STATES OF GUERNSEY

# Renewable Energy Team (RET) Strategy – 2015 and Onwards

(Detailed)

COMMERCE AND EMPLOYMENT
A STATES OF GUERNSEY GOVERNMENT DEPARTMENT

GRET
Guernsey Renewable Energy Team

# Document summary - RET Presents


- **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 (e.g. Offshore Wind, tidal, wave).
- **RET mission.**
- The **"Conditions"** needed to fulfil the vision and mission.
- RET's **Strategy** and **objectives** (pre 2015 and beyond 2015).
- 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;
      - sustainable and secure energy supply for Guernsey."
    - "recognizes that:
      - We should recognise 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 and States policy.

# Vision – Long Term Legacy

– ***Overall vision: Local renewable energy generation*** *which is* ***low carbon*** *and* ***affordable*** *and will provide greater* ***energy security*** *and* ***independence*** *to Guernsey*

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 (pre 2020) AND/OR

  b) when commercially viable (post 2025)

f) Wave – Research or commercially viable (Post 2020)

Maximise local economic development / employment

Renewable power generation for export in the long term

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

# RET Mission

- **Overall Mission**
- To prepare the groundwork for development of renewables, RET will ensure that all the required **political, legislative** and **commercial processes** and **approvals** are in place by 2018, as well as a base line **environmental and resource** understanding of Guernsey waters.
- This is to enable at least the **initial deployment** of local macro **renewable energy generators** in the 2020's if economically viable.

**Secondary**

- 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

# 2015 Priority objectives – Top 4 / Summary

1. **Undertake the next stage of research into offshore wind to take Guernsey closer to making a final decision.**
2. **Commercial PV** – project completed / near approval
3. **Secondary legislation (finalised) / licensing / territorial seas and seabed rights (progressed)**
4. **Substantial progress in Public consultation –** conclusion of Public Perception PhD

Further progress all areas in 2015 strategy document with:

- Continued refinement to analysis of all marine renewable energy resources – including looking at the wave resource as it is the least understood resource currently.
- Continue to forge links, cooperate and liaise with stakeholders in the CI, Universities, other governments and institutions in the UK and France.
- Continued Environmental Baseline data collection.
- Continued work on Marine Spatial Plan (MSP) and zoning.
- Utilise the results from the public perception PhD to inform RETs consultations strategy going forward.

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# 2020 / 2030 Targets

| | Early 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 | 0.5 - 1.25 | 10 |
| Wind # | 10-30 potential | 26.28-78.84 | 5-16% | >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 | 27% | |
| Total Electricity from all renewable sources | 30-55 | 163.18 – 221.24 | 33.25-45.5% ^ | TBC |

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

! heavily dependent on any local support mechanism

* Assumes 40% capacity

# Assumes 30% capacity

+ using average Gsy irradiance levels

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

~ GEL predicted 2020 demand of 480GWh (which is approx 25-30% of total ENERGY consumption in Gsy) based on trended organic load growth prediction and estimated migration to electric heating

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

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

| Type | Potential Capacity – early 2020s | Notes |
|---|---|---|
| Commercial scale PV | Initially 1MW-2MW of capacity; expansion towards 2 - 5MW by 2020 (dependant on local support mechanisms). | Work with Planning / Environment. Establish public acceptability and flow of projects Prioritise States owned land projects due to economic returns. |
| Offshore wind | 20 to 30MW farm off Guernsey coast **could** be under development by early 2020s | Understand feasibility and acceptability. Expand upon earlier work . |
| Tidal | 10MW or larger array of tidal turbines **could** be deployed in Guernsey waters by 2020 if Guernsey waters are used as an advanced test site. | Work is underway to assess the viability of Guernsey as a location for advanced trial arrays. It is unlikely that tidal will be commercially viable prior to the mid 2020s with work underway in Canada, France and Scotland likely to be crucial for advancing the industry. |
| Wave | No major development expected to be operational before 2020. Wave devices **could** be deployed in Guernsey waters by 2020 if Guernsey waters are used as an advanced test site. | Work is underway to assess the viability of Guernsey as a location for trial arrays. It is unlikely that wave will be commercially viable prior to the mid 2020s. |

# Order and Timing of local macro renewables up to 2030s

| Type | Potential Capacity – 2030s | Notes |
|---|---|---|
| Commercial scale PV | Similar to 2020 levels at macro scale. | Little room for expansion from 2020 assuming achieved pre 2020. |
| Offshore wind | 100 to 300+ MW farm off Guernsey could be operational in the 2020s if desire / support for electricity from other jurisdictions is there. | Understand feasibility and 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 by 2030. | Dependant on successful demonstration of commercial viability of multi-turbine arrays. Monitor UK (e.g. MeyGen), French (Raz Blanchard) and international projects (e.g. Bay of Fundy) to see if they demonstrate feasibility and viability by 2025. |
| Wave | Unquantified amount potentially available of 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

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

# 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 renewable energy is relatively more expensive at present
  - **Timing** – tidal and wave technology maturing but not yet commercially available
  - **Scale** – local project to be small later in this decade and increase significantly after 2020

- Objectives – Ongoing
- Engage with stakeholders and communicate informed stories and balanced reality (LT)
- Presentation/seminar/briefings with States members, public and other stakeholders (LT)
- Engage with overall States energy policy makers to have a clear long term energy policy, with a focus on renewables (LT)
- Local Businesses / Interested parties "buy-in" and participate (LT)
- Repeat message and update annually (LT)
- Meetings with members of the media to outline RET vision and strategy (LT)
- Co-ordination with EPG (LT)

# 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 (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 2015
- Understand and inform the financing option debate on a technology by technology basis due to significant differences in technology workings and maturity (LT)
- Undertake work to explore public views about the potential options for funding renewables (LT)
- Understand the parameters of merit order variation
- Continue work on accessing FITs/ROCs from UK and potential to access subsidies from France (LT)
- Clear strategy on how to approach market (LT)
- Further refine and maintain up to date model to look at development costs and how these affect electricity or energy costs for the island (LT)
- Identify what is acceptable to Guernsey population - University Studies - Public engagement PhD (Exeter)
- Monitor development and associated costs (LT)
- Objectives post 2015
- Continuation of up to 2015 as technologies mature
- 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 2015
- Zoning – establish areas for potential development / lease and marine atlas
- Leasing – "Head lease":
  - Finalise the head lease (or equivalent for ownership / acquisition of rights to) seabed with the Crown – 0-3 and 3-12 miles
- Leasing - "Sublease":
  - Analysis of options (e.g. Different charges for Local consumption/export/export only) leading to:
- Licensing regime finalised (LT)

Objectives post 2015

- 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 EU to ensure:
  - Ability to export locally generated renewables
  - International FIT's/ subsidies/ incentives applicable to Guernsey

- CI wide: Work with all Channel Islands (and CDs) on an integrated strategy and projects on relevant areas

- Objectives end 2015
- International:
  - Collaboration on projects – e.g. Participation in EU funded project as a partner if possible (LT)
  - Understand how/if Guernsey can access FITs etc from other jurisdictions (LT)
  - Explore commercial agreement opportunities with France / other EU (LT)
  - Liaise with French (relevant authorities) / other relevant EU – progress under MOU/FFC (LT)
  - Continue Liaison/links with UK/DECC (LT)
- CI (and CD) wide:
  - Liaise with ERG where relevant (LT)
  - Continue to be key contributors to CIMREG and further progress (LT)
  - Ongoing relationship with the other islands at officer and political level – utilise joint CI approach where necessary (LT)
  - Collaboration on projects where practicable (LT)

- Objectives post 2015
- Obtain access to FITs (or equivalent) for export
- Continuation of up to 2015

# Commercial PV Assessed

- Sufficient solar resource – Irradiance
- Availability of space – e.g. Land, roof spaces
- Economically viable project(s)

- Objectives end 2015
- Agree to progress potential States owned site(s)
- 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)
- Continue to feed into Environment planning laws - SLUP

- Objectives post 2015
- Continue to facilitate/identify potential PV projects

# Wind Assessed

- Economically viable project
- Sufficient wind resource
- Suitable locations
- Public acceptance

- Objectives end 2015
- Conclude if local offshore wind is economically viable in short to medium term
- Continue to process and analyse data from wind mast and other data (LT)
- Refine the location of potential specific wind farm location(s)
- Partner with offshore wind developer / consultant to refine business model
- Zoning of potential areas
- Interaction with public re acceptability of offshore / near shore wind in local waters
- Model and then monitor wind at specific location(s) (LT)
- Progress work outlined in “Offshore Wind – summary and next steps” document (9.2014) e.g.:
  - Site selection process
  - Detailed analysis of electricity prices
  - Strategy for wind data gathering and resource analysis

- Objectives post 2015
- 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
- Conclusion of tidal strategy – either:
  - Advanced tidal test site in local waters (potential pre 2020) or
  - Wait for commercially available tidal technology (likely to be post 2025)

- Objectives end 2015
- Refine understanding of modelled tidal resource (LT)
- Obtain further empirical tidal and other data (e.g. seabed) where practicable and cost effective (LT)
- Publish high level conclusions (LT)
- 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) (LT)

- Objectives post 2015
- 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 pre 2015 understandings 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

- Objectives end 2015
- Refine understanding of modelled wave resource (LT)
- Zoning of potential areas
- Engage with environment on wave buoy – maintain involvement with the project

- Objectives post 2015
- Understand empirical wave data (such as that from Env. 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 2015 understandings depending on specific sites/information

# Environmental Understanding

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

- Objectives end 2015
- Follow up on work identified in REA (LT)
- Collate 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 (LT) –
    - Relating to the environment – e.g. Geology
    - Relating to wind – e.g. birds etc
    - Relating to tidal – e.g. Mammals etc
- Involvement of key Stakeholders (LT)
- Update Marine Atlas to incorporate new data to assist with zoning (LT)

Objectives post 2015

- 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 2015
- Feed into island infrastructure plans giving renewable needs and perspective (LT)
- Feed into GEL strategic review of cabling (LT)
- Ensure GEL's strategic review of cabling allows renewable generation for domestic use and export (LT)
- Understanding use of system charges for transmission of energy (LT)

- Objectives post 2015
- Extend pre 2015 objectives – infrastructure, cabling etc

# Other objectives to realise wider vision

- Objectives end 2015
- Continue active role in Guernsey Finance Renewables / Cleantech initiative to attract cleantech financial services to Guernsey (LT)
- Continue and expand University links and projects (LT)
- RET to advise parties involved with all areas of relevant policy (LT)

- Objectives post 2015
- 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

# 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)