



Renewable Energy Team (RET) Strategy – Preparation for Long Term Renewable Development– 2017 and Onwards (Detailed)



Document summary - RET Presents

2017

2020

2030?

- **Context of renewables in Guernsey**
- **RET vision** including:
 - A **long term legacy** for Guernsey
 - the **realistic** optimal level of macro renewable energy in Guernsey:
 - to 2020 - small scale local developments for local consumption (e.g. Solar).
 - Post 2020 – larger scale local developments with potential for some export if desired (e.g. Offshore Wind, tidal, wave).
- **RET Aim and Purpose**
- The **“Conditions”** needed to fulfil the vision and mission.
- RET’s **Strategy** and **objectives** (2017 and beyond 2017).
- List of acronyms used appear on the final page of this document.



Guernsey Context / History

- **2008 Energy Policy** - noted by the States, enabled Commerce and Employment (C&E) (which delegated this work to RET) to have the mandate to progress local macro renewable energy.
- **2011 Energy Resource Plan :**
 - referred to the need to diversify the energy generation into low carbon and renewable generation and to reduce environmental impacts of our energy consumption
 - “an energy vision for 2020 whereby:
 - gradual decarbonisation of Guernsey’s energy generation;
 - diversification of energy generation between low carbon and renewables;
 - Contributing to sustainable and secure energy supply for Guernsey.”
 - “recognizes that:
 - energy generation and energy use have environmental impacts and we should *plan* to adopt carbon reduction”
- **2014 Guernsey Electricity Strategy – Future Strategy**
 - agreed, reaffirming the work into renewables
- **2014 Scrutiny Committee review of The Security of Guernsey’s Electricity Supply**
 - agreed, supporting the medium term aim of having renewables as a significant contributor to on-island electricity
- The RET strategy contained within this document is in alignment with the above States policy.



Vision – Long Term Legacy

- **Overall vision:** *“Guernsey’s future energy demand will increasingly be met by local renewable energy.”*

Delivered through the following priorities:

- a) Reinforced / additional cable links with France
- b) Small scale land projects such as micro solar
- c) Macro Solar
- d) Offshore wind – when economics are acceptable – circa 2020
- e) Tidal –
 - a) pre commercial development site (post 2020) AND/OR
 - b) when commercially viable (post 2025)
- f) Wave –
 - a) pre commercial development site (post 2020) AND/OR
 - b) when commercially viable (post 2025 / 30)

Maximise local economic development / employment

Generation of renewable power for on island consumption; with potential for export in the long term

Local centre of excellence for renewables and related industries (e.g. using financial services)

RET Purpose

Overall Purpose

- To **research, recommend** and **promote** the best local renewable energy options for Guernsey by providing a pathway to achieve the Island's 2050 energy policy targets.

Aim

- Our aim is that local renewable energy generation will deliver **energy independence** and **greater energy security**, with a **lower environmental impact** than our current approach. The initial goal will be to provide for **local consumption at competitive prices** with a longer-term view to explore the potential for export.

Strategic Objectives

- Engage and communicate with the island on macro renewable energy – promote concepts and understanding
- Provide accurate and timely information to decision makers
- Inform and be informed by States Energy Policy
- Enable Guernsey's economy to thrive by ensuring it has access to locally sourced, cost competitive and secure electricity in the future

2017 Objectives – Top 6

- Provide support and information for the development of an up-to-date energy policy.
- Develop and implement a public awareness and communications plan.
- Continue to provide assistance to External Affairs to secure territorial seas and seabed control out to twelve nautical miles.
- Further research the local wind resource.
- Maintain and develop links with universities to commission relevant research.
- Investigate the practicalities of implementing macro solar generation on States land.

RET objectives – General

- Public engagement and communication aligned to a developed communications strategy – look to arise awareness and understanding among the people of Guernsey with regards to the local, and global, position of renewable energy.
 - Prioritise communication around wind feasibility work
 - Work with Education and schools directly to provide a Schools awareness programme to share our learning, focussing on the reasons for cable/solar/wind/tide/wave hierarchy.
- Advise on an updated States Energy Policy with specific regard to macro renewables.
 - Provide E&I with a written representation of RET's requirements from the Energy Policy – Q2 2017
 - Work with others within the States on any reformation of the energy policy as part of the energy policy review – Q3/4 2017
- Work closely with Guernsey Electricity Ltd (GEL) where there is strategic and objective alignment.
- Investigate how energy storage can affect the viability of large scale renewable developments in Guernsey (including cost).
 - Project investigating options – Q2 2017
 - Working with GEL on detailed understanding
 - Monitoring industry advancements
- Work with External Affairs on Guernsey obtaining control of the seabed and extension of territorial seas to 12 nautical miles
 - Lobby and assist External Affairs on acquisition
 - Aim to deliver in accordance with project plan including (but not limited to):
 - Policy Letter to States of Guernsey: target end of 2017.
 - Prepare business case for MoJ – 2017
 - Initial discussions with MoJ ahead of formal process – 2017
- Investigate what proportion of a given development could be factored as secure (from an N-2 perspective) and understand the financial value/credit associated with this security of supply contribution of a given development (e.g. 30MW wind). – initiate in 2017
- Understand the wider socio-economic value of renewables to Guernsey
- Work with the other Channel Islands and wider international governments to progress renewables including work with the UK (through DECC & BIC) and French governments.
- Explore the potential for a renewables research/development base
- Encourage and support public and private sector renewable projects
- Where RET collect data - aim to collect data in a manner that is useful to a developer and to provide realistic estimates of power output and generation profiles for Guernsey.

RET objectives – Technology Specific

- **Wind Energy**
- Begin remote sensing monitoring of the wind resource in Guernsey utilising LiDAR equipment that will be in situ at Chouet headland for a minimum of 2 years. –
 - Installation – Q2/Q3 2017
 - Monitor Data – Q2/Q3 2017 – Q3 2019
- Ensure that work on offshore wind continues following recommendations from Xodus report and other projects (including looking to secure wave data if possible/affordable).
- Closely follow progress in floating offshore wind developments.
- **Solar Energy**
- Propose the preferred method for progressing a project and/or programme for solar utilising States of Guernsey property assets. This takes into account that funding is unlikely to be provided by States Treasury for any project – by end 2017
 - Develop 1MW solar capacity on Island by 2020 if suitable site and funding identified.
- Work with GEL to understand the potential for a joint project (States Land – GEL management) – identify all suitable sites and refine to best options by end 2017
- **Tidal Energy**
- Develop the best mechanisms for Guernsey with regards to leasing of the seabed to a developer (which may include GEL) looking at potential returns, cost, risk and opportunities of supply of electricity to the island or for export – once ownership model of seabed is understood (see point 5).
- Zone suitable areas for locating marine renewable devices to define what further data is likely to be required – looking to progress by end 2017 and would tie into any Marine Spatial Planning work undertaken by CfE&I.
- Undertake a gap analysis of work to date highlighting key areas for future study – start Q3/4 2017
- Monitor progress of key developments including MeyGen, FORCE and the Raz Blanchard
- Refine the understanding of the marine environment and renewable resources to a level of greater detail in order to accelerate generator deployment. (LT)



Factors beyond RET's control that influence the mission

- Continually investigate access into other electricity markets and their subsidies to make near term marine renewables more viable whilst ensuring that the overall needs of the island are not compromised/ if it is in the best long term interest of the island – continuous.
- Follow closely the renewable technologies, the accompanying economics and energy storage such that Guernsey is fully up to date with the industries – continuous.
- Understand and monitor the costs of generation of the different renewable generating options.

2020 / 2030 Targets

	2020s			2030s ^{\$}
	"Installed" capacity (MW)	GWh (at stated capacity)	% of total electricity (based on predicted 2020 load) [~]	Installed capacity (MW)
Locally Generated – macro in the following order:				
Commercial Photovoltaic ⁺	2 - 5 [!]	2.2 - 5.5	0.6 - 1.5	10
Wind #	10-30 potential	26.28-78.84	7.1-21.3%	>100-300
Tidal [*]	0 or test projects	0	0	~100
Wave	0 or test projects	0	0	TBC
Renewable Energy Imported through CIEG cable [@]	15	131.4	35.5%	
Total Electricity from all renewable sources	27-50	159.88 – 215.74	43.2-58.3% [^]	TBC

^{\$} Note that 2030 is a significant time away that the targets are only estimates at this stage

⁺ using average Gsy irradiance levels

[!] heavily dependent on local land/rooftop availability

[#] Assumes 30% capacity

^{*} Assumes 40% capacity

[@] Additional cable links to France are likely to increase the amount that can be imported

[^] During summer period with lowest demand supply may exceed demand and therefore not all electricity generated may be used on island

[~] GEL predict an approximate 2020 demand of 370GWh (which is approx 25-30% of total ENERGY consumption in Gsy)

- 2020s local generation is expected to form the first stage of a larger project that increases significantly through the '20's up to 2030.



Order and Timing of local macro renewables up to early 2020s

Type	Potential Capacity – early 2020s	Notes
Commercial scale PV	Initially 500kW-1MW of capacity; expansion towards 2 - 5MW by early 2020s (dependant space availability).	Work with Planning. Establish public acceptability and flow of projects Initially prioritise States owned land projects.
Offshore wind	20 to 30MW farm off Guernsey coast could be under development in the 2020s	Understand feasibility and acceptability. Expand upon earlier work. Dependent on acceptance of some support mechanisms/price rise.
Tidal	No major development expected to be operational before 2020. Small scale development could take place by early 2020s if a developer decides to test in Guernsey waters.	It has been concluded that Guernsey is not well suited to act as a location for advanced trial arrays. It is unlikely that tidal will be commercially viable prior to the mid 2020s. Monitoring UK (e.g. MeyGen), French (e.g. Raz Blanchard) and international projects (e.g. Bay of Fundy) to see if they demonstrate feasibility and viability by 2025.
Wave	No major development expected to be operational before 2020. Wave devices could be deployed in Guernsey waters by early 2020s if a developer decides to test in Guernsey waters.	It has been concluded that Guernsey is not well situated to act as a location for trial arrays. It is unlikely that wave will be commercially viable prior to the mid 2020s. Monitoring UK (e.g. Wave Hub) and international (e.g. CETO 6 – Australia) projects to see if they demonstrate feasibility and viability by 2025.

Order and Timing of local macro renewables - to 2030s

Type	Potential Capacity – 2030s	Notes
Commercial scale PV	Similar to early 2020s levels at macro scale – as long as potential is taken up.	Little room for expansion from early 2020s assuming achieved.
Offshore wind	100+ MW farm off Guernsey could be operational in the 2030s if desire / support for electricity from other jurisdictions is there.	Understand feasibility and refine understanding on acceptability. Expand upon earlier work. Reliant on support / subsidies from other jurisdictions.
Tidal	100MW or larger array of tidal turbines could be deployed in Guernsey waters in the 2030s, depending on the state of the industry.	Dependant on successful demonstration of commercial viability of multi-turbine arrays and take up pre and post 2020.
Wave	Unquantified amount potentially available off West, North and South coasts.	Dependant on successful demonstration of commercial viability of multi-turbine arrays. Monitor UK, French and international projects to see if they demonstrate feasibility and viability by 2025.



Conditions Required / Objectives – listed in order of priority

- Local commercially viable sources of RE – PV, Tidal, Wind, Wave, other
- Effective Communication – Political and public buy-in
- Mature Technology at acceptable price
- Commercial and Legal processes – inc seabed
- International and CI Cooperation
- Environmental Understanding
- Channel Island Renewable Infrastructure in place

Commercial PV Assessed

- Sufficient solar resource – Irradiance
- Availability of space – e.g. Land, roof spaces
- Economically viable project(s)
- Public acceptance
- Objectives end 2017
- Progress potential States owned site(s) (Top Priority)
- Play an active role in SoG PV project(s) – focusing on viable States owned building projects
- Facilitate private PV project(s) through highlighting and helping with the removal of obstacles (LT)
- Objectives post 2017
- Continue to facilitate/identify potential PV projects

Wind Assessed

- Sufficient wind resource
 - Economically viable project
 - Suitable locations
 - Public acceptance
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- Objectives end 2017
 - Deploy LiDAR, with renewable energy generated power source, at Chouet headland alongside existing anemometer (Top Priority)
 - Monitor wind resource and compare to existing anemometer (2 years)
 - Undertake analysis of wind speeds at different heights (potential for some analysis during data collection)
 - Continue to refine work on local offshore wind viability in short to medium term
 - Continue to process and analyse data from wind mast and other data (LT)
 - Refine the location and layout of potential specific wind farm location(s)
 - Zoning of potential areas
 - Interaction with public re acceptability of offshore / near shore wind in local waters
 - Progress other work identified in offshore wind feasibility report.
 - Monitor progress in offshore wind – especially cost of developments and floating
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- Objectives post 2017
 - Model and then monitor wind at specific location(s) (LT)
 - Refine/update understanding with regards to newly available technologies
 - Progress work outlined in “Offshore Wind – summary and next steps” document (9.2014) to project ready position
 - Survey (geotechnical, seabed and other) the location of potential specific wind farm location(s)
 - Begin deployment of first offshore wind project

Tidal Assessed

- Sufficient Tidal Resource
 - Wait for commercially available tidal technology (likely to be post 2025)
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- Objectives end 2017
 - Refine understanding of modelled tidal resource
 - Obtain further empirical tidal and other data (e.g. seabed) where practicable and cost effective
 - Publish high level conclusions
 - Undertake analysis of work to date highlighting areas where additional data is required
 - Zoning of potential areas
 - Maintain an understanding of the industry maturity, including a good understanding of work underway at potential key projects (e.g. MeyGen, Raz Blanchard, Bay of Fundy)
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- Objectives post 2017
 - Continue to maintain an understanding of the industry maturity, including a good understanding of work underway at potential key projects (e.g. MeyGen, Raz Blanchard, Bay of Fundy)
 - Refine understanding depending on specific sites/information
 - Identify specific potential array locations
 - Further measurements at specific probable array locations when appropriate
 - Begin deployment of first tidal array

Wave Assessed

- Sufficient Wave Resource
 - Greater understanding of potential / timing for wave sector – overall and locally
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- Objectives end 2017
 - Refine understanding of modelled wave resource
 - Zoning of potential areas
 - Continue to work with all States sections with an interest in deployment of a wave rider buoy – identify if there is an opportunity
 - Monitor industry development – e.g. Wave hub (Cornwall)
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- Objectives post 2017
 - Understand empirical wave data (such as that from a Wave Buoy)
 - Refinement of Zoning based on improved data
 - Publish high level conclusions
 - Identify specific areas
 - Undertake site specific measurements at identified areas when appropriate
 - Refine pre 2017 understandings depending on specific sites/information



Effective Communication – Public and political buy-in

- RET's strategy to take into account / be informed by States overall energy policy AND
- RET to inform overall States energy policy re macro renewables
- Proactive communication of when Guernsey will adopt renewables based on balanced and effective communication, of opportunities and reality in Guernsey, leading to well informed stakeholders with specific focus on:
 - **Financing** – as most renewable energy is relatively more expensive at present
 - **Timing** – tidal and wave technology maturing but not yet commercially available
 - **Scale** – local project - potentially small later in this decade and increase significantly after 2020
- Objectives – Ongoing
- Engage with the people of Guernsey, through a well developed communications strategy, informed stories and balanced reality (Top Priority)
- Engagement with young people through schools/education
- Presentation/seminar/briefings with States members, public and other stakeholders
- Engage with overall States energy policy makers to have a clear long term energy policy, with a focus on renewables
- Local Businesses / Interested parties “buy-in” and participate
- Repeat message and update annually
- Meetings with members of the media to outline RET vision and strategy
- Co-ordination with External Affairs

Mature Technology at Acceptable Price

- - Technology at a commercial stage – known deployment / operational data and costs
- - Domestic renewables - An acceptable economic framework by :
 - domestic FIT, Carbon Tax, deviation from merit order (e.g. allowing higher priced renewable electricity onto the grid with a “user pays” policy; or similar) **OR**
 - “grid parity”
 - Return to States from a development – no ground rent but with “cheaper” locally generated electricity **OR** States ground rent and more expensive locally generated electricity
- - Export – Requires access to international support mechanisms - potential ground rent
- - Mixture of above for a single development exporting and domestic
 - Objectives end 2017
 - Continued updating of costs based on global developments
 - Understand and inform the financing option debate on a technology by technology basis due to significant differences in technology workings and maturity
 - Continue work on accessing CFDs (post 2018) from UK and potential to access subsidies from France
 - Devise strategy on how to approach market
 - Further refine and maintain up to date model to look at development costs and how these affect electricity or energy costs for the island
 - Identify what is acceptable to Guernsey population on a technology by technology basis
 - Understand the value of renewable development in offsetting traditional fuel technology on island
 - Objectives post 2017
 - Continuation of up to 2017 as technologies mature
 - Undertake work to explore public views about the potential options for funding renewables
 - Final identification and potential selection of appropriate technologies/development partners (“winners”) for Guernsey
 - Financing mechanism concluded and approach market



Commercial & Legal Process

- Licensing and lease arrangements in place – including:
 - territorial seas extension
 - sea bed acquisition
 - Charging / fees
- Objectives end 2017
- Work with External Affairs on Guernsey obtaining control of the seabed and extension of territorial seas to 12 nautical miles.
Aim to deliver the following:
 - Policy Letter to States of Guernsey: target end of 2017.
 - Prepare business case for MoJ – 2017
 - Initial discussions with MoJ ahead of formal process – 2017
- Zoning – establish areas for potential development / lease and marine atlas
- Leasing – “Head lease” (requires certainty of seabed):
 - Finalise the head lease (or equivalent for ownership / acquisition of rights to) seabed with the Crown/the UK – 0-3 and 3-12 miles – as per Jersey 2015
- Leasing - “Sublease”:
 - Analysis of options (e.g. Different charges for Local consumption/export/export only)
- Objectives post 2017
- Engage with T&R regarding overall RET leasing
 - Commercial leasing parameters decided
 - Lease (or equivalent) initial areas of seabed for development
- Lease (or equivalent) of further areas of seabed for development

Cooperation – International and CI wide

- International – work with external governments and stakeholders – focus on UK and France to ensure:
 - Ability to export locally generated renewables
 - International FIT's/ subsidies/ incentives applicable to Guernsey
- Continued links through BIC – identify areas where, working through BIC, UK funding may be available
- Continued links with France – Identify areas of common interest where EU funding may be available
- CI wide: Work with all Channel Islands (and other CDs) on an integrated strategy and projects on relevant areas
- Objectives end 2017
- International:
 - Collaboration on projects – e.g. Participation in EU funded project as a partner if possible
 - Understand how/if Guernsey can access FITs etc from other jurisdictions
 - Explore commercial agreement opportunities with France / other EU
 - Liaise with French (relevant authorities) / other relevant EU – update relationship with France following the end of FFC
 - Continue Liaison/links with UK/DECC/BIC
- CI (and CD) wide:
 - Liaise with External Affairs where relevant
 - Continue to be key contributors to CIMREG and further progress
 - Ongoing relationship with the other islands at officer and political level – utilise joint CI approach where necessary
 - Collaboration on projects where practicable
- Objectives post 2017
- Obtain access to FITs (or equivalent) for export
- Continuation of up to 2017



Environmental Understanding

- Appropriate baseline environmental data for all macro renewables
- Understanding of environment
- Engage Key Stakeholders

Objectives end 2017

- Follow up on work identified in REA
- Continued collation of all available environmental data
- Marine mapping leading to zoning of potential areas , then:
 - Identify data gaps and collect, or assist in the collection of, additional data, where practicable and cost effective, including –
 - Relating to the environment – e.g. Geology
 - Relating to wind – e.g. birds etc
 - Relating to tidal – e.g. Mammals etc.
 - Update Marine Atlas to incorporate new data to assist with zoning
 - Feed into MSP/leasing work

Objectives post 2017

- Involvement of key Stakeholders
- Continue building on / collecting baseline data
- Update Mapping to incorporate new data
- Focus on key areas identified in zoning



Renewable Infrastructure in place

- RET to inform and be informed by States / GEL policies on:
 - “Local” island
 - Infrastructure
 - cabling infrastructure
 - Future proofing for the potential export of renewable energy
 - “Interconnector” cabling infrastructure which allows secure supply
- Objectives end 2017
- Feed into island infrastructure plans giving renewable needs and perspective
- Continue to work with Guernsey electricity on renewable energy projects where appropriate
- Understand Energy storage and the applications to Guernsey
- Feed into GEL strategic review of cabling
- Ensure GEL’s strategic review of cabling allows renewable generation for domestic use and export
- Objectives post 2017
- Extend pre 2017 objectives – infrastructure, cabling etc
- Understanding use of system charges for transmission of energy



Other objectives to realise wider vision

- Objectives end 2017
- Continue role in assisting others within States in relation to renewable energy potential in Guernsey
- Continue University links and projects (Top Priority)
- RET to advise parties involved with all areas of relevant policy

- Objectives post 2017
- Maximise local employment including, but not exclusively, high value jobs, maintenance and day to day jobs relating to renewables
- Explore further the proportion of construction and maintenance engineering could be performed on island
- Incorporate renewables into an overarching “sustainable Guernsey” vision
- Develop a full understanding of Guernsey’s maximum renewables potential
- Potentially create a sustainable renewable energy research base on Guernsey – potentially aligned with a UK University
- Understand the wider socio-economic value of renewables to Guernsey



Acronyms used in this document

- C&E = Commerce and Employment Department
- CIEG = Channel Island Electricity Grid
- CIMREG = Channel Island Marine Energy Group
- DECC = Department of Energy and Climate Change
- EPG = Energy Policy Group
- ERG = External Relations Group
- EU = European Union
- FFC = Framework for Co-operation
- FIT = Feed in tariff
- GEL = Guernsey Electricity Limited
- GWh = Gigawatt hours
- (LT) = Long Term Project – Projects which are underway but are not due to be completed in 2015
- MOU = Memorandum of Understanding
- MSP = Marine Spatial Plan
- MW = Megawatt
- REA = Regional Environment Assessment
- RE = Renewable Energy
- RET = Renewable Energy Team (part of C&E responsible for macro marine RE)
- ROC = Renewable Obligation Certificate
- T&R = Treasury and Resources Department

(Note – macro is classified as a project of at least 50kW installed capacity)