SEBERANG PERAI

CLIMATE ACTION STRATEGY

SEBERANG PERAI
ASPIRING CITY OF TOMORROW

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Preamble

THE CLIMATE IS CHANGING, THIS IS THE REALITY

It is influencing our ecosystems our cities and our lifestyles here in Seberang Perai and throughout the entire world.

On 12 December 2015, during the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21), 195 States adopted the Paris Agreement, which sets out to Limit the average rise in global temperatures to well below +2°C, and strives to limit the increase to +1.5°C. Thanks to an unprecedented mobilisation of civil society and States, this Agreement was reached and entered into force exceptionally quickly on 4 November 2016.

The international community has sent out a strong signal to citizens, economic operators and members of civil society by setting the goal of achieving carbon neutrality by 2050 and by defining the transition towards a more environmentally and climate-friendly way of life as a universally shared vision.

Cities are dynamic ecosystems o f our planet. They are already home to nearly 60% of the world's population, generate the most dynamic economic activity and emit 70% of global greenhouse gas emissions.

For the past ten years or so, thanks to their Climate Plans, cities have become the local leaders of the fight against climate disruption. At Paris City Hall on 4 December 2015, over 1,000 representatives of local governments signed the Paris Pledge for Action which encouraged States to adopt the Paris Agreement but, above all, committed them to cutting greenhouse gas emissions in their territories drastically (by 80%), to acquiring 100% renewable energy resources between now and 2050, and to improving the resilience of their cities to climate risks, now and in the future.

EXECUTIVE SUMMARY

Executive Summary

What are greenhouse gases?

A wide range of gases known as greenhouse gases contribute to climate change. The most important greenhouse gases are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Other greenhouse gases comprise so-called F-Gases, a wide variety of man-made gases used in various applications, such as refrigeration and air conditioning. Collectively these greenhouse gases are the subject of international agreements, such as the United Nations Framework Convention on Climate Change and the Paris Agreement.

Different greenhouse gases have different atmospheric characteristics, including Global Warming Potential (GWP). This is a measure of the cumulative warming of a gas over a specified time period usually 100 years. This is expressed relative to CO_2 which has a GWP of 1. The amount emitted of any greenhouse gas multiplied by its GWP gives the equivalent emission of the gas as CO_2; this is known as CO_2 equivalent. This makes it easier to sum up the emissions and contribution of greenhouse gases to climate change and determine options to address climate change

The accelerating impact of greenhouse gas emissions on climate disruption must be arrested. The window of opportunity to act is fast closing, but Seberang Perai is on the right track. As economic development has advanced, it is clear that the link between prosperity and emissions has not been broken.

Seberang Perai has directly experienced the extreme weather events of flooding, drought and extreme weather. But many cities have experienced much worse. The shift in climate is bringing profound shifts of desertification, rising sea levels, displaced population, profound challenges to the natural world, and economic and social disruption. We are close to a tipping point where these impacts will sharply worsen.

Decarbonisation is now a must if the world is to contain the damage and build resilience in the face of such a profound challenge.

This is a strong foundation on which to build a Climate Action Plan committed to achieving a net zero carbon development system for Seberang Perai and in the process, create a resilient, vibrant and sustainable city. The Local Government will take the lead on this agenda through this Plan in defining a roadmap to this goal and initiating a coherent set of policy actions to get us there.

Agenda 2030 and the Paris Agreement on climate change require a transformational shift of our economies and societies towards climate resilient and sustainable development. Seberang Perai and the international community are responding to this requirement, setting out a profound change in the systems and practices which support our lifestyle. Every home, every community, every workplace and every Stakeholders, must be mobilised to get involved; every network which supports our lives – energy, transport, telecommunication, public service, waste management – must adapt rapidly. If we delay the transition, we as a city, shall most certainly face greater costs and fewer opportunities. The reality is that, only by adapting now, can our enterprises remain competitive and our society resilient.

In addition to the contribution of the proposals contained in this Plan to reduce Seberang Perai's greenhouse gas emissions, many of the changes that are required will have positive economic and societal co-benefits, including cleaner air, warmer homes, and a more sustainable economy for the long term. In line with the UN Sustainable Development Goals, climate action must be seen as complementary to other important policy objectives, such as promoting sustainable economic development pathways, improving energy security, and addressing air pollution impacts on human health. For example, a significant shift away from internal combustion engine vehicles in the transport sector, and the retrofitting of existing buildings with Renewable Energy systems, are expected to result in significant improvements in local air quality metrics and health outcomes.

Rising to this challenge is important not just for Seberang Perai's long term economic and societal interests, but also in relation to the attractiveness of Seberang Perai as a location for Foreign Direct Investment, as a tourism destination, and as a source of safe, high-quality agricultural and food products. In addition, a renewed climate ambition will help to secure our international reputation, which in turn will underpin Seberang Perai's ability to promote its international policy objectives in recognition of the adverse and dangerous impacts that it poses to the realisation of the Sustainable Development Goals.

As a basis for policy planning we have sought to design a trajectory to 2030 and 2050 which to emerge as a Carbon Neutral City and to be a Zero Carbon City respectively.

We have evaluated the options for change to identify those which can, at the lowest cost to our society as a whole, deliver the abatement we need to achieve by 2030. This in turn has allowed us to identify what the range of contribution is that we should expect from different sectors using those options. The greatest savings from known technologies lie in Waste, Transport and Electricity; the lowest savings are from segments of the Enterprise sector. The aim is to pursue the pathway with the least burdens and the greatest opportunities.

Identifying the best options does not of course mean that they will be taken up. Policy must be carefully designed so that measures are fair and incentives are right. Information and access to capital must be accessible. Supporting infrastructures must be planned and delivered, with communities brought on board. Leadership, innovation, and opportunity in the new methods must be developed. These policy frameworks need to evolve continuously as part of a dynamic policy making process as technology evolves and experience develops.

Delivering such an integrated set of policies will require a deep level of collaboration across Government. The model will be built around ambitious goals, consistent implementation, transparent accountability, and capacity for continuous feedback and learning. Key features will include:

- A five year Strategic Plan and sectoral targets with a detailed plan of actions to deliver them
- Setting up Climate Change and Carbon Neutral Unit
- A Climate Action Delivery Committee overseen by the Climate Change and Carbon neutral Unit (CCCNU) to ensure delivery
- An Climate Action Council consist of various stakeholders to recommend actions and evaluate policy
- Strong accountability to the Climate Action Council
- Carbon proofing all Government decisions and major investments

While this framework of goals and performance monitoring is crucial, it will be equally important that every public body adopts a Mandate for Climate Action. Accordingly, with leadership from top management, these bodies will be engaged and empowered to be innovative, not just in leading the way by reducing their own emissions, but also by stimulating and inspiring action across Seberang Perai society.

Some of the key measures which will help create a framework across the entire public sector and beyond to support change shall include:

- Consistent development of a Green Procurement Strategy
- Targets of 50% waste reduction, 15% Renewable Energy, 20% Energy Efficiency and 50% greenhouse gas emissions reduction must be shared by the entire public sector
- A trajectory for the price of carbon to create incentives which help avoid locking in carbon intensive technologies
- promote research and innovation to meet the climate challenge

Waste and the Circular Economy

- Develop coherent reduction strategies for plastics, food waste, and resource use
- Increase the level and the quality of recycling, with less contamination and greater replacement of virgin materials by recycling.
- Eliminate non-recyclable plastic
- Reduce the reliance on landfill with sharp reductions in plastics and compostables entering landfill
- Achieve Zero Waste City by 2030

Electricity

- Increase reliance on renewables from 3% to 20% by 2022 and further increase to 50% by 2030 and reach 100% renewables by 2050
- Put in place a coherent support scheme and plan for micro-generation
- Open up opportunity for community participation in renewable generation as well as community gain arrangements
- Guidelines for New Development to have 100% energy from renewable sources

Buildings

- Introduce stricter requirements for new buildings and substantial refurbishments
- Design policy to incorporate Building Energy Index (BEI) as base for approval
- Green Building Accreditation as a mandatory requirement for New Development approval
- Increase attention to Energy and Carbon ratings in all aspects of managing property assets

Transport

- Enhance infrastructure and policy for Battery Electric Vehicle (BEV) or Plug-in Hybrid Electric Vehicle (PHEV)
- Make growth less transport intensive through better planning (Transit Oriented Development), remote and home-working and modal shift to public transport
- Increase the renewable biofuel content of motor fuels
- Set targets for the conversion of public transport fleets to zero carbon alternatives

Agriculture

- Deliver substantial verifiable greenhouse gas sequestration through adoption of a specified range of improvements in farming practice
- Deliver expansion of forestry planting and soil management to ensure that carbon sequestration from land-use is delivered over the period 2021 to 2030 and in the years beyond
- Support diversification within Agriculture and land use to develop sustainable and circular value chains and business models for lower carbon intensity farming, including, organic production, protection and enhancement of biodiversity and water quality, and the production of bio-based products and bioenergy

Enterprise and Services

- Embed energy efficiency, replacement of fossil fuels, careful management of materials and waste, and carbon sequestration across all enterprises and public service bodies
- Green Enterprise and Services Accreditation as a mandatory requirement for licensing approval
- Plan for the delivery of quality employment and enterprise in the new areas of opportunity being opened up

While sectoral goals and policy roadmaps are vital to progress, at the heart of all these are people and the priorities they adopt and the choices they make. The capacity to deliver a plan, such as this, which reaches so far into our daily lives, will be impossible without support and acceptance of the value of the changes being targeted and the necessity of the key infrastructures which support them. To underpin this citizen involvement, specific strategies are being evolved:

- Engagement Capacity Building and empowering Local Community Action
- Realising the new economic opportunities in communities and regions
- Just Transition for those facing particular challenges in adjusting through reskilling and community participation
- Empowering the new generation to have their voices heard and get access to the science and the opportunity to lead change

This Plan also reflects Seberang Perai's commitment to achieving the 2030 Sustainable Development Goals (SDGs). Agreed by the United Nations in 2015, the 17 SDGs address the environmental, economic, and social challenges that the world needs to tackle by 2030 to ensure a sustainable future. SDG 13 calls on countries to 'take urgent action to combat climate change and its impacts', by implementing commitments to the United Nations Framework Convention on Climate Change, as well as by improving public awareness of the need for Climate Action. Crucially, SDG 13 also calls on countries to integrate effective Climate Action measures into local policies. This all of Government Climate Action Plan does that, and places Seberang Perai at the forefront of international efforts to achieve SDG 13.

YBhg. Dato' Sr Hj Rozali bin Hj Mohamud
Mayor
Seberang Perai City

CHAPTER 1

THE CRITICAL NATURE OF THE CHALLENGE

1. The Critical Nature of the Challenge

Evidence for warming of our climate system is beyond dispute. Observations show that global average temperatures have now increased by more than 1°C since pre-industrial times. The atmosphere and oceans have warmed, the amount of snow and ice has reduced, and sea levels have risen as the concentrations of greenhouse gases have increased. The projections of future global and regional climate change indicate that continued emissions of greenhouse gases will cause further warming and changes to our climate.

These changes will cause extensive direct and indirect harm to Ireland and its people, as well as to other countries more exposed and less able than we are to withstand the associated impacts, which are predicted to include:

- Rising sea-levels threatening habitable land and particularly coastal infrastructure
- Extreme weather, including more intense storms and rainfall affecting our land, coastline and seas
- Further pressure on our water resources and food production systems with associated impacts on fluvial and coastal ecosystems
- Increased chance and scale of river and coastal flooding
- Greater political and security instability
- Displacement of population and climate refugees
- Heightened risk of the arrival of new pests and diseases
- Poorer water quality
- Changes in the distribution and time of lifecycle events of plant and animal species on land and in the oceans

In addition, many of the pollutants responsible for climate change are also damaging human health and have, for example, been shown to increase childhood asthma. The impact of climate change will be felt by every individual, household, and community across Seberang Perai. There is an onus on each of us to mitigate the magnitude of long-term climate change by taking actions to reduce greenhouse gas emissions, and to increase the capacity of carbon sinks such as forests.

There is now a high level of awareness and understanding in Seberang Perai of the impacts of climate change. The experiences that we have encountered for the past three years have strengthened our idea on climate change and raise urgency for us to act in order to lessen the impact on Seberang Perai.

Against this background, strategies must be devised to reduce and manage climate change risks through a combination of mitigation and adaptation responses.

The Intergovernmental Panel on Climate Change's Special Report, *Global Warming of 1.5°C,* published in October 2018, confirmed that the international community has a limited window for real action to reduce emissions to ensure that current and future generations can live sustainably in a low-carbon and climate-resilient world. It is, therefore, essential that the international community steps up its efforts towards meeting the Paris Agreement objectives of:

- Holding the increase in the global average temperature to well below 2°C above preindustrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change
- Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production
- Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development

The Paris Agreement and Agenda 2030 Sustainable Development Goals (SDGs) recognise that the impacts of climate change will be felt by all, but also that these impacts will be uneven. Vulnerable communities and people around the world – in particular women and girls – face devastating impacts to their livelihoods and greater challenges in adapting to the long-term effects of climate breakdown. As a Party to the Paris Agreement, Seberang Perai recognises the Principle of "common but differentiated responsibility and respective capabilities" within the Agreement, which acknowledges a diverse range of capacities and responsibilities by Parties. Seberang Perai also recognises both the right and responsibility of all cities to pursue low-carbon, climate-resilient development, and is supporting initiatives – within the framework of both the Paris Agreement and the United Nations SDGs – to support their countries in achieving these objectives.

This Plan underpins this ambition by setting out clear 2030 targets for each sector and the expected emissions savings that will result. The analysis presented in this Plan shows that it is not only technically feasible to meet our 2030, but that it is also economically achievable. The majority of the required sequestration to 2030 could be achieved by deploying measures that are, over their life-time, either cost-neutral or result in net savings to society. The climate change mitigation pathways presented entail a coherent set of sequestration measures across the five sectors that contribute most to our greenhouse gas emissions: Waste, Transport, Electricity, Built Environment, and Industry.

To realise the necessary reduction, we have taken critical policy decisions with the publication of this Plan, including a new commitment that 50% of our electricity needs will come from renewable sources by 2030. Further decisions will need to be made in the next 2 to 3 years. The earlier we act the less dramatic and costly it will ultimately be for Seberang Perai. Acting now reduces our long-term transition costs, and brings additional benefits such as better air quality and reduced fuel poverty. It will also enhance Seberang Perai's international reputation as a destination of choice for tourism and foreign direct investment, and as an environmentally sustainable agri-food producer. Early action will also be vital to our ability to pursue other important strategic local interests, and to credibly advocate for urgent climate action globally.

This Plan also proposes a big step-up in our engagement with citizens and communities through more coherent mobilisation of existing structures and initiatives to inform, engage, motivate, and empower people to take climate action. We recognise that individuals and communities will be at the heart of the low-carbon transition and that not everybody is equally placed to readily respond to the policies and initiatives that will be implemented by this Plan. Therefore, through our work to empower individuals and communities to take action, we will seek to recognise different capacities and starting points so that positive choices can be made for the future that will ultimately bring long-term benefits to communities across Seberang Perai.

Reflecting the central priority that climate change will have in our political and administrative systems into the future, this Plan sets out a series of new governance arrangements that will be put in place, including carbon proofing of our policies, the establishment of carbon budgets with clear sectoral targets, a strengthened Climate Change Advisory Council, and greater accountability of the council. We will also publish our performance against the targets and actions we have set for ourselves in this Plan, which has a strong focus on implementation, including actions with specific timelines, clear lines of responsibility, and steps needed for their achievement. The supervision of delivery from the Climate Change and Carbon Neutral Unit will ensure the critical coordination across all departments and agencies to focus effectively on timely implementation in their areas and to anticipate any corrective measures needed.

It is impossible to predict how the next decade will unfold. The pace of individual, technological, scientific, societal and economic changes will not exactly match our assumptions today. Therefore we will update this Plan every 12 months, underpinned by consultation with key stakeholders.

These updates will be informed by the latest analysis, performance against our targets, and any new or corrective actions that we may need in order to stay on track towards our overall 2030 targets and our ultimate objective of achieving a transition to a competitive, low-carbon, climate-resilient, and environmentally sustainable society and economy by 2050. It is the latter two goals that are the most significant: meeting our overall 2030 target, and being on a trajectory towards a zero-carbon, sustainable

economy by 2050. Therefore, the individual targets and actions in this Plan will be updated and revised each year to ensure we achieve these goals.

Chapter 15 of this Plan addresses climate adaptation. People throughout Seberang Perai have already experienced first-hand the potential impact of climate change, particularly through floods and storms and the damage that can ensue. Events like these, and the expected increase in their frequency, highlight the need for adaptation measures to help the city cope with the effects of climate change.

CHAPTER 2

WHERE WE STAND

2. Where We Stand

Seberang Perai policy began to address reductions in city greenhouse gas emissions started since 2010 onwards. The rate of emissions reduction was modest up to 2015, with efforts to decarbonise hampered by strong economic activity. Nevertheless, from 2016 there were reductions in emissions. Current record In 2019 shows that 16.55% reduction in per capita emission compared to the emission in 2015. While the absolute emission in 2019 also indicate about 11.8% reduction compare to the emission in 2015.

EMISSION PER YEAR		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019*
Population ('000 people)		848.59	860.58	872.74	885.08	897.58	910.27	923.13	936.16	949.4	962.82
SECTORS	Stationary Energy (kilotonnes CO2e)	3097.36	3141.13	3185.51	3230.53	3276.18	3322.47	3234.07	3157.93	3083.58	2366.51
	Mobile Energy (kilotonnes CO2e)	2668.82	2706.53	2744.78	2783.56	2822.9	2862.79	2887.87	2943.28	2982.61	2835.79
	Waste (kilotonnes CO2e)	747.6	750.73	693.41	799.43	811.47	823.22	811.11	846.79	891.42	927.08
	IPPU (kilotonnes CO2e)	301.25	305.51	309.82	314.2	318.64	323.14	324.43	325.27	325.72	320.5
	AFOLU (kilotonnes CO2e)	159.54	161.79	164.08	166.39	168.75	171.13	171.94	172.69	173.03	170.5
REAL	REAL EMISSION (kilotonnes CO2e)	6974.57	7065.69	7097.6	7294.11	7397.94	7502.75	7429.42	7445.96	7456.36	6620.38
	REAL PERCAPITA (tonnes CO2e)	8.22	8.21	8.13	8.24	8.24	8.24	8.05	7.95	7.85	6.88

Figure 2.1 : Carbon Emission in Seberang Perai by Sector from 2010 to 2019

Carbon Emission for Seberang Perai in 2019 reduced for about 31.4% when compared to the Business-as-usual (BAU) Scenario of the same year. The reduction occurs due to the policies implemented in Seberang Perai which favour to the usage of Renewable Energy and efforts done in order to create awareness and increase the energy efficiency in Seberang Perai. Furthermore, policies formulation and implementation in Seberang Perai have been an inclusive process, where it involve all the stakeholders in Seberang Perai which make it easier for the city to achieve the intended target.

As shown in Figure 2.2, the intended target of per capita emission in 2019 is about 6.34 tonnes CO2eq but the real emission missed the target by 8.5%. The efforts need to be enhanced in order for Seberang Perai to achieve its target to be a Low Carbon City by the year 2022 which the City have set the target to reduced its per capita emission way below 5.0 tonnes CO2eq.

	EMISSION PER YEAR	2015	2016	2017	2018	2019*
REAL	REAL EMISSION (kilotonnes CO2e)	7502.75	7429.42	7445.96	7456.36	6620.38
	REAL PERCAPITA (tonnes CO2e)	8.24	8.05	7.95	7.85	6.88
BAU	BAU EMISSION (kilotonnes CO2e)	-	8695.88	9005.86	9323.11	9647.46
	BAU PERCAPITA (tonnes CO2e)	-	9.42	9.62	9.82	10.02
TARGET	TARGET EMISSION (kilotonnes CO2e)	-	7434.91	7006.24	6564.17	6108.18
	TARGET PERKAPITA (tonnes CO2e)	-	8.05	7.48	6.91	6.34

Figure 2.2 : Comparison of Real, BAU Scenario and Targeted Emission for Seberang Perai from 2016 to 2019

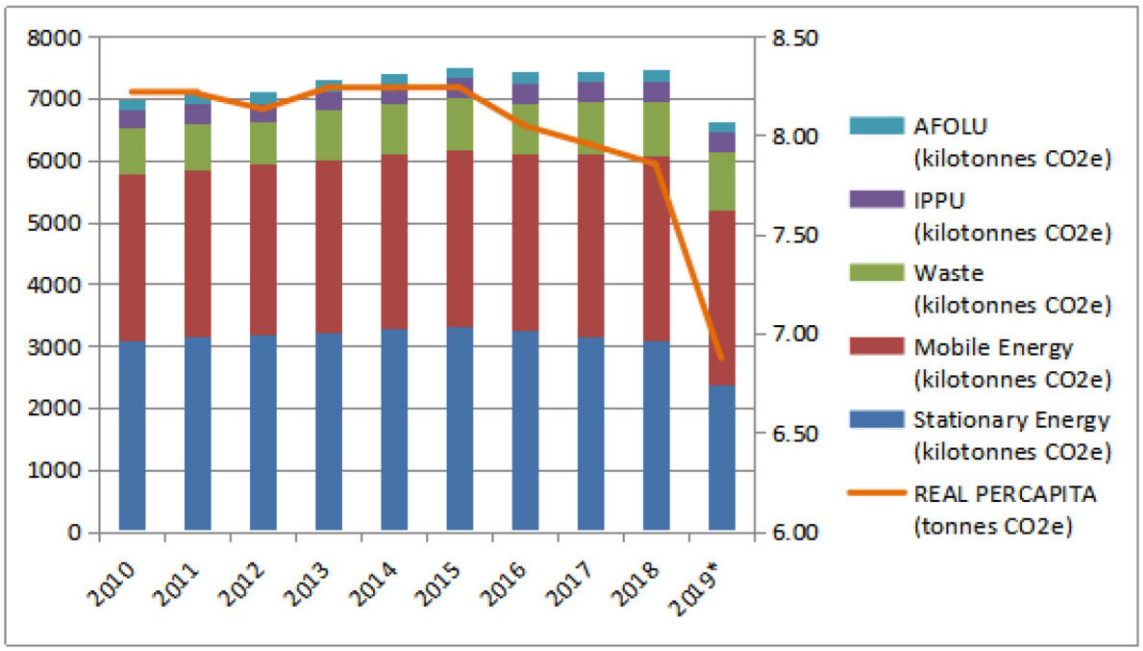

Figure 2.3 : Carbon Emission in Seberang Perai based on Sectors from 2010 to 2019

2.1 Emissions Trends 2010 to 2016

As shown in Figure 2.3,the absolute emission increases about 7.6% in 2015 compare to 2010 but the per capita emission in Seberang Perai from 2010 to 2015 is almost at a constant number . This is due to the strong policies implemented by Seberang Perai City in disseminating awareness to the city dwellers. The trend later shows slight reduction in 2016 with about 0.98% reduction in the absolute value compare to 2015 and about 2.3% reduction in per capita emission compare to the same year. This is a clear indication of the success of the policies implemented in Seberang Perai.

2.2 Seberang Perai's Targets for 2017 to 2022

Seberang Perai have set a target to be a Low Carbon City which the City have set the target to reduced its per capita emission way below 5.0 tonnes CO2eq by the year 2022. In order to achieve the target, the city need to reduced 50% of its per capita emission in 2022 compare to the year 2015 and about 61.3% reduction when compare to BAU Scenario in 2022. The reduction target can only be achieved if the city able to achieved the followings :

- 50% Waste Reduction with 70% Recycling Rate by 2022
- 20% Energy Mix with renewable sources
- Increase the mode sharing of Public to Private transport from 1% to 5%
- Preserve 8% of Seberang Perai area as forest
- Increase green coverage of the cities by planting 100,000 trees

EMISSION PER YEAR		2016	2017	2018	2019*	2020#	2021#	2022#
REAL	REAL EMISSION (kilotonnes CO2e)	7429.42	7445.96	7456.36	6620.38	6266.81	5765.59	5187.43
	REAL PERCAPITA (tonnes CO2e)	8.05	7.95	7.85	6.88	6.42	5.82	5.17
BAU	BAU EMISSION (kilotonnes CO2e)	8695.88	9005.86	9323.11	9647.46	9979.22	10328.31	10695.26
	BAU PERCAPITA (tonnes CO2e)	9.42	9.62	9.82	10.02	10.22	10.43	10.65
TARGET	TARGET EMISSION (kilotonnes CO2e)	7434.91	7006.24	6564.17	6108.18	5634.06	5149.30	4649.68
	TARGET PERKAPITA (tonnes CO2e)	8.05	7.48	6.91	6.34	5.77	5.00	4.12
REDUCTION	EMISSION REDUCTION (kilotonnes CO2e)	1266.46	1559.90	1866.75	3018.08	3712.41	4562.72	5507.83
	CUMULATIVE REDUCTION (kilotonnes CO2e)	3982.75	5542.65	7409.4	10427.48	14139.89	18702.60	24210.44

Figure 2.3 : Seberang Perai Emission projection up to 2022

2.3 Seberang Perai's Targets for 2023 to 2030

Our latest projections indicate that a strong surge in demand for electricity, at a rate faster than the introduction of renewables, will mean Seberang Perai's emissions will continue to increase up to 2025, after which point policies contributing to fuel switching in power generation will contribute towards stronger emissions reduction to the end of the decade. While annual emission limits for the period 2021 to 2030 will guide Seberang Perai towards the 2030 target, the main binding target will be for cumulative emissions. As previously indicated, Seberang Perai will need to reduce its greenhouse gas emissions consistent with a 75% reduction by 2030, relative to 2015 levels.

2.4 Seberang Perai's Ambition for 2050

The City Council supports the adoption of a zero carbon target by 2050 . The Climate Action Plan puts in place a decarbonisation pathway to 2030 which would be consistent with the adoption of a zero carbon target in Seberang Perai by 2050. The Plan also commits to evaluating in detail the changes which would be necessary in Seberang Perai to achieve this target. In 2017 Seberang Perai formulated a Policy Position for an 50% reduction in CO2eq. Per capita emissions by 2022 compared to 2015 levels for the waste production, electricity generation, built environment, and transport sectors. It also outlines an approach to carbon neutrality by the year 2030 focussing in the agriculture and land-use sector, including forestry, which does not compromise on the capacity for sustainable food production.

2.5 Actions

Action Number	Action
1	Evaluate in detail the changes required to adopt a more ambitious commitment of zero greenhouse gas emissions by 2050, as part of finalising Seberang Perai's long-term climate strategy by the end of 2019 as per the advice of the Intergovernmental Panel on Climate Change.

CHAPTER 3

CLIMATE IMPACT ON SEBERANG PERAI

3. Climate Impact on Seberang Perai

The climate is changing, and Seberang Perai– a low-lying Coastal City – is vulnerable. The 2015 Paris Agreement on climate change is a call to action for every city to mitigate climate change, and Seberang Perai will play its part. We aim to reduce our per capita emissions by 50 % below 2015 levels by 2022 to be a Low CArbon City and further reduced to achieved Carbon Neutral City by 2030. **Improving efficiency** will remain our key strategy for reducing emissions across the industry, transport, buildings and waste sectors. Increased awareness building, enhanced regulations, capability building, and government support will help Seberang Perai achieve this.

Climate change, which refers to the large-scale, long-term shift in the earth's weather patterns, is caused by increasing levels of greenhouse gases (GHG)2 in the earth's atmosphere. The year 2015 was the warmest on record, with average temperatures reaching about 1°C above those in the pre-industrial era. Without additional efforts to reduce GHG emissions, temperatures could continue to rise to between 3.7°C and 4.8°C above pre-industrial levels by 2100. Higher temperatures, rising sea levels, and changes in weather patterns can cause significant damage to homes, businesses, and livelihoods globally. In recent years, Seberang Perai has seen bouts of high temperatures and very intense thunderstorms that have led to flash floods. Our annual mean temperature rose from 26.6°C in 1972 to 28.3°C in 2015, which were both the warmest year and the second-driest year ever recorded. In early 2014, Seberang Perai also experienced its longest dry spell since records began in 1869. It is projected that our temperatures could rise by between 1.4°C and 4.6°C by the end of this century (2070 to 2099), while mean sea levels could increase by between 2.5m and 7.6m in the same period. Climate change is a global challenge that requires a global response. Although Seberang Perai accounts for only about 0.009 % of global emissions, we contribute to international efforts to address climate change under the United Nations Framework Convention on Climate Change (UNFCCC). Domestically, we are reducing GHG emissions and making use of innovative low-carbon solutions, while enhancing our resilience to the impacts of climate change.

3.1 Climate Hazards and Vulnerability

Extreme Percipitation

The Intensity of rain increasing tremendously over the year. The average rainfall in Seberang Perai during Rainy seasons a decade ago was about 25mm/hour for normal rain and about 42mm/hour during rain storm. Currently, the average rainfall in Seberang Perai during Rainy season is about 47mm/hour for normal rain and about 63mm/hour during rain storm. The dramatic changes in the rain intensity have increase the frequency of Flash Flood in Seberang Perai due to the overflow of the drainage system. The intensity are expected to increase about 20% in the near future. This phenomenon will impact Socio-Economic Development in Seberang Perai and eventually if not been managed properly can impact the vulnerable members of society.

Monsoon

Seberang Perai as a City situated at the northern part of Peninsular Malaysia, historically only been affected during the Inter-Monsoon seasons. Recently, the climate shift can be observed where a few episodes of rainy days occurs during the Northeast Monsoon and Prolonged dry-spelled during the Southwest Monsoon period. These shifts has contributed to load of new challenges faced by the city that affect the Agriculuture, Tourism and Public Health in Seberang Perai. The shifts are expected to be at a greater scale in near future.

Cyclones

After Tsunami in 2004, Seberang Perai has not experiencing any major disaster until the year 2017 where Seberang Perai been affected by two typhoons namely Doksuri (September) and Damrey (November), The impact of these typhoon caused economic loss of more than RM 11 Millions. The number of cyclones affecting Seberang Perai also increasing over the years from 3 series of cyclones in 2010 up to 9 series of cyclones in 2017. In 2019, Seberang Perai have been impacted by two typhoons namely Lekima (August) and Matmo (October) which have caused economic loss of more than RM 5 Millions. The number of cyclones recorded in Seberang Perai throughout 2019 is up to 10 times.

Extreme Hot Temperature

Seberang Perai as part of Equators city experiencing hot season almost all year round. The temperature during the hot days keep on increasing reaching all time high at 39.7 degree celcius in 2017. This conditions resulted in many public health and social issues in Seberang Perai. The temperature increase due to the increase in human activities that resulted in the emission of GHGs. It is expected that the temperature will keep on increasing in the near future.

Flash Flood

Seberang Perai is one of the rapid developing city in Malaysia. Over the years, urbanization area keep on expanding and congested. These has caused severe flash flood to occur over the years. The frequency and severity increase as the expansion of urban area increases. Hence, actions needed to curb the episodes of flash flood from increasing in the future.

3.2 Future Climate Scenario

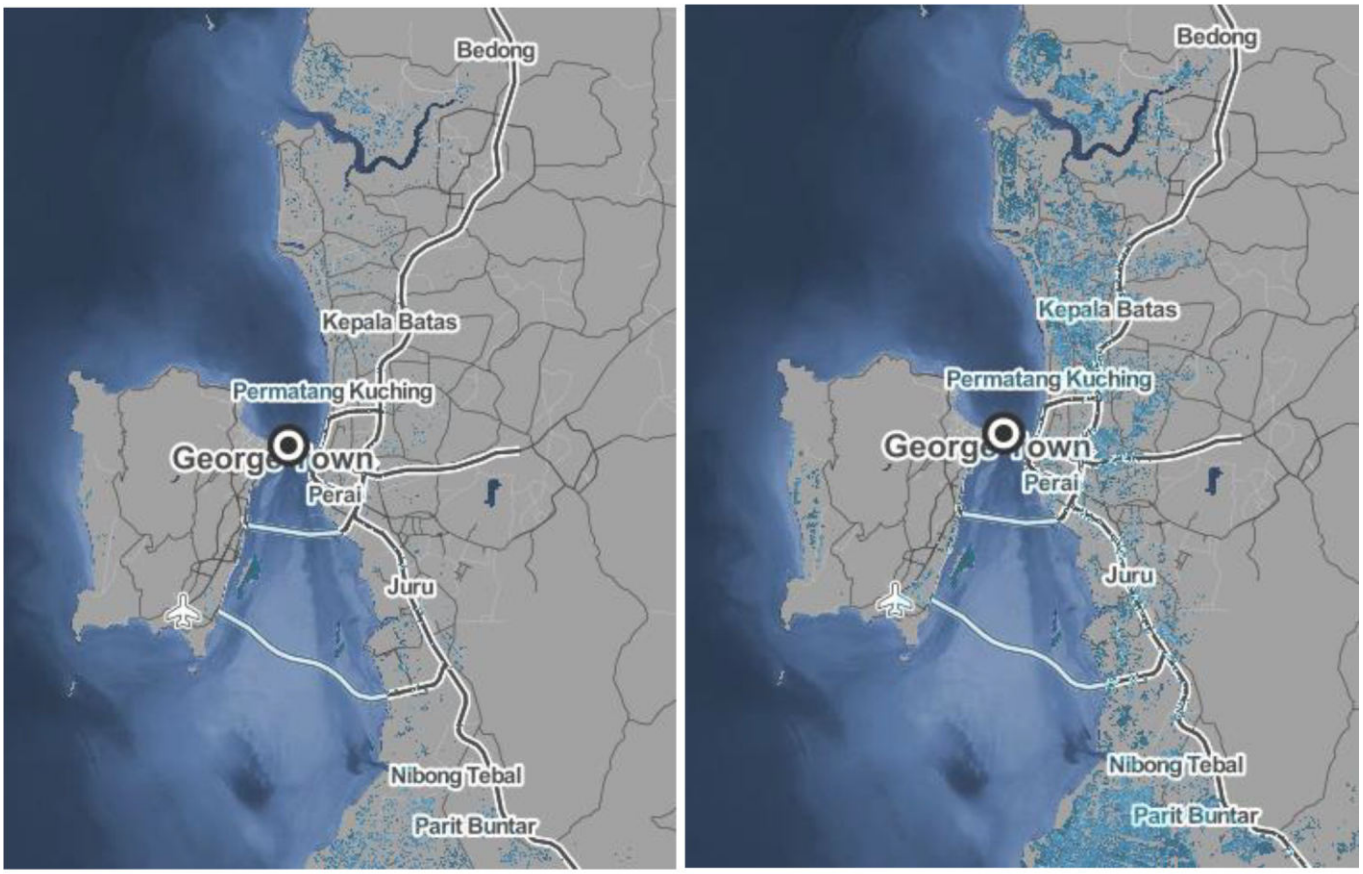

Figure 3.1 : Comparison of the effect of global warming at 1.5 ºC vs 2.0 ºC in Seberang Perai

As shown in figure 3.1, when the temperature rises at 1.5 degree celcius about 15% of Seberang Perai will be submerge under water due to the low lying plane and the expected sea level rise at 2.9 metres. Additional increase of 0.5 degree celcius will cause the sea level to increase up to 4.7 metres which will result to about 45% of Seberang Perai to be flooded.

CHAPTER 4

CHOOSING THE PATHWAYS

4. Choosing the Pathways which Create the Least Burden and Offer the Most Opportunity for Seberang Perai

The challenge of closing the gap to our 2030 target, coupled with the broader policy objective of long-term decarbonisation across all sectors of the economy, requires both public and private investment and large societal shifts in technology, attitudes and behaviour, at an unprecedented pace. Specifically, Seberang Perai requires a change in its overall emissions trajectory of the order of a 5% decline each year from 2021 to 2030 to meet our targets.

The Journey to 2030 and 2050

An important factor in choosing policies to deliver the 5% per annum reduction is a realisation that in the period between 2030 and 2050, a much steeper decline will have to be achieved based on achieving a minimum 80% emissions reduction by 2050, relative to 2015. One important implication of this for the period to 2030 is to ensure **that all investment choices make sense** in terms of decarbonising by 2050, and we avoid creating stranded assets by choosing what may appear to be cheaper options in terms of our 2030 decarbonisation goal.

Policy Frameworks to Drive Investment Decisions – International Experience

Other countries, facing similar challenges, have used smart financing options to overcome these higher upfront costs. For example, in the United States, the transport company, Proterra, sells e-buses at the same price as the equivalent diesel buses and enters into a 12-year service agreement to convert capital and operational costs, which can be paid for using savings from the eco-friendly buses. In Chile, where 100 e-buses were recently launched, the bus operator has leased the fleet from an investor to overcome the upfront challenge of high capital costs.

In the built environment sector, smart financing policies have been implemented to address the upfront costs of retrofitting homes. For example, in the United States, home owners can take out 'Green Mortgages' (also known as Energy Efficient Mortgages) which lets them borrow money to pay for energy efficient retrofits that may be costly up front, but save money over the long run. The European Investment Bank's *Smart Finance for Smart Buildings* initiative allows financial intermediaries, such as banks, to develop and deploy attractive financial products for the energy renovation of buildings, especially homes.

The challenge of how Seberang Perai, individual sectors, and every citizen will achieve these technology adoption rates and behavioural changes, and the implementation of the policies to achieve this shift, is the key focus of this Plan.

CHAPTER 5

GOVERNANCE OF THE CHALLENGE

5. Governance of the Challenge

5.1 Governance Structure

In order to be a leader in responding to climate disruption, it is important that the correct governance structure is established.

5.2 Delivery of the Climate Action Plan

The aim of the **Climate Action Plan** is to make Seberang Perai a leader in responding to climate disruption. This Plan will be monitored quarterly and updated annually, with a Climate Action Plan 2050 published in early 2020. This will ensure that this plan is a living document, with new actions being added each year. This follows the successful approach which was core to delivering the Action Plan for Jobs.

We will establish a **Climate Action Delivery Committee** overseen by Climate Change and Carbon Neutral Unit (CCCNU), which will hold each department and public body accountable for the delivery of actions set out in the Climate Action Plan. The Board will be chaired by the Mayor of Seberang Perai. A delivery report will will be published each quarter.

The Board will also discuss and review key strategic projects and areas of work, such as establishing a new model for retrofitting, to identify barriers, challenges, and key lessons to date. A progress report will be presented to the **Climate Action Council**, and published each year.

5.3 Carbon Proofing of Government Policy

We will also ensure that all Government memoranda and major investment decisions are subject to a carbon impact and mitigation evaluation, for which a template will be developed. This will be incorporated in Council procedures, in regulatory impact assessments, and in project evaluation processes.

5.4 Oversight of Government

We will establish the **Climate Action Council** and give them additional powers to, in particular:

- Recommend to Government the appropriate five-year Strategic Plan and Sectoral Target
- Monitor the progress of the City in reducing greenhouse gas emissions
- Provide policy evaluation advice to the Government, based on best available science

The Government will also support the establishment of a Climate Change and Carbon Neutral Unit, to provide robust advice and evidence to the Standing Committee regarding the impact of particular policy decisions on our decarbonisation and climate action objectives.

5.5 Carbon Budgets and Sectoral Targets

The Government will be politically accountable for both the setting of climate targets and for implementing the policies needed to deliver these. In this Plan, we have set out a number of new climate targets, including for decarbonisation in the periods 2020 to 2030 and 2050. Within these periods, the Government has also agreed a target decarbonisation range for each sector.

A System of Carbon Budgeting

The Government will develop the targets that are set out in this Plan to adopt a system of carbon budgets. To do this, we will propose a new Climate Action Policy Direction, which will introduce a requirement on Government to propose carbon budgets for three five-year periods. A carbon budget will be the total amount of emissions which can be emitted during a five-year period and will be calculated on an economy-wide basis, i.e. the Emissions Trading System (ETS) and the non-ETS sectors.

The first three carbon budgets will cover the following five-year periods: 2021 to 2025, 2026 to 2030, and 2031 to 2035. The procedure for adopting carbon budgets will be as follows:

- In advance of each five-year period, the Climate Action Council will provide timely advice to the Mayor, on the appropriate three five-year carbon budgets: the upcoming carbon budget and the two that will follow
- Following receipt of the advice of the Climate Action Council, the Mayor will recommend to the Government Agencies the adoption of three five-year carbon budgets
- Where the Government Agencies has not followed the advice of the Climate Action Council, the Mayor will make a written request setting out the reasons why the Government Agencies is not accepting the advice of the Council
- Where the Government Agencies reject the Council's proposed carbon budgets, it must propose alternative budgets. Where this proposal varies from the advice of the Climate Action Council, the relevant Agencies should justify the reasons for the proposed variation

The Government Agencies will commence this system of carbon budgeting on an administrative basis in advance of the Climate Action Policy Direction.

Sectoral Targets

Once the Council has agreed the overall carbon budgets, the Mayor will propose a decarbonisation target range for each sector within the ceiling of the adopted carbon budgets, as well as an annual trajectory target range for each sector, for adoption by Government.

The Oversight Role of the Climate Action Council

On an annual basis, the Agencies with primary responsibility for each sector will report to the Council as follows:

- Indicate the change in emissions in their sector
- Provide an update on the implementation of actions contained in the Climate Action Plan regarding their sector
- Indicate any significant deviation or any potential future deviation from their sector's planned actions and targets
- Identify future mitigation measures that will be necessary for their sector to achieve its target

This will represent a significantly greater level of accountability than currently existed.

Where there is any deviation from the carbon budgets set, or a sectoral target range, following a report CCCNU, the Agency with primary responsibility for the sector shall:

- Report any deviation to the Joint Oireachtas Committee on Climate Action, and the reasons for the deviation
- Set out the measures which are planned to rectify the shortfall
- Respond to any recommendation made by the Council within three months

5.6 Actions

Action Number	Action
2	Establish Climate Change and Carbon Neutral Unit
3	Establish a Climate Action Delivery Committee to oversee the implementation of the Climate Action Plan
4	Establish a Climate action Council consist of various stakeholders to recommend actions and evaluate policy
5	Establish a Climate Action Policy Direction
6	Commence the process of forming carbon budgets for 2021 to 2025, 2026 to 2030, and 2031 to 2035

CHAPTER 6

CARBON PRICING AND CROSS CUTTING POLICIES

6. Carbon Pricing and Cross-cutting Policies

6.1 Introduction

While the evaluation of the costs of adopting different technologies has delivered a clear pathway, their successful adoption will require specific policies to remove barriers at sectoral level and a broad policy framework designed to promote the transition. Government policies on levy, expenditure, sustainable finance, spatial planning, and research and development provide an important enabling framework for individual, household, community, and company-level climate action. These policies also act as enablers for a wide range of other Government policies and activities within individual sectors.

For most areas of environmental damage, a key problem is that those inflicting the damage do not pay the cost of the damage they inflict. This is the rationale for charging a carbon price for carbon emissions which reflects the growing damage that they are inflicting. This serves to discourage emissions and to make carbon reduction more achievable.

6.2 Targets

To meet the required level of emissions reduction, by 2030 we will:

- Implement a carbon levy of at least RM25 per tonne by 2030, accompanied by a trajectory of increases over successive annual Budgets

6.3 Measures to Deliver Targets

Our 2030 decarbonisation ambition will require all sectors to step-up a level if we are to achieve our targets. For carbon pricing and cross-cutting policies, the following measures will be critical to success:

1. Our Strategy for Environmental Levy

Levy policy can play a central role in incentivising the behavioural change necessary to reduce greenhouse gas emissions. We are committed to having in place a levy framework, which plays its full part in exerting, along with other available policy levers, the necessary leverage to reduce our emissions.

We will use successive annual Budgets as a means to reforming key environmental levy measures, including detailed analysis through the Climate Action Council, to:

- Examine the introduction of an emissions-based levy regime for New Development and Industry
- Introduce environmental criteria into the Planning Approval
- As an resource to produce green grant at the city level to promote behavioural changes and retrofitting
- Provide the policy recommendation to promote business investment in energy efficient equipment and gas-powered commercial vehicles

2. Carbon Pricing

Carbon pricing will have a key role to play in the transition to a low-carbon economy and act as an important tool for Seberang Perai to achieve its long-term decarbonisation objectives in a cost-effective manner by 2050.

Our Future Vision for Carbon Levy

We are committed to implement a carbon levy of at least RM20 per tonne by 2030, accompanied by a trajectory of increases over successive annual Budgets. Decisions to be taken in a budgetary context on the future evolution of our carbon levy will underpin many of the actions in this Plan. This commitment will send a strong signal to householders and firms of the need to invest in low-carbon alternatives, where possible.

The primary purpose of a carbon price is to change behaviour to support reducing Seberang Perai's greenhouse gas emissions. We will, therefore, ensure that the use of additional carbon levy revenues takes account of the purpose for which a carbon levy was introduced, including consideration of the appropriate balance between a possible dividend-based approach and expanding funding to decarbonisation programmes.

We will carefully examine the impacts on low-income and rural households and those experiencing poverty, as well as broader distributional impacts.

Shadow Price of Carbon

As part of project appraisal for all government investments, it is essential to avoid expenditure that locks in long-term fossil fuel consumption. To that end, the Seberang Perai City Council expenditure procedure will be reformed by 2030 to improve the calculation of a shadow price of carbon. This will result in Government investments valuing carbon at a level which will see the shadow price increase to RM25 per tonne by 2030, RM100 by 2050.

The reform of the expenditure procedure will also see a new stage introduced into the project lifecycle – project identification. This will become the first stage of the life-cycle with the purpose of ensuring early consideration of approaches to deal with a policy issue ahead of selecting the preferred option and proceeding to the appraisal stage. Climate considerations will be incorporated in this new life-cycle stage.

Consistent application of these rules will allow decision-makers to better understand and appreciate the climate consequences of their investment options.

3. Spatial and Planning Policy

A part of Seberang Perai Local Plan 2020 - 2030 is to propagate transition to a Low-Carbon and Climate Resilient Society, Compact Growth and Sustainable Mobility. We are continuing our work to fully implement the Local Plan, State Structural Plan and National Physical Plan.

Changing the pattern of development in this manner will need to be buttressed by new policy tools in the planning system. It will ensure that more people will be living within the existing built-up footprint of cities and towns and will support achieving the objectives of this Plan through:

- Reduced travel distances and greater proximity to employment and services, which will enable a greater proportion of journeys by bike or on foot (zero emissions)
- Greater urban density, which when combined with the point above, will ensure more viable public transport (less emissions per person than by individual vehicle)
- Greater sustainable mode share, which will enable township to densify, as development will not be dependent on road capacity nor car parking requirements, and less land will be required for the latter
- Higher density residential development, which tends to comprise smaller units and therefore require less energy transmission.
- Closer proximity of multi-storey and terraced buildings, which will require less energy and make renewables-based systems of energy distribution or area-wide technology upgrades, more feasible

Spatial Pattern and Urban Structure

In transitioning to a low carbon and climate resilient society, actions to address the spatial pattern and urban form of development are required in addition to actions that focus on the individual building envelope.

Similarly, actions that integrate land use and transport planning i.e. consideration of spatial pattern, urban form and mobility, are required, in addition to actions that focus on individual transport measures or modes.

These cross-cutting considerations are necessary, because the spatial pattern of development and related urban structure directly influence the need to travel in the first instance. They also determine the pattern of movement, in terms of the frequency and duration of trips and ultimately, behavioural choices regarding modes of transport that may be used.

There is a need to combine measures to influence the spatial pattern of development, urban structure and overall mobility, with low carbon technology measures, such as a significant increase in the EV fleet.

Sustainable Communities

Where different sustainability measures are combined spatially, for example to match urban density with public transport accessibility and/or to focus on reducing energy demand and renewables, with the aim of reducing emissions, these place-related measures are often described as ‘sustainable communities’.

There are many different types of sustainable community or sustainable development. Notable examples in Ireland include the Dundalk Sustainable Energy Zone (SEZ) and at a smaller scale, but also integrating ecology and biodiversity, the Cloughjordan Eco-Village in Co. Tipperary.

Large-scale housing-focused developments at Adamstown and Cherrywood in County Dublin, combine higher density urban form with mobility. District heating and other measures have been incorporated into housing and commercial schemes on a localised basis.

Significant examples of where all of these measures have been successfully combined on a large urban scale, include Hammarby-Sjostad in Stockholm, Sweden and both Rieselfeld and Vauban in Freiburg, Germany.

There is scope to support the development of place-based and holistic sustainable communities in Seberang Perai, to showcase possibilities and enable learning that can be replicated elsewhere, to achieve low carbon outcomes.

Development initiatives that can demonstrate a range of innovative and place-appropriate measures and that can accelerate transition to a low carbon and climate resilient society on an area basis, will be supported.

City Planning Framework

The spatial pattern and form of development provides the critical enabling capacity to realise the impact of other component policies within an integrated package, by linking the spatial distribution of population, jobs and other activities within an urban area. Changing the pattern of development and urban structure will take time, but will deliver in the medium to long term.

Implementation

The Census of Population undertaken by the Department of Statistic Malaysia (DSOM) at tenth yearly intervals, next due in 2020, provides important data in respect of the spatial distribution of the population, including information on commuting patterns and transport mode share. Integrated measures to influence the spatial pattern of development, urban structure and mobility will have a positive impact on commuting and sustainable mode share.

In summary, the cross-cutting, interrelated measures set out in the Planning Framework to achieve compact growth, sustainable mobility, and a low- carbon and climate resilient society are shared in this Climate Action Plan. They will have a cumulatively positive downward impact on greenhouse gas emissions, as well as a range of other environmental, social, and economic benefits.

4. Broadband

The High Speed Broadband network will deliver a range of environmental benefits. Availability of better online conferencing and collaboration tools will reduce the need for business travel and the associated carbon emissions. High Speed Broadband also increases the creation of local employment opportunities, which allows more people to work closer to their homes, reducing the emissions associated with longer commuter journeys. ‘Smart Homes’ technologies will allow the remote management of domestic energy consumption through smart metering, heating and lighting systems, and enable consumer autonomy over their domestic energy consumption. This will play an important contributory role in decarbonising the residential sector. As opportunities for ‘Smart Agriculture’ are leveraged, lower carbon emissions relative to the yield of the city agricultural sector will result, as precision farming generates a higher-yield per animal and hectare through data-driven herd and crop management.

5. Financing the Transition

There is a growing realisation that financial institutions, when they are funding the acquisition of assets, must pay far greater attention to the climate resilience of assets where they risk locking into high-carbon technologies, or other climate vulnerabilities, and in turn, show a greater willingness to fund investment in changes which can make those assets more climate resilient.

There is a rapidly growing appetite in the financial sector to diversify into green activities, no doubt to balance their exposure to fossil investments or other vulnerable assets. However, the transition to a low carbon economy and society also brings significant opportunities for the financial sector.

Ensuring success will require technological innovation and investment. The Intergovernmental Panel on Climate Change estimate that the world will need to spend around US$900 billion annually until 2050 on energy-related mitigation investments if global warming is to be limited to 1.5 degrees.

This investment will cover a range of activities:

- Developing disruptive innovations, including some that we may not already have thought about
- Expanding new types of infrastructures, including for clean sources of energy, not least given the potential increased cost efficiency of these
- Adapting existing infrastructures, such as retrofitting existing homes and offices to make them more energy efficient

This investment will need to be financed. To meet this challenge, the financial sector will need to innovate – just like the rest of the economy. We need to see rapid development of smart finance packages that recognise the constraints facing individuals and enterprises in making the change, with the the creation of a facilitative environment where climate related financial risks can be more efficiently assessed and considered.

Mobilising Private Sector Investment

The low-carbon transition will require significant private investment alongside government expenditure on a sustained basis over a number of decades. Through the Climate Action Council, we will seek to leverage the significant volumes of private sector capital that is available for well-structured projects, including solar electricity generation, interconnection, and major transport infrastructure. Climate Action Council need to identify priority opportunities in key sectors to mobilise private investment towards assisting in meeting our climate objectives.

Promoting a Sustainable Financial System

International Financial Services (IFS) are among the most competitive and rapidly changing global industries. We need to be able to maintain and grow our IFS sector by exploiting opportunities and meeting any emerging challenges in this very dynamic and very competitive sector.

6. Research and Development

There is a need to ensure that the best scientific evidence and advice is available to underpin Government policy and support the actions in this plan. Seberang Perai need to reflects the increased urgency of the need to address climate change, with a new research priority theme focusing on Energy, Climate Action and Sustainability, and two priority areas concentrating on decarbonising and sustainable living and also smart and sustainable food production and processing.

We will continue to develop our city climate research capacity through prioritisation of funding opportunities across all public funding bodies. In particular, we will seek to further develop economic opportunities for innovation and commercialisation arising from research funding, to ensure that Seberang Perai is favourably positioned to benefit from new and emerging global opportunities in addressing climate change.

Given the long-term nature of the climate challenge, we will also give specific priority to the most difficult decarbonisation challenges that need to be solved so that we can meet our 2050 objectives, including developing the potential for mission-oriented funding through other research funders.

6.4 Actions

Action Number	Action
7	Implement a rolling strategy to introduce environmental levy framework
8	Implement a carbon levy of at least RM25 per tonne by 2030 and carry out a full assessment of a trajectory of increases over successive annual Budgets
9	Reform the Seberang Perai City Council expenditure procedure to implement the shadow price of carbon and introduce more robust consideration of climate impacts in project appraisal
10	Develop a strategy on mobilisation of private sector investment to meet our climate targets
11	Implement the new strategy for international financial services to promote the development of the sustainable finance sector in Seberang Perai
12	Develop the potential for mission-oriented funding option for Research and Development
13	Introduce and Implement the Sustainable City Planning Framework

CHAPTER 7

ELECTRICITY

7. Electricity

7.1 State of Play

Electricity accounted for 41.36% of Seberang Perai's greenhouse gases in 2019, down from 44.28% in 2015. It is important that we decarbonise the electricity that we consume by harnessing our significant renewable energy resources. By doing this we will also become less dependent on fossil fuels.

To date we have been very successful in deploying renewable electricity, with 3% of electricity produced from renewable sources in 2019. The target is to reach 20% by 2022. Emissions for the sector were on a upward trend between 2005 and 2011, but have stayed relatively static since, as a result of rising demand for power generation from renewable sources. Given our 20% target is based on a percentage of total energy demand, this rising demand makes meeting our 2022 target is a challenge.

Despite our success in deploying renewable electricity and Seberang Perai's share of electricity emissions (as a percentage of our overall greenhouse gas emissions) are still the highest among other sectors.

While decarbonising electricity is at the heart of our strategy and we have a good record of renewable deployment, we have to do it against a background of very rapid projected growth in electricity demand. Demand for electricity is forecast to increase by 50% above existing capacity in the next decade in line with economic forecasts. Ensuring we build renewable, rather than fossil fuel, generation capacity to help meet this demand is essential. It makes economic sense, but also facilitates decarbonising our building and transport through electrification.

Case Study – Cost of Renewable Electricity

Renewable sources of electricity such as wind and solar now account for the majority of new electricity generation capacity being built globally. Over the last decade, growth in renewable was aided by supportive public policies and consumer preferences. However, the next phase of growth in renewables is likely to be more driven by economics.

According to advisory firm Lazard's year-end 2018 estimate, the levelised cost of energy – the price per each unit of energy – for utility-scale renewable electricity continues to fall. Lazard's estimate that renewables are now cheaper than combined-cycle natural gas (or indeed coal) for new-build generation capacity. In addition, it is forecast that new-build renewables will out-compete even existing fossil fuel generation in most countries before 2030.

This does not mean that moving to a higher penetration of renewable electricity is easy. Renewable generation is intermittent and often unpredictable. This creates new challenges for utilities, market participants, and policy makers. Intermittency also creates the need for a range of technology solutions which may include large-scale interconnection, storage, and dispatchable capacity (e.g., natural gas plants that can generate electricity at times where there is no wind).

There is no one-size-fits-all answer to supporting 70% renewables. However, we are witnessing rapid improvement in some of the technology that could support higher renewable penetration. For example, Bloomberg NEF estimate that the levelised cost of energy, for lithium-ion batteries has fallen by 35% since the first half of 2018. If this trend continues, a technology which was immature only a few years ago could play a significant role in supporting decarbonisation of electricity.
Our ability to decarbonise our electricity system will be key to our ability to decouple economic growth from emissions growth. While ongoing action on energy efficiency can help offset some energy demand growth, ensuring the deployment of increasing renewable generation capacity will be fundamental to our success.

The renewables sector is very dynamic in nature, with technologies still rapidly evolving. Ensuring increased levels of renewable generation will require very substantial new infrastructure, including solar farms, grid reinforcement, storage developments, and interconnection.

Notwithstanding the financial and engineering challenges that this brings, it is imperative that communities recognise the value these infrastructures bring. A successful strategy must lend itself to such innovation. It will also need to successfully mix the support of small-scale activity, at enterprise and community-level, with larger projects, to ensure a highly efficient delivery of additional renewables.

It is clear that policy measures to date will not achieve the level of decarbonisation required in the electricity sector to meet our 2030 emissions reduction target. We must reduce our electricity sector emissions to 1.5 Mt in 2030. In 2018, emissions from electricity were 3 Mt and in 2030, despite emissions are projected to be 3.5 Mt. This clearly demonstrates the need for a significant step-up in ambition over existing policy, not only to meet our 2030 targets, but to set us on course to deliver substantive decarbonisation of our economy and society by 2050.

In the electricity sector, reaching a 50% share of renewable electricity would require a comprehensive development policies and integration between various agencies.

7.2 Targets

To meet the required level of emissions reduction, by 2030 we will:

- Reduce CO2 eq. emissions from the sector by 50% in 2030
- Deliver an early and complete phase-out of coal-fired electricity generation
- Increase electricity generated from renewable sources to 50%, indicatively comprised of :

Achieving 50% renewable electricity by 2030 will involve phasing out coal-fired electricity generation plants, increasing our renewable electricity, reinforcing our grid (including greater interconnection to allow electricity to flow), and putting systems in place to manage intermittent sources of power. This will require Renewable Energy Companies to work more closely with community and enterprise to ensure wider community gain.

The Solar Leasing Programme
The Solar Leasing Programme is a flagship Tenaga Nasional Berhad (TNB) policy designed to deliver on our commitments to decarbonise our electricity grid, harness our natural resources and bring renewable energy into the heart of our communities. This will be the key policy measure that will drive the delivery of our 50% Renewable Energy target, attracting significant international investment in the renewable sector in Seberang Perai and driving down consumer costs. The design is at the forefront of international best practice in competitive auction design, community investment and ownership. The inclusion of specific support for Solar System design will be transformative and, in the long run, will deliver the scale of renewables required to decarbonise our electricity system.

7.3 Measures to Deliver Targets

Our 2030 decarbonisation ambition will require all sectors to step-up a level if we are to achieve our targets. For electricity, the following measures will be critical to success:

1. Phasing Out Fossil Fuels

Removing fossil fuels from the grid will be essential in the coming years.

- We have committed to end the burning of coal and to the replacement of coal-fired generation with low-carbon and renewable technologies.
- MESTECC have announced that they will transition away from Coal by 2025

2. Harnessing Renewable Energy

The government is committed to a very significant increase in the level of clean, renewable energy. This will be achieved by a significant step change.

- Ensure New Development to tap into Renewable Energy
- New Commercial and Industry Buildings need to have at least 15% of renewable energy by 2022 and 50% by 2030
- Develop mechanism to have Renewable Energy in a new housing scheme
- Assist existing building to have renewable energy infrastructure

3. Micro-generation

The Government strongly supports enabling people to sell excess electricity they have produced back to the grid. To enable this, we will have to make a number of changes.

- Smart Metering Programme that will facilitate better demand management and cost savings for consumers, particularly when closely aligned with the ambitious roll-out of retrofitting programmes and micro-generation capacity for homes and small enterprises
- Change the electricity market rules in order to enable micro-generated electricity to be sold to the grid. This should include provision for a feed-in tariff for microgeneration to be set at least at the wholesale price point
- Design market mechanisms, network tariffs, competitive auctions for renewables and the public service obligation in a way that distributes costs fairly, including in terms of competiveness
- Continue promoting closer working with community and enterprise by Tenaga Nasional Berhad (TNB) to ensure wider community gain

7.4 Actions

Action Number	Action
14	Implement Solar Leasing Programme throughout the city
15	Renewable Energy Guidelines for New Development
16	Implement Smart Metering Programme
17	Land Leasing for Renewable Energy Farm
18	Provide facilitation for Existing Building to install renewable energy infrastructures

CHAPTER 8

ENTERPRISE

8. Enterprise

8.1 State of Play

Enterprise will play a pivotal role in our ability to fulfil this transition and meet our 2030 and 2050 targets. It shapes the way materials are managed, from raw states to final consumption and disposal.

It manages large transport flows. It builds and uses a large share of our buildings and it influences a vast supply chain by the priorities it sets. However, emissions from enterprise in the carbon inventory include only those associated with production processes, i.e. manufacturing combustion industrial processes and F-gases. In 2018, they were 0.33 MtCO2eq., or 4.4% of Seberang Perai's total emissions.

The largest share of enterprise emissions comes from the manufacturing sector, mostly chemicals, food processing, beverages, and materials. Emissions from enterprise that are highly diverse, with a large proportion arising from Small Medium Enterprises (SMEs), especially those working with industrial gases (also known as fluorinated or F-Gases). These are gases with high global warming potential used in refrigeration, air conditioning and semiconductor manufacturing.

While the recovery in enterprise activity has seen some switching of the sector's energy requirements from fossil fuel to renewable energy, the link between economic growth and emissions has still not been broken.

If enterprise is to contribute to the overall objective to meet the target of 75% emissions reduction by 2030, relative to 2015 levels, further work will also be required to align the expected rapid growth in energy demand from data centres with grid infrastructure plans.

Reducing the sector's transport and buildings emissions will take leadership at enterprise level. Transport is currently over 99% dependent on fossil fuels and a high proportion of buildings within the sector have a poor Building Energy Index (BEI), with a low level of renewables penetration.

It is encouraging to see some major companies committing to 50% emissions reduction by 2030, but this level of ambition must become the norm across the enterprise sector. Companies and sectors that fail to make early moves to decarbonise their activity across their entire business model will become increasingly uncompetitive.

It is clear that policy measures to date, will not achieve the level of decarbonisation required in the industry sector. Analysis of cost-effective measures indicate that there are significant opportunities for the sector, particularly in food processing and other manufacturing. In food processing, measures include phasing out oil and replacing with biomass and electricity. In materials production, measures include use of alternatives fuels, such as Solid Recovered Fuels (SRFs) and other waste streams substituting for fossil fuels.

8.2 Targets

To meet the required level of emissions reduction, by 2030 we will:

- Reduce Seberang Perai industry emissions by15% by 2030, relative to 2030 projections
- Increasing the share of renewable energy in Manufacturing Industry up to 50% by 2030
- Enterprise must contribute to the more ambitious targets for buildings (80%) and transport (50%)
- Reduce Building Energy Index (BEI) up to 100 kWh / m^2 / year
- Achieve Zero Waste Industry by 2030

Enterprise will be required to implement a detailed agenda of transition and change if it is to ensure that our sectors are climate resilient and can remain competitive in a decarbonising world.

This agenda will include:

- Improving energy efficiency of processes, buildings and transport
- Replacing fossil fuel with renewables in their processes, buildings and transport
- Improving the way in which resources are used in their supply chain to reduce emissions and conform to circular economy principles
- Being innovative across production, distribution, and marketing to realise the opportunities arising
- Developing the new skills and techniques necessary
- Developing measures of the climate and environmental impact of activities which will become more widely expected in the marketplace
- Improving their resource and waste management to move toward circular economy

This will require leadership from within enterprise, but also the capacity to build networks of good practice within sectors. The enterprise facing state and local agencies, having regard to their statutory mandates, will be prioritising decarbonisation as part of their strategies.

The focus of programmes emphasising management development, start-up, lean productivity improvement, training, marketing and innovation will all increasingly emphasise this urgent agenda for climate resilience in our sectors. Each of these agencies shall, as part of this plan, be adjusting their suite of programmes in line with this national priority. The use of audits and benchmarks can become a valuable tool in helping enterprise adapt.

It is encouraging to see many companies and some sectors already stepping forward with clear commitments to cut-emissions, to go renewable, to electrify their fleets and to manage waste in a different way. It is important that all sector associations and local chambers recognise and support their members so that networks quickly form to follow the pioneers. Public bodies will be encouraged to form partnerships so that shared endeavour can deliver more. We need to see the emergence of clusters within which the sector's efforts can be aggregated and scaled.

8.3 Measures to Deliver Targets

1. Carbon Pricing

- As we progressively decarbonise our economy, policy must prevent a large gap emerging in carbon pricing to ensure an ongoing strong signalling effect for decarbonisation

2. Enterprise Transition Agenda

- Working with the enterprise agencies, will prioritise preparatory work on the following actions:
    - Accelerate the roll out of renewable energy, Combined Heat and Power (CHP) technologies and Power Purchase Agreements (PPAs)
    - Develop a strategy for waste heat recovery from industrial processes
    - Support the adoption of renewable heat for process and space heating
    - Support industry to test and demonstrate scalable and replicable innovative approaches to decarbonisation
    - Support large businesses with the installation of charging infrastructure for electric vehicles, the conversion of fleets and the piloting of new vehicles
    - Develop proposals for mandatory audits for large industry
    - Expand the use of energy performance contracts

3. Enterprise Agency Leadership

- Decarbonisation of enterprise is about far more than supporting the introduction of energy efficiency measures. It is fundamentally about decarbonising processes which are adopted by industry to produce goods and services. CCCNU will work to further integrate climate change considerations into their overall strategies

4. Enterprise Leadership in the Wider Community

- Enterprises can play a prominent role as leaders beyond their immediate business activities. Government will promote their active participation. This will include:
    - Participation in wider community initiatives, such as Sustainable Energy Communities and Better Energy Communities
    - Support for business networks of SMEs where experience could be shared, for example through local chambers of commerce
    - Support for employees to actively contribute to decarbonisation in work and their wider lives
    - Work with industry-led initiatives to support decarbonisation programmes, such as low carbon pledges

Case Study – Pre-competitive Collaboration

Increasingly, industry leaders are looking to tackle environmental issues while also improving their economic value. However, in certain instances it can be costly (or perceived to be costly) to address environmental issues as an individual company. Taking actions can expose companies to competitive disadvantages if other players in their industry do not commit to similar action.

On the other hand, if companies work together to tackle such issues collaboratively, it can improve economic value for all as well as supporting the environment and the wider society. Such an approach is often referred to as 'pre-competitive collaboration' where industry leaders come together to form an alliance with a common goal. For example, denim industry players in the Netherlands formed the Alliance for Responsible Denim where they collaborated to tackle water, energy and chemical issues to produce denim in a more sustainable way. The UK's 'Priming Food Partnerships' initiative is another example of pre-competitive collaboration to stimulate technological advances that can deliver healthy nutrition for consumers. This enables the industry to develop standards, generate data and enhance industry knowledge. It also levels the playing field for all participants by removing the competitive disadvantage for any one company.

8.4 Actions

Action Number	Action
19	Prioritise decarbonisation as part of enterprise agency strategies and drive the decarbonisation agenda across their respective client bases
20	Develop networks in key industry sectors and a roadmap of actions to support decarbonisation of large industry
21	Promote the integration of climate considerations into business operations through the work of the Corporate Social Responsibility Stakeholder Forum
22	Work with all business representative groups and companies that sign up to a low carbon trajectory
23	Implement Green Industry Award to encourage participation from every business entities

CHAPTER 9

TRANSPORT

9. Transport

9.1 State of Play

By 2050 the population of Seberang Perai is expected to grow up to 1.25 million people. This growth, will drive greater demand for transport across various modes, with increased movement of people and goods. While this is a sign of a vibrant economy, it intensifies our decarbonisation challenge, in particular as transport accounted for 40% of Seberang Perai's greenhouse gases in 2018. Furthermore, air pollution emitted from transportation contributes to poor local air quality, in the form of increased micro-particulates and nitrogen oxides, which reduces people's quality of life and harms their health. These issues cannot be ignored and provide further impetus for addressing the challenge in this sector.

Seberang Perai's share of transport emissions, as a percentage of our overall greenhouse gas emissions, is high and serious actions needed to mitigate it. While some of the challenges we face in reducing emissions from transport are universal, such as technical barriers to biofuel substitution; the lack of Electric Vehicle (EV) substitutes in freight; and the higher upfront cost of EVs, other challenges are more specific. These include our dispersed settlement pattern and low population density (which contribute to a high proportion of journeys being made by private car as there is no public transport or active travel substitute); our dependence on fossil fuels with 99.7% of our transport energy demand in 2017 served by fossil fuels; the scale-up required from the present share of new car purchases to 100% electric by 2030.

The analysis of the most cost effective policy options available to Seberang Perai shows a very substantial number in the transport sector and, while they have significant upfront costs, their adoption will bring net savings to the economy overall. Consumer costs have fallen significantly. EV battery prices have fallen by 79% in the last 7 years, with 2030 forecasts predicting a further 67% fall by 2030.

This will mean cheaper consumer prices. When the upfront cost and the ongoing running cost are looked at together, it will be as cheap to have an EV as to have a petrol/diesel vehicle. On this basis, the most efficient roadmap for Seberang Perai would include a 50% reduction in transport emissions by 2030, with substantial acceleration in the second half of the decade.

In some areas, we see very significant early adoption particularly for urban delivery vans where the quick payback period is already encouraging large scale switching in public and private sectors.

To make growth less transport intensive some key policies include:

- The successful execution of the Planning Mechanism, designed to promote compact, connected and sustainable living (Transit Oriented Development)
- Expansion of walking, cycling and public transport to promote modal shift
- Better use of market mechanisms to support modal shift
- The successful roll-out of the Broadband Plan, which can promote remote working and wider activities which reduce unnecessary journeys

While the most influential instrument to reduce carbon intensity of travel will be the fiscal incentive around motoring, other important influences will be:

- Ensuring the EV charging network underpins public confidence
- Creating an early public procurement framework for EVs
- Accelerating steps to decarbonise the public transport fleet
- Enhancing priority for public transport
- Biofuel mix
- Giving Local Authorities more discretion in designating low emission zones
- Developing a strategy for the heavy freight sector

The most cost-effective reduction opportunities for transport, are in the electrification of transport. This is due to fast falling battery prices, which are likely to put the overall cost of EVs on par with those of fossil fuel vehicles over the next decade (see case study below on Electric Vans and An Post). In terms of electric buses, while they may be more expensive up-front than petrol or diesel buses, their deployment can be justified by the benefits they offer, including better air quality. Their early adoption would also demonstrate public-sector leadership.

Air Travel
Since 2012, greenhouse gas emissions associated with flights operating in the European Economic Area (EEA), including domestic flights as well as those to and from third countries, are covered by the EU ETS. Airlines are required to monitor, report and verify their emissions, and to surrender allowances against those emissions. Airlines receive tradable allowances covering a certain level of emissions from their flights per year and must purchase allowances to cover any shortfall between their allocated sum of free emissions allowances and their actual emissions, as reported annually.

To support the planned development of a global Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) by the International Civil Aviation Organisation (ICAO), the EU agreed in 2014 to limit the scope of aviation in the EU ETS to flights within the EEA. CORSIA will come into effect in 2021 and aims to stabilise global aviation emissions at 2020 levels by requiring airlines to offset any emissions growth after 2020 by purchasing eligible emission units generated by projects that reduce emissions in other sectors. As Ireland is a member of ICAO, Irish aircraft operators will have to offset any emissions growth after 2020 by purchasing eligible emission units, i.e. pay full carbon price.

9.2 Targets

To meet the required level of emissions reduction, by 2030 we will:

- Reduce CO2 eq. emissions from the sector by 50% relative to 2030 projections
- Increase the number of EVs, comprised of:
    - passenger EVs
    - electric vans and trucks
    - electric buses
- Build the EV charging network to support the growth of EVs at the rate required, and develop our fast-charging infrastructure to stay ahead of demand
- Require at least one recharging point in new non-residential buildings with more than 10 parking spaces
- Propagate the Circular Economy to encourage the development of Biofuel with the blend proportion of biofuels in road transport to 10% in petrol and 12% in diesel

9.3 Measures to Deliver Targets

Our 2030 decarbonisation ambition will require transport to step-up a level. This means a significant ramp-up in EVs from their current numbers, increased penetration of cleaner, alternative fuels, and an irreversible shift to low-emission mobility. These changes will need to be underpinned by policy tools such as vehicle and fuel taxation measures, and a strong carbon pricing trajectory. For transport, the following measures will be critical to our success:

1. Modal Shift

We want to make sure that we provide good public transport, cycling and walking infrastructure, so people are less reliant on their cars, and we can cut congestion.

Policies need to be better aligned to achieve more ambitious targets for modal shift, involving building supporting infrastructures. We shall:

- Expand sustainable-travel measures, including a comprehensive cycling and walking network for Central Business Districts (CBD), with a particular emphasis on safety of cyclists. We shall also expand greenways.
- Promote compact growth and greater integration of policies for land use and transport planning, which will reduce the demand for commuter travel and support more efficient patterns of development and travel (Transit Oriented Development)
- Establish a Park-and-Ride facilities
- Establish a Cycling Project
- Consider further opportunities to expand and better integrate existing mobility management initiatives for institutions and enterprises, such as Smarter Travel Workplaces, Smarter Travel Campus, Green School Travel and Workplace Travel Plans, including the potential for increased participation by public

2. Conversion of Public Fleets

The conversion of our public fleets will have a positive impact on our emissions and our air quality.

- Develop a Green Public Procurement Framework for conversion to EVs in 2025
- Make converting fleets to EVs a central element of the mandate given to all public bodies
- Pass legislation to enable Local Authorities to introduce low- and zero-emission driving zones

Case Study – Electric Vans and An Post

Globally, many organisations are switching to electric delivery vans for light weight urban delivery services. The Total Cost of Ownership (TCO) for this vehicle segment is currently at parity with ICE vehicles and is expected to reduce further as battery prices reduce. In Ireland, An Post is taking the lead in this space by placing sustainability at the core of their business strategy. Having successfully piloted a number of electric vans in Dublin in 2018, An Post plans to roll out electric vans across the city enabling the company to reach zero emission deliveries between the canals by the end of 2019.

With an expected payback of 2.9 years, light weight urban electric vans not only contribute to reduced carbon emissions, increased air quality and reduced noise pollution but are economically worthwhile for the business. As such, An Post plans to electrify the rest of their urban fleet by the end of 2020, expanding to Kilkenny, Waterford, Limerick and Galway.

An Post's sustainable strategy also includes measures to encourage their employees to drive EVs including providing charging points at their offices. In addition, they plan to install a commercial network of EV charging points at post offices with a pilot of 12 points across the country being trialed this year. An Post is committed to 50% carbon reduction by 2030 and 100% by 2050.

3. EV Charging Network

The transition from petrol and diesel cars to electric vehicles will make a big impact on our emissions. It will also improve our air quality. We are already seeing a big increase in the number of electric vehicles being sold. By the middle of the 2025s EVs will reach Total Cost of Ownership parity with diesel and petrol engines. This means that when a consumer factors in both up-front cost and on-going running cost, it will be as cheap to have an EV as a petrol/diesel vehicle.

To give people confidence to switch to EVs, and ensure that the city charging network has a substantial supply buffer ahead of demand, measures include to produce guidelines for EV Charging Station and Provide EV Charging Point for New Development Area.

Case Study – EV Sales and Costs

The pace of EV sales growth has accelerated significantly in recent years. 2017 was the first year that that global sales of new electric vehicles passed one million units. Under the current growth trajectory, EV producers could almost quadruple in 2020, selling circa 4.5 million units or about 5% of the overall global light-vehicle market. Both car makers and regulators are taking notice. Car makers will launch about 340 BEV and PHEV models in the next three years, significantly reducing supply as a barrier to further market

uptake. Regulators in countries and cities are supporting the take-up by setting end dates for the sale of diesel- and gasoline-powered vehicles. Norway, for example, wants BEVs to account for 100 percent of its new-car sales by 2025.

At the same time, the cost of owning an EV is plummeting. In 2010, EV battery prices were $1,000/kWh. At the end of 2017, average prices hit $209/kWh, a 79% drop in seven years. Forecasts to 2030 suggest that battery pack prices will be as low as $70/kWh. All-in-all, this means lower costs for consumers. By the middle of the 2020s EVs will reach TCO-parity with diesel and petrol engines. This means that when a consumer factors in both up-front cost and ongoing running cost, it will be as cheap to have an EV as a petrol/ diesel vehicle

Case Study – Electric Buses
Major cities around the world have set ambitious targets to roll out electric buses over the next decade with China leading the charge. Shenzen was the first city to operate a 100% eBus fleet consisting of 16,000 vehicles. However, many other countries across the globe are following their lead, for example, the Netherlands have set targets for 100% of new transit bus sales to be electric by 2025 and a 100% of the entire bus fleet to be electric by 2030. Norway have also committed to all new bus sales being eBuses by 2025 and 75% of their long-distance buses sales being electric by 2030. Furthermore, 12 major cities have signed the 'Fossil-Fuel-Free Street Declaration', pledging to buy only electric buses from 2025 onwards. These include London, Paris, Los Angeles, Copenhagen, Barcelona, Quito, Vancouver, Mexico City, Milan, Seattle, Auckland, and Cape Town.

5. Use of Biofuels
Engage in the Circular Economy to encourage the development of Biofuel with the blend proportion of biofuels in road transport to 10% in petrol and 12% in diesel

6. Emerging Technologies
Further investigate decarbonisation options such as hydrogen vehicles, biomethane and AD substitutes for natural gas, to prepare relevant development guidelines.

9.4 Actions

Action Number	Action
24	Develop Transit Oriented Development guidelines
25	Conduct analysis on improving accessibility for public transport and cycle lane
26	Develop a Green Public Procurement Framework for conversion to EVs in 2025 and Set a road map for more LEVs in public sector fleets
27	Develop the EV charging network necessary to support the growth of EVs to at least
28	Develop and implement planning rules and guidelines across residential and nonresidential parking locations for EV charging infrastructure and Ensure our regulatory regime for buildings requires the installation of EV charging infrastructure
29	Develop a regulatory framework on low emission zones and parking pricing policies, and provide local authorities with the power to restrict access to certain parts of a city or a town to zero-emission vehicles only. Examine the role of demand management measures including low emission zones and parking pricing policies
30	Develop and implement cycle network plan
31	Engage in the Circular Economy to encourage the development of Biofuel with the blend proportion of biofuels in road transport to 10% in petrol and 12% in diesel

CHAPTER 10

BUILT ENVIRONMENT

10. Built Environment

10.1 State of Play

The built environment accounted for 41.36% of Seberang Perai's greenhouse gases in 2018. It is important that we improve the energy efficiency of our buildings, including our homes, workplaces and schools, by meeting higher energy performance standards and by increasing retrofit activity. This will not only reduce Seberang Perai's dependence on fossil fuels, but will also improve our living standards by making our buildings more comfortable, healthier, safer, and less costly to heat.

We have already had some success in decarbonising our buildings with emissions falling by 10.3% in 2019. This scale of continued reduction beyond 2020 is needed in order to achieve our reduction target.

Seberang Perai's faces a number of challenges in reducing emissions from our buildings. Our buildings are 98% reliant on fossil fuels, over 99% of our homes and other buildings are not assessed for their BEI ; and the current annual retrofit activity for existing stock is far too limited.

Set out the target emission reductions in the Built Environment if the most cost effective options are adopted. A hierarchy of the most cost effective investments underpin this, including:

- Improving the fabric of buildings
- District cooling and heating in commercial buildings
- Setting new building standards

While some measures have a very quick payback and are being quite widely adopted, it is clear that we must accelerate universal adoption but also embrace changes whose payback is not so rapid.

The analysis shows that our ambitions for the Built Environment must go beyond our target in 2030. Compared to recent patterns, the rate of emission reduction needs to double from 5% to close to 7% per annum.

In order to deliver the efficient pathway, we must reduce our built environment sector emissions to 1.5 Mt CO2eq. in 2030. This requires 75% emissions reduction relative to 2030 projections.

Therefore, as we transition to lower-carbon pathways we must ensure the introduction of other low-carbon solutions in new residential and commercial buildings.

The level of emissions reduction required could be achieved by:

- Increasing the cumulative number of buildings that are retrofitted to improve BEI
- Reaching 50% renewable energy sources in residential buildings by 2030, and 75% Renewable Energy in commercial premises

District heating and cooling networks also have several characteristics that are attractive for climate mitigation policy, particularly those that use a renewable heat source, or heat that is currently wasted, such as from power stations or data centres. Heat networks can be very versatile as they are not bound to one source. They can be supplied by waste heat, gas boilers, biomass boilers or heat pumps.

10.2 Targets

To meet the required level of emissions reduction, by 2030 we will:

- Reduce CO2 eq. emissions from the sector by 75% relative to 2030 projections
- Sharply reduce fossil fuel use, given the current heavy reliance on gas, oil, coal and peat in the sector
- Assist building retrofits to achieve a better BEI
- Increase the number of Sustainable Energy Communities

10.3 Measures to Deliver Targets

Mobilising the acceleration of work to make our buildings climate resilient will require new approaches that go well beyond existing approaches. The key initiatives which will be developed under the plan are:

- Develop a model that aggregates up into large area based packages where economies can be achieved in delivering professional advice, tendering the work and developing smart finance, and easy pay back methods
- Ensuring that every significant new build or refurbishment takes the opportunity to maximise the adoption of climate resilient measures
- Promoting the widespread adoption of heat pump or other renewable heating and cooling options

These will take significant innovation in the approach but will also require collaborative approaches across Government Agencies, Enterprise, Finance and Communities to deliver. A Task Force will be immediately established to develop the model.

In many cases policy measures can be leveraged to greater effect through smart design and the introduction of interim measures. For instance, with smart metering, in the interim period to full roll-out in 2025, new products and services could be introduced that enable customers to avail of cheaper electricity by managing their energy demand, through the use of night rates or other behavioural signals. Notwithstanding this, our 2030 decarbonisation ambition will require a further step-up in activity. A combination of new funding options, a grouped approach to housing retrofits, and signalling advanced performance requirements to phase out fossil-fuel use will all play a key role. For the built environment, the following measures will be critical to success:

1. New Delivery Structure for Retrofitting

We will develop and put in place a new retrofitting delivery model, which will group retrofits together to achieve economies of scale, leverage private finance, and ensure easy pay-back methods. The savings on your electricity bill from using less energy can help fund this, while the home will be warmer and produce less emissions.

Various approaches to aggregation exist across a number of countries, but they generally exhibit similar characteristics. An area based retrofit programme would seek to capitalise on critical mass, leveraging economies of scale that would benefit both householders and the supply chain. This type of programme

would focus on designated areas in both rural and urban environments and could be designed and delivered to include other strategic delivery partners.

The blending in of more private householders for energy retrofits would then balance and scale an overall 'project' and make greater impact. Appropriate methods of procurement, and high performance standards would be employed with due regard for location, scale and ownership mix.

Area based, scaled approaches can make it easier to inform and engage the homeowners being targeted by building on existing community structures and programmes. They can also build the confidence of supply chains, which will need to invest in both competency and capacity as we fulfil our city ambition on the decarbonisation of our built environment.

The Climate Action Council need to identify a delivery structure and funding options for an area based residential retrofit programme in early 2021 as part of this Plan.

Case Study – Netherlands Retrofit Project

In the Netherlands, the Government funded an innovative project called 'Energiesprong', which aggregated demand for retrofits before deploying builders to complete the work at pace. Builders were incentivised to improve efficiency and speed, and got the turnaround time to retrofit a house down to three days. The initiative used social housing as a launch pad before rolling out the approach across the private sector, and was financed by housing companies, which achieved savings on energy costs, repairs and maintenance. The tenants paid for energy like a phone plan: they got an allowance for a guaranteed indoor temperature, plus an allowance for hot water per day, and a power bundle for light and appliances. Energiesprong has since been rolled out in the UK, Italy, France and Germany.

2. Building Standards, Retrofitting and Energy Efficiency

- we have committed to design **a new delivery model** for retrofitting, which will examine grouping large numbers of houses together to achieve economies of scale, leveraging smart finance, and ensuring easy pay-back methods
- The Public Sector Energy Efficiency Programme supports public bodies in achieving a 33% energy efficiency target by 2030, this will be increased to 50% for 2050, but there are also a number of other initiatives in key areas such as in the health sector and enterprise.
- Establish the Excellence in Energy Efficient Design (EXEED) programme to embed energy efficiency design and structured energy management in the commercial and public sectors.
- Coordinate the Sustainable Energy Communities programme and enlist a wider range of organisations to anchor its collective approach. This will be done through developing new partners, creating more visibility within communities, and attracting matching finance
- Extend sectoral networks to new areas, to raise information and awareness and mainstream the adoption of low-carbon technologies, processes and techniques

3. Market Signals

- Carbon pricing can encourage energy efficiency improvements by households and businesses. We are committed to implement a carbon price of at least RM25 per tonne by 2030, accompanied by a trajectory of increases over successive annual Budgets. This will improve the payback period for investments and increase the up-take of energy efficiency measures by factoring the cost of

carbon into decision-making. How revenue from carbon pricing could be usefully deployed will be based on the principle that measures we design should incentivise involvement in the transition. Carbon pricing is further described in Chapter 6

- Mechanical electricity meters will be replaced in every house by 2025 under the Smart Metering Programme. This will facilitate consumers in improving energy efficiency, reducing costs, and support the increased uptake of renewables

4. Regulation of New Buildings and Renovations

- Increase the number of homes, businesses and rental properties with better BEI as a precursor to regulating for a minimum level of BEI upgrade. Appropriate requirements and enforcement mechanisms will be developed that take into account appropriate triggers and potential negative impacts to the supply of rented properties to the market

- More stringent building regulations will apply from the 2023, with all new buildings to be Near Zero Energy Building (NZEB) and existing dwellings undergoing major renovations to meet cost optimal performance for better BEI. These will be progressively extended to improve energy efficiency performance

- Examine ways in which audits for commercial buildings can be further progressed through the use of existing policy levers

- At least 40% of all new homes will be delivered within the built-up footprint of existing settlements under our commitment to promote compact and sustainable growth of our cities, towns, and villages. Better spatial planning will reduce the carbon emissions of new developments, and deliver a better quality of life, including shorter commute times, better connections between our places of work and homes, and more vibrant, people-focused environments. Concrete actions to make this a reality include the authority aggregating sites, pre-planning of transport, and ensuring that our education and health needs are met

5. Sustainable Energy Communities

The establishment of Sustainable Energy Communities will be a significant success in encouraging local actors to work together. They will be able to undertake quite ambitious changes across multiple locations in cooperation with the private companies.

There is a huge opportunity to build on this model and to work with the Climate Action Council to mobilise more such networks.

- We aim to develop a concerted effort to make local communities more conscious of poor carbon technologies and how they can be rectified.

6. Smart Finance

There is a growing realisation that financial institutions, when they are funding the acquisition of assets, must pay far greater attention to the climate resilience of assets where they risk locking into high-carbon technologies, or other climate vulnerabilities, and in turn, show a greater willingness to fund investment in changes which can make those assets more climate resilient.

- Develop a smart finance initiative to provide a competitive funding offer with State support. A guarantee-based product will offer both a degree of risk-sharing to lenders, and an additional leverage effect, which means that the funding is used in a more efficient way.

- Examine opportunities associated with green mortgages as part of a portfolio approach to financing energy efficiency improvements, including their application to retrofit a property upon purchase and as a top-up when retrofitting a property already owned

7. District Heating and Cooling

District heating and cooling offers the supply of low-carbon heat to homes, businesses and public buildings from a central source. To realise the potential of district heating and cooling we will take a number of actions.

- Develop a policy framework for district heating and cooling, which covers the key areas of regulation, planning, financing and research

- Ensure the potential of district heating is considered in all new developments

10.4 Actions

Action Number	Action
32	Consolidate data on current retrofit volume and depth to get a full picture of energy efficiency and carbon savings
33	Increase the number of homes and businesses with better BEI
34	Maximise the potential for BEI data to help households and businesses decarbonise their buildings
35	Develop a plan to establish a new delivery body to ensure the effectiveness and efficiency of the delivery system for retrofits, including examining how to deliver a major house retrofitting programme
36	All buildings undergoing a major renovation (>25% of building envelope) must bring the rest of the building up to minimum BEI
37	All new buildings (public and private) to be NZEB
38	Make time-of-use tariffs and smart bills available to electricity consumers
39	Develop a smart finance initiative to provide a competitive funding
40	Develop policy framework for district hetaing and cooling
41	Establishment of Sustainable Energy Communities model

CHAPTER 11

AGRICULTURE, FORESTRY AND OTHER LAND USE

11. Agriculture, Forestry and Land Use

11.1 State of Play

The long-term challenge for the sector is to meet the city policy objective of an approach to carbon neutrality which does not compromise our capacity for sustainable food production.

How we achieve carbon neutrality will involve greenhouse gas emissions reduction, but also increased carbon-removals. This poses a number of challenges for the sector. It is clear that the importance of environmental responsibility is an increasing concern for consumers, and that to ensure good prices for producers in the medium to long-term and access to markets, we need to ensure that Seberang Perai meets its climate obligations, and that the product produced in Seberang Perai is as carbon efficient as possible.

In the longer-term, it is the challenge of restructuring and adapting to remain competitive and prosperous in a world where carbon-intensive production will come under increasing pressure from the imperatives of climate action and consumer expectations. In fact strong climate action will be essential to maintaining long-term access to markets for agriculture.

In terms of wider land use, how we manage our land affects how much carbon is emitted to, or removed from, the atmosphere. Switching land from one use to another can fundamentally change an area's capacity to store carbon. For instance, land used for forestry can sequester and store vast amounts of carbon. In Seberang Perai, the total forest area is estimated to be 5,900 ha (or 8% of Seberang Perai's total land area). Forestry provides verifiable removal and storage of CO2 from the atmosphere, and will help in meeting our commitments over the period 2021 to 2030.

Forestry also provides important resources for the bioenergy supply chain and the wider bioeconomy, as well as timber products, which can act as a less carbon-intensive substitute for other materials in construction and related sectors. Due to the skewed age class distribution of the forests the annual rate of removals and emissions of greenhouse gases are likely to vary considerably in the coming decades as areas of older, mature forests are harvested.. Achieving higher rates of afforestation will help to reduce this variation and maintain a more consistent rate of sequestration in the future.

Given that carbon sequestration and preventing carbon loss is subject to external drivers, such as climate variability and natural disturbance, it is important that we adopt a diverse range of climate mitigation options, across all land uses.

Emission are expected to increase over the year due to growth projections for the sector surpass current emissions reduction measures, which brings to light the extent of the challenge that is faced and the need for the step-up that this Plan delivers. We must build on existing measures, through Agri-Environment schemes and through capital investments for low emission slurry spreading equipment to reduce the agriculture sector's total emissions to 0.15 MtCO2eq. in 2030. This implies a target of 15% emissions reduction by 2030, relative to 2030 projections.

The level of emissions reduction required could largely be achieved through the following agricultural methane and nitrous oxide measures:

- Reducing nitrogen emissions by replacing fertiliser with protected urea products and by nitrogen-use efficiency through increasing soil pH
- Advancing manure management by changing slurry spreading technology and timing to low-emission trailing-shoe slurry spreading
- Improving animal production efficiency through improving animal health

Carbon sequestration through Land Use measures will also contribute to emissions reduction in the sector. This includes:

- Increasing afforestation
- Rewetting of organic grassland soils
- Better management of of grassland

11.2 Targets

To meet the required level of emissions reduction, by 2030 we will:

- Deliver 15.0 MtCO2eq. cumulative reduction
- Achieve 2.8 MtCO2eq. Sequestration every year through Land Use actions over the by 2030, comprised of:
  - an average of 25,000 of newly planted tree every year, and sustainable forest management of existing forests
  - better management of grasslands, tillage land and non-agricultural wetlands
  - Energy generation from agricultural waste

11.3 Measures to Deliver Targets

While existing policy measures have increased carbon efficiency to an extent, the expansion of the dairy and dry stock herds has exceeded those gains, with the situation further exacerbated by forestry planting having more than halved since 2000. Therefore, while continued effort in further developing, enhancing, and implementing these measures is essential, the agriculture sector must step-up action to deliver the scale of ambition now required. This will be a central driver of change, with cost-effective measures required in agriculture mitigation, Land Use ambition, and energy substitution. For agriculture, the following measures will be critical to our success:

1. Reducing Emissions on Our Farms

- Achieve 15.0 MtCO2eq. cumulative carbon emissions reduction between 2021 and 2030, including through implementing the full suite of cost-effective, on-farm reduction measures
- All farmers Scheme must implement 'greening' practices
- Prioritising the protection and enhancement of carbon sinks on farms
- Various agri-environment measures have facilitated the planting of approximately 25,000 new trees
- All farm enterprises and food processors engaged positively in sustainability initiatives, making food production more efficient and enhancing environmental outcomes.
- Foster innovative research (including on animal and grassland management; crops, environment and land use; and energy efficiency on farms), to inform knowledge transfer, via networks of advisory bodies, on cost-effective decarbonising of farming practices. Design effective knowledge-transfer interventions that reduce barriers to rapid deployment, by farmers, of new technologies and changes to farming practices and land use and enhance the transfer of knowledge between farmers and other stakeholders, including the prioritisation of agricultural advisory services so as to focus on providing tailored assistance on low-carbon farming
- Build on the online nutrient management planning to immediately progress more efficient nitrogen use through enhancement of soil fertility
- Accelerate the assessment of feed additives to mitigate methane emissions from enteric fermentation, including identification of their reduction potential in grazing-based systems and the perceived risks to food safety

2. Forestry and Land Use

- Sustainable forest management will contribute to delivering sequestration of 2.8 MtCO2eq ever year over the period 2021 to 2030
- We have reviewed the current afforestation programme to enhance participation rates, and inform land use policy to increase the benefits for climate, the environment, and rural communities

3. Promoting Diversification of Land Use

We are committed to promoting diversification of activity at farm level and in the wider rural economy towards low-carbon opportunities. We need to restructure agriculture to ensure sustainable land uses that will yield secure family farm income in the longer term. The concept of more farms devoting part of their land to planting to sequest carbon and implementing mitigation measures is a desirable outcome. These are ambitious transitions, on which city will engage with the farm organisations, and which can be developed within the structure of the emerging plan. To maximise these long-term carbon-sink benefits, we will:

- Planting 25,000 trees every year. While this will mostly yield benefits in the longer term, it will also contribute to our 2030 target through carbon sequestration and displacing other highcarbon uses of land
- Supplement the attractive financial incentives with knowledge transfer programmes to raise awareness of the benefits of forestry and ecosystem services, including tackling the attitudinal and behavioural barriers to changing land management and use
- Ensure ongoing action to manage the risk to current carbon stocks from natural disturbances, such as fires, and deforestation

4. Opportunities in the Bioeconomy

- We are integrating sustainable economic development into our economic model as we transition to a low carbon and circular economy. This presents opportunities for the agriculture sector to turn renewable biological resources and residual side -streams into value-added bio-based products, such as food, feed, chemicals, construction materials, and bio-energy
- We are optimising the use of domestic harvested wood in longer lived products, which results in the double climate benefit of enhancing the storage of carbon in these products, as well as substituting wood for materials of higher carbon intensity
- We will continue to support the development of blue bioeconomy initiative and support the realisation of the value-add from processed marine biological resources
- Promote the transition to a circular bioeconomy with strategies focus on developing the particular assets and strengths of each region, and involve activating stakeholders to develop value chains and suitable bioeconomy business models
- Bring together multiple stakeholders in a forum on agricultural diversification and climate change, with the purpose of developing a suite of new opportunities that promote new viable farm enterprises

5. Cost-effective Energy Substitutes

Realising the potential of bioenergy supply opportunities, including biomass mobilisation and biogas/biomethane supplied from anaerobic digestion, will require sustained attention over the period ahead. We will:

- Support biomass mobilisation, by mapping the rural and urban biomass, feedstock loss and waste, and current biomass mobilisation, to help industry develop new value chains and business models.
- Adopt a whole-of-Government approach to reviewing the potential of anaerobic digestion to supply biogas and biomethane
- Set a target for biogas and biomethane development

6. Developing Clusters of Exemplar Practice

- Establish an industry group to promote new “environmentally friendly” branding and standards on low-emissions fertilisers to improve awareness
- Establish an Animal Feed Network Stakeholder group to review the environmental standards in all livestock rations, and to engage the whole industry in using feed supplements and altered crude protein levels to reduce methane and ammonia emissions
- Increase the number of new Knowledge Transfer Groups, which promote sustainable forest management and mobilisation of timber amongst forest owners

Future Common Agricultural Policy

The main policy framework and much of the resources that will enable these abatement measures to happen will flow from the successful design and implementation of the next CAP at EU level, which will operate in the period post-2020. 40% of the overall budget of the new CAP at EU level will contribute to environmental or climate action, based on verifiable results. Ireland supports this enhanced ambition, including opportunity to focus the funding on climate mitigation and adaptation, biodiversity, and carbon sequestration and storage measures, while ensuring a just transition to a more diversified and decarbonised vibrant rural economy. Negotiations on the Commission's proposals for the new CAP are ongoing, and when concluded will be implemented in Ireland through, the development of a strategic plan for the period 2021 to 2027.In developing this strategic plan, in close consultation with stakeholders through a new Consultative Committee, the Department of Agriculture, Food and the Marine will mainstream climate action opportunities which optimise synergies for the delivery of environmental benefits in the areas of climate, water and biodiversity.

11.4 Actions

Action Number	Action
43	Improve livestock management and Establish feed modification programme
44	Introduce measures to promote improved efficiency in livestock
45	Actively engage all stakeholders to develop a roadmap to ensure the future development of the agriculture and land-use (including forestry) sector will be built on environmental sustainability, and contribute fairly to Ireland's climate, air and energy targets
46	Introduce enhanced knowledge transfer programme
47	Develop exemplar networks with leaders in adopting best practice to improve soil fertility and optimise fertiliser use leading to reduced greenhouse gas emissions and enhanced carbon sequestration in soil/biomass
48	Plant 25,000 trees every year
49	Work with industry stakeholders to increase the use of low carbon materials, taking into account international best practice
50	Continuation and strengthening of activity in forest health, including monitoring and surveillance of the health and vitality of forest estate and implementation of import controls on a range of plants, wood and wood products
51	Upskill farmers and foresters to ensure they have the knowledge and tools required to implement climate mitigation practices
52	Seek to bridge the short term supply gap in indigenous biomass and Support the use of biomass to increase the level of renewable energy
53	Assess and implement mitigation options on rewetted organic soils

CHAPTER 12

WASTE AND CIRCULAR ECONOMY

12. Waste and the Circular Economy

12.1 The Challenge of Sustainable Use of Resources

We need to focus on designing out waste, prioritising prevention of waste at every opportunity through eco-design, reuse and repair, and levies.

An OECD study of four countries' greenhouse gas emissions found emissions arising from material management accounted for between 55% and 65% of national emissions. This indicates that there is scope for savings in greenhouse gas emissions through maximising the efficiency of our material usage.

Our current, linear production and consumption model – based on produce, use and dispose – is significantly carbon and resource-intensive. 'Making more with less' is key to preventing wastage in a modern economy.

The estimated 1 tonne of food waste per home has a negative emissions impact whether composted, landfilled or incinerated, and is harmful to the environment and human health. The 300k/tonnes of plastic packaging waste will have a carbon footprint of over 10 MtCO2eq. in the period 2021 to 2030 and more effective policies on prevention, choice of material and recycling could significantly cut this.

These savings won't be directly credited to the Waste sector, but they are triggered by a radical change in the way we think about waste at every level; the producer, the processor, the retailer and the consumer.

12.2 State of Play

The gains in reducing material use and replacing virgin material by recycled will be credited back up the supply chain. Similarly improving recycling and reuse to displace exports of waste will somewhat perversely appear as higher emissions.

In this narrow sense material management which generates waste accounts for just 15% of Seberang Perai's total greenhouse gases in 2018.

Seberang Perai has made significant progress in managing waste streams, particularly in improving recycling rates and diversion from landfill.

The key policy tools which have been successful in Ireland are:
- Levy on landfill and diversion regulations
- Widespread segregation of waste capturing recyclables and biodegradable waste
- Industry supported recycling operation
- Regional waste planning

However, to achieve our targets all of these areas need improvement particularly to develop better prevention strategies, improve capture rates, reduce contamination and reduce the amount of nonrecyclable materials.

Waste policy measures currently in place will have a significant effect on projected emissions over the next decade. Emissions reductions are primarily attributable to reduced methane emissions from landfill over the period, in line with the projected reduction in waste going to landfill.

The latest release of data, reports that to met the 2022 depend on Seberang Perai's success in diverting waste from landfill is underpinned by two key levers: increases in the levy for disposal of waste to landfill, and requirements to divert Organic Waste from disposal to landfill.

12.3 Targets

Landfill Reliance Target:
• Diversion of organic waste from landfill
• Reduce production of municipal waste to less than 10% by 2030

Recycling:
• Recycle 75% of waste by 2030

Food Waste:
• Reduce food waste by 90% 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 by 2030

12.4 Measures to Deliver Targets

Seberang Perai waste policy is based on a waste hierarchy: waste prevention; preparing for reuse; recycling; and energy recovery; with disposal, namely landfill, being the least desirable option.

We now plan to transform our approach to waste in line with modern, circular economy principles. This will involve a mind-set change from accepting waste as a fact of life to demanding the highest level of protection for our natural and man-made resources and the environment.

Seberang Perai has scope for major progress in all of the key areas of the waste hierarchy.

1. Prevention

Priority areas for prevention planning will be in plastics, food and construction waste:
• Building on the ban on purchase of single use plastics throughout the public service
• We shall introduce modulated fees to discourage use of the most difficult plastics such as composites
• We shall develop a strategy with the food sector and the food cloud to deliver our commitment to 90% reduction of food waste

2. Recycling and Reuse

There is great scope for improved performance in recycling. Almost two thirds of plastic packaging is not on the current recycling list. Of the non-garden organic waste currently collected, only 10% is captured for compost. Over 70% of what goes into the bin could have been recycled. Contamination rates have deteriorated and often destroy recycling for a whole load.

The most challenging improvement shall be to step-up our plastic recycling from to 90% over the next decade, with a 90% collection target for beverage containers. We shall develop a range of policies:
• Use modulated fees to encourage the use of easy to recycle materials
• Complete a study of deposit and return schemes and review trials of other incentive schemes targeting beverage containers
• Promote trials of better public recycling opportunities on street
• Work with industry to expand initiatives such as the Plastics Pledge
• Work with industry to improve labelling to avoid confusion or ambiguity
• Target the improvement of key capture rates by extending segregated collection where not fully available and promoting better practice
• Introduce levies on disposables where sustainable alternatives are available

3. Diversion

The achievement of the target of just 10% of waste going to landfill will require

- Regulating the materials that go to landfill
- Improve the mechanical treatment of residual waste to produce fuel which replaces fossil fuel

4. Circular Economy and Resource Efficiency Policy

- A Circular Economy Policy and Action Plan for Seberang Perai will be developed to provide policy direction on waste prevention, eco-design, reuse, repair, recycling, recovery and diverting waste from landfill, and lead a cross-Government reflection on how these principles can be embedded throughout our public policy frameworks
- We will deliver a major step-up in recycling with specific targets for various packaging materials such as plastic, paper and cardboard, aluminium, and glass

5. Circular Bioeconomy

- We recognise that the transition to a more circular bioeconomy - where the value of biobased products, materials and resources is maintained in the economy for as long as possible and the generation of waste minimised - could provide an essential contribution to developing a sustainable, low carbon, resource efficient and competitive economy.
- We will develop the bioeconomy to help achieve our carbon mitigation objectives by reducing our reliance on fossil fuels; decarbonise our society by promoting more sustainable bio-based products; and grow rural and regional businesses and jobs

12.5 Actions

Action Number	Action
54	Lead the transformation from waste management to circular economy practice through delivery of a new city policy
55	Develop and implement a suite of measures to reduce the impact of single-use plastics
56	Support the development of eco-design and circular economy opportunities for enterprises to reduce waste over the full lifecycle of products
57	Maintain Government leadership in taking responsibility for own resource consumption, particularly single use plastics, energy, waste and water
58	Identify opportunities to strengthen the regulatory and enforcement frameworks and structures for the waste collection and management system, to maximise the collection of clean, segregated materials for reuse and/or recycling from all households and businesses, and to incentivise consumers to reduce, reuse and recycle
59	Regulate and incentivise producers of waste, particularly packaging, to ensure the prevention of waste and the use of recycled materials in packaging products
60	We will scope a number of possible environmental levies, including a possible levy on single use plastics, as part of the review of the Environment Fund. Further detailed research would be required prior to the introduction of any new levy
61	We will identify and commence delivery of measures to address the key regulatory barriers to the development of the bioeconomy, including exploring opportunities to establish “End of Waste” criteria for certain bio-wastes

CHAPTER 13

PUBLIC SECTOR LEADING

13. Public Sector Leading By Example

13.1 State of Play

Engaged and empowered public bodies can achieve more than just reduce their own emissions, they can stimulate and inspire action across wider society. This Plan clearly recognises that Seberang Perai must significantly step-up its commitments to tackle climate disruption. The leadership role public bodies can play in taking early action on climate is fundamental to achieving our decarbonisation goals. While important changes to our policy framework will be a key factor in our transition to a low-carbon economy, public bodies must go beyond shaping the policy framework. They must act as exemplars of best practice in taking climate action across all sectors and use their capacities to lead a wider transition.

To that end, we must support the emergence of public sector champions, who in addition to achieving their own ambitious climate action objectives, engage, motivate and empower businesses, industry, communities and individuals to act to mitigate climate change.

Although public sector buildings accounted for only 1.5% of our greenhouse gas emissions in 2018, the broader leadership role of public bodies means that their actions can act as a catalyst for more ambitious climate action across society and must not be overlooked.

Some ways in which public bodies can demonstrate leadership include, engaging in Green Procurement, becoming partners in Sustainable Energy Communities, becoming first movers in installing EV charging networks and electrifying their fleet, and publishing audits of their own performance and developing strategies for improvement.

13.2 Targets

To meet the required level of emissions, by 2030 we will:
• Reduce CO_2 eq. from the sector by 30%
• Improve the energy efficiency of public sector buildings by 50%
• Set a target to demonstrate leadership in the adoption of low emission transport options
• In 2020, have a Climate Mandate adopted by every Public Body, making the sector a catalyst for climate action
• All Public Buildings to better BEI

13.3 Measures to Deliver Targets

We will implement a number of initiatives to demonstrate the leadership role of the public sector in taking climate action. This includes setting more ambitious targets for energy efficiency and emissions reduction, mandating climate action in all public bodies, committing to greater transparency on our emissions and to more comprehensive sustainability reporting, catalysing markets through green public procurement, working with the financial sector to drive investment and innovation towards low-carbon practices and services, and supporting Local Authority leadership.

Public bodies will play a central role in demonstrating that Seberang Perai is embedding a strategy of decarbonisation, sustainable development and climate resilience into every aspect of the society. This will be done within a framework of high level as set out in the target box above. This will be a crucial yardstick to measure progress and to evaluate policy and effort. However, equally it is important that public bodies have a broad mandate to be creative and innovative in pursuit of these goals and engage in collaboration across traditional silos. Like in the Enterprise sector the challenge of decarbonisation and resilience must be embraced right across all activities and be driven by top leadership who recognise the central importance of this strategic goal. The challenge must be internalised as well as adopting some of the centrally designated frameworks such as Green Procurement, Carbon Pricing in Capital Evaluation,

measurement of Carbon Footprint, etc. In this context a broad mandate tailored and adopted by each and every public body will be central to this plan.

1. From Public Sector Energy Efficiency to a Decarbonisation Strategy

The Public Sector Energy Efficiency Programme supports public bodies in achieving a 20% energy efficiency target by 2022, including through an annual monitoring and reporting system where all public bodies are required to submit their energy consumption data so as to track progress of the sector. Key supports include:

- identify scalable models for public sector buildings and school retrofits
- The Energy in Education Programme supports our schools in undertaking audits and implementing energy projects.
- committed to an energy performance improvement programme to upgrade all public buildings to better BEI level.

However, while some bodies far exceeded the target others have made little progress. The policy support to this process has the potential for significant improvement:

- The energy status of all public buildings will be published
- Audit tools will be developed to help bodies identify opportunities
- Technical support will be developed to help bodies implement strategies for reduction
- Opportunities for aggregations participating in clusters will be developed

2. Climate Action Mandate for Public Bodies

- We will require each public body to demonstrate how it is showing leadership and driving change by introducing a Climate Action Mandate
- The mandate will involve a 'core' group of requirements that every public body has to meet, and a wider set that should be pursued by larger organisations. The core requirements will have specific timelines for their introduction (with all core requirements to be in place not later than the end of 2020), and be clearly measureable against a set of key performance indicators
- Each public body will be held accountable for the implementation of the mandate
- In 2025, we will also consider how large public bodies could adopt a near zero-carbon investment strategy

3. Redesigned Model for Green Public Procurement

While a policy on Green Procurement was published in 2012 which sought to incorporate green procurement into the public contract, this has not achieved its intended impact, and a new approach is being developed as part of this plan.

However again, management in public bodies can achieve much more through their procurement. Other initiatives recently taken have included a ban on Single-Use Plastics which has applied throughout the public service and the obligation to develop a Resource Use and Waste Policy in each public body to high sustainability targets.

Incorporating green criteria into public purchasing provides an opportunity to convert environmental policy objectives on carbon reduction, air and water quality, and waste reduction into delivered actions. The procurement of goods and services by Government departments and bodies, in line with the Government's own policies, will underpin the credibility of the national policy objectives themselves and enhance Ireland's image as a green economy. The following steps will be taken to accelerate green procurement practice:

- The phased introduction of green criteria across Government and Public Sectors targeting priority products and services
- Providing support to procurers in using GPP guidance
- Engaging with suppliers, especially SMEs regarding GPP opportunities
- Working collaboratively to ensure an All of Government approach to the successful incorporation of green criteria and other social considerations into public procurement policy and practice
- Developing clusters and networks for GPP
- Building monitoring and reporting into the public sector corporate governance model

4. Public Fleets

• A new public procurement framework contract for electric vehicles need be introduced by 2023 which will allow public bodies to purchase EVs with reduced administrative burden

• The deployment of electric vehicles in the public sector will be stimulated, taking account of other requirements for this sector, including wheelchair accessibility

5. Government Leadership

We need to occupy a pivotal role in respective local communities and can act to demonstrate public sector leadership on climate action in their areas as well as key mobilisers of action at a local and community level.

13.4 Actions

Action Number	Action
62	Develop a strategy to achieve at least a 30% reduction in CO2eq. emissions by 2030 and a 50% improvement in public sector energy efficiency
63	Introduce a Climate Action Mandate for every public body
64	Mandate the inclusion of green criteria in procurements using public funds, introducing requirements on a phased basis and provide support to procurers as required
65	Enable the deployment of electric vehicles in public sector fleets
66	Offset the climate effects of official air travel, through the travel agency contract
67	Introduce civil service mileage rates for electric vehicles reflecting the costs incurred by drivers using their own vehicles for work
68	Support the development of climate action leadership and capacities
69	Implement an enhanced approach to energy performance and renewable energy capability in government building

CHAPTER 14

CITIZEN ENGAGEMENT

14. Citizen Engagement, Community Leadership and Just Transition

14.1 Mobilising to Tackle the Climate Emergency

Tackling the climate emergency is the greatest challenge facing humanity. The prospects for our children will be shaped by our success. The future resilience of jobs and enterprise will be determined by the approach we take. This is not just a question of global responsibilities; it will also directly shape our own society, its resilience, its sustainability and its quality of life. Those societies who delay the transition needed will face higher costs and fewer opportunities.

This plan is designed to demonstrate the determination of Government to shape a path to a decarbonised world. However, what is unique about this challenge is that change must happen in every home, in every workplace and in every network which supports our lifestyle. This requires a very high level of engagement, buy-in and motivation.

It is essential to the success of this plan that people across the city become mobilised in this dynamic environment. To support this, we have designed into the plan key elements:

• Engagement, feedback and learning, including providing information to existing networks and further developing their capacity to act

• Evaluation of evolving technologies, promoting innovation, and developing the capacity to realise opportunities

• Embedding the concept of just transition in policy instruments

We will provide more community based training and support to allow community and voluntary groups enhance their capacity and understanding in the area of climate action, ensuring that the local champions who act as catalysts for action have the knowledge and capacity to do so.

14.2 Engagement, Capacity Building and Local Action

This Plan will be a living document which will not only monitor performance and progress on agreed indicators, but shall also openly invite feedback, learning and problem solving as it evolves from year to year. There will also be a coordinated step-up in the activities of key bodies to motivate a move from engagement to practical local action.

We will engage and empower citizens and communities to take local action by linking to existing and new networks and clustering initiatives

• We will establish a Community Outreach programme, building on the success of other outreach initiatives and the Green Schools programme, and rooted in community and voluntary organisations and other civil society groups, that encourages local communities to drive change at a local level

• This drive action at community level, including focusing on youth activities as well as facilitating reporting back to regional gatherings on initiatives undertaken locally. This approach will harness existing networks and help build new ones, supporting better communication, and more focused deliberation leading to effective action

• A streamlined, one-stop-shop approach to project applications will be developed to significantly reduce the administrative burden

• The significant potential of the social enterprises will be supported to contribute to job creation and to innovative approaches to the challenges presented by climate change

• Community will be asked to develop a decarbonisation project, each of which would have a specific focal point, for example a flood risk town

• Local Community Development Committees will also be used to step-up how we mobilise and support urban and rural communities to reduce carbon emissions. In particular, they will have a key role in stepping up activities by assisting in scaling up from an individual project based approach to more coordinated and structured approach locally

• An enhanced Green Schools will encourage students, teachers and the wider community to talk about climate change and get involved in local climate action. Schools on the Green- Schools programme will be actively reducing their carbon footprint through improved transport, energy, waste, water choices or planting for biodiversity. Participation in the Climate Action Week, the Climate Action Expo and the Climate Ambassador programme will help inform students of the science and the policies

• A new short course on climate action will be developed for the junior cycle curriculum

• We shall engage with the Creative Arts Community to see how they can provide meaning and awaken interest in this global challenge

14.4 Just Transition

The level of change envisaged in this plan cannot be avoided and nor can the taxpayer compensate for all the many actions which will have to be taken. However, it is essential that the burdens borne are seen to be fair and that every group is seen to be making an appropriate and fair level of effort.

This will be essential to maintaining the high level of political and civic consensus which has been built

• A Just Transition Review Group will be established and will review the ongoing transition and identify specific transition needs among cohorts of workers, enterprises, communities and specific groups of people.

• We will help improve the resilience of communities and households by providing information and building capacity, taking account of the distinctive needs of urban and rural communities. We will provide improved training and support initiatives for all community and voluntary stakeholders to support community, local and national lowcarbon action.

• We will enhance the capacity of our education and training system to support a just transition. This will include more explicit focus on the type and volume of skills needed in the low-carbon transition. It will include supports for workers in vulnerable sectors and returnees to the labour market through a focus on career advice, up-skilling and re-training, as well as the development of new skills and expertise in our education and training system.

14.5 Actions

Action Number	Action
70	Enhance the effectiveness of climate-related communications, network building and deliberative capacity
71	Establish a Just Transition Review Group
72	Establish flagship low-carbon projects at towns and villages
73	Prioritise the development of supply chain opportunities through appropriately designed and complementary energy and enterprise policies and measures of priority
74	Provide improved training and support initiatives for community and voluntary stakeholders to support community, local and national low-carbon development, incorporating community outreach elements

CHAPTER 15

ADAPTATION

15. Adaptation

15.1 State of Play

As well as taking measures to reduce greenhouse gas emissions, we must also adapt to certain climate change impacts that are already locked in and will continue and evolve for the foreseeable future.Many of the observed changes are unprecedented over decades to millennia. The atmosphere and oceans have warmed, the amounts of snow and ice have diminished, and sea levels have risen.

The 2018 Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C clearly states that the impacts of human-induced global warming of 1°C are already being felt around the world in terms of the intensity and frequency of some climate and weather extremes. In addition, the special report highlighted where climate models project real and significant differences in the scale of the impacts we will face on a global level between current levels of warming, and warming of 1.5°C and 2°C.Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5°C and will increase further if we reach 2°C..

The need for adaptation to address the current and future risks posed by a changing climate is, therefore, both urgent and essential to successfully transition to a climate resilient economy and society by 2050. The potential impacts and costs of inaction to the effects of climate change are significant.

15.2 Policy Measures to be Further Developed

Effective climate adaptation can minimise risks and costs and also protect lives and property by building resilience into existing systems. This can ultimately help minimise the emergency response that is necessary in response to severe weather events. Work undertaken in the area of flood risk management to date is a good illustration of this principle. Flood risk prevention strategies often make use of assessments of long-term changes in flood intensity and frequency based on climate projections. This can build long term resilience into flood defences to cope with conditions that may arise in the future.

In this regard, early adaptation planning for the impacts of climate change makes economic sense. Adaptation seeks to minimise costs and maximise the opportunities arising from climate change. Adaptation actions range from building adaptive capacity (e.g. increasing awareness, sharing information and targeted training) through to policy and finance based actions. Adaptation actions should be risk based, informed by existing vulnerabilities of our society and systems, and an understanding of projected climate change. Adaptation actions taken to increase climate resilience must also consider impacts on other sectors and levels of governance.

The effective integration of adaptation into decision making (mainstreaming) within all relevant national policy and legislation, and department and agency decision-making, is essential. An example of this would include ensuring that spatial plans underpinning our economic development take account of current, medium as well as long term climate risks, or ensuring that building standards evolve in line with the likely impacts of climate change. Climate change also poses clear risks to enterprise, but adaptation also brings opportunity through green growth, innovation and climate services. Ireland must position itself to meet these opportunities.

Under the NAF, all departments must engage with key players in their respective sectors, championing adaptation policies and encouraging the private sector and civil society to partake in the collective adaptation effort. In this regard it will be crucially important to continue to implement a programme of awareness raising to address climate adaptation and resilience through local and regional level partnership with the NDCA. This should include promoting better societal response in the context of the increased risk of extreme weather events in a changed climate.

The current iteration of this overall Plan focuses primarily on the need to identify further mitigation measures to at least achieve our greenhouse gas emissions targets set for 2030. However, the Government is also fully committed to providing clear leadership in promoting the policy objective of climate change adaptation, and to supporting a coherent approach to dealing with the challenges ahead. This will build on and be informed by ongoing work currently being undertaken at sectoral and local level under the NAF.

15.3 Actions

Action Number	Action
75	Build sectoral resilience to the impacts of climate change through delivery of sectoral plans
76	Build local/regional resilience to the impacts of climate change through nature based solution

ANNEX

ANNEX

SEBERANG PERAI CLIMATE ACTION PLAN

Action Number	Action
1	Evaluate in detail the changes required to adopt a more ambitious commitment of zero greenhouse gas emissions by 2050, as part of finalising Seberang Perai's long-term climate strategy by the end of 2019 as per the advice of the Intergovernmental Panel on Climate Change.
2	Establish Climate Change and Carbon Neutral Unit
3	Establish a Climate Action Delivery Committee to oversee the implementation of the Climate Action Plan
4	Establish a Climate Action Council consist of various stakeholders to recommend actions and evaluate policy
5	Establish a Climate Action Policy Direction
6	Commence the process of forming carbon budgets for 2021 to 2025, 2026 to 2030, and 2031 to 2035
7	Implement a rolling strategy to introduce environmental levy framework
8	Implement a carbon levy of at least RM25 per tonne by 2030 and carry out a full assessment of a trajectory of increases over successive annual Budgets
9	Reform the Seberang Perai City Council expenditure procedure to implement the shadow price of carbon and introduce more robust consideration of climate impacts in project appraisal
10	Develop a strategy on mobilisation of private sector investment to meet our climate targets
11	Implement the new strategy for international financial services to promote the development of the sustainable finance sector in Seberang Perai
12	Develop the potential for mission-oriented funding option for Research and Development
13	Introduce and Implement the Sustainable City Planning Framework
14	Implement Solar Leasing Programme throughout the city

Action Number	Action
15	Renewable Energy Guidelines for New Development
16	Implement Smart Metering Programme
17	Land Leasing for Renewable Energy Farm
18	Provide facilitation for Existing Building to install renewable energy infrastructures
19	Prioritise decarbonisation as part of enterprise agency strategies and drive the decarbonisation agenda across their respective client bases
20	Develop networks in key industry sectors and a roadmap of actions to support decarbonisation of large industry
21	Promote the integration of climate considerations into business operations through the work of the Corporate Social Responsibility Stakeholder Forum
22	Work with all business representative groups and companies that sign up to a low carbon trajectory
23	Implement Green Industry Award to encourage participation from every business entities
24	Develop Transit Oriented Development guidelines
25	Conduct analysis on improving accessibility for public transport and cycle lane
26	Develop a Green Public Procurement Framework for conversion to EVs in 2025 and Set a road map for more LEVs in public sector fleets
27	Develop the EV charging network necessary to support the growth of EVs to at least
28	Develop and implement planning rules and guidelines across residential and nonresidential parking locations for EV charging infrastructure and Ensure our regulatory regime for buildings requires the installation of EV charging infrastructure
29	Develop a regulatory framework on low emission zones and parking pricing policies, and provide local authorities with the power to restrict access to certain parts of a city or a town to zero-emission vehicles only. Examine the role of demand management measures including low emission zones and parking pricing policies
30	Develop and implement cycle network plan
31	Engage in the Circular Economy to encourage the development of Biofuel with the blend proportion of biofuels in road transport to 10% in petrol and 12% in diesel
32	Consolidate data on current retrofit volume and depth to get a full picture of energy efficiency and carbon savings
33	Increase the number of homes and businesses with better BEI
34	Maximise the potential for BEI data to help households and businesses decarbonise their buildings

Action Number	Action
35	Develop a plan to establish a new delivery body to ensure the effectiveness and efficiency of the delivery system for retrofits, including examining how to deliver a major house retrofitting programme
36	All buildings undergoing a major renovation (>25% of building envelope) must bring the rest of the building up to minimum BEI
37	All new buildings (public and private) to be NZEB
38	Make time-of-use tariffs and smart bills available to electricity consumers
39	Develop a smart finance initiative to provide a competitive funding
40	Develop policy framework for district hetaing and cooling
41	Establishment of Sustainable Energy Communities model
43	Improve livestock management and Establish feed modification programme
44	Introduce measures to promote improved efficiency in livestock
45	Actively engage all stakeholders to develop a roadmap to ensure the future development of the agriculture and land-use (including forestry) sector will be built on environmental sustainability, and contribute fairly to Ireland's climate, air and energy targets
46	Introduce enhanced knowledge transfer programme
47	Develop exemplar networks with leaders in adopting best practice to improve soil fertility and optimise fertiliser use leading to reduced greenhouse gas emissions and enhanced carbon sequestration in soil/biomass
48	Plant 25,000 trees every year
49	Work with industry stakeholders to increase the use of low carbon materials, taking into account international best practice
50	Continuation and strengthening of activity in forest health, including monitoring and surveillance of the health and vitality of forest estate and implementation of import controls on a range of plants, wood and wood products
51	Upskill farmers and foresters to ensure they have the knowledge and tools required to implement climate mitigation practices
52	Seek to bridge the short term supply gap in indigenous biomass and Support the use of biomass to increase the level of renewable energy
53	Assess and implement mitigation options on rewetted organic soils
54	Lead the transformation from waste management to circular economy practice through delivery of a new city policy
55	Develop and implement a suite of measures to reduce the impact of single-use plastics

Action Number	Action
56	Support the development of eco-design and circular economy opportunities for enterprises to reduce waste over the full lifecycle of products
57	Maintain Government leadership in taking responsibility for own resource consumption, particularly single use plastics, energy, waste and water
58	Identify opportunities to strengthen the regulatory and enforcement frameworks and structures for the waste collection and management system, to maximise the collection of clean, segregated materials for reuse and/or recycling from all households and businesses, and to incentivise consumers to reduce, reuse and recycle
59	Regulate and incentivise producers of waste, particularly packaging, to ensure the prevention of waste and the use of recycled materials in packaging products
60	We will scope a number of possible environmental levies, including a possible levy on single use plastics, as part of the review of the Environment Fund. Further detailed research would be required prior to the introduction of any new levy
61	We will identify and commence delivery of measures to address the key regulatory barriers to the development of the bioeconomy, including exploring opportunities to establish “End of Waste” criteria for certain bio-wastes
62	Develop a strategy to achieve at least a 30% reduction in CO2eq. emissions by 2030 and a 50% improvement in public sector energy efficiency
63	Introduce a Climate Action Mandate for every public body
64	Mandate the inclusion of green criteria in procurements using public funds, introducing requirements on a phased basis and provide support to procurers as required
65	Enable the deployment of electric vehicles in public sector fleets
66	Offset the climate effects of official air travel, through the travel agency contract
67	Introduce civil service mileage rates for electric vehicles reflecting the costs incurred by drivers using their own vehicles for work
68	Support the development of climate action leadership and capacities
69	Implement an enhanced approach to energy performance and renewable energy capability in government building
70	Enhance the effectiveness of climate-related communications, network building and deliberative capacity
71	Establish a Just Transition Review Group
72	Establish flagship low-carbon projects at towns and villages
73	Prioritise the development of supply chain opportunities through appropriately designed and complementary energy and enterprise policies and measures of priority
74	Provide improved training and support initiatives for community and voluntary stakeholders to support community, local and national low-carbon development, incorporating community outreach elements

Action Number	Action
75	Build sectoral resilience to the impacts of climate change through delivery of sectoral plans
76	Build local/regional resilience to the impacts of climate change through nature based solution

SEBERANG PERAI

CLIMATE ACTION STRATEGY

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