View towards Sherkin

Energy audit on Oileán Chléire

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1 Introduction

In 2013, Oileán Chleíre joined the SMILEGOV[1] project through its membership in the *Comhdháil Oileáin na hÉireann* (Irish Islands Federation) and subsequently in the *European Small Islands Federation* (ESIN). The objectives of SMILEGOV, funded by the IEE at the European Commission, is to establish a clear picture of the island's energy consumption, its emissions and how it is it supplied with energy, moving into an action plan for a more sustainable future, and to invite the island to join the Pact of Islands[2].

Process

The work has mainly been carried out by Senior Advisor Christian Pleijel, formerly at Sweco, now an independent consultant and the Vice President of ESIN (*European Small Islands Federation*) and Mr Mairtin O'Mealoid, Manager, Comharchumann Chléire Teoranta Oileán Chléire, Contae Chorcaí, with local support, with support from the Irish Islands Federation and from the County Council.

Methodology

The island has been observed from six different perspectives, a method described and used in Christian Pleijel's book on the small islands of Europe[3]: (1) Facts, (2) Identity and culture, (3) Optimism, (4) Pessimism, (5) Alternative solutions, and (6) Actions. The reason for not solely describing the energy and mobility situation on Ischia is that issues such as energy and mobility are closely related to tourism, trade & industry, transports, healthcare, culture, schools and demography.

Islands are miniatures of the world, solitary, clearly separated from the mainland by the sea. Being small, distant and vulnerable, an island needs to plan and develop itself in a cohesive and continuous manner, handling the complexity of local, regional and European politics, combining small scale and big scale.

September 2015,

Christian Pleijel and Mairtin O'Mealoid

[1] http://www.sustainableislands.eu/
[2] http://www.islepact.eu/html/index.aspx
[3] http://europeansmallislands.com/how-to-read-an-island/

2 Summary

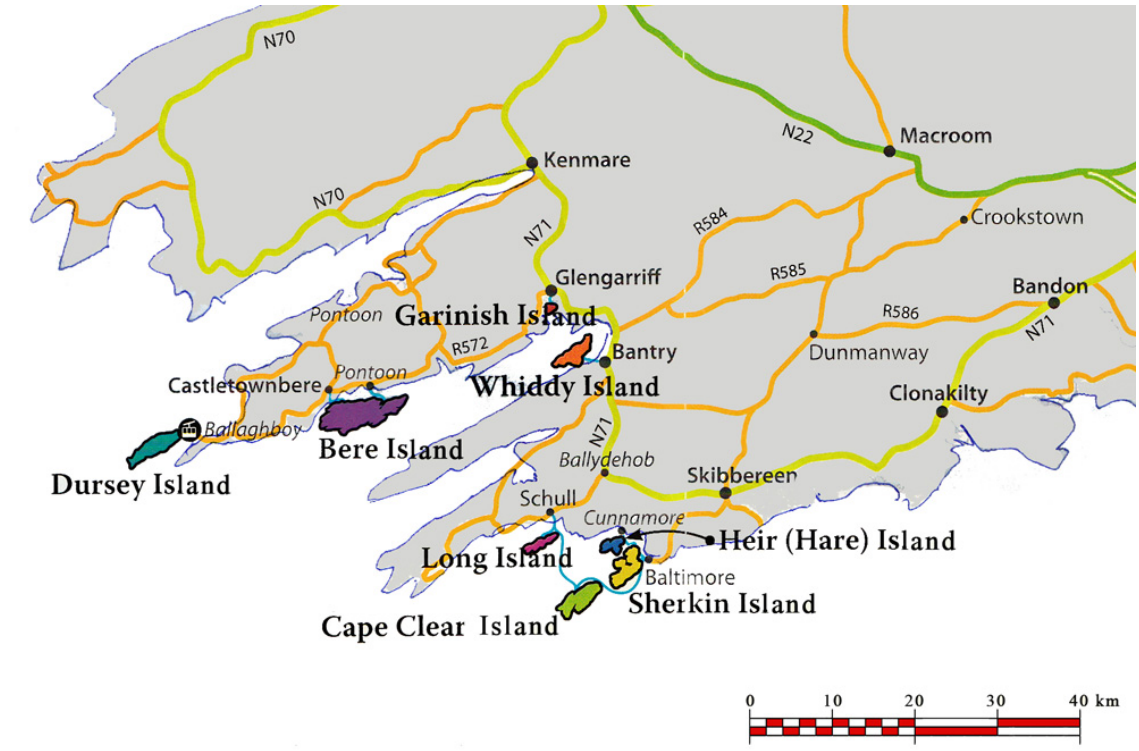
Baseline Year	2013	
Population	125 / 217 residents	
ENERGY CONSUMPTION		
Agri diesel	1,372 MWh	
Boat diesel	56 MWh	
Ferry MDO	898 MWh	
Small boat diesel	66 MWh	
Small boat petrol	4 MWh	
Butane gas	63 MWh	
Coal	147 MWh	
Briquettes	38 MWh	
Timber	111 MWh	
Heat oil (kerosene)	183 MWh	
Electricity (304,700 kWh)	395 MWh	
Sum of energy consumption	**3,326 MWh**	
Per capita 125 / 217	26,608 kWh	/ 15,357 kWh[4]
EMISSIONS[5]		
Agri diesel	349 kg CO_2e	
Boat diesel	13 CO_2e	
Ferry MDO	248 CO_2e	
Small boat diesel	16 CO_2e	
Small boat petrol	1 CO_2e	
Butane gas	12 CO_2e	
Coal	58 CO_2e	
Briquettes	4 CO_2e	
Timber	2 CO_2e	
Heat oil (kerosene)	46 CO_2e	
Electricity	182 CO_2e	
Sum of emissions	**931 kg CO_2e**	

[4] The European average is 28,439 kWh/person/year
[5] http://www.carbon-calculator.org.uk/

Per capita 125 / 217 7,466 kg CO_2e / 4,298 kg CO_2e

LOCAL ENERGY PRODUCTION

ACTION PLAN



3 Facts

3.1 Oileán Chleíre

Oileán Chléire (Cape Clear Island, in English) is the southernmost inhabited island in Ireland, situated off the south coast of County Cork, near Baltimore, from where there are daily sailings to and from the island.

Almost oval in shape, it has an area of 6,7 km^2 (2,59 sq mi), about five km miles long and approximately two and a half km wide, with the Cnoicin an tSeabthaic rising 160 m over sea level at low tide.

Heather, gorse and wild flowers cover the rugged hills. The island has wild romantic sceneries, sparkling harbours, jagged cliffs, bogs and a lake. There is a myriad stonewalls giving a patchwork effect to the varied landscape, divided into east and west halves by an isthmus. Megalithic standing stones, a 5,000 year-old passage grave, a 12th century church ruin, the 14th century O'Driscoll cas-

tle, (cannonaded in the early 1600's), all relate to times past.

Saint Ciarán, the island's patron saint, allegedly the earliest of Ireland's four pre-Patrician saints, was born on Cape Clear.

Oileán Chléire 's remote island location, coupled with its proximity to the continental shelf, makes it one of the foremost centres for bird watching in Ireland. Whales, leatherback turtles, sun fish, dolphins and sharks are spotted regularly.

The island has a long-established fishing and maritime tradition and a famous sea-faring heritage. Its people have been prominent in naval exploits across all the world's continents. Many heroic rescues were undertaken by the inhabitants over the past centuries.

Development on the island is largely concentrated into two areas; one between South Harbour and North harbour where services such as pubs, the shop and restaurants are located, and the other in the middle of the island near the church, heritage centre and fish farm.

3.2 Population

The island population is 125 in winter, in summer 400-450. The island is a gaelic speaking region but it is mostly bi-langual.

Oileán Chléire has a very low proportion of its population in working age and a high proportion of elderly people.

Secondary school students are away during the week, university students are home some weekends. There is a large number of summer students, the island being an excellent setting for two Irish colleges.

There are also one- or two-day visitors to the island, mainly in summer.

The human pressure on the island's fresh water system, on energy supply, on sewage and waste handling, postal services, healthcare, rescue, roads and ferries should be calculated as follows:

	No	Days
Residents 365 days	125	45,625
Part-time residents 30 days	500	15,000
Summer students 14 days	200	2,800
Visitors (1 day)	15,6280	15,628
Sum		79,053

79,053 man-days divided by 365 gives 217. The number of people using Oileán Chléire as a human society is equivalent to a population of 187. That is the base or calculating the island's ecological footprint. From an infrastructural and a sustainable perspective, Oileán Chléire serves 217 people, not 125.

3.3 Governance

Oileán Chléire is part of County Cork.

The *West Cork Islands Integrated Development Strategy* was finalised in 2010[6] under Assistant County Manager Theresa White, chair of the West Cork Island Interagency Group.

"Máirtín O'Méalóid, manager of the *Comharchumann Chléire Teoranta* which played a significant role in the council's development, stated that it will be a very important forum for discussions on matters to the seven islands of West Cork and that the CCT very much looks forward to working closely with the council in a supportive way into the future."[7]

The council's role and functions are:

- Collective representation of interests of all seven inhabited West Cork Islands

- Assistance with the implementation of the Integrated Strategy for the West Cork Islands in conjunction with relevant agencies;

- Promoting public awareness of the West Cork Islands as an entity and island group, while recognising the individual differences and specific issues pertaining to each individual islands.

A website for the all of the seven islands was launched in 2012: http://westcorkislands.com/

3.4 Public service

There are a number of services located near the pier at the North Harbour on Oileán Chléire including an information point and island map, the island library and the Raidió na Gaeltachta studio.

Other services on the island include the primary school, naíonra/playschool, helipad, Comharchumann Chléire building with tourist information office, bird observatory, holiday home complex, hostels, camp site, picnic benches, fuel pump and a graveyard.

There is a primary school on the island with 13 children, a crèche with after school care operating at part time basis, a full time nurse and a doctor who comes once a month.

The island lacks a banking facility or ATM but a laser cashback facility is available on the island**.**

3.5 Trade & Industry

The islanders are employed in farming, ferries, school, tourism and associated services, summer colleges, beef farming, goat farming, organic farming, vegetable growing, fishing as well as computer-based services such as translation.

In 1969, the local co-operative *Comharchumann Chléire Teoranta* (CCT) was established. It is the local development group on the island and

6 http://www.askaboutireland.ie/enfo/irelands-environment/county-focus/cork/islands/west-cork-islands-strategy.pdf

7 http://www.corkcoco.ie/co/pdf/786082054.pdf

offers substantial community supports to it. The CCT is involved in various community development projects including island rural transport and renewable energy.

In its own right, it directly operates a number of ventures, including a social club/pub; a coal, gas and oil distribution facility, which is combined with a machinery hire business; the sale of books and souvenirs; a rural transport project. In addition, it acts as co-ordinator of a number of property sub-tenancies, though it is not itself the owner of those properties – most are owned by Údarás na Gaeltachta, though some are on sites belonging to Roinn na Mara. It is also a shareholder in an independent, privately-owned worm farm, Feirmeoirí Éisc Chléire Teo., which has two major private investors and has been well supported financially by Taighde Mara Teoranta, a subsidiary of Údarás na Gaeltachta.

It occupies, under a lease, a building owned by Údarás na Gaeltachta, in which it has its own offices, but it also has, as sub-tenants, a pottery workshop, child-care facilities (which are complemented by both after-school facilities and youth club activities) and some other enterprises.

And it also owns two properties, which are used by students during the periods of the Coláistí Samhraidh and another, which is used both as classroom space and a games room – though this usage is for relatively short periods of the year only.

As described above, the CCT has a vital role in the life on the island. It played a main role in bringing electricity to the island (in partnership with the Electricity Supply Board), it has established a number of enterprises to create sustainable employment which include island based pottery, fish farm and campsite, it has facilitated many small business start ups and it established the second Irish Summer College of the island in 1972.

Most of CCT's economic activities also make important social contributions to the Island's community as well as making some (often small) contributions to covering its fixed overheads. Apart from its social contribution, CCT employs thirteen people, many of whom are employed on a part-time basis. The estimated value of its economic contribution to the Island is about 300,000 euro per year most of which relates to employment and its associated multiplier effects.

The island has an established reputation for its Irish language schools.

The Oileán Chléire observatory is the only one of its type in Ireland. Its research database is extensive as a daily log of bird sightings is recorded from March 23rd to November 5th annually since 1959.

The annual storytelling festival represents a popular and unique cultural event in the area.

There is significant tourism potential which is not being fully harnessed. There is a shortage of activities for visitors. Bird-watching and sea-watching could be developed, Irish be taught to more pupils.

Rough weather. Photo Chuck Kruger

3.6 Access and transport

The island is located significantly further offshore than the other West Cork Islands and access is therefore more vulnerable to disruption by poor weather. This has implications for service provision, access to goods and services for islanders and the holding of events on the island, particularly during the winter months.

The island is accessed via a 45-minute ferry ride from Baltimore; one ferry operates year-round, and additional summer ferries operate from Baltimore and Schull (between the beginning of June and the end of August).

The total number of passengers from Baltimore was 21,096 return journeys, whereof islanders 6,178, tourists and other visitors 14,919. Total fuel used was 66,485 l diesel.

The summer ferry between Cape Clear and Schull operated between the beginning of July and the end of August. It transported 709 passengers for which it used 7,102 l diesel.

Estimated fuel used by the heavy cargo barge was 16,000 litres for 2014.

There are four main piers at the island. The main access point is known as North Harbour (Trá Chiaráin), which is owned by the Department of Agriculture, Fisheries and Food (DAFF). Within North Harbour, there are three piers; the middle pier (generally used by ferries and yachts), the dock (which is used by fishing boats and ferry mainly during winter) and the outer pier (the Bull's Nose), which has recently been replaced by a new structure including hydraulic storm gates.

Barges and RoRo traffic can access the island via Cuas an Duglais (at the eastern end of the island), which is maintained by Cork County Council. There are two other piers on the island – Foilcoagh and South Harbour. There is a new deepwater slipway at North Harbour to accommodate Ro-Ro traffic.

Roads on the island are generally narrow and steep. The island has its own rural transport bus service that meets people from the ferry as well as a helipad used for the emergency services and other occasional use.

Nearest airports are Cork and Farranfore. Kent railway station is located 9 km from Cork Airport. Killarney railway station is nearer to but does not have as frequent services.

3.7 Water supply

The water central

The island is struggling to provide sufficient freshwater during the summer months. Water used to be turned off at night during the tourist season but in 2015, for the first time in 20 years, it wasn't.

There is a need to upgrade the public water supply on the island, with mains replacement being the first priority.

Currently exploring the possibility of a dual system where collected water would be used for toilets and other activities where potable water is not required.

Water Management needs to be part of solution in the long term.

On Oileán Chléire we are using the same water for flushing toilets as we use for drinking, this is a very energy inefficient system and needs to be corrected!

Recently there has been a pilot project using desalinisation to top up the island water during the summer months, this system can help but is extremely bad value from an energy and financial point of view.

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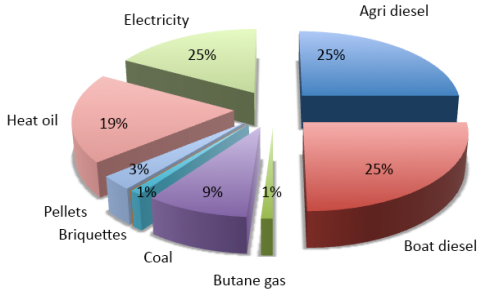
3.8 Energy

The island depends heavily on fossile fuel products for its energy use which is 100% imported and not renewable.

The island is served by three-phased electricity supplied via a cable from the mainland.

People on Oileán Chléire Island use energy for heating, transports and common services (freshwater, sewage, waste and street lighting):

Agri diesel	135,000	litres
Car petrol	6,000	litres
Marine diesel oil	96,087	litres
Small boat diesel	6,000	litres
Small boat petrol	500	litres
Butane gas	4,772	kg
Coal	19	tonnes
Turf briquettes	11,400	kg
Timber	30	tonnes
Heat oil (kerosene)	18,000	litres
Electricity	394,832	kWh



This sums up to 3,326 MWh, which per capita counting 125 inhabitants is 26,608 kWh/year, counting 217 inhabitants it is 15,357 kWh/y[8].

[8] European average is 28.439 kWh/p/y

Sea transports – getting to and from the island – account for 25 of the total energy used.

3.9 Emissions

The emissions from the island consist of sewage, waste and greenhouse gas (CO_2-equivalents), of which the latter should be balanced against Oileán Chléire's ability to store carbon (not calculated here). Since Oileán Chléire is an island, part of the sea area surrounding the island should also be included in the calculation its of carbon storage ability.

(a) Sewage

Wastewater treatment on the islands is generally comprised of individual on-site septic tanks or treatment systems.

The sum of sewage on the island can be estimated to 160 litres x 231 man-days x 365 days = 13.5 million litres. Most of it is grey water (from showers, bath, dish and washes) and a smaller part is blackwater from toilets comprising bacteria, nutrigents and medicine spill.

(b) Solid waste

Domestic waste is collected centrally in the harbour and removed by the islanders to meet the Cork County Council waste collection service in Baltimore. There are recycling facilities on the island. However, these facilities could be improved. Waste reduction should be encouraged and a glass crusher and paper baler such as those operated on Bere island

would be useful given the distance to and cost of transporting waste to the mainland.

(c) Greenhouse gas[9]

On Oileán Chléire, the total emissions of greenhouse gas are almost 931 tonnes of CO_2e, almost 1,000 tonnes a year. Use of agri diesel for tractors and machinery (=road transports) and of MDO for sea transports are the main sources, followed by the use of electricity.

An Oileán Chléire resident emits 7,4 tonnes of CO_2e a year, 84,3 if the inhabitant number is considered to be 217.

3.8 Local Energy Production

Chléire Wind Energy System was Ireland's first integrated wind energy system utilising 2 x 33kw windmills to provide electricity during suitable periods, also charged a large bank of batteries for conversion during times when wind was slack. Some power sold to grid.

Diesel generators used to provide power when needed.

Shortcomings because net price for selling electricity was too low also, this may have been set purposely low to discourage alternative energy generation. The licensing process in Ireland is very slow with projects taking anything up to 5 years from concept to full implementation. Local, regional, national and European regulations and directives can create direct impediments to natural resource based projects, particularly in the islands.

Oileán Chléire is anxious to revive wind energy to provide power and generate income.

[9] Human emissions of CO_2 have augmented from 270 ppm to 380 ppm in 100 years. Parallel to this, the average temperature on Earth has increased with almost 1°C. We call this the 'greenhouse effect', gases contributing to this are carbon dioxide (CO_2), nitrogen oxide (NO_x), methane (CH_4), freones, water steam and ozone. Carbon dioxide is the most frequent by volume with 379,64 ppm (2015). Although the degree of methane is low, methane is 25 times more efficient than carbon dioxide in producing heat. This is why all gases should be included in discussions on temperature changes and possible actions on lowering their effects. In order to measure this, CO_2-equivalents (CO_2e) are used, which define the amount of any greenhouse gas needed to produce as much heat as CO_2. One kilo of methane gas has the same effect as 21 kg carbon dioxide.

View towards Fastnet

4 The culture and identity of Oileán Chléire

Cape Clear's Gaeltacht status is crucial to its population's sense of identity, but it can also be harnessed to attract visitors. Already the *Coláistí Samhraidh* attract young people to the Island, but there is also evidence of demand (gathered by one interviewee and supported by one written submission) from the ***corporate sector*** for courses on the Island. To garner this potential new custom, investment in both the Coláistí themselves and in the premises being used for those courses would be necessary.

Oileán Chléire is not so remote counted in kilometres but it is quite distant counted in time.

North Harbour of Oileán Chléire is 6,5 nautical miles (12 kilometres), from the port of Baltimore The trip takes about 45 minutes or slightly longer in rough conditions.

The speed is thus 8 knots 16 km/h.

Modern people are used to travelling at 70 km/h and perceive the distance to be about 50, not 12 kilometres.

Because of the distance in time, visitors tend to see the island as much more remote than it really is. It adds to the myth and the image of an island such as Oileán Chléire but is generally true for many small islands, remote in reality and in human minds. This affects people's willingness to live and work on small islands.

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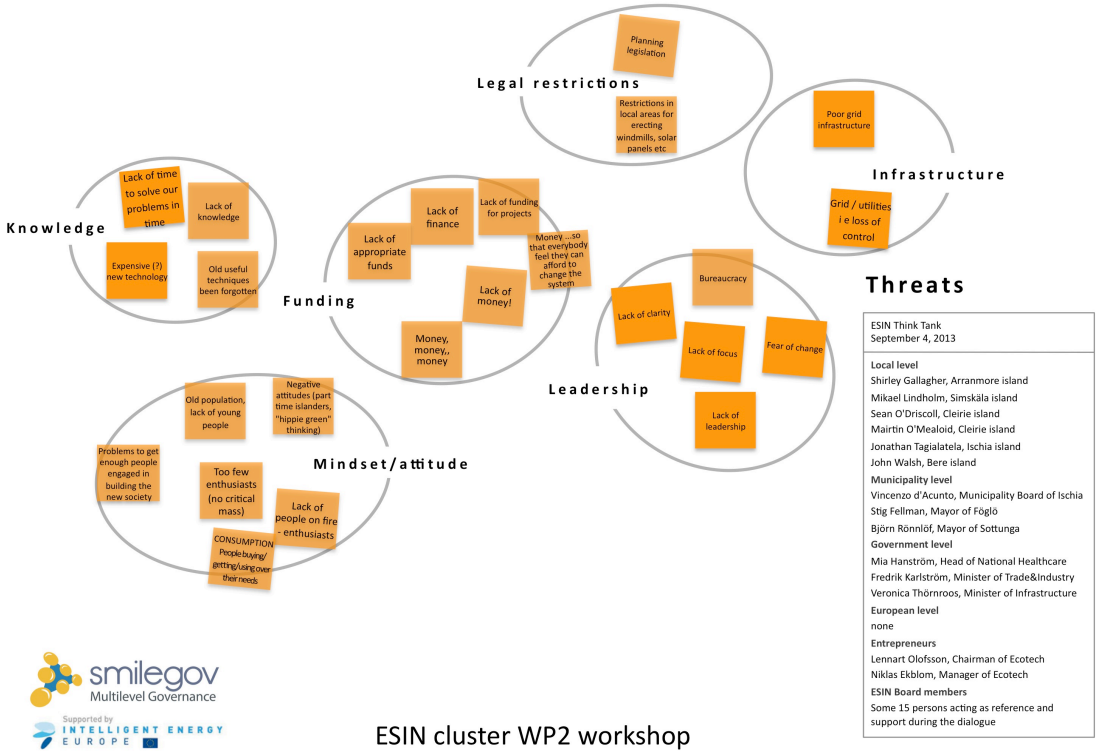
At an initial Smilegov workshop in Mariehamn, September 2013, the ESIN cluster islands including Mairtin O'Mealoid from Oileán Chléire, made a Metaplan summary of common opportunities

5 Optimism

Despite reservations on the part of some local people, An Comhar-chumann is currently, and is likely to be for the immediate future, crucial to the social and economic future of the Island.

The island's tourism potential has never been properly exploited; the Irish language, and a combination of bird-watching and watching sea-life, possibly with some other water-based activities, have particularly valuable potential; however, the short season, the shortage of some types of accommodation, the short-age of wet weather facilities and in-adequate investment in marketing are impediments to the growth of this sector.

The cattle farming on the island is successful and island cattle make a good price because of their fine con-dition.



From the same workshop: a metaplan summary of common threats.

6 Pessimism

The biggest problem facing Oileán Chléire (by far) Is the continuing net reduction in its population.

Cape Clear is suffering from a serious and consistent decline in its population and, without intervention, that is going to continue, if not accelerate – probably to the point where the sustainability of the Island's population could be threatened within the foreseeable future;

Having to leave the Island for second level education is a factor in promoting its de-population (primarily from the perspective of the parents – the children have less difficulty with the current arrangements);

Jobs will be necessary if new settlers are to be attracted to Cape Clear to boost its population; so too will housing, social and sports amenities for young people, dedicated work-space and, ideally, some second level educational provision;

Fishing and farming have traditionally been the Islanders' main economic activity, but both are now in serious decline, apart from some niche farming activities, including organic farming, goat farming and farm-based tourism.

Many of An Comharchumann's existing assets need to be up-graded, or replaced.

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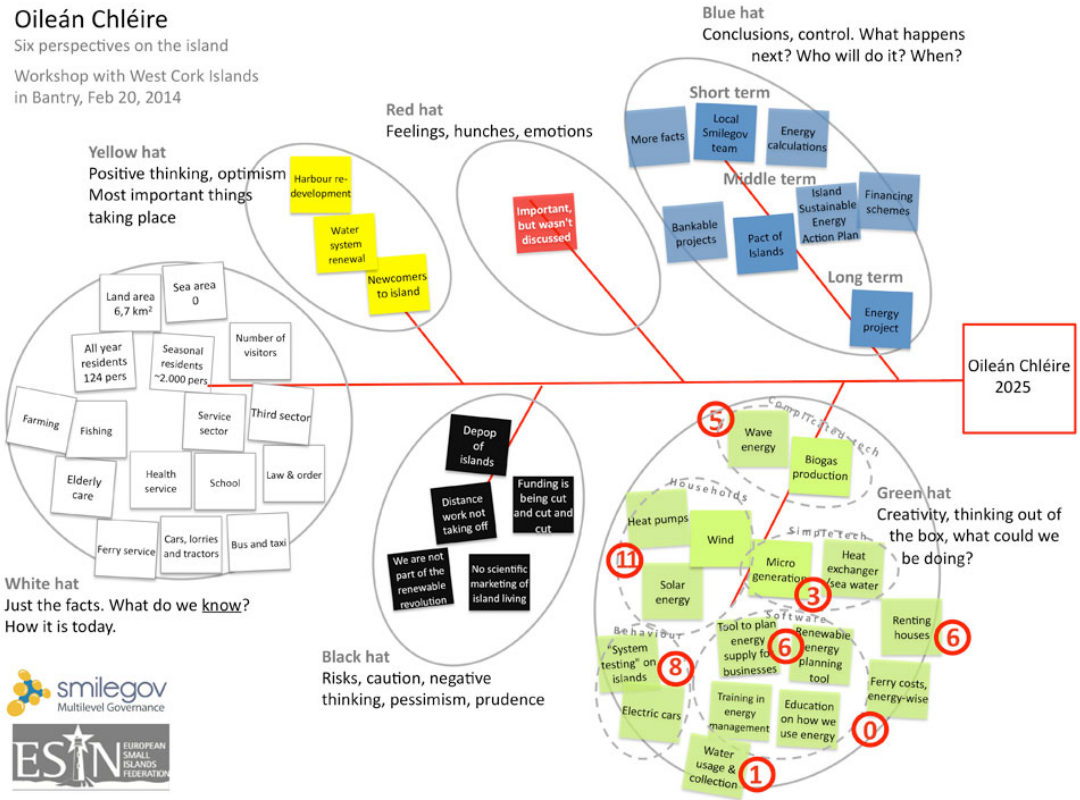

On a Smilegov workshop in Bantry, February 2014, Oileán Chléire made a "fishbone" analysis of its general situation 2025 summarising six different different aspects of the future for the island.

7 Opportunities

In the wider context of economic activity, it was suggested that Cape Clear is an appropriate location for a wind farm. At present, there is no Power Procurement Agreement but the capacity of the cable would be capable of carrying current to the meinand if there was excess electricity being produced.

In the past, technical issues were raised concerning the potential for accessing the national grid with power generated on the Island and those concerns appear to hold validity; however, it is clear that local people are not convinced about the validity of those reservations, but according to electricity-generating companies, the investment in a new line to link to the grid would be prohibitive, unless the technology improves. As things stand, there are a number of buildings and other assets, including the school and the campsite, which are heated by *solar energy* (partly as a result of an EU-funded initiative called the 'Solar Energy Trail').

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8 Action Plan

Oileán Chléire has significant scope to be an energy efficient community and to develop energy related activities that will be of economic benefit to the community. The islanders are well placed to approach this project given the history of wind energy production going back to the 1980s.

The island has signed up to the Pact of Islands and is committed to reducing energy consumption by 20% by the year 2020.

The reduction in energy use will require a significant input through community activation and participation.

Some of the actions to be implemented will include some or all of the following:

1 Work with relevant agencies and authorities to develop partnerships that will enable the island community to reduce energy consumption.

2 Identify all energy leaks on the island, that is find the areas of activity where energy is being wasted or lost through inneffi-cient use.

3 In the short term implement an island wide insulation project to capture as much of the escaping energy as possible (the low hanging fruit).

3 Implement the use of all available new technologies such as LED lighting and power cut-off timers ect.

4 Develop renewable energy systems on both a small localised scale and on a larger island wide scale.

5 Develop wind energy use to provide for island use and to sell power into the national grid as an economic activity.

6 Consolidate transportation activities to reduce fuel usage where possible and introduce electric vehicles utilising renewable power sources.

7 Explore and develop new methods of energy saving in an island context and share these with other communities.

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