

**Cabinet Secretary for Environment, Climate
Change and Land Reform**

Roseanna Cunningham MSP

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c/o Clerk to the
Committee
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23 January 2018

Dear Graeme,

Thank you for your letter of 20 December and your invitation to me to give evidence to the Environment, Climate Change and Land Reform Committee on the finalisation of the Climate Change Plan.

I would like to thank the Committee again for its scrutiny of the draft Plan. My officials have worked through the reports of the four Committees and their recommendations but as you will appreciate, I would not be able to share a further draft of the Plan or discuss its contents with the Committee prior to publication on 28 February. I would instead suggest that Chris Stark, Director of Energy and Climate Change, would be better placed to discuss the process of development of the Plan at Committee on 30 January. A

In the interests of full disclosure, you should be aware that Chris Stark will soon be leaving the Scottish Government to take up post as the Chief Executive of the Committee on Climate Change.

Stakeholder engagement

You asked for assurances on the involvement of stakeholders, including the Committee on Climate Change, in the process of developing the Plan. I can assure you that stakeholder engagement has been an important part of the development of the final Climate Change Plan. Ministers and officials have engaged with business, public sector, civil society and community representatives to gain a fuller understanding of their perspectives as well as seeking feedback to ensure that we are setting out a clear and ambitious vision of a low carbon Scotland that can be achieved through collective action.

For example, in the past year we've engaged with SEPA, COSLA and the local authority Waste Managers' Network to identify where there is potential for landfill gas capture at sites that don't have it, primarily historical (closed) sites. Zero Waste Scotland also ran media campaigns throughout 2017 under the "Love Food Hate Waste" Banner, including a high profile campaign for the Christmas period.

Details of engagement in other sectors and on the plan in general are set out in Annex A.

TIMES model development since the Draft Climate Change Plan

In your letter you asked for additional information regarding TIMES modelling that has been carried out since the publication of the draft Climate Change Plan. Detailed information regarding TIMES as well as key changes made for each sector, and for future fuel alternatives, are summarised in Annex B.

Monitoring

The Scottish Government is committed to monitoring the implementation of the Plan and will publish annual summary monitoring reports on progress against policies outlined in the Plan. We have been engaging with the Committee on Climate Change on developing the monitoring framework and will continue working with the Scottish Parliament and the Committee on Climate Change to ensure effective monitoring of the Plan's implementation.

This monitoring framework marks a new approach to understanding the implementation of the Climate Change Plan. As recommended by the ECCLR committee, the Scottish Government is embedding the monitoring framework into the Plan to show clearly how each sector will monitor progress. Consideration of appropriate implementation and policy output indicators has been integral to the development of policies and policy outcomes, and part of the iterative process for refining the Plan. It is, therefore, not possible to publish the monitoring framework prior to publication.

The framework will continue to evolve over time and it is vital to retain flexibility in our monitoring approach to enable us to respond to any lessons we learn from the implementation of the Plan and reflect any new or improved data as it becomes available. Our intention is to publish the first annual summary monitoring report in October 2018, aligning it with the timing of the statutory report on the 2016 annual target required under the Climate Change (Scotland) Act 2009.

Yours,

A handwritten signature in black ink, appearing to read 'Roseanna Cunningham'. The signature is written in a cursive style with a large initial 'R'.

Roseanna Cunningham

Climate Change Plan Engagement

Date	Location	Engagement	Outcome
May 2017	Inverness	National Economic Forum	<p>Included a session chaired by Ms Cunningham on The Transition to Low Carbon Economy: Challenges and Opportunities. Within the discussion a number of positive case studies were highlighted picking up on the circular economy, energy efficiency, district heating, low carbon buildings, and engaging businesses on the benefits and support available in making the transition to a low carbon economy. The group highlighted the need to encourage companies to use less energy as a way of avoiding the increasing costs of energy. It was noted that energy efficiency is not always a priority in board rooms. Feedback from this session has been considered as the Climate Change Plan has been developed.</p>
July 2017	London and Edinburgh	National Grid – Future Energy Scenarios	<p>Officials attended workshops relating to the 2017 Future Energy Scenarios publication by the National Grid, available at: http://fes.nationalgrid.com/</p> <p>These events helped to inform the development and presentation of the Energy Strategy 2050 energy scenarios and are a source of information for the Climate Change Plan electricity chapter.</p>

January 2017 – May 2017	Scotland	Public consultation	The Scottish Government held a public consultation on its Draft Scottish Energy Strategy: The Future of Energy in Scotland. The consultation received 254 responses. This consultation informed the final Scottish Energy and the contents of the final Plan. The Scottish Energy Strategy is the companion document to the Climate Change Plan.
October 2017	Internal engagement	Workshop with Enterprise Agencies and Skills Development Scotland	The Scottish Government held a workshop with Enterprise Agencies and Skills Development Scotland to understand better the economic opportunities (and the barriers and enablers) associated with transforming Scotland's energy system. This workshop shaped and informed the high-level content of the final Plan, and the Energy Strategy.
November 2017	ECCI, Edinburgh	Across Scales in Energy Decision Making Workshop	The Scottish Government participated in a workshop hosted by the Edinburgh Centre for Carbon Innovation, where we shared our modelling of future Scottish energy systems and gained insight and advice from leading experts in the field. A summary of the workshop is available here .

March 2017	Edinburgh	Transport and Climate Change conference	<p>Bringing together stakeholders including COSLA, transport industry groups, transport operators, academics, environmental NGOs and other government agencies such as SEPA. This event sought to enhance stakeholder understanding of the analysis behind the draft Climate Change Plan, carbon envelopes and the TIMES model and how these influenced policy development. It also provided an opportunity for participants to contribute views on sustainable transport, emissions abatement and the approach the Climate Change Plan should take to modal shift, low carbon vehicles and demand management. Stakeholder views from workshops held during the event were collated and have been used to refine the transport policies and proposals in the final Plan.</p>
November 2016	Edinburgh, Glasgow and Stirling	SEEP pre-consultation events	<p>The purpose of these events was to provide an opportunity for stakeholders to input into the development of Scotland's Energy Efficiency Programme (SEEP). They were attended by a mix of local government representatives, independent researchers, energy companies, regulators, enterprise agencies, the energy efficiency industry, and citizen groups.</p> <p>SEEP is the cornerstone of the Scottish Government's actions to improve the energy efficiency of Scotland's buildings and decarbonise heat supply. This programme supports the reductions in emissions in the Buildings sector of the Climate Change Plan.</p>

April 2017	Perth, Glasgow and Edinburgh	SEEP Consultation Event	<p>These events provided an opportunity for stakeholders to find out more about the consultation and to discuss opportunities and challenges with colleagues. They were attended by a mix of local government representatives, independent researchers, energy companies, regulators, enterprise agencies, the energy efficiency industry, and citizen groups. Responses to the SEEP consultation are informing the development of the SEEP Routemap which will set out the long term ambitions for the programme.</p>
June and November 2017	Edinburgh, Glasgow	SEEP Partnership Forum	<p>The SEEP Partnership Forum met and considered the findings of the consultation and discussed next steps. The Forum includes representatives from our delivery partners in local government and the wider public sector.</p>
April - June 2017	Edinburgh, Ayr	Consultation on energy efficiency and condition standards in the private rented sector	<p>During the SEEP consultation events were held to discuss the details of the consultation with local authorities and private sector landlords. Feedback from these events is informing the development of regulations for energy efficiency standards in the private rented sector along with formal responses to the consultation.</p> <p>Our next steps on minimum energy efficiency standards in the private rented sector will be confirmed in the SEEP Routemap, which supports the delivery of the Climate Change Plan.</p>

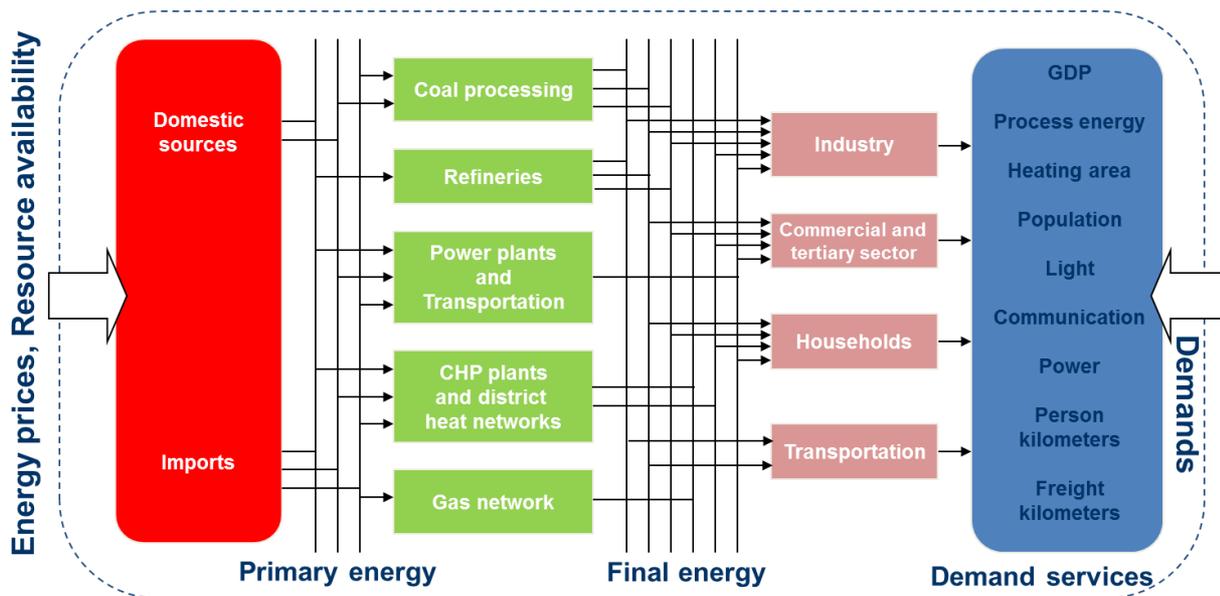
<p>September 2016 (Working Group) January 2017 and December 2017 (consultations)</p>	<p>Edinburgh, Glasgow and Inverness</p>	<p>Consultation on Heat and Energy Efficiency Strategies, and Regulation of District Heating /Short Life Working Group on Heat Regulation</p>	<p>The Short Life Working Group on Heat Regulation was established by the Minister for Business, Innovation and Energy, and advised on potential regulatory scenarios for district heating and for the introduction of the Local Heat and Energy Efficiency Strategy (LHEES) under SEEP.</p> <p>This group informed our high level policy scoping consultation on Heat and Energy Efficiency Strategies, and Regulation of District Heating. The group consisted of stakeholders from various organisations including: local authorities; the public sector – SEPA, BEIS; the third sector – Energy Saving Trust, Citizen’s Advice Scotland, Scottish Futures Trust; industry representatives – Association for Decentralised Energy, Aberdeen Heat and Power.</p> <p>The evidence received in response to this consultation document enabled officials to scope out broad policy options and supported Ministers’ consideration of the extent of district heating regulation required. Following that a more detailed consultation setting out our preferred approach to regulation and on LHEES was published, for further comment and testing with stakeholders. The consultation will run until 20th February 2018, which will inform the ongoing development of SEEP, and therefore support the delivery of the Climate Change Plan.</p>
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October 2016	Edinburgh	Consultation Workshop: on the Agriculture Chapter of the Climate Change Plan	A document, 'The Climate Change Plan for Agriculture – policies and proposals to reduce greenhouse gases emissions from agriculture', was subject to discussion at an all-day consultation workshop. Attendees (including policymakers, farming leaders, environmentalists and scientists) considered the Scottish Government's policies and proposals and provided detailed feedback which played a vital role in the development of the content of the Agriculture Chapter within the draft Climate Change Plan.
February and November 2017	Perth	Agriculture and Climate Change Strategic Group Meetings	The Scottish Government's Agriculture and Climate Change Strategic Group contributed heavily to the development of the agriculture policies and proposals in the draft Plan, and they have continued to do so during 2017. Two further meetings were held with the Agricultural and Climate Change Strategic Group in 2017, which included a presentation on the individual policies which will contribute to the delivery of the policy outcomes, along with details on the development milestones and additional proposals.
16 March 2017	Edinburgh	Ministerial stakeholder summit	This event provided support for Scottish Government's forestry ambition including the Climate Change Plan policies on woodland creation and increasing the use of timber in construction.
24 May 2017	Perth	Ministerial stakeholder summit	This summit included a progress update on the Mackinnon review that focused on helping to improve the forestry planting approvals process in order to deliver Climate Change Plan woodland creation targets.

2 June 2017	Aberdeenshire	Ministerial event - Moorland Forum	This forum provided support for the Scottish Government's commitment to grow the rural economy through sustainable productive mixed land-use, where forestry, farming, conservation and sporting interests work well together and are managed in an integrated way. It provided support for delivering the Climate Change Plan policies through engaging with other land use interests such as through the 'Sheep and Trees Initiative'.
Various (3-4 times a year)	Edinburgh	Forestry Grant Scheme Customer Representative Group	This group facilitates ongoing discussions with forestry grant scheme customers on implementing the Forestry Grant scheme, a key policy that underpins the delivery Climate Change Plan woodland creation targets.
c. Monthly	Edinburgh	Mackinnon Project Delivery Reference Group	This group facilitates ongoing discussion on the implementation of the recommendations from the Mackinnon review to improve forestry grant scheme planting approvals process to support the delivery of Climate Change Plan woodland creation targets.
Various (6-8 times a year)	Edinburgh and four regions.	Scottish Forest and Timber Industries Leadership Group and regions.	This group facilitates ongoing engagement and activities on increasing the economic contribution of the forestry to the Scottish economy including managing the delivery of the Timber Development Programme that supports the Climate Change Plan policy of increasing the amount of wood products in construction policy outcome.

Various	Battleby	National Peatland Group	<p>This group, supporting work by Scottish Natural Heritage, has allowed consideration of how much restoration is technically feasible and allowed consideration of supporting actions that require action, eg contractor capacity, land manager engagement and links to other initiatives such as the Peatland Code.</p> <p>In addition there has been ongoing liaison with individual stakeholders including the IUCN Peatland Program</p>
November 2017	Edinburgh	Energy Intensive Industries (EII) Roundtable and Working Group	<p>The Group's objective is to advise the Government on issues emerging from energy efficiency and our policies on climate change and renewables. Its first meeting was held in November 2017. At this meeting representatives from each EII sector were invited to present a brief summary of significant challenges and potential opportunities related to improving energy efficiency or decarbonising processes in their sector. The discussion provided the Scottish Government with an opportunity to reflect these views from industry within Scotland's Energy Strategy, prior to its publication in December 2017, and the final Climate Change Plan. This working group will progress a policy delivery framework to capture opportunities for investment in energy efficiency and decarbonisation, in line with Climate Change Plan targets.</p>

TIMES modelling



The development of the Climate Change Plan is supported by the Scottish TIMES model. This is a whole energy system model of the Scottish economy, commissioned by the Scottish Government in order to enrich its analysis of the impact of emission reduction legislation on the energy system. The TIMES framework is an internationally recognised approach.

The Scottish TIMES model combines two different, and complementary, approaches to modelling energy: a technical engineering approach and an economic approach. It is a high level strategic model, covering the Scottish energy system, as well as non-energy sectors, including Agriculture, Land Use, Land Use Change and Forestry (LULUCF), and Waste. It contains many thousands of variables covering existing and future technologies and carbon abatement measures, such as availability, cost and greenhouse gas emissions factors.

TIMES models use linear programming to identify the least-cost pathway for meeting our climate change targets, where energy demands are met at the lowest possible cost over a specified time horizon. This pathway includes a specific mix of primary energy supply, both domestic and imported / exported, that can optimally meet Scottish energy demands. The system-wide approach taken by the model ensures the results are internally consistent. For example, there is a fixed amount of, say, biomass available to the model; if more is used by one sector, less is available to other sectors.

By incorporating the Scottish Government climate change targets and other policy and technical constraints, the model can be used to determine how best to deliver on our climate change ambitions, taking into account Scottish-specific factors relevant to the deployment of technologies, such as potential capacities / activity levels.

The Scottish TIMES has a series of demand-driven energy sectors (industry, services, residential, transport, and parts of agriculture). These have a series of final energy demands that the model must meet, such as residential lighting demand, or short distance passenger kilometres driven by cars.

Additionally, there is an electricity sector where demand is determined by the model and is driven by demand for electricity as a “feedstock” in the other sectors (through the electrification of transport or heating demand) as well as wider factors such as the energy efficiency of our building stock.

Scottish TIMES also incorporates “non-energy” sectors (most of Agriculture, Waste and LULUCF, including peatland). Although these non-energy sectors, for the most part, do not have final energy demands or long supply chains, their inclusion ensures that emissions in TIMES account for all Scottish emissions in the greenhouse gases inventory, and that once climate change targets are taken into account emissions from energy sectors do not increase beyond the overall targets.

TIMES must meet defined demands for transport and heat in the agricultural sector. However, TIMES also includes the non-energy component of Agriculture emissions.

For Waste, TIMES incorporates the latest data from the Greenhouse Gas Inventory and incorporates projected future emissions defined by specific waste sector modelling.

For LULUCF, TIMES uses data on projected emissions from the Centre for Ecology and Hydrology (CEH) for forestry, harvested wood products, settlements and the components of the Agriculture Related Land Use sector not included within Agriculture. TIMES also deliver new planting rates and future peatland restoration rates as advised by sector analysis and takes into account the accompanying impact on emissions.

Ensuring that emissions trajectories are informed by sector-specific models and analysis, we can be more confident on the robustness of sector emissions envelopes. This is a standard approach used to address non-energy parts of whole system models. It ensures that the final results are underpinned by the most detailed modelling possible, which would not be possible if a single model was used to analyse all sectors.

The Transport sector is incorporated into TIMES via fuel shares and emissions projections. While both are determined exogenously, changes to Transport fuel shares will ripple through the rest of the system, as Transport supply chains are fully incorporated into the model. Transport emissions projections are taken into account in deriving sector envelopes in the same way as for the non-energy sectors; their inclusion ensures total emissions from all sectors do not exceed the overall targets. The emission projections and fuel shares for Transport in the draft Climate Change Plan were based on data provided by Transport Scotland and sourced from research by Element Energy, providing a detailed representation of the transport sector in Scotland. The original emissions projections have been updated following the Programme for Government announcement.

TIMES model development since the Draft Climate Change Plan

Since the publication of the draft Climate Change Plan we have continued to update the Scottish TIMES model to reflect the Programme for Government 2017 and the most recent data available.

These updates can be categorised as follows (and the key changes made for each sector, and for future fuel alternatives, are summarised in the tables below):

- **BASELINE DATA:** Incorporates the key statistics and information on the current energy system in Scotland, and the broader underlying drivers of future energy demand and supply. Over the course of the year these variables were updated in the model to reflect the publication of more timely information.
- **FUTURE TRENDS:** Reflects feedback from stakeholders and sector experts on future developments in the model’s key sectors, the model’s assumptions about the expected evolution and cost of new technologies and information outputted from key sector specific models that act as a point of Quality Assurance.

- **POLICY ISSUES:** Key policy and delivery assumptions in the model reflect the specific characteristics of the Scottish energy system and existing, and newly announced, Scottish Government policies.
- **MODELLING IMPROVEMENTS:** Reflects continued refinements to the model's underlying architecture and assumptions.

Sector	
Agriculture	<ul style="list-style-type: none"> • BASELINE DATA, FUTURE TRENDS: <ul style="list-style-type: none"> i. Incorporation of the latest 2015 greenhouse gases inventory data and a resulting revised emissions profile for non-energy Agricultural emissions. ii. Agricultural transport demand driver revised reflecting the downward trend in baseline non-energy emissions.

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Sector	
Residential	<ul style="list-style-type: none"> • BASELINE DATA <ul style="list-style-type: none"> i. Mapped 2012-2015 emissions to match the latest greenhouse gases inventory. ii. Updated demand drivers in new housing heat demand to more closely reflect the approach taken in existing houses. iii. Updated reduction in average demand for heat and hot water for new build homes compared to existing homes. iv. Ensured a minimum share of non-electrical heat is supplied by biomass residential boilers, reflecting current activity. • FUTURE TRENDS <ul style="list-style-type: none"> v. Incorporated smart meters into the model with updated energy savings potential drawing on the UK Government cost-benefit analysis on the smart meter roll-out. vi. Updated the energy saving potential and cost of phased conservation measures in TIMES, which included expanding the set of conservation measures modelled, drawing on data from the National Housing Model. vii. Constrained the potential deployment of district heating to align with figures in the UK's National Comprehensive Assessment of District Heating and Cooling (2015). • POLICY ISSUES: <ul style="list-style-type: none"> viii. An increasing share of heat and hot water demand must be met by low-carbon technologies and fuels over time. This increasing share is limited by the proportion of properties that are not on the gas grid.

Sector	
Electricity	<ul style="list-style-type: none"> • BASELINE DATA: <ul style="list-style-type: none"> i. Conducted an update of the historical generation, capacity, and load factor data inputs in Scottish TIMES, drawing from BEIS Energy Trends December 2016, DUKES 2016, BEIS Renewable electricity capacity and generation (2017), BEIS Regional Statistics – 2003 – 2015: Standard Load Factors, the Renewable Energy Planning Database (2017), and from an updated version of UK TIMES. ii. Mapped 2012-2015 emissions to match the latest greenhouse gases inventory. iii. Added a new floating wind technology that is made available for the model to use, drawing from the Scottish specific project data. • FUTURE TRENDS: <ul style="list-style-type: none"> iv. Delayed the introduction of CCS used in electricity generation to after 2030. v. Constrained the use of biomethane and other biomass in electricity generation processes that produce captured emissions, eliminating the models ability to produce negative emissions in electricity. vi. Capacity for a natural gas electricity generation plant has been maintained at a minimum of 1 GW. vii. Added new minimum constraint for offshore wind electricity generation capacity between 2020 and 2025, reflecting installed and planned capacity. viii. Set up a limit on exports/imports of electricity to ensure the system maintains sufficient capacity to continue exporting to the rest of the UK, and that Scottish climate targets are not met by exporting emissions to other parts of the GB system. • MODELLING IMPROVEMENTS: <ul style="list-style-type: none"> ix. Fixed a technical issue where commodities continued to be imported and not used by the sector. This has no impact on emissions, as the commodities are not transformed.

Sector	
Land Use, Land Use Change and Forestry	<ul style="list-style-type: none"> • BASELINE DATA, FUTURE TRENDS: <ol style="list-style-type: none"> i. Incorporated a new set of LULUCF projections from the Centre for Ecology and Hydrology (CEH), which have been reviewed by BEIS. CEH have made a number of changes to their models, including the addition of litter input associated with ground flora, which reduces net soil emissions. The new projections increase the scale of the carbon sink across the LULUCF sector by approximately 6 million tonnes on average relative to the sector data used in the draft plan. ii. Incorporation of the latest 2015 greenhouse gas inventory data for historic emissions/removals. Further updates to the historic data for this sector, associated with the new CEH models described above, are expected to be included in the 2016 greenhouse gas inventory when it is published later this year. iii. Baseline afforestation rates were netted off new planting rates, as advised by Forestry Commission.

Sector	
Industry	<ul style="list-style-type: none"> • BASELINE DATA: <ol style="list-style-type: none"> i. Mapped 2012-2015 emissions to match the latest greenhouse gases inventory. ii. Ensured a minimum share of non-electrical heat in industry is supplied by biomass boilers, reflecting current activity. • FUTURE TRENDS: <ol style="list-style-type: none"> iii. Constrained the use of biomethane and other biomass in industrial processes that produce captured emissions, eliminating the models ability to produce negative emissions in industry

Sector	
Services	<ul style="list-style-type: none"> • BASELINE DATA: <ul style="list-style-type: none"> i. Mapped 2012-2015 emissions to match the latest greenhouse gases inventory. ii. The share of Scottish non-domestic building energy demand as a share of the UK has been updated to the most recent data available on non-domestic energy consumption share. iii. Ensured a minimum share of non-electrical heat in services is supplied by biomass boilers, reflecting current activity. • FUTURE TRENDS: <ul style="list-style-type: none"> iv. Incorporated smart meters into the model with updated energy savings potential drawing on the UK Government cost-benefit analysis of the smart meter roll-out. v. Updated the energy saving potential of phased conservation measures in TIMES in the services sector.

Sector	

Transport	<ul style="list-style-type: none">• BASELINE DATA:<ul style="list-style-type: none">i. Mapped 2012-2015 emissions to match the latest greenhouse gases inventory. • FUTURE TRENDS:<ul style="list-style-type: none">ii. Biodiesel has been set an upper limit as a share of fuels in cars, vans, buses and trains for all periods. • POLICY ISSUES, FUTURE TRENDS:<ul style="list-style-type: none">iii. The Transport emissions profile for cars and vans has been updated to reflect the impact of the Programme for Government announcement. • MODELLING IMPROVEMENTS:<ul style="list-style-type: none">iv. Aviation and shipping emissions cap has now been modified so that it includes all domestic technologies, as some were missing from the cap definition (but still being captured elsewhere in the modelling).
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Sector	
Waste	<ul style="list-style-type: none"> • BASELINE DATA: <ul style="list-style-type: none"> i. Updated data for inorganic/ organic municipal solid waste, organic waste, and landfill gas, that is available for energy use. ii. Incorporation of the latest 2015 greenhouse gases inventory data. The 2015 Greenhouse Gas Inventory used a Scottish model of landfill emissions, whereas the 2014 Greenhouse Gas Inventory, used in the draft Plan, was based on a disaggregation of a UK model. • FUTURE TRENDS: <ul style="list-style-type: none"> iii. Waste emissions have been realigned to the revised 2015 greenhouse gases inventory, and an updated profile of landfill and waste management emissions has been incorporated.

Sector	
Other fuels	<ul style="list-style-type: none"> • FUTURE TRENDS: <ul style="list-style-type: none"> i. Updated assumptions regarding the potential availability of future biomass have been incorporated. These assumptions have been sourced from a study commissioned by BEIS from Ricardo, the latest emissions and land-use projections from the Centre for Ecology and Hydrology (CEH), the Forestry Commission (FC) and DEFRA. They represent a reduction in the amount of biomass available across the system. ii. Constrained the application of hydrogen with natural gas in the existing gas network over the period of the Climate Change Plan.