Appendix 2

Update of consultancy studies approved within the Climate Change Strategy (CCS) for 2020-2030.

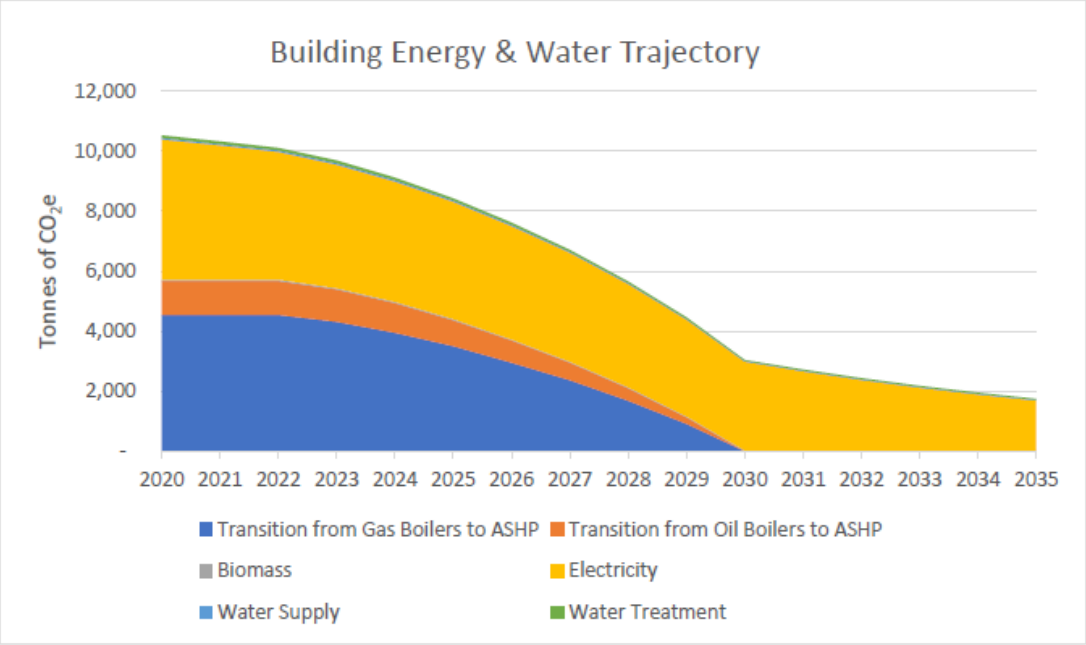
Contents

Buildings Decarbonisation Strategy

Net Zero Carbon Emissions Trajectory for the Corporate Estate

Executive Summary

The trajectory below shows a projection of the carbon emissions for energy and water from buildings operated by Moray Council if efficiency measures are improved and heat pumps are installed in buildings (includes emissions from street lighting).

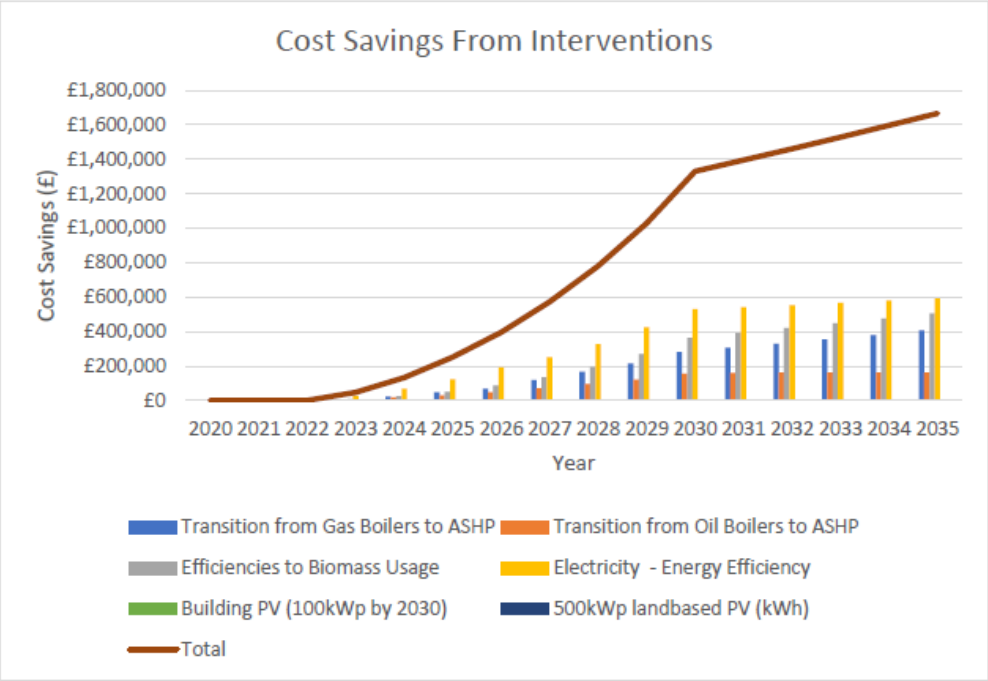


This represents an overall saving 7,490 of tCO_2e (71%) when comparing 2020 to 2030.

It is estimated that there will be 3,043tCO_2e from hard to reduce sources that will be unavoidable by 2030 that will need to be offset, and it is assumed that this can be offset through a 500kWp solar farm and a tree planting scheme which will cost £524k combined.

Carrying out the recommended initiatives will result in financial savings over the term as shown in the chart below:

Chart showing the energy cost savings of installing all recommended initiatives



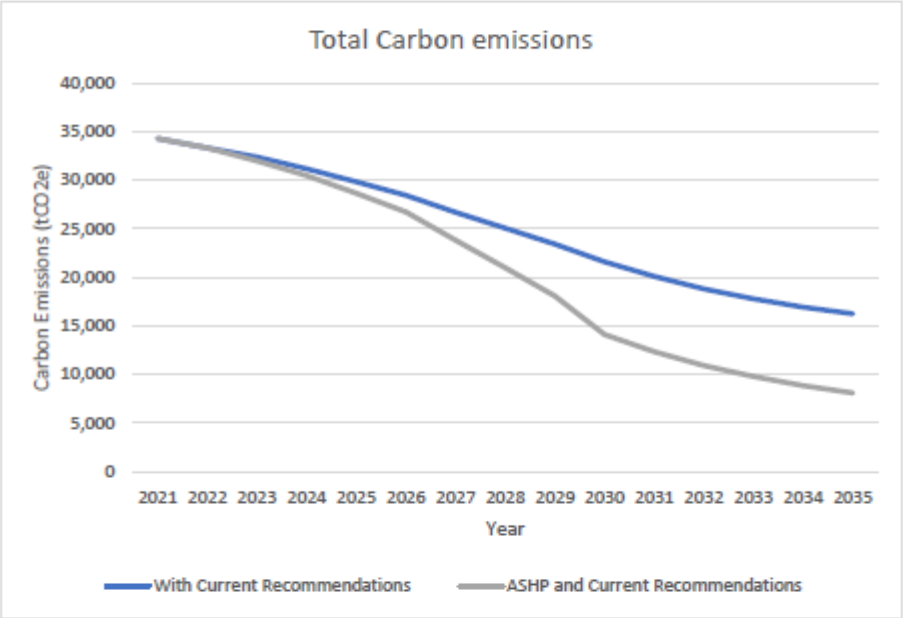
It is estimated that a financial budget of £19.8 million is required to reach net zero carbon by 2030 for corporate assets by being more energy efficient in buildings, installing air source heat pumps, generating power, and developing a tree planting scheme. It is estimated that these initiatives will financially benefit the Council by £1.3million in 2030.

Executive Summary

The Council has nominated 2030 as the net zero carbon year. The trajectory shows that the carbon emissions will reduce from 34,283tCO_2e in 2021 to 14,085tCO_2e by 2030 if Air Source Heat Pumps (ASHP) are installed to 80% of houses and recommendations from the domestic Energy Performance Certificates (EPC's) are delivered. This represents a carbon saving of 59%. This is the amount of carbon that will need to be offset to balance the emissions that cannot directly be removed based on current technology and within a reasonable budget.

The trajectory below shows the projected carbon emissions based on the recommendations in the EPC and what the emissions could be if ASHP are installed.

Total Carbon Emissions for All Dwellings Trajectory 2021 to 2035



It is estimated that a financial budget of £61.9 million is required to reach net zero carbon by 2030 for the housing estate by reducing heat loss, installing air source heat pumps, generating power and developing a tree planting scheme.

This trajectory is intended to be a live document that should be continually updated as more accurate information is made available such as dwelling energy usage, energy saving initiatives required/delivered and cost of measures.

MOTT MACDONALD

Moray Hydrogen Strategy - Current Status

February 2022

1 Hydrogen Strategy Status

1.1 Stakeholder Analysis

We have approached over 70 stakeholders located in Moray and the north of Scotland including local industry, local government organisations, and the wider community. We are very pleased with the level of engagement and interest from local businesses and community groups. Many organisations and individuals in Moray demonstrate a high degree of awareness of Scotland's net zero objectives, they are committed to decarbonisation, and willing to work with Moray Council to support and develop a hydrogen economy. Some stakeholders, such as the distilleries, are working on their own decarbonisation plans, whilst many others have not started their journey yet and would welcome support for Moray Council.

Notable findings so far:

- The AES Solar feasibility study for Cooper Park / Lossie Green – option to expand this to generate Hydrogen from Solar.
- Ardmore Distillery, application for BEIS grant funding
- Edrington Group (The Macallan and Glenrothes Distilleries), interested in becoming involved
- Ocean Winds (Caledonia Offshore Windfarm), interested in collaboration in Moray for hydrogen production and conversion of crew support fleet at Buckie
- Local transport companies – are investing in Hydrogen vehicles and keen to engage with Moray Council.
- Buckie Harbour Masterplan, opportunities for hydrogen
- Moray West Offshore Wind Farm, interest in hydrogen production
- Port of Cromarty Firth and allied stakeholders; potential opportunities for Moray
- RAF Lossiemouth – opportunity for development of a pilot project with Moray Council to create a small-scale Hydrogen hub to fuel hydrogen vehicles.
- Crown Estate, able to support Moray

From the engagement carried out, it is evident that there are companies who are seriously considering generating and supplying hydrogen and a significant number of companies who would have a demand for Hydrogen.

It is also clear at this early stage that collaboration of national and local government (Moray Council and adjacent Councils), industry and communities will be crucial for the development of a Hydrogen economy within Moray.

1.2 Demand Analysis

The main users of energy within Moray have been identified and mapped. We've obtained most of the data we need on the major buildings/distilleries etc. and will present our findings graphically, along with explanatory text outlining key findings from discussions with stakeholders. We've also identified some of the transportation information and are following up on the remaining information we need.

1.3 Hydrogen Production

Our team are currently evaluating the potential electrolyser sizes and technology selection based on our demand forecast. Our initial thinking is to consider options for electrolysers or hydrogen storage (including potential pilot projects) at specific locations and show the sequencing as part of the short-, medium-, and long-term actions. The following locations are being considered:

- Offshore wind farm cable landing sites (at costal locations or close by), to take advantage of any excess capacity.
- Elgin, for transport users including Moray Council HGVs.
- Lossiemouth (as part of potential collaboration with RAF Lossiemouth)
- Buckie Harbour, for offshore wind farm crew transport vessels (and longer term for fishing)
- Blackhillock, for power access
- A Distillery (to be identified) or cluster of distilleries, to encourage decarbonisation.

1.4 Other Activities

We have started to evaluate the long-term options and impacts on the gas and power networks within Moray. The information supplied by SGN via Moray Council is very useful, along with our in-house data.

The economic modelling and social analysis have also been started in line with our schedule. We appreciate the input from Moray Council for our social impact analysis.

1.4.1 Media Impact

- The press release has been published on our website:

  Mott MacDonald to develop hydrogen strategy for Scottish local authority - Mott MacDonald

- It has also been published on LinkedIn here: https://www.linkedin.com/posts/mott-macdonald_mott-macdonald-to-develop-hydrogen-strategy-activity-6901545792105242624-4K6j

- The study has also been published by Infrastructure Intelligence here: Mott MacDonald to develop hydrogen strategy for Moray Council | Infrastructure Intelligence (infrastructure-intelligence.com)

- We are pleased to say *New Civil Engineer* has also picked up the story:

  Motts to develop hydrogen strategy for Scottish council | New Civil Engineer

Interim Note

Background

Announced in 2017, the Scottish Government pledged to phase out new petrol and diesel cars and vans in Scotland by 2032. In the context of a global climate emergency, this commitment to transition to Electric Vehicles (EVs) places EVs central to the strategy to tackle climate change in Scotland, with outcomes as a result of this transition having a positive impact on noise pollution, air quality and health, in addition to a reduction in greenhouse gas emissions.

In support of the EV transition, the public sector in Scotland has led the provision of charging infrastructure. Since 2013, Transport Scotland have invested in a national base network of charge points named ChargePlace Scotland, with the aim of making EV ownership accessible for all. For charge points in Moray, a flat rate tariff has been in place since these were installed in 2014. However, Moray Council propose to introduce a variable tariff based on consumption. Work on potential tariff structures forms part of this study and will conclude with a recommendation.

Moray Council's Climate Change Strategy 2020-2030 sets out the Council's vision and ambitions to achieve net zero carbon emissions by 2030. To support this vision, Moray Council have commissioned the development of this EV study, with a focus on future charging infrastructure and decarbonising the Council's fleet of vehicles. This study will directly support the reduction in carbon emissions by accelerating the transition to EVs through an evidence-based action plan which will identify strategic actions and delivery recommendations.

What is the main purpose of this study?

Moray Council have been undertaking various workstreams across the broad area of electric mobility which has resulted in the procurement of this commission to support with the development of an electric vehicle charging study. The study has been split into two distinct areas which can be summarised as follows:

- **Public Use of On-Street and Off-Street Charging Infrastructure:**
    - Prioritising a list of locations for EV charging investment which will need to consider the types of chargers required at each site, the suitability of grid connections and associated high level costs.
    - Provide advice on available technologies for on-street residential charging for properties that do not have a driveway.
    - Investigate alternative financial charging mechanisms that could be adopted by the council as part of EV charging network operations.

- **Decarbonising of the Council's Own Fleet:**
    - Technical support to the council to determine an approach and understanding of how the existing council estate will need to be adapted to accommodate future fleets.
    - Examine opportunities for co-locating charging infrastructure in the facilities of partners.
    - Investigate future strategies in regard to larger vehicles.
    - Detailed engagement with the DNO to understand capacity options and the level of upgrades required to service the new fleet.
    - Working with the council's fleet management team to develop a cost profile of the replacement along with the benefits that this will generate.

This interim report sets out work to date, including analysis of data around EVs and public charge points in Moray, infrastructure recommendations, and advice on on-street residential charging. A separate document is being produced to detail outputs of the Council fleet focused technical work.

What is the current situation with EVs in the UK?

Buying and driving an EV can feel intimidating for many people and there is a general lack of awareness about the benefits and practicalities of driving an EV. There are however some real-world barriers and constraints to transitioning the private car fleet to EVs that have been considered which are explained below:

- **Range of vehicles** – One common perceived barrier to driving an EV is the real-world range of vehicles before recharging is needed. However, new buyers of EV are experiencing much greater range than early adopters and typical ranges have gone from less than 100 miles to 200+ miles. 200+ miles electric range is more than adequate for the vast majority of UK drivers' daily driving requirements which are below 20 miles per day, meaning daily charging is unnecessary. Even company car users whose annual mileage is quoted as 17,500 miles typically don't exceed 70 miles daily so electric range should be adequate for most daily mileage requirements.
- **Choice of vehicles is expanding** – There are now over 200 plug-in car models available on the UK market, including more than 60 plug-in hybrids (PHEV), more than 140 full battery electric models (BEV).
- **Price of vehicles** – EV prices generally remain high, although a number of models have come to the market in 2021 priced under £40K with battery capacities up to 60 kW. The second-hand EV market is still small though and many independent second-hand dealerships leave this limited market to franchised dealers. Due to the falling price of batteries and increasing maturity of vehicle production techniques it is estimated that price parity between EV and petrol/diesel vehicles will occur in the mid to late 2020s.

- **Charging of vehicles** – One of the most often cited barriers is the lack of charging infrastructure. Currently, there is a range of charging infrastructure types and connectors which differ across vehicle manufacturers and models; however all manufactures (with the exception of Tesla) are working towards the Open Smart Charging Protocol meaning charging types and connectors will become standardised in the coming years. As noted previously, ChargePlace Scotland is a national network of change points, which has continued to expand across the country providing a base charging network for all.
- **EV charging technology is evolving rapidly** – Prior to 2016, most technology charged at 3kW alternating current (called slow charging), which was adequate to fully recharge most batteries (typically up to 24kWh) overnight. With the development of vehicles came fast 7kW alternating current charging, and with the introduction of higher capacity batteries, direct current fast, rapid and ultra-rapid charging technology has since become available that (providing the vehicle is compatible) recharges vehicles much quicker. Scotland's public charge point network is the most comprehensive in the UK outside of London. There are 49 public charge points per 100,000 people, and 12.5 public rapid charge points per 100,000 (highest in the UK)[1].
- **Supply of vehicles** – Consumers currently report long waiting times for EV purchases, and there have been instances of models being removed from sale for periods in the UK due to an excess of demand over supply. This constrained supply also affects the price of EVs and has consequential impacts on low utilisation of charge points, leading to challenges for sustaining and planning a cohesive public charging network. The lack of production capacity is a global issue, originating in vehicle production plants and battery production facilities across the world. Investment in manufacturing facilities for batteries and vehicles is gathering pace with significant recent announcements in the UK[2], however further expansion of capacity is needed in the coming years. Despite this, the Draft Vision for Scotland's Public Electric Vehicle Charging Network (January 2022) states that 21.4% of new car sales in Scotland were electric in December 2021, suggesting that there is an increased uptake in EVs. It remains to be seen whether supply can keep up with demand in 2022 and beyond.

[1] https://www.transport.gov.scot/media/50970/a-network-fit-for-the-future-draft-vision-for-scotland-s-public-electric-vehicle-charging-network-pdf.pdf
[2] https://www.reuters.com/business/retail-consumer/nissan-bets-big-uk-with-ev-battery-plant-new-crossover-2021-07-01/

Summary

Key points researched to date are:

- There are real world constraints to transitioning to EVs including: range of vehicles, choice of vehicles, price of vehicles, charging of vehicles, EV charging technology and vehicle supply. Despite this, significant advances have been made, although the limited supply of vehicles is a threat in the near to medium term.
- Between the end of 2016 and 2020 there has been an increase of 220% in the number of public chargers (UK).
- Uptake of vehicles in Moray is higher than surrounding Local Authorities. However, based on forecasts, significant acceleration is needed in EV uptake to meet Government targets.
- Within Moray, charging infrastructure is predominantly concentrated within the main strategic settlements which is expected given the population density of the areas, and also near to the main strategic routes – A95 and A96.
- Regarding sites that may come forward in the future independently (commercial sites) through investment by supermarkets and charge point operators, these are located in dense urban areas with fewer potential commercial sites located in smaller towns e.g. Lossiemouth which could be a focus for intervention.
- The model suggests that by 2030 there will be approximately 16,000 EVs in Moray with an increase in the growth rate of EV uptake in the second half of the 2020s.
- The modelling assessment shows that the roads with the highest volume of EV traffic are being driven not by the higher population areas within Moray, but rather the cross traffic moving East-West.
- There are many considerations when implementing on-street charging such as TROs, charge point types, locations and charging frequencies. When specific locations have been determined, the charger speed and type of charger needs to be considered to select the most appropriate solution.

Work is ongoing in the following areas and the final report will include recommendations on:

- Locations for additional EV charging to be implemented.
- A tariff structure that will provide competitive prices for the consumers while remaining cost-neutral for the Council.

A separate document is being produced to detail outputs of the Council fleet focused technical work.