SUSTAINABILITY MANAGEMENT PLAN 2020-2025

Towards a Carbon Neutral and Environmentally Sustainable Irish Aviation Authority

Glossary of Terms

ATC	Air Traffic Control
ANSP	Air Navigation Service Provider
CO2	Carbon Dioxide
DATCC	Dublin Air Traffic Control Centre
DCCAE	Department of Communications, Climate Action and Environment
EPO	Energy Performance Officer
GWh	Gigawatt hour
HQ	Head Quarters
IAA	Irish Aviation Authority
BMS	Business Management System
ISO	International Standards Organisation
kWh	Kilowatt Hour
LED	Light Emitting Diode
LTHW	Low Temperature Hot Water
MW	Megawatt
MWh	Megawatt Hour
NAC	North Atlantic Communications
NOCP	National Operational Contingency Plan
NOEMP	National Operational Environmental Management Plan
NZEB	Near Zero Energy Buildings
PV	Photovoltaic
PPA	Power Purchase Agreement
RES-E	Renewable Electricity
SEAI	Sustainable Energy Authority of Ireland
SES	Single European Sky
TFC	Total Final Consumption
TPER	Total Primary Energy Requirement
VRF	Variable Refrigerant Flow

Executive Summary

The IAA is setting out a Sustainability Management Programme (SMP) on climate action. The requirement for each public body to create a SMP was mandated by the Government in the 2019 State Climate Action Plan.

The aim of this document is to outline how the IAA plan to achieve net carbon neutrality (excluding operational contingency & resilience requirements), reduce energy consumption and promote environmental sustainability across the organisation. As part of this plan, the Irish Aviation Authority is setting out how to implement and govern the programme to ensure it will be successful.

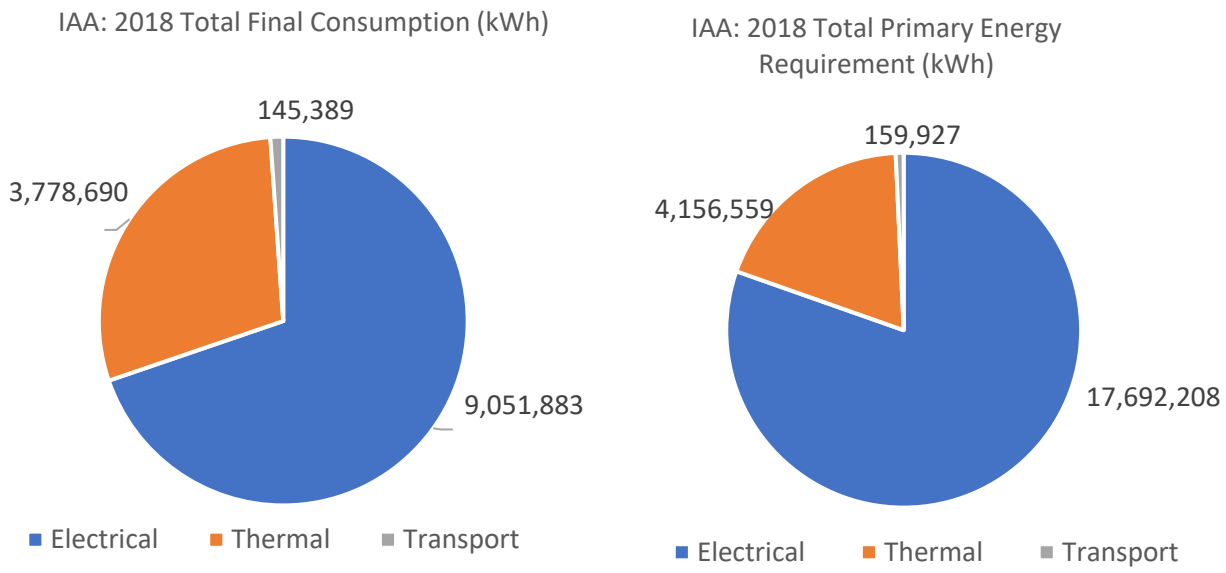


Figure 1: Total energy use in total final consumption and primary energy

The Irish Aviation Authority (IAA) used 13GWh of energy (metered consumption), equivalent to 21.6 GWh of primary energy and produced c. 78 tonnes of waste (over 50% recycled) in 2019. This Sustainability Management Plan 2020-2025 coincides with Reference Scenario 3 under the EU SES program for the safe and efficient operation of a "Single European Sky".

The overall ambition of the Irish Aviation Authority is to aim to achieve net carbon neutrality by 2025.

This plan contains the following objectives:

Objective 1: **As a minimum, achieve a 50% energy efficiency improvement by 2030.** This is a follow-on objective from the 33% by 2020 energy efficiency target – which the IAA is currently ahead of target on.

Objective 2: **Measure and offset employee business aviation travel CO_2 equivalent - into the Government's Climate Action Fund.** This is mandated by Government in the 2019 Climate Action Plan.

Objective 3: **Reduce IAA internal business transport energy use and shift to electrified transport where practicable.**

Objective 4: **Procure renewably sourced electricity in 2020.**

Objective 5: **Reduce waste generation by 50% per employee by 2025. Eliminate single use plastics in favour of reusable items. Recycle 90% of paper, cardboard, metal and glass generated in the IAA operations**. Systematically assess each waste stream and establish a reduction plan for each item including paperless actions.

Objective 6: **Define and implement biodiversity management in line with the "Biodiversity for Business" management framework**. This will consist of a site by site ecological

assessment and mitigation plan in addition to education and awareness activities with related incentives for staff.

Objective 7: **Strive to be leaders operationally and achieve the targets set down by the EU Single European Sky initiative (supporting reduction of aircraft fuel use).**

Objective 8: **Fully implement effective green public procurement** across all business activities.

Objective 9: Leverage our Sustainability Management Plan and achievements to **promote climate action with our stakeholders, key partners, suppliers, contractors, service providers and wider society.**

Objective 10: **Aim to become net carbon neutral by 2025** (excluding operational contingency and resilience requirements).

As a public body, the IAA has an obligation (as defined in SI 426 of 2014) to achieve a 33% energy efficiency improvement by the end of 2020. The most recent IAA results published by the Sustainable Energy Authority of Ireland (SEAI) reflect our energy use to 2018 and show that IAA energy efficiency improvement projects have delivered energy efficiency savings of 37.6% - ahead of the 2020 (33%) target. However, these results do not include the energy impact of the new Dublin Visual Control Tower once the new parallel runway is operational or other planned new facilities e.g. new radar station.

The Irish Aviation Authority has invested in a significant number of specific energy actions across 5 sites over the last three years with estimated savings of 750 tonnes of CO_2 & 2.5 Million kWh of energy. These results were achieved by completing building insulation upgrades, lighting upgrade and installation of new low energy heating and cooling systems.

The IAA will, over the next 5 years:

- Replace building plant and equipment with more energy efficient equivalents.
- Any substantial building renovations or new buildings to be constructed to Near Zero Energy Building (NZEB) standard.
- Reduce/eliminate fossil fuel usage where feasible.
- Measure and offset employee business aviation travel CO_2 equivalent.
- Transition the operational fleet from fossil to electric vehicles, where practicable and install supporting infrastructure.
- Procure renewably generated electricity.
- Complete biodiversity assessments and projects across IAA centres and remote sites.
- Develop resource efficiency (food, water, waste) strategies to reduce waste generation per capita by 20% across all IAA premises by 2023 and 50% by 2025.
- Embark on a sustainability education and awareness campaign to achieve the above objectives.

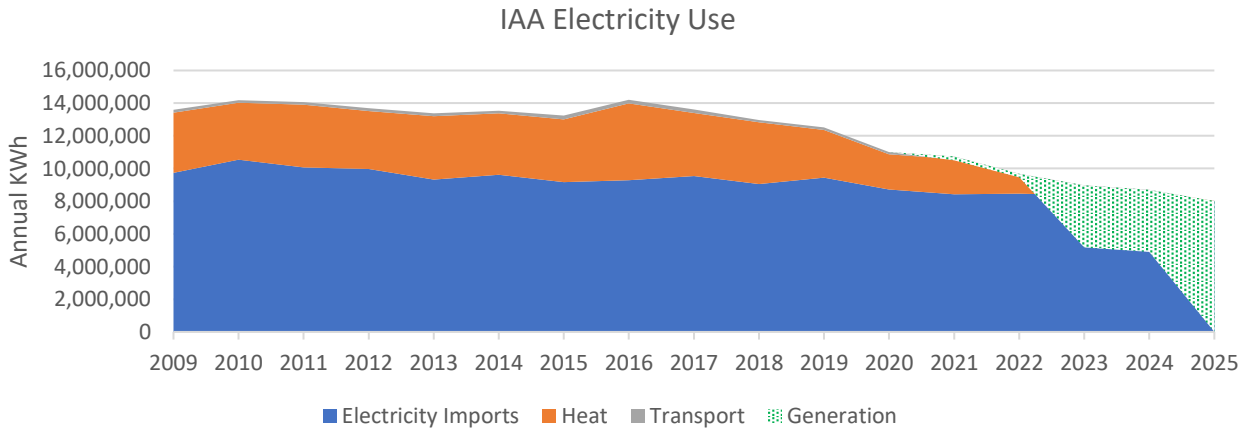


Figure 2: IAA Electrical energy use

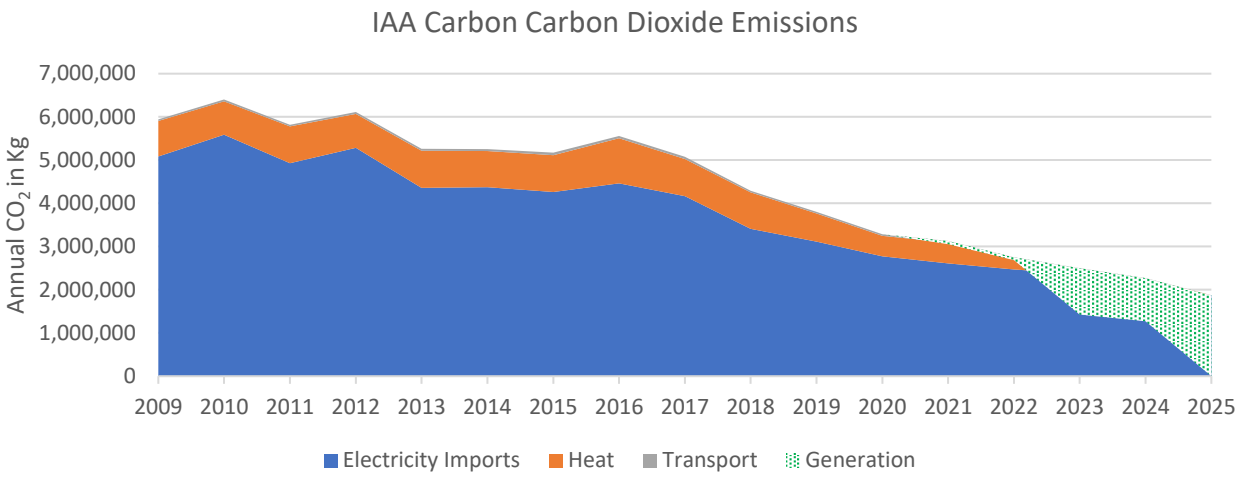


Figure 3: IAA carbon dioxide emissions

The IAA will establish a cross functional 'Sustainability Team' to implement this Sustainability Management Plan which shall be chaired by the company's Energy Performance Officer (EPO). It will report directly to the senior management team and publish results and actions annually. In addition, the IAA will endeavour to normalise the climate and energy transition through engaging with a variety of internal and external stakeholders as well as existing and new competent third parties.

1 Mandate for Climate Action

1.1 Aim

The 2019 Government Climate Action Plan has mandated all public bodies to achieve a 50% energy efficiency improvement and a 50% CO2 reduction by 2030. The IAA are committed to achieving the 50% energy efficiency improvement by 2030 but aim to exceed the CO2 target - targeting net carbon neutrality by 2025 (excluding contingency and resilience operational needs).

The IAA also aim to decrease our impact on the natural world by enhancing the sustainability of our business. The establishment of a competent Sustainability Team, led by the EPO, appropriately resourced and funded, with a clear vision and strategy directed by the IAA Executive Group will ensure the successful delivery of the programme and achievement of the objectives. This will ensure the IAA continues to build on its already established programme of energy efficiency and drive environmental sustainability innovation.

1.2 Implementation

The Sustainability Management Program will be implemented as part of a management system (certified to ISO 9000) which is currently used for management of the IAA quality/business management systems. The IAA may also consider the implementation of the ISO 14000 (Environmental Management) and/or the ISO 50001 (Energy Management) standards in the future.

The Sustainability Team will meet at least twice per annum, more frequently initially:

- A Sustainability Team will be established with relevant terms of reference and reporting structure
- All actions will be compiled on a central register of opportunity under the headings: a) Energy, b) Transport, c) Waste, d) Biodiversity, e) Green Public Procurement.
- Objectives and associated key actions will be developed for implementation as part of the annual Sustainability Management Plan. Each objective and key action will be costed, approved and budgeted for under the normal budgeting process.
- The Sustainability Team will be responsible for the oversight and co-ordination of the implementation of the objectives and key actions noting that internal/external resources, stakeholders and competent third parties will be required.
- The Sustainability Team will be chaired by the organisations Energy Performance Officer (Head of Corporate Affairs) and the members will be competent and have adequate resource time allocation to effectively delivery the objectives and key actions.
- The IAA's sustainability management team, with responsibility for energy and environment, shall be appropriately resourced to effectively implement the programme with an adequate allocation of both full and part time resource capacity. Key champions from each area of the business will be required to support the team in the delivery of the programme nationally.
- Training and access to competent consultants to enable the team to effectively deliver on their obligations will be provided where required.
- The sustainability management team, via the EPO, will report annually to the Executive Group.

2 Energy Balance

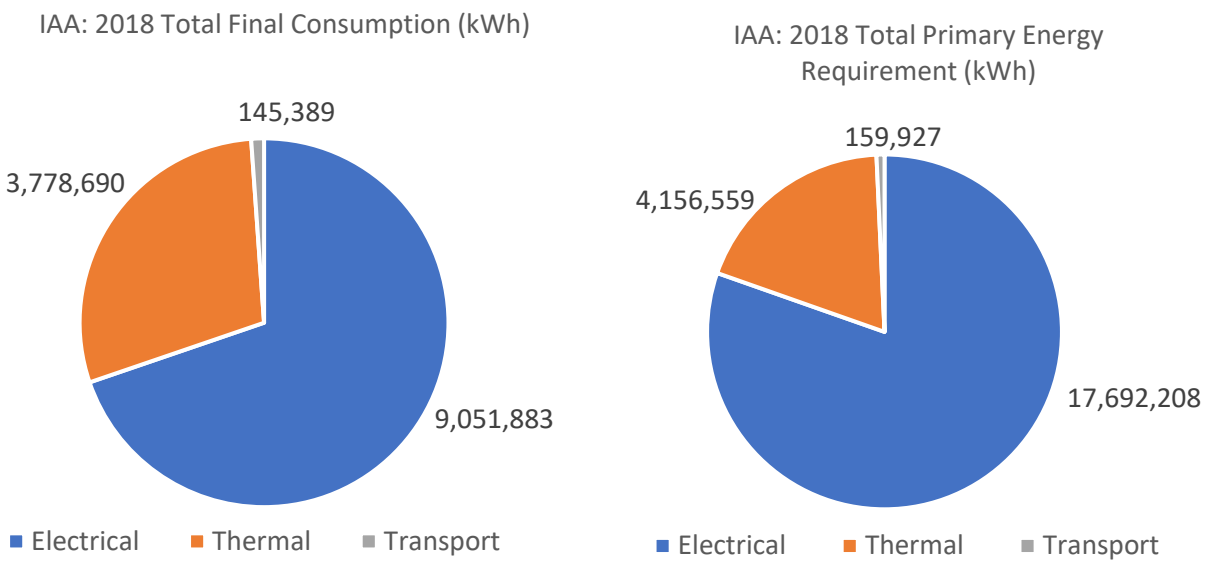


Figure 4: Total Energy use in total final consumption and primary energy

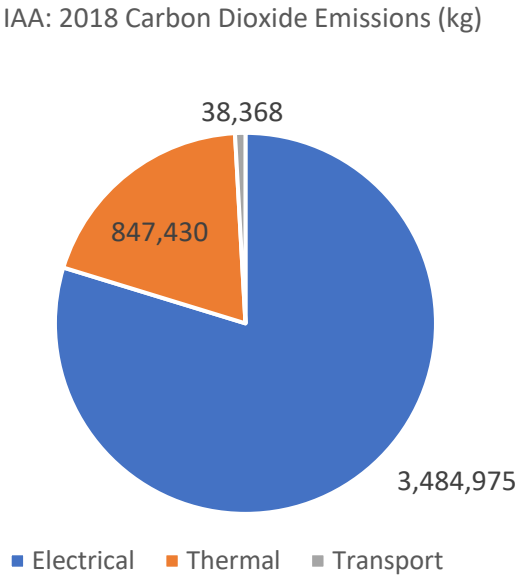


Figure 5: Energy related carbon dioxide from IAA activities

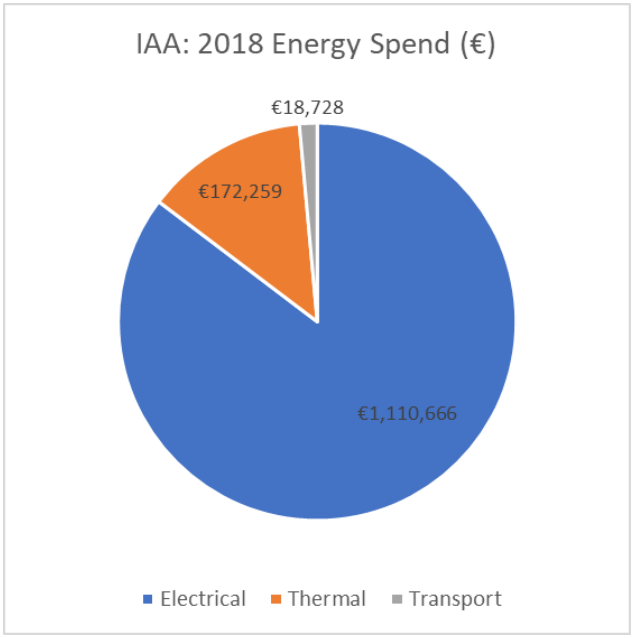


Figure 6: Annual energy costs arising from IAA activities.

2.1 Facilities

The IAA's facilities are responsible for much of the authority's energy use, related cost and CO_2 emissions. They also have the largest potential energy and emissions saving potential. To date a substantial amount of work has been completed under the IAA's Energy Programme 2016-2020 which included estimated savings in the order of 2.5GWh or a little over 18% of the authority's energy use from the 2016 baseline. Many of these investments have been supported by the Sustainable Energy Authority of Ireland's public sector and communities' programmes.

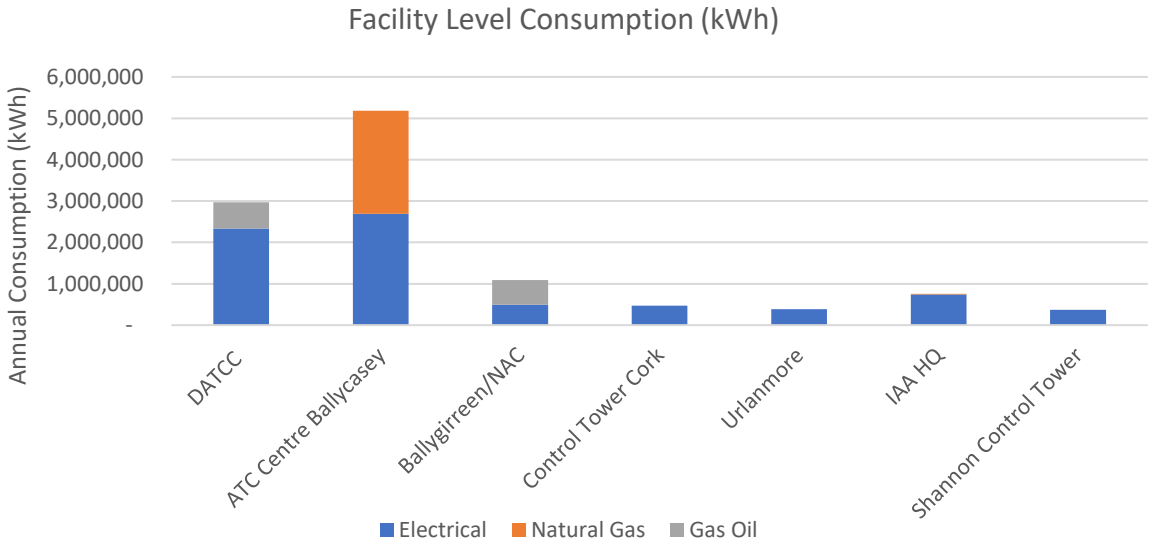


Figure 7: Energy use in IAA facilities

Note: These seven IAA Facilities account for 83% of IAA's electrical consumption, 100% of natural gas consumption, 99% of gas oil consumption, and 87% of overall consumption.

2.1.1 SEAI Monitoring and Reporting results

The IAA has an obligation under the EU Energy Efficiency Directive (as promulgated via SI 426 of 2014) to achieve 33% energy efficiency savings by the end of 2020. The most recent SEAI results to date reflect the IAA's energy use in 2019 and this shows the IAA delivering savings of 41% - ahead of the 2020 glidepath. However, new facilities such as the Visual Control Tower Dublin and a planned new radar site will impact on the overall savings once they are fully commissioned and operational. This plan sets out the actions to exceed the new 2030 public sector targets of 50% energy performance improvement and an absolute reduction in 50% of CO_2.

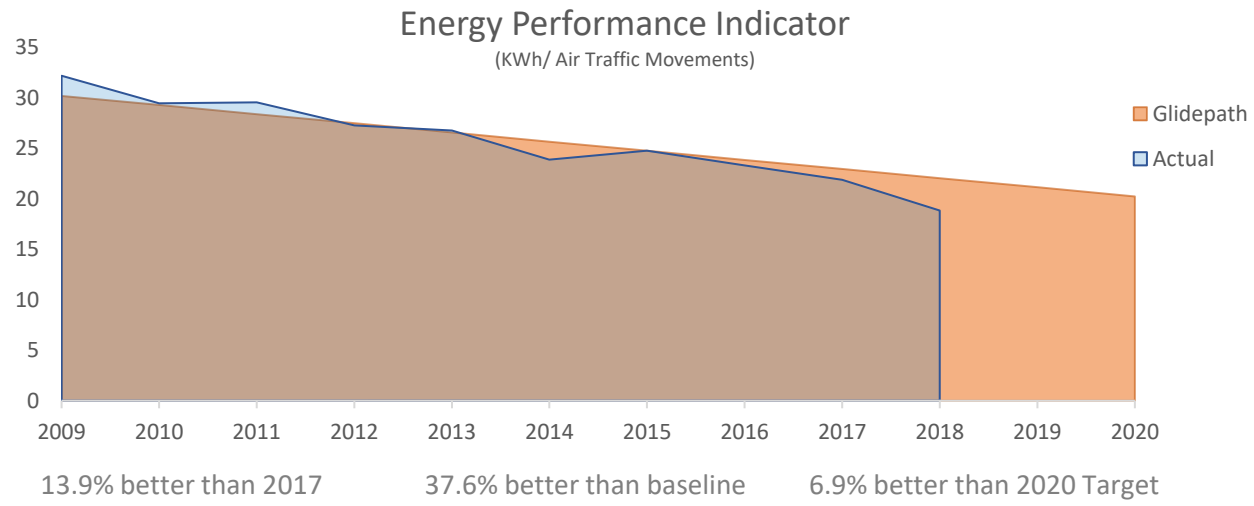


Figure 8: Energy Performance *Improvement* from 2009 Baseline (SEAI)

2.1.2 Action to Date

Initial energy audits were carried out at all key IAA sites between 2016 and 2018. Arising from these, several energy-saving measures were identified, with a focus on energy efficient heating and cooling systems, replacing existing fluorescent light fittings with LED's, service pump replacements, and building fabric insulation upgrades. All measures proposed provide for energy savings, but also had ancillary benefits, for example, improved lighting levels and thermal comfort.

Figure 9: New high efficiency service pumps installation at IAA facility

Figure 10: New VRF heating and cooling system and new LED lighting installation at IAA facility

2.2 Sustainability Management Plan for Energy

The IAA's strategy for mitigating its energy related environmental impact on climate change is straight forward in principle but will be challenging in implementation and will require mobilisation of all IAA staff and dedicated resource allocation. This is effectively a simple strategy of waste elimination, efficiency, HVAC electrification and renewable energy procurement.

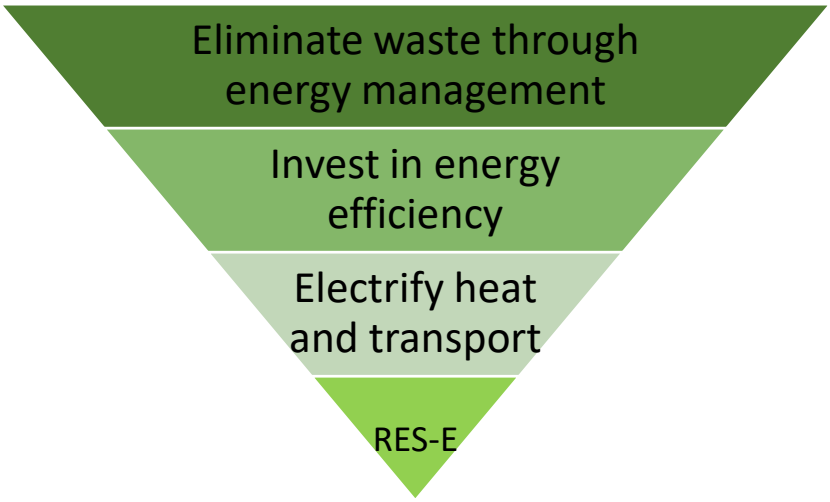


Figure 11: Sustainability Management Plan for Energy

2.2.1 Energy Efficiency in Facilities

The IAA's energy use includes a significant amount of energy for building heating and lighting. Over the last 3 years a substantial investment has been made in building renovation and energy efficiency improvement.

The long-term strategy for energy efficiency at IAA Facilities is as follows:

- When building new or renovating IAA facilities - complete to a Near Zero Energy Building (B2) standard or better.
- Complete energy audits and plant/equipment life-cycle analysis at all main IAA Facilities and invest in energy efficiency opportunities.
- Replace outdated air handling and cooling systems with state of the art VRF air-conditioning systems that allow simultaneous heating and cooling with heat recovery.
- Ensure that all building plant and equipment is replaced using the highest energy efficiency rated equipment from the triple-E register, where practicable.

- Transition from fossil fuels where practicable. *Note: Contingency and operational resilience requirements will require some existing fossil fuel heating boilers, back-up generators and specific fossil powered fleet vehicles to be retained.*

2.2.2 IAA Operational Equipment

The IAA's operational equipment (systems and navigational equipment) will be replaced at appropriate end of life cycles. While Triple-E equipment will be purchased where available, the nature and specialisation of the main energy using equipment will ensure that procurement is based on operational performance, resilience, safety and security concerns ahead of energy performance. However, energy performance will be included in life cycle cost assessments. It is envisaged, through modernisation and improvements in computing power per unit of electricity used that savings are likely with new equipment.

Figure 12: LED lighting installation

2.2.3 Thermal Fossil Fuel Use

There are three IAA facilities which account for the majority of thermal fossil fuel use within the IAA, namely;

- Shannon Centre, Ballycasey
- Dublin ATC Centre
- North Atlantic Communications, Ballygirreen

The IAA have already undertaken extensive energy upgrades to reduce fossil fuel dependency. Further energy efficiency upgrade works are planned within CAPEX programmes to replace existing HVAC air handling units as they reach end of life. Where operationally practicable, fossil fuel thermal heating systems will be electrified.

2.2.4 Cost Analysis

The IAA maintains a robust OPEX maintenance regime and annual CAPEX submissions are prepared to manage end of life replacements for critical infrastructure. Where HVAC air handling units noted above will be reach end of life over the next five years – they are scheduled for replacement within existing equipment capital budgets.

Figure 13: VRF heat recovery system installed in IAA Shannon Centre in Ballycasey

2.3 Sustainable Transport

The IAA operates a fleet of 17 vehicles using a total of 174,000 kWh of fossil fuel. The first electric vehicle in the Authority arrived in 2019 and the remaining will transfer to electric power where practicable over the period to 2025 (or as suitable vehicles come to market) and current vehicle leases expire.

2.3.1 Business Aviation Travel

The IAA has a large business travel aviation footprint. However, we also recognise the mandate in the 2019 Government Climate Action Plan, requiring public bodies to offset business air travel carbon at an initial rate of €26/tonne CO2 commencing for travel taken in 2020. The first payment due into the Governments Climate Action Fund will be in February 2021.

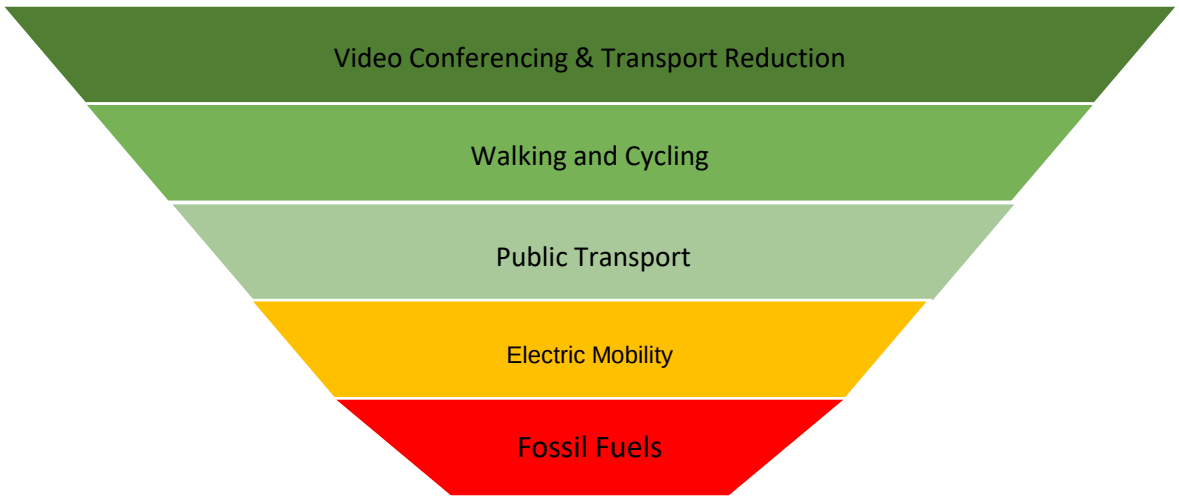
While it will be necessary for IAA staff to continue to undertake business travel, we will encourage the use of video conferencing and other remote working technologies where possible.

The IAA recognise that in order to mitigate climate change, limiting direct (Scope 1) carbon dioxide emissions will be our priority. We recognise that most of the IAA's efforts will be focused on reducing these emissions, but we will also aim to reduce indirect emissions from business aviation travel as well as offsetting.

2.3.2 Reduction in Transport Energy

In order to ensure that the IAA is supporting decarbonisation of transport, a specific set of sustainable transport actions will be developed, including the following actions:

- Ensuring widespread videoconferencing systems are available to use by the full organisation to limit the necessity for business meetings transport.
- The IAA will develop a detailed transport plan that will include all business travel related carbon emissions (in addition to the IAA operational fleet) and create a comprehensive reduction plan for these emissions.
- The IAA will continue to install facilities to allow employees shower when cycling or walking to work.
- Further promote the current Tax Saver public transport and Cycle to Work Schemes for IAA staff.
- The IAA will promote bus and rail public transport use among employees, where practicable. The HQ and DATCC locations are quite well served by public transport. However, this is more challenging at other facilities.



2.3.3 Vehicles

The IAA has 17 fleet vehicles, consisting of 4 company cars, and 13 operational/engineering support vehicles, all on lease. Of the 4 company cars, one is a battery electric Hyundai Kona. The operational/engineering support vehicles are a combination of estates, people carriers, MPVs, and off-road pickup vehicles.

Figure 14: Irish Aviation Authority's sustainable internal fleet transport strategy

Vehicle Type	No.	Current Vehicle	Lease Expiration
Engineering all-wheel drive support vehicle	4	Ford Kuga	2021, 2023 & 2024
Engineering 4x4 used to access remote radar/nav sites	3	Ford Ranger Pickup	2023
Operational transport	5	Toyota Verso	2023
Company fossil vehicles	3	Various	2020 & 2021
Engineering support vehicle	1	Skoda Fabia Estate	2020
Company electric vehicle	1	Hyundai Kona EV	2022
TOTAL	**17**		

The IAA's Senior Management are embracing battery electric vehicles with the first delivery of an IAA EV fleet vehicle in 2019.

Over the next 5 years, new electric vehicles are expected in the marketplace which are expected to be suitable for use in most areas of the IAA fleet. At the conclusion of the leasing period for each current vehicle, the IAA shall analyse the EV market, and if there are practical and economic EV alternatives available, they shall be chosen.

Figure 15: Hyundai Kona EV (IAA's first EV).

The IAA will procure all vehicles on the lowest life cycle costs using the new methodology and shadow price for carbon published by Government. There are several vehicles, particularly all-terrain pickup vehicles which the IAA use, where no suitable BEV or PHEV is available currently. This is expected to change in the next 5 years. TESLA, Ford, Rivian and other manufacturers are claiming that they will have all-terrain pickup trucks available in the marketplace commencing in 2021.

Figure 16: Electric pickup concept

By switching the IAA fossil fuel fleet vehicles to battery electric vehicles, c.17,000 litres of fossil fuel can be saved. Accounting for the electricity needed to power equivalent new electric vehicles, the annual energy required for transport would reduce by c.75%, from 174,610 kWh to an estimated 43,656 kWh.

2.3.4 Supporting Infrastructure

The IAA recognise the challenge of supporting staff to transition away from fossil fuel vehicles to electric vehicles (not withstanding our ambition to reduce the amount of travel needed). The IAA has already installed charging facilities in IAA facilities in Ballycasey, Ballygirreen, DATCC and the IAA HQ in D'Olier street. We will continue to roll out charging points, increasing the number as required based on an individual facility assessment. We will also, where requested, facilitate the charging of non-car based personal mobility vehicles (E-bikes etc.)

The IAA commits to providing charging facilities for EVs at all occupied sites, in line with local authority guidance.

Figure 17: EV charging point in IAA Ballygirreen

2.3.5 Costs of decarbonisation of transport

While the upfront cost of an EV is currently higher than a fossil fuel vehicle, the life cycle cost of an EV is reaching parity with the cost of a fossil fuel vehicle in 2020. As IAA vehicles are leased, it is likely that any increase in lease costs will be matched by the decrease in operational and fuel costs. It is expected that the decarbonisation of vehicles will reach cost neutrality over the period to 2025.

The minor costs associated with the provision of additional video conferencing, vehicle charging, and other small ancillary costs will be included in existing annual operational budgets.

2.4 Renewable Electricity

Considering the large energy demand attributable to IAA navigation, communication and IT equipment, the IAA recognises that a significant amount of renewable electricity will need to be generated or purchased to get the organisation to net carbon neutral. Following on from the electrification of transport and heating, the viability of renewable electricity improves for the organisation.

Detailed site by site technical analysis, taking cognisance of the following key challenges will be undertaken before renewable energy projects are progressed;

- Potential for interference with radio and radar communications. No installations will be made until a full and detailed interference study is completed to ensure no adverse interference is attributable to the Solar Panels, their DC wiring or their inverters.
- Sensitivity to special areas of conservation (SAC) on IAA's landholdings.
- Glint, glare and impact on neighbours
- Erection of large equipment (radio masts) and the required land sterilisation (from installation of renewable energy)
- Restriction of access and use of specific sites.

2.4.1 Self-Electricity supply potential

There are several potential scenarios of land based renewable generation which will be examined as a pathway to a carbon neutral IAA. It is envisaged that the IAA may seek to utilise a licenced electricity supplier to purchase and sell power on behalf of the Authority and to allow energy to be transferred between sites across the national grid. The IAA will also examine the potential of a corporate power purchase agreement or other third-party arrangement either on land owned or adjacent to IAA Facilities (within the limits of the Irish distribution grid regulations) or at remote locations.

The viability of solar PV installations at IAA facilities was assessed as part of previous energy audits. However, until such time as the IAA can verify that there is no risk due to electromagnetic interference to sensitive telecommunications and radar equipment, the IAA is not pursuing such installations on IAA sites at present.

The IAA recognises however that renewable energy systems will be a key enabler in achieving net carbon neutrality for the organisation.

With the changing nature of the electricity market, the implementation of the clean energy directive and other public policy initiatives noted in the Governments' Climate Action Plan, the IAA will review renewable options further in the 2020 to 2022 period.

2.4.2 Renewable Electricity Procurement

In the short term, the IAA will consider purchasing renewable electricity from an electricity utility provider in 2020.

2.5 IAA's Carbon Neutral Pathway

As the IAA aims to be carbon neutral by 2025, it is envisaged that we will need to have transitioned to c. 9 GWh of renewable energy by that point - sourced either directly or via a third-party arrangement e.g. Power Purchase Agreement. This renewable electricity (RES-E) requirement would be the equivalent of 20 hectares of Solar PV or one very large wind turbine (3MW at 30% capacity factor), or a mix of smaller turbines and solar PV in current technology terms.

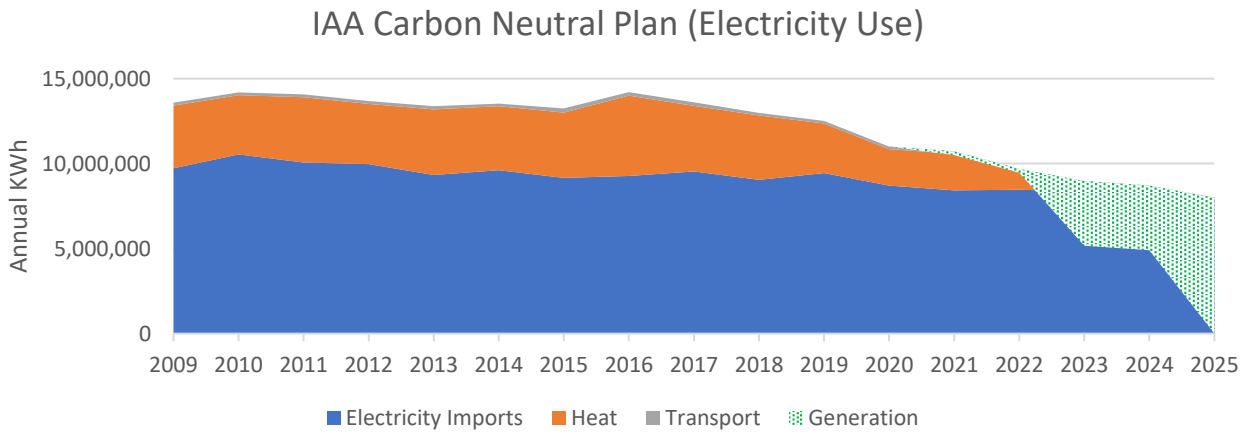


Figure 18: IAA's carbon neutral pathway in energy use reduction

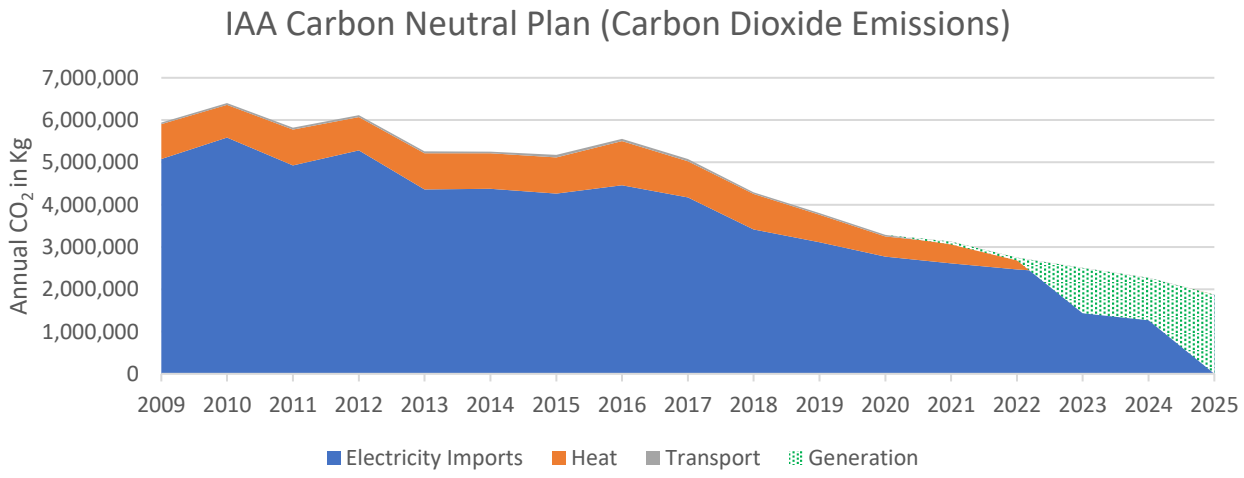


Figure 19: IAA's carbon neutral pathway in carbon dioxide emissions reduction.

The above graphics utilise real data up to 2018 and projected data from 2019-2025. They assume the energy efficiency upgrades in 2019 deliver as planned and that there is a continued modest improvement year on year of energy efficiency improvements (c. 3.5% per annum). It assumes that heat and transport are largely electrified by 2025. Note also the grid electricity is decarbonising as the EU Emissions Trading Scheme pushes higher carbon electricity sources away from the grid (gas v's coal), in addition to the construction of more renewable electricity generation installations across the island of Ireland.

As an indication of scale, the IAA renewable energy requirements by 2025 - would require a solar PV farm installation (or other renewable equivalent) in the order of two and a half times the solar array that is used to provide renewable power to Belfast Airport (pictured inset).

Figure 20: Belfast airport solar farm (image courtesy of Lightsource BP)

2.6 Food and Waste

The IAA has made significant progress over the last number of years in reducing waste but is certain there are further opportunities in the area of food and waste management. An analysis[1] of waste produced by the IAA is included below.

Table 1: Waste analysis at IAA facilities.

Waste Category	%	Kgs
Recycled Paper	48%	37,808
Total Mixed General Waste	38%	29,606
Total Dry Mixed Recycling Waste	7%	5,393
Total Organic [Food] Waste	5%	4,198
WEEE	2%	1,756
Waste Ink Toner	Neg	122
Glass	Neg	19
Total Waste	**100%**	**78,902**

2.6.1 Context

The IAA, have an obligation to meet the Government's Climate Action Plan 2019, which sets out several targets, including the following:

- Landfill Reliance Target:
    - Limit diversion of biodegradable municipal waste to landfill to maximum limit of 427k tonnes by 2020 and for every year after to reduce diversion of municipal waste to 10% by 2035.
- Recycling:
    - Recycle 65% of municipal waste by 2035.
    - Recycle 70% of packaging waste by 2030.
    - Recycle 55% of plastic packaging waste by 2030.
    - Separate collection obligations extended to include hazardous household waste (by end 2022), bio-waste (by end 2023), and textiles (by end 2025).
- Food Waste:
    - Reduce food waste by 50% by 2030.
- Plastic Single-Use Items:
    - Ban specific single-use plastic convenience items including polystyrene food containers, cups and drinks containers in line with Single Use Plastics Directive.
    - Provide for 90% collection of plastic drinks containers by 2029.
    - Determine and introduce reduction targets and measures no later than 2022 to be achieved no later than 2026.
    - Ensure all plastic packaging is reusable or recyclable

This is a national target, and all government departments, semi-state organisations, private enterprises and individuals have a role to play to meet the targets set out above. Additionally, while the measured emissions coming directly from waste management is small in comparison to larger emitting sectors such as transport, energy production and agriculture, this is a narrowed view of the impact of consumption. Under the Sustainable Development Goal 12, all countries must move towards more

[1] Excludes one contractor's waste from a managed service.

sustainable consumption and production practices. The less goods we consume, the less extraction, production, transport, and disposal emissions are released. For example, a study done by the Centre for International Environmental Law (CIEL) and others stated that in 2019, the production and incineration of plastic will produce more than 850 million metric tons of greenhouse gases—equal to the emissions from 189 five-hundred-megawatt coal power plants.'

The IAA is committed to improving the management of its waste stream. This will be achieved through better source separation of its three waste streams (residual, recycling and biowaste) and through effective waste prevention actions. To date, we have installed a three bin-system, reusable water containers, glasses and coffee cups in our kitchens and HQ conference centre and have a policy to collect batteries and electronic waste. There remains a reasonably large amount of disposable and single use items that the IAA can impact through a robust coordinated approach to reduce and better manage internal waste.

In order to radically reduce the waste streams the following actions have been categorised into two groups: those actions that can be achieved within 1-2 years and those that can be achieved over the next 5 years. These actions will form a part of the overall sustainability action plan/resource efficiency action plan.

The IAA commits to the following:

2.6.2 Short-term Actions (within 1-2 years)

- Increase its current recycling rates by at least 25% through better source separation of recycling and reducing the level of contamination. This will be done through education and interaction with IAA staff, cleaning staff contractors and the facilities management company as well as through better signage and collection systems.
- Ban the purchase and use of all single-use plastic items, such as disposable coffee cups, water cups, cutlery, plates stirrers, straws, milk jiggers (individual milk servings).
- Remove all individual desk rubbish bins in favour of several well-signed centralised, easily accessible waste segregation and recycling stations.
- Encourage all staff members to print on both sides of the paper and to forego printing where possible, moving towards a paperless office.
- Invest in reusable delftware, cutlery, glasses and coffee cups rather than choosing compostable substitutes. The IAA wants to move away from a 'throw-away' culture to a more reusable one.
- The IAA will provide a selection of reusable coffee cups and water bottles for staff as appropriate.
- The IAA will install water refill areas from mains water with appropriate filters to encourage the use of reusable water glasses or bottles to drastically reduce the number of disposable plastic bottles.
- The IAA will ban the sale of bottled drinks in plastic containers and move towards glass or aluminium containers or the installation of on-tap drinks systems.

2.6.3 Medium-term Actions (within the next 5 years):

- Conduct an audit of the canteen in the Ballycasey Centre to analyse its food preparation policy and food waste generation. Following the audit, update practices to reduce food waste at all levels, from preparation to plate waste. Adopt and activate a policy to reduce food waste by 30% by 2022 and 50% by 2025.
- Investigate the toxicity of current cleaning products to look towards buying and using more environmentally friendly products.

- As part of the overall waste management plan, the IAA will adopt several targets:
    - Recycle 90% of paper, cardboard, metal and glass generated in the offices by 2023.
    - Recycle 55% of all plastic packaging by 2023.
    - Aim to reduce overall waste generation per capita by 20% across all IAA premises by 2023 and 50% by 2025.

2.6.4 Third Party Providers

The IAA utilises third parties to cater in house and to bring in food for events. In order to ensure the IAA's sustainability goals are brought to life, several actions on policies, procurement and management of external parties is required.

- The IAA will create a sustainable food policy that outlines guidelines on the management of any food prepared on-site or brought in by a caterer and how to manage and reduce food waste. Such policy should promote the use of more locally grown and seasonal food, sustainably packaged food, offer more vegetarian/vegan options and reduce food waste.
- Develop a policy for off-site facilities that are used by staff for conferences or meetings to ensure that such facilities comply with the ethos outlined above, i.e., no single-use items and sustainable food preparation.
- Ensure that all food and organic waste is segregated in the kitchen areas and properly collected and treated by authorised waste management providers by 2021 to mirror the government's commitment to limit the amount of biodegradable waste going to landfill.
- Engage with the waste management company to ensure proper weights and contamination levels of all waste streams to measure success and identify barriers or problem areas.
- Consolidate the waste management companies from four regional companies to one to have a single entity that compiles waste generation data to compare progress between the different IAA premises.
- Implement these policies and guidelines through procurement and governance.

The establishment of any new policy along with new waste prevention actions is the first step towards creating a more sustainable consumption paradigm. However, there must be buy-in and support from the staff to engender effective behaviour change. To enlist the support of staff, a green team must be formed and empowered in each premise to tackle these new initiatives. The above approach is ambitious and goes beyond what is required by government and the EU. The IAA hopes to be industry leaders in embracing the circular economy by forgoing a linear approach to consumption.

2.6.5 Water

As part of the annual maintenance programs the IAA will:

- Complete leak detection audits as appropriate to ascertain whether there are any leaks within any of the IAA facilities. This will be an easy way to reduce water usage. A leaky tap can lose up to 20,000 litres of water per annum.
- Audit the current hardware being used in the kitchens and bathrooms with a view to installing dual flush toilets, sinks with sensors, flushable urinals and other water saving measures.
- Develop a water policy that will include design standards for all new developments and enhancements that includes water usage reduction requirements.

2.6.6 Waste Reduction Costs

The IAA in its analysis has ascertained that most measures in the areas of single use plastic reduction will be revenue positive in the short to medium term.

The IAA will work to eliminate desk bins and will work with the cleaning staff to empty bins only when full. This will reduce the number of plastic bin liners used and purchased as well as reduce amount of residual waste and its associated costs. Additionally, as the cost of collecting recycling material is less than the residual waste, properly segregating clean recyclable material will reduce waste management costs as well.

The cost of purchasing reusable cups, delft and cutlery should be minimal and offset by any plastic disposable items currently used. A survey of The Times Building did not reveal a significant usage of plastic cutlery, plates and cups, but a similar assessment of the other IAA buildings will be completed. The full cost implications and potential savings will only be affirmed when an analysis of current buying practices of disposable and other office items is tabulated. This baseline data is essential to compare with any investment costs of buying more reusable options.

A waste audit report will be completed at each occupied IAA building. This would include a baseline audit of the current waste situation and purchasing decisions, meetings with facilities management team and cleaners, a waste reduction and recycling workshop for the staff and ongoing work with the staff to establish a green team to adopt new waste reduction measures within the building with a 6-month follow-up audit to evaluate progress within the IAA.

2.7 Biodiversity

All organisations have a responsibility to act in the face of the biodiversity crisis in the natural world. As a landowner, the IAA have a key role in the protection of native species, but particularly in areas of outstanding natural heritage like the Shannon Estuary and the Malin peninsula.

The IAA will develop a Biodiversity Action Plan in line with the guidance under the Biodiversity framework for Business which was developed with the Trinity College Dublin's Botany Department and the National Biodiversity Data Centre. It will have cognisance of the sensitivity of Aviation to mammals and birds from an operational point of view. The operational side of the IAA activities may need to be counter to the natural biodiversity of a site (by scaring away birds for example).

Figure 21: Biodiversity framework for business

2.7.1 Objectives

The IAA in fulfilling its leading role will develop an organisation-wide Biodiversity Action Plan. This plan will have the following objectives:

- Objective 1: To identify and implement measures to enhance and protect biodiversity in the IAA landholdings:
- Objective 2: To ensure that biodiversity is integral to the planning and design process across all of IAA's investments and future developments.
- Objective 3: To encourage staff engagement with biodiversity and increase knowledge and awareness of biodiversity

Figure 22: Wildflowers sown in IAA facility in 2019 (Source: D. Connolly, Aramark)

2.7.2 Biodiversity Action Plan

In order to build up an appropriate biodiversity plan the following steps are planned by the IAA:

- Identify, the appropriate budget to implement the biodiversity action plan.
- Engage qualified experts to support the development of the biodiversity plan
- Survey the habitats within the curtilage of the IAA land holdings focussing on the most sensitive species of plants, insects, mammals and birds. This is likely to take 12 months to include several seasonal site visits.
- Identify Invasive species and develop actions to remove them.
- Identify the species that are under threat in line with the IUCN classification status and draft the biodiversity plan to support these species.

Figure 23: Whooper Swans near IAA facility (Source: John Power, IAA Retired)

- Through engaging with experts, identify the threatened bird and bat species and install appropriate bird / bat boxes.
- Minimise the use of herbicides and peat products across the organisations land holdings without compromising operational effectiveness.
- Continue to install enhanced of pollinator, invertebrate and insect habitats (ponds, wildflowers, leaf piles etc).
- As part of investments and maintenance programs continue to enhance the planting of native species and permaculture
- Continue supporting pollinators in line with the all-Ireland pollinator plan.
- As part of the Biodiversity plan, to develop biodiversity monitoring programs.
- Work with experts to train facilities staff on biodiversity enhancement

Figure 24: Beehives at Ballygirreen site

2.8 Climate Adaptation

Climate Adaptation and climate resilience are key actions for all public bodies. The IAA, as an operator of critical infrastructure manages service risks in a systemic and pre-emptive fashion and will consider climate change as part of their National Operational Environmental Management Plan (NOEMP) and National Operational Contingency Plan (NOCP) reviews. This assessment will seek to assess the vulnerability of the IAA to events such as:

- Increasing in rainfall intensity and flooding
- Increase in windspeeds and storms
- Sea level rise
- Increased summer temperature
- Increased winter precipitation including snow.

The IAA will include climate adaptation risks in the NOEMP and NOCP by Q4 of 2021. Climate Adaptation will not be dealt within the sustainability plan of the IAA.

3 Operational Excellence in the Single European Sky (SES)

Improving Air Traffic Management (ATM) performance is the raison d'être of the Single European Sky initiative. The Performance and Charging Schemes are the regulatory instruments through which the European Commission drives ATM performance in cooperation with the Member States, their National Supervisory Authorities (NSA), and operational stakeholders.

The schemes set binding targets on Member States to deliver performance-driven air navigation services leading to less delays and the saving of unnecessary costs for airlines and passengers. In addition, the environmental impact of air traffic will be reduced due to more efficient and shorter flight paths. IAA Operations provide Air Traffic Management services in Irish controlled airspace and there are 6 Key Result Areas (KRAs) which underpin the overall strategy of the IAA:

- KRA 1 – Safety Regulation
- KRA 2 – ATM Safety
- KRA 3 – Security
- KRA 4 – Service Excellence
- KRA 5 – Financial
- KRA 6 – Stakeholder & Customer Relations

The overarching focus of the IAA is on safety; whilst also ensuring the delivery of a cost-efficient service, minimising ATFM-related flight delays (capacity) and reducing fuel burn & emissions (environment). The European Commission sets binding targets on each of these areas under the Performance and Charging Schemes.

The Performance Scheme sets targets in the key performance areas of safety, environment, airspace capacity and cost-efficiency through the adoption of European Union-wide performance targets and approval of consistent National or Functional Airspace Blocks (FAB) performance plans. The first reference period (RP1) ran from 2012 to 2014. The second reference period (RP2) runs from 2015 to 2019. The third reference period (RP3) will run from 2020 to 2024. The scheme, binding for EU member States, can extend to third States, thus providing benefits to the pan-European dimension of the network.

3.1 Second Reference Period (RP2) 2015-2019

EU-wide targets for the second reference period (RP2) were set by the Commission Implementing Decision of 11 March 2014. An environment key performance indicator (KPI) was established for the horizontal flight efficiency of the actual trajectory, i.e. comparison between the length of the en-route part of the actual trajectory and the corresponding portion of the great circle distance, summed over IFR flights. This KPI aims to reduce average en-route flight inefficiency.

For the 2nd reporting period 2015-2019, the EU wide target was set at 2.6% to be achieved by 2019. The values were distributed at FAB (and not national level) via the Network Operations planning process, resulting in a KPI of 2.99% for the UK/IRL FAB to be achieved by 2019. The actual results achieved were:

Table 2: Results for IAAs second reference period.

Year	UK/IRL FAB Target	Ireland	UK/IRL FAB Performance
2015	3.36%	1.30%	3.48%
2016	3.27%	1.40%	3.87%
2017	3.18%	1.35%	3.71%
2018	3.09%	1.26%	3.64%
2019	2.99%	1.19%	3.50%

The IAA has taken all possible steps to improve the horizontal flight efficiency KPI with the full introduction of free route airspace within Irish controlled airspace i.e. airspace within which users can flight

plan between a defined entry point and a defined exit point without reference to a route network. The IAA has had the third best performance of all EU states over the last two years. Further improvements in this area will be achieved with the introduction of free route airspace in neighbouring airspaces resulting in cross border free route airspace. Free route airspace is due to be introduced across Europe over the next 3-4 years and the IAA will fully cooperate with this introduction.

3.2 Results

National Supervisory Authorities submit monitoring reports to the European Commission in June each year. The performance results are then analysed in the PRB annual monitoring reports.

The IAA met its safety, capacity, environment and cost-efficiency Single European Sky Targets in 2018. We are continually looking at ways of improving our ATM service and we have implemented several initiatives in recent years;

- High Intensity Runway Operations (HIRO) – at Dublin airport we continued to roll out HIRO improvements which over the last 5 years have increased runway capacity from 45 to 49 movements per hour.
- New Dublin Air Traffic Control Tower – will facilitate parallel runway operations when the new northern parallel runway is completed by the airport.
- COOPANS air traffic management system – is continually being upgraded to latest functionality.
- Point Merge Continuous Descent Approach to Dublin.
- Free Route Airspace (FRA) – in 2017 we expanded our FRA model to include en-route low-level airspace, which facilitates aircraft flying shorter, more direct routes.
- Borealis Alliance – this alliance comprises nine air navigation service providers working together to implement Free Route Airspace across one third of Europe's air traffic network.
- Functional Airspace Block (FAB) – working with our FAB partner, NATS in the UK, together we have developed an advanced system which significantly reduced delays for aircraft and passengers travelling to London Heathrow, delivering both fuel and CO2 emission savings.

3.3 Third Reference Period 2020-2025

For the 3rd reporting period 2020-2024 the EU wide targets have been set at: 2,53% in 2020, 2,47% in 2021, 2,40% in 2022, 2,40% in 2023 and 2,40% in 2024. The targets will be established at national level (and not at FAB level as in the second reference period) and will be published when the Irish National Performance Plan for RP3 is adopted. A KPI of 1.0% for Ireland (as compared to the 2019 YTD value of 1.19%) is currently under discussion. The IAA is currently developing a plan for further initiatives in order to continue to lead the way in environmentally sustainable ANS services.

Other environment indicators are monitored, although specific EU-wide targets are not set. These include:

- Comparison between last filed flight plan and great circle distance
- Continuous descent operations
- Continuous climb operations
- Additional taxi and out times
- Additional flight time for sequencing arrival traffic

Improvements in continuous climb and descent operations will be implemented gradually at all Irish airports with the active collaboration of the airlines, pilots and controllers.

Significant improvements in taxi times and arrival sequencing times will be achieved once the new parallel runway is available for use at Dublin. The implementation of the collaborative information exchange and decision-making process known as Airport-CDM among all operational stakeholders at Dublin Airport is already leading to reduced taxi-out times leading to lower fuel burns.

4 Governance and Implementation

4.1 Environmental and Energy Management

The IAA has an ambitious Sustainability Management Plan scheduled to commence in 2020. It will be chaired by the Authority's Energy Performance Officer (EPO) who is a member of the Senior Management Team and will include dedicated resources as well as a cross functional team to implement the actions. It will bring in additional resources as needed from the remainder of the organisation and externally as required.

The Sustainability Team will include representatives from the following:

- Corporate Affairs (Chair)
- Property and Security Management
- Operations
- Technical Services
- Finance
- Human Resources & Procurement
- Comms and Media
- Sustainability champions from each of the main facilities
- External Facilities Management representative

In order to achieve this, the Sustainability Management Plan will be implemented through the IAA's Business Management System (BMS). It will be used to identify, collate, manage and implement all the objectives and key actions as part of this program. The IAA's Business Management System is already accredited to ISO 9000 and the IAA may consider further integration towards ISO 14000 and/or ISO 50001 standards in future.

The Sustainability Management Plan will include the following main functions:

- The Sustainability Team, meeting frequency, roles and responsibilities and resourcing.
- The management review of this plan, implementing actions and the implementation results.
- The development and management of a register of opportunities that holds all ideas for the plan. Each audit should generate actions that are held centrally on this register.
- Each year the team should develop an annual plan, funding and resource requirements for this plan and should be used to govern the implementation of the actions.
- Monitoring, corrective actions and reporting.

The IAA will embrace the sustainability challenge through embedding actions throughout the organisation by utilising the DAAMS action tracking system, ensuring full and part time competent resources are assigned and by providing adequate funding and Executive Team support and direction.

4.2 Resourcing and Financial Management

The IAA is committed to funding the implementation of this overall Sustainability Management Plan as part of its multi-annual financial framework and budgeting process. The commitment of senior management to funding investments that are justified on a life cycle cost analysis as part of the IAA's CAPEX and OPEX processes. In addition, the IAA commits to minimising environmental damage as parts of its operations.

The IAA will seek to work with external organisations, including the Sustainable Energy Authority of Ireland, who have grant aided substantial investment to date to identify external sources of support for energy and sustainability related investments.

4.2.1 Life Cycle Cost Benefit Analysis

The IAA will, for energy related purchases consider the implementation of a life cycle cost benefit analysis using the Department of Public Expenditure and Reform's Public Spending Code cost benefit analysis (CBA) methodology for the public sector. This CBA methodology will use the prevailing domestic carbon price as a shadow price of carbon which is expected to rise to €80 by 2030 and €265 by 2050 in a linear fashion. In addition, it mandates a lower discount rate to be utilised of 4% for energy related investments.

4.2.2 Resourcing Implementation

The IAA understands that the implementation of an ambitious Sustainability Management Plan, such as this requires dedicated resources, organisational support and competent external support.

In order to ensure this plans implementation succeeds the IAA will:

- Appoint a dedicated SMP Leader
- Resource the teams with dedicated competent resources for effective delivery of this plan as well as ensuring sustainability work displaces other work from support champions individuals' duties.
- Ensure training and continuous professional development in the area is provided for.
- Appointing competent external resources where required for specific technical/environmental studies, consultancy and support.

4.3 Green Public Procurement

The embedding of Green Public Procurement is a key pillar of this Sustainability Management Plan. The IAA's Procurement Team will need to be at the core of this action by:

- Engaging in upskilling and training.
- Trialling new methods and measurements for evaluating climate and environmental impacts.
- Engaging with existing and new service providers and potential providers through market engagement activities.
- Ensuring that all equipment, supplies and services are from energy efficient options and where appropriate identified from the Triple-E register.
- Establish, communicate and monitor the compliance with green procurement policies.
- Collaborating with other public bodies and regulatory agencies as required.
- The IAA will seek to continue to embed Green Public Procurement in all its procurement activities.

By Q4 2020 the IAA will complete a review of the current purchasing practices from which a roadmap of a life-cycle analysis procurement approach will be developed. This roadmap will seek to ensure that the IAA procures the most sustainable products (where practicable) in compliance with the

approach set out by the Department of Communications, Climate Action and Environment's Green Public Procurement Guidelines[2].

4.3.1 Electricity

The IAA's energy use and resulting CO_2 emissions are predominantly through its electricity supply. The IAA will, through procuring certified 100% renewable electricity, decrease its carbon footprint. The Authority will aim to implement best practice in procurement of sustainable electricity when it reviews its electricity supply in 2020. The market currently consists of internationally traded renewable certification, and the IAA will use this or an alternative method of ensuring that the renewable electricity is as local and low carbon as possible (e.g. through direct purchase or otherwise), within a certified procurement framework. It is expected that this will have marginal cost implications, as many modern renewable technologies are competitive with the wholesale market price.

4.4 Offsetting Carbon

The IAA, from 2020 will establish a tracking program for carbon from aviation business travel. These carbon emissions, coupled with the prevailing domestic carbon cost (currently set at €26 / tonne) will be paid into the Climate Action Fund, as per government mandate.

4.5 Reporting

As part of this plan, the IAA commits to reporting on an annual basis from 2021 on the implementation of this plan. This is in addition to the annual energy reporting required under SI 426:2014. In this Report the IAA will detail the implementation of this plan under the following headings:

- Energy use & Carbon Footprint
- Food, Waste, Water
- Biodiversity
- Green Public Procurement

The reporting will include results, actions complete and actions planned.

[2] http://www.epa.ie/pubs/reports/other/corporate/olg/GreenPublicProcurementfinalwebv2.pdf

5 Impact on the Wider World

The IAA recognises an opportunity as a leading public authority to use its influence to enhance the understanding by the wider aviation community of climate change and the actions that can be taken to reduce waste, emissions and land use impacts of consumption.

5.1 Internal Stakeholders

An Internal communications campaign will commence shortly after this document is published to inform staff of this SMP. The internal stakeholder engagement will include:

- Development and recruitment of the internal implementation team will require staff representatives and will be recruited with a representative from each of the facilities (Sustainability Champion).
- Communication through internal newsletters (IAANews), posting on the AV8 (internal intranet) and IAATV – the internal messaging service in IAA.
- Agenda items at team meetings.
- Electronic copies shared internally, and a small number of printed copies left at relevant locations (Reception areas, Tea/ Coffee stations/ cafeteria).

5.2 External Stakeholders

The IAA will report on the progress on the statutory requirements under SI 426 and the forthcoming climate action requirements. In addition to these requirements the IAA will:

- Publish appropriate press releases.
- Share information on social media which will include stats on the improvements of the IAA's climate related results.
- Inclusion on the IAA's website.
- Inclusion in the IAA's Annual Report.

5.3 Collaborative Working

In order to maximise the effectiveness of this Sustainability Management Plan, the IAA recognises many other public bodies and stakeholders are pursuing similar activities. The IAA will seek to engage on an outreach and learning program, led by the EPO.

In addition, many of the activities are in some way related to other airport organisations and entities. The development and implementation of this plan will impact other organisations and the IAA will seek to partner with such organisations where appropriate to increase the impact of actions derived in this plan, identify synergies and benefit from efficiencies.

The IAA commits as part of this plan to adequately resource staff in engaging externally for:

- Training and leaning.
- Leading and following other organisations.
- Collaborating on specific work tasks with close stakeholders.
- Collaborating with the wider public sector on specific tasks or focus groups to identify relevant solutions to specific challenges in the area of climate, biodiversity and green procurement.

Appendix 1: Summary of Actions

Area	Action	Due	Lead
Climate Action Governance	Establish a Sustainability team, terms of reference and governance structure	Q3 2020	Corporate Affairs
	Define stakeholder engagement plan & website integration	Q4 2020	Comms and Media
	Complete 1st annual sustainability report for 2020 actions	Q2 2021	Property and Security Management
	Complete energy efficiency investment plan	Q4 2022	Property and Security Management
Energy	Complete energy audits in all buildings	Q1 2022	Property and Security Management
	Procure grid renewable electricity from utility supplier	Q2 2020	Property and Security Management
	Complete technical assessment for longer term carbon free electricity supply	Q4 2022	Property and Security Management
	Review video conferencing system adequacy	Q4 2020	Property and Security Management
	Review adequacy of shower facilities for employees	Q4 2020	Property and Security Management
Transport	Review adequacy of E-Vehicle and E-Bike charging facilities for employees	Annual by Q4	Property and Security Management
	Implement EV procurement policy for leased vehicles where practicable	Q4 2021	Procurement
Waste	Complete waste assessment of all facilities	Q4 2021	Property and Security Management
	Complete detailed waste reduction action plan	Q1 2022	Property and Security Management
Biodiversity	Complete detailed biodiversity survey for all sites	Q4 2020	Property and Security Management
	Complete biodiversity action plan including staff engagement plan	Q1 2021	Property and Security Management
Green Public Procurement	Complete review of IAA's Procurement practices	Q4 2020	Procurement
	Detail IAA's green procurement policy and plan	Q2 2021	Procurement
Climate Adaptation	Include climate adaptation actions in the NOEMP and NOCP	Q4 2022	Property and Security Management Manager Property & Security

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