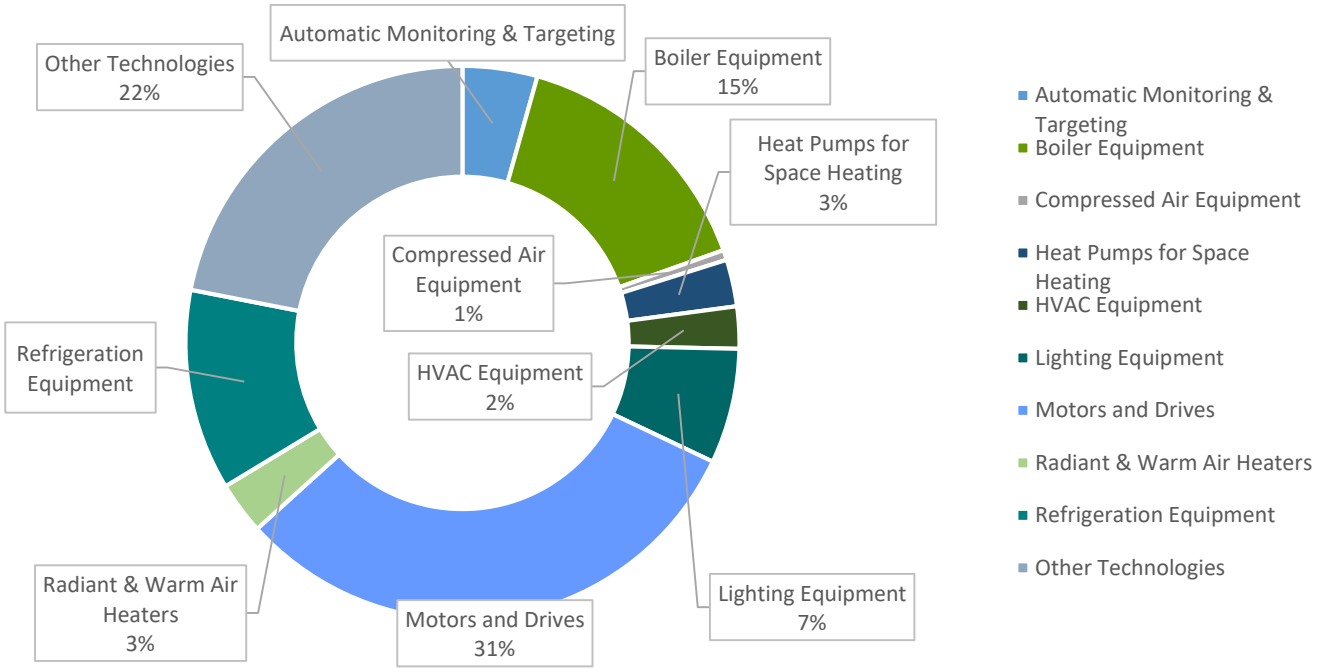
Results (historic)

Abatement of 10 MTCO2 in 2016

Note:

This is all abatement due to sale of these equipment.

Not only that which was directly influenced by the policy, which will be lower

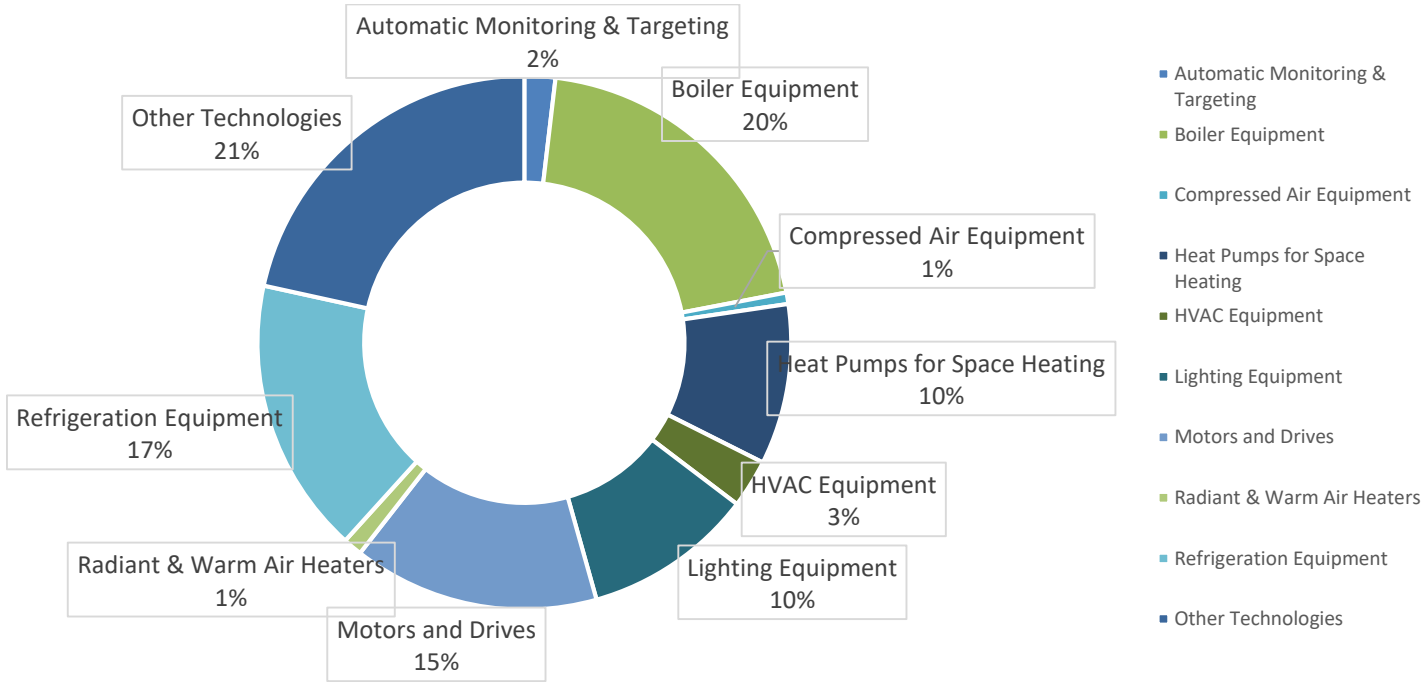


Other Technologies includes 'Air-to-Air recover', Solar Thermal Systems', 'Uninterrupted Power Supplies' & High Speed Hand Driers

Qualifying sales of £1.4bn in 2016

Note:

Qualifying sales not potential tax relief claim, which is lower percentage of this amount

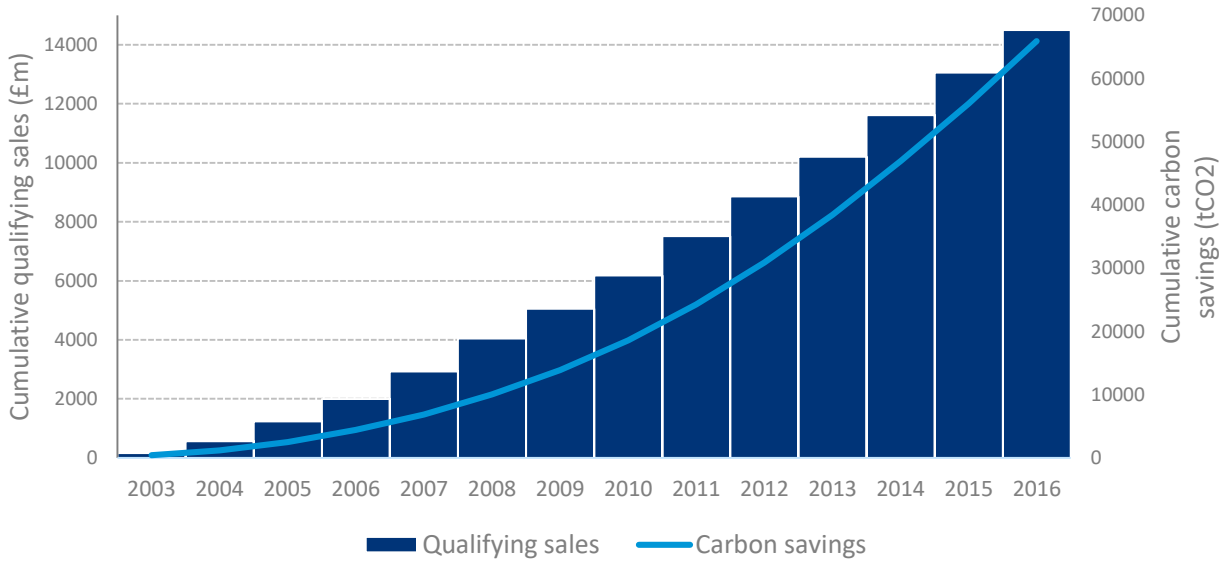


Other Technologies includes 'Air-to-Air recover', Solar Thermal Systems', 'Uninterrupted Power Supplies' & High Speed Hand Driers

By 2016 businesses had spent £15bn on ETL compliant equipment

Emissions reduced by ~66MtCO$_2$ but not all due to policy!

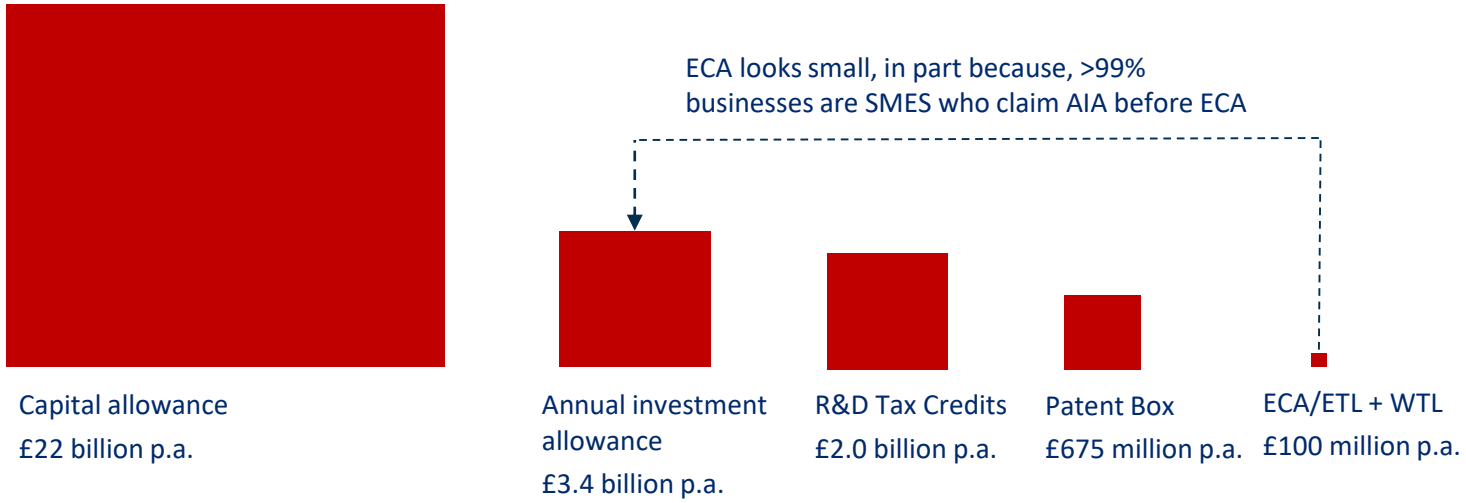
Some purchases would have happened anyway (2003-2016)



In 2016, qualifying sales were £1.4Bn, annual carbon savings due to these products were 1.2MtCO$_2$. Persistent savings (including products purchased in previous years) were ~10 MtCO$_2$.

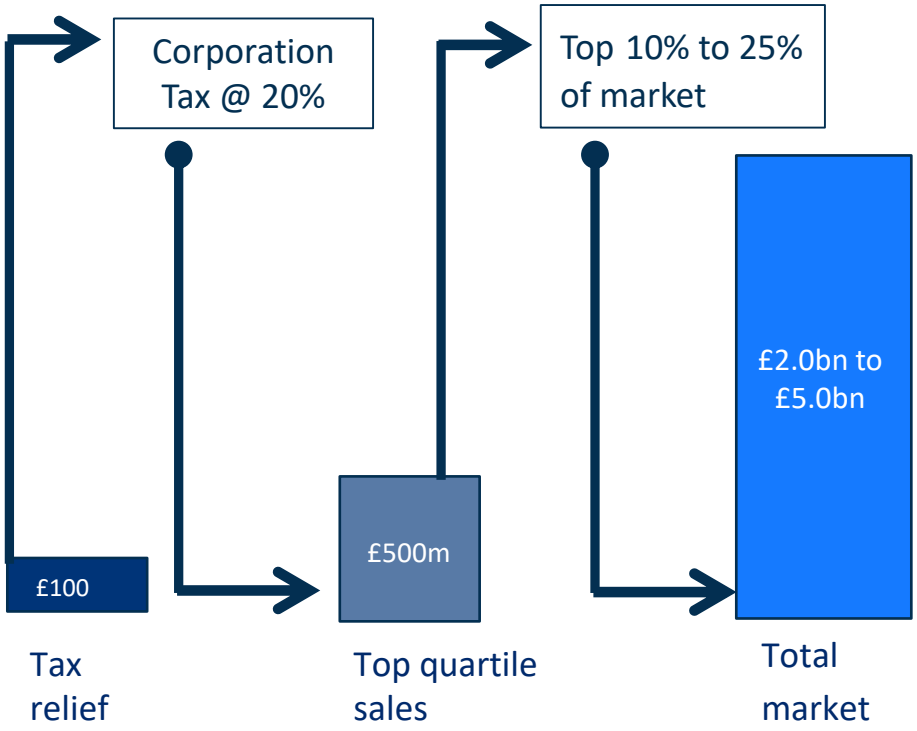
Typical cost effectiveness is £10-20/tCO$_2$ (*over a 5 yr period*)

First year allowances: 2016 cost to UK exchequer*

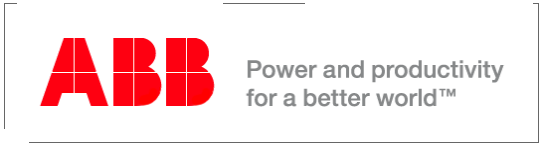


- Tax relief for energy efficiency is insignificant in the context of other accelerated reliefs available to industry – yet ECA delivers material market impact through technology transformation
- UK R&D evaluation showed that for every £1 in tax forgone between £1.53 and £2.35 of expenditure was stimulated

ECAs have significant influence on technology markets



ETL products are supplied by UK and international brands



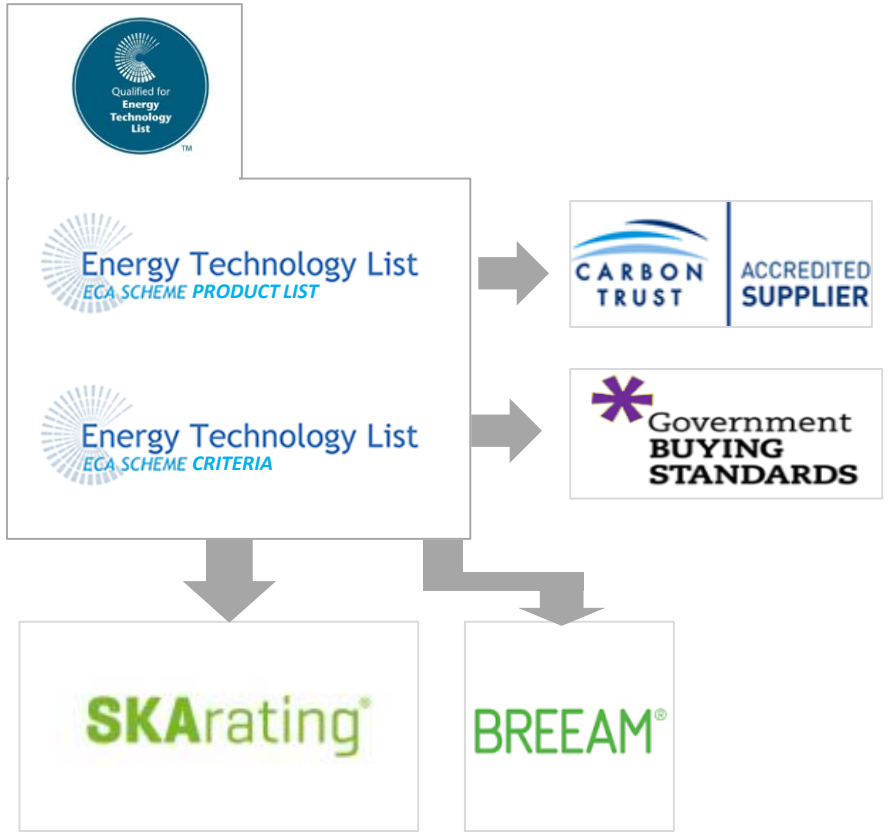
ETL is now embedded in the building retrofit process

EcoLabel

Product or supplier catalogues

Procurement standards

Environmental assessment Methods (good practice)



Some benefits & disbenefits of the ETL

Benefits

Reduced information asymmetry

- Government stamp of approval significantly mitigates information asymmetry
- Successful operation in technically complex areas (e.g. lighting)
- ETL integrated into the procurement processes (e.g. TFL, Tesco, Heinz) and environmental assessment tools

Increased product innovation

- ETL drives faster introduction of near-term market-ready innovations
- Transformation of product mix and increase in average product efficiency in market supply

Accessible fiscal benefit

- Tax relief a preferred fiscal incentive by larger companies and/or for larger purchases
- Many businesses / trade bodies are keen on tax reliefs and would like them to be bigger

Disbenefits

Secondary barriers due to policy tools

- Tax system compliance requires use of complex ETL criteria. Some groups find these difficult to use.
- Legislative cycle operates more slowly than the commercial cycle

Missing winners

- Could stunt growth in technologies not supported by the ECA scheme
- Wrong technology selected for application

Crowding out other incentives

- Misunderstanding of the ‘rudder effect’ leads to other fiscal incentives not being available

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