

# Isle of Gigha Energy Audit



Coordinated by:

**The Scottish Island Federation**



Consulting Partner

**Community Energy Scotland, Simon McKinney**



Funded by:



**Dr Andy Oliver  
GREL Renewables Officer**

Gigha Renewable energy Ltd, Isle of Gigha, Argyll PA41 7AA  
andy@gigha.org.uk / Gigha.andy@gmail.com  
07810 302127

## Contents

<b>1. Executive Summary</b>	<b>3</b>
<b>2. EA Introduction</b>	<b>3</b>
<b>3. Island: Energy Mix</b>	<b>3</b>
<b>4. Energy Supply</b>	<b>4</b>
<b>5. Total Energy Consumption</b>	<b>5</b>
<b>6. Domestic Consumption</b>	<b>6</b>
<b>7. Public &amp; Commercial consumption</b>	<b>7</b>
<b>8. Industrial Consumption (where applicable)</b>	<b>7</b>
<b>9. Transport consumption</b>	<b>7</b>
<b>10. Cost data and expenditure</b>	<b>7</b>
<b>11. Assessment of the potential for fuel switching</b>	<b>8</b>
<b>12. Island Community / Island background</b>	<b>8</b>
<b>13. Island Demographics and Population</b>	<b>9</b>
<b>14. Local Economy</b>	<b>10</b>
<b>15. Appendix 1: map</b>	<b>12</b>
<b>Appendix 2: Photographs</b>	<b>12</b>
<b>Appendix 3: Contact database</b>	<b>13</b>

## 1. Executive Summary

Gigha's energy mix is predominantly electric / oil with reliance on biofuel as a back-up. As the IGHT properties are renovated they are transformed into more energy efficient households and this, in conjunction with the new builds for both the private and rental sector, have significantly improved Gigha's energy efficiency.

The potential for energy switching is limited to those on Gas Oil to electricity.

## 2. EA Introduction

It is proposed that on Gigha we sample 4 different types of domestic property, namely:

- Old large unrefurbished – good condition oil
- Old large unrefurbished – poor condition electricity / solid fuel
- Refurbished detached
- Refurbished semi-detached

In addition we will audit the community-run hotel which has 13 rooms, no double glazing and a mixture of oil, electric and solid fuel heating. We have made tentative approaches to the owner of the PumpAshore Halibut Farm and hopefully this will bear fruit. All bar the fish farms have agreed to disclose energy usage via past bills.

## 3. Island Energy Mix

Fuel	Supplier(s)	Applications
Electricity	SSE supplemented with domestic renewable, diesel generator backup	Across all sectors
Coal	McNairs, local supply	Domestic
Kerosene	Gleaner, Brogans, McNairs	Domestic heating fuel, Gigha hotel
LPG	McNairs, Ardminish Stores	Primarily domestic cooking and Gigha Hotel / Boathouse Café Bar cooking

Red diesel	Gleaner, Brogans, McNairs	Agricultural, diesel generator backup
Wood	IGHT, self-sourced	Domestic heating

## 4. Energy Supply

Individual contribution of fuels to each sector for the Isle of Gigha:

<b>Domestic</b>	3079 MWh p.a.	<b>Industrial</b>	1588 MWh p.a.
<b>Public &amp; Commercial</b>	685 MWh p.a.	<b>Transport</b>	317 MWh p.a.

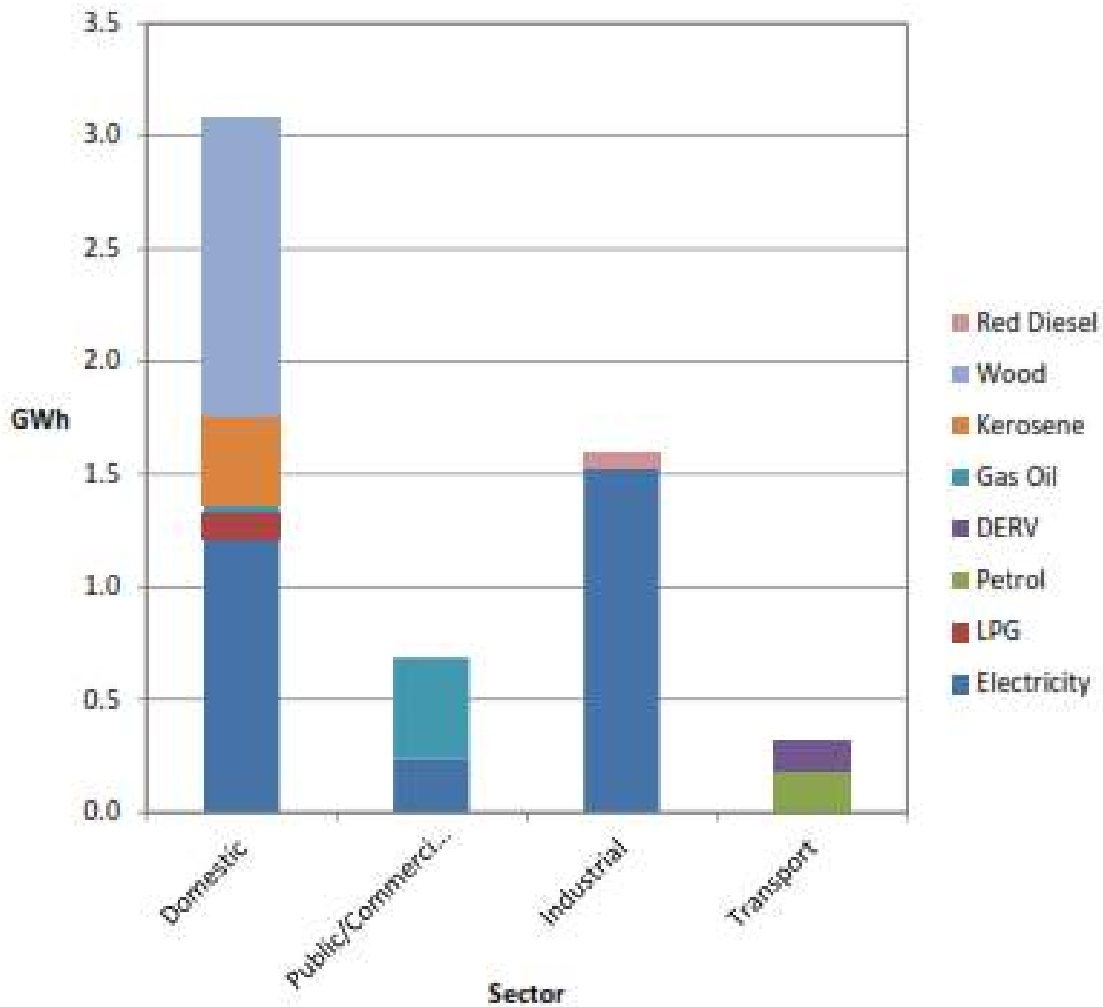
There are also 64 homes on Gigha, which also include a mix of electric and non-electric heating systems. The total non-electric cooking, space and water heating energy requirement, met by wood, LPG, kerosene and gas oil, is 1869 MWh p.a.

Approximately 35 houses possess solar water heating systems which provide hot water, 10 have PV panels fitted and there are two community-owned properties which have purpose built sunspaces to supplement heating.

The Public & Commercial sector on Gigha uses a mix of electricity and gas oil.

The Industrial sector, which uses large amounts of electricity, consists of Scottish Water treatment works and a large aquaculture farm.

The transport sector consists of a small fleet of private vehicles. There is no public transport service.



## 5. Total Energy Consumption

The total energy consumption on Gigha is the summation of the all usage across the sectors, but by far the largest is electrical usage.

Alternates can be summarised as

Fuel Type	LPG	Gas Oil	Kerosene	Wood	Coal
MWh	121	28	403	1317	negligible

The energy consumption in the Domestic sector is from a combination of housing space and water heating requirements and applications such as lighting, washing, and cooking.

The Fyne Homes also manages a small proportion of housing stock on Gigha and have found on average 3 bedroomed properties consume 10 – 12.5 MWh p.a., 2 bedroom properties 8 – 10 MWh p.a. and 5 – 8 MWh p.a. for one bed properties.

The electrical demand for Gigha features a large proportion of industrial consumption. This is a result of the large Gigha halibut fish farm which dominates the island's electricity demand.

The Gigha Halibut fish farm is by far the largest energy user operating in tandem at all times 2 out of 3 water pumps (100kW, 100kW, and 75kW ratings). This leads to an average electricity consumption of 1.5 GWh p.a.

Scottish Water is another large industrial user of electricity on Gigha.

The Public & Commercial sector which includes a small selection of B&Bs, Shop and Post Office, Hotel, Café/Bar and other public buildings is estimated to require 234 MWh p.a. of electrical energy for space heating.

The remainder of electricity is consumed by a blend of housing stock and holiday homes which have been newly built or refurbished within the last 10 years. These holiday homes use a combination of electricity and heating fuels. The electric component of the heating demand is estimated at 1.21 GWh p.a

## **6. Domestic Consumption**

The domestic sector uses a mix of electricity and heating fuels such as kerosene, gas oil, individually sourced coal from the mainland (for which no figures exist), and indigenous wood fuel. The figures for overall wood fuel are estimated at 1300 MWh but this figure may be under-reported as many residents use their own, free picked wood rather than buying in from the Trust (where the figures can be recorded). Also one resident bulk imports wood fuel from the mainland for their personal use. It is envisaged that wood fuel use will show significant increase as the proportion of houses with log stoves increases and the domestic cost of electricity continues to rise. Several households supplement this with PV renewables.

The houses on Gigha possess a mix of heating systems depending on when they were built. Houses built or refurbished in the last 10 years use a combination of electric and solid fuel heating systems. Wood fuel, which is locally source, gas oil and kerosene are used in houses older than 30 years.

## 7. Public & Commercial consumption

The Public & Commercial sector on Gigha comprises only a number of non-residential buildings such as a fire station, surgery, café, school, and a small number of hotels and B&Bs. The non-electric fuel demand we estimate for these buildings is 496 MWh p.a. which is met primarily by gas oil and a small amount of red diesel.

## 8. Industrial Consumption (where applicable)

The largest energy users in the Gigha industrial sector are the Gigha Halibut fish farm and Scottish Water site. The energy consumption for both of these is met primarily by electricity. The Scottish water site also possesses a diesel backup generator which provides 11 MWh p.a.

## 9. Transport consumption

As Gigha also has no public transport service the entire requirement of the transport sector is for a private fleet of 68 vehicles which consume approximately 35 MWh p.a. of DERV, and 82 MWh p.a. of petrol.

## 10. Cost data and expenditure

To quantify the energy expenditure, the following energy sector costs were used, based on DECC and other bodies previous works, updated for 2015:

Fuel Type	Cost / kWh
Electricity (domestic)	15.35
Electricity (commercial)	9.97
Heating Oil	6.28

Bottled gas	14.62
Wood	3.90
Diesel (tax exempt)	7.74
Coal	5.51
Petrol	15.91
DERV	16.97

- The total annual expenditure on energy across all sectors for Gigha is approximately £475,000 p.a.
- The Domestic sector energy costs are predominantly electric which costs the Gigha community £174,000 p.a.
- The Public & Commercial sector energy costs are split evenly between gas oil £26,000 p.a. and electricity £26,000 p.a with a small amount of red diesel £3,000 p.a.
- The industrial sector energy costs on Gigha are predominantly electric £115,000 p.a with a small amount of red diesel £1,000 p.a.
- The transport fuel costs on Gigha are £26,000 p.a. petrol and £20,000 p.a Derv

## 11. Assessment of the potential for fuel switching

The theoretical maximum electrifiable load on Gigha is 1 430 MWh. The target of 280 MWh p.a. can therefore be met solely through switching gas oil user in the Public & Commercial sector and kerosene users in the Domestic sector to electricity.

However, through project SMILEGOV and informed by this energy audit, there has been an exploration of a theoretical model for a Solar PV system complementing the existing windfarm, which could supply electricity directly to users through the establishment of a Community Benefit company and financed through community shares. This may impact on fuel switch on the island.

## 12. Island Community / Island background

The most southerly and the most accessible of the Inner Hebridean Islands, Gigha is due West of Glasgow and tucked between Kintyre and



the Isle of Islay. Seven miles long by a mile and a half wide, Gigha is situated three miles west of the Kintyre peninsular, less than three hours drive from the City of Glasgow. Gigha is accessible by a Caledonian McBrayne ferry, the MV Loch Ranza, which runs an hourly timetable from 8:00 to 18:00 six days a week and a reduced service on Sundays.

Historically Gigha has been claimed by several clans and was latterly owned by a succession of private owners including William Horlicks, of the malted drink fame, until the island was bought into community ownership on March 15<sup>th</sup> 2002. The largest community buyout in Scotland was aided by the Scottish Land Fund and since the buyout the island has striven to sustainably develop the land, improving the housing assets and constructing **the first community-owned, grid-connected wind farm in Scotland.**

When we took over the island in 2002 we carried out a Housing Needs survey and found that out of all our estate properties, only one was above tolerable living standard. This prompted our community to push for the most ambitious of housing improvement projects which has led to 33 houses being fully refurbished and at the time of writing this report we have the final 9 to complete. This has been a challenging project but has led to our residents having warm, affordable housing. We have also sold land to a social landlord, Fyne Homes, who have built 18 houses to rent that has allowed the population to rise from a dangerously small 99 pre-buyout to 155 currently (we reached a peak of 173 in 2009).

We have a primary school, a doctor's surgery that a local doctor visits once a week, a 24hr community nurse and an active village hall. The Scottish Fire Service has a unit on the island and we have an ambulance provided by the Scottish Ambulance Service, an HMCA Coastguard station as well as a special constable. There are no council facilities on Gigha but they do provide a waiting room / toilet facilities at the ferry slip. The council also provide a bin lorry once a week and carry out maintenance to the main road. Scottish Water has a water treatment plant that provides drinking water network for the entire island.

### 13. Island Demographics and Population

Prior to the buyout the Gigha's population was slowly dropping away as people move away for work. Back in the 1700s Gigha population was in excess of 400 and at the time of the Great War was around 250. In those days agriculture provided the bulk of employment and people were accustomed to living with extended families in the same house. Since the buyout not only has the population increased but we have seen an influx of younger families, many of whom are returning to their Gigha roots. Given contemporary domestic population density trends, it is felt that our current population to grow to around 200 before we started to hit infrastructure issues such as water provision.

#### Island Inventory

Type of Housing	Number	Sector	Main Fuels type(s)	3 Phase supply
Domestic Housing	52	Primary	Electric / Wood	N
Holiday Home – letting	9	Secondary	Electric / Oil	N
Holiday Home – private 2 <sup>nd</sup> home	7	Primary	Electric	N
Bed and Breakfast	4	Secondary	Electric / Oil	N
Farms	4	Secondary	Oil / Electric	Y
Hotel / Café	2	Secondary	Oil / Wood	N
Shops	2	Secondary	Electric	N
Aquaculture	2	Secondary	Electric	Y

### 14. Local Economy

Gigha's historical industry was agriculture and in the 1950's there were 13 operational farms – this figure is now 4 but all four are viable units, indeed 2 are growing. All farms are predominantly dairy with some beef

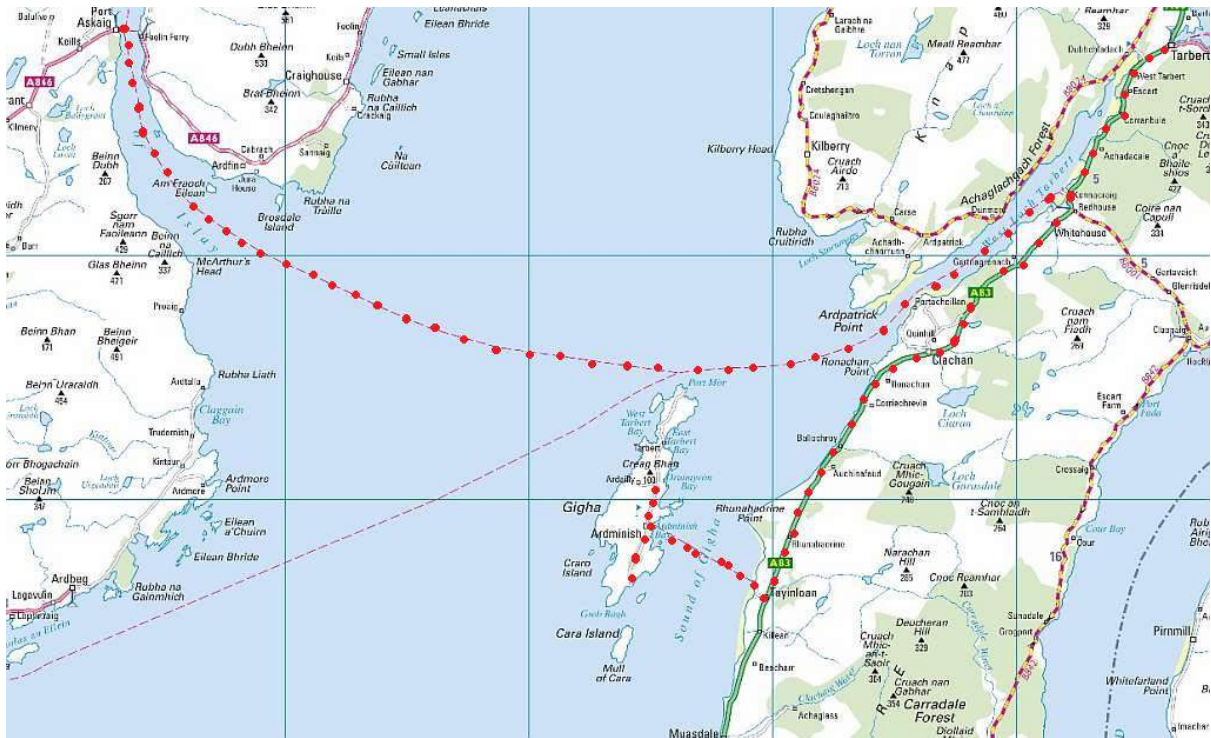
and sheep, fields are cut for silage but there is no arable as such. We have 2 large aquaculture units – Scottish Salmon Company has a large sea salmon unit with two caged sites at the north end of Gigha producing up to 2000 tonne per cycle and there is a land based PumpAshore farm at the south of the island rearing organic Halibut. We have a 1 GW community-owned wind farm at the south end of the island providing limited employment but providing invaluable income for the island. There is a community-owned hotel providing 25+ bed spaces per night and 8 self-catering cottages – there are also 2 privately let self-catering properties and 4 bed and breakfasts. One of the bed and breakfasts is Achamore House that also trades as IFER which manufacture and retail flower essences and employ several people. Calmac have 2 crews of 3 on the Loch Ranza, all local residents.

The Isle of Gigha Heritage Trust, the community company that owns and runs Gigha, employs administrative staff, a chief executive, estate workers and a head gardener.

Ardminish Stores and Post Office provides fresh groceries, newspaper, fuel and anything else you can think of and the Gigha Gallery retails arts and crafts and hosts exhibitions all year. The Boathouse Café is a seasonal restaurant providing high standard fare and seasonal employment and Gigha Boat Activity Centre is a seasonal business that provides bike and sea kayak hire from Ardminish Bay.

Many people on Gigha operate as self-employed – covering employment such as agriculture, aquaculture, gardening, IT, craft production, fishing and photography.

## 15. Appendix 1: map



## Appendix 2: Photographs





### Appendix 3: Contacts Database

Isle of Gigha Heritage Trust Fergus Waters	Craft Units Isle of Gigha Argyll PA41 7AA	Land-owner / landlord
---	---	-----------------------

01583 505390		
Argyll and Bute Council 01546 605522	Argyll and Bute Council, Kilmory, Lochgilphead, Argyll, PA31 8RT	Local Authority Body
Community Council William McSporran	10 Ardminish Gigha Argyll	
Gigha Renewable Energy Ltd 01583 505390	Craft Units Isle of Gigha Argyll PA41 7AA	Owner of 3 Vestas V27 wind farm
Gigha Green Power Ltd 01583 505390	Craft Units Isle of Gigha Argyll PA41 7AA	Owner of Enercon E33 wind farm
Gigha Halibut Alisdair Barge	Gigha Halibut Drumachro Gigha Argyll	Operator of on-shore Halibut farm
Scottish Salmon Neil Bannatyne (manager)	Highfield Gigha Argyll	Owner / operator sea fishfarm
Scottish Water Andy Clements / Andy Oliver 01583 505358	Mill Loch Isle of Gigha PA41 7AA	Water Supply Utility