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A Green Transition for the Isle of Wight

A Sustainable Local Economic Strategy realised through more Green Enterprises and Employment

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Foreword

In May 2016, a group of Isle of Wight green activists, green social investors, a number of community inspired social enterprises and a range of social and investment fund managers came together under the title of a Green Dragon Enterprise Day. The idea was simply to initiate a dialogue about the green identity of the Isle of Wight, which has a huge potential for generating energy through the sun and tides and could become a *hub* for community inspired renewable and wider green-transition opportunities. The motivation driving all the attendees was the need for quality employment for Islanders. The day was a hive of discussion, idea sharing and innovative thought which all happened within an old church that has been saved from closure by turning it into a community resource and activity centre. Nearly twelve months later, a community owned solar farm has been launched, a social enterprise is developing around making Isle of Wight increase its tourism by 40% by making it more accessible, a community action group is developing the idea of the UK's first green ice rink, and a bio-char waste management social enterprise have all moved forward. Another major outcome is this report.

The idea for the green credentials of the Island being a major driver in job creation has been around for some time. The Island has always had a strong engineering sector around marine and aviation industries which has adapted to the now significant renewable energy sector. The Danish company Vestas is a major global energy company dedicated exclusively to wind energy and Vestas have their International Innovation Centre on the Isle of Wight. The brand Eco-Island was developed, but was perhaps ahead of its time. It is a fact, though, that the Island is the sunniest location in the United Kingdom and so a good place for solar and now it is planned to have tidal turbines off its coast. As electric cars develop and the costs fall, the Island would be ideal for electric cars, buses, taxis and bicycles.

The focus on both a Green Island and on Green Jobs is consistent with Islanders taking destiny into their own hands and creating jobs for their future. This report, undertaken by the Green House Foundation with funding received from the Green European Foundation's ECOPRO project, estimates the number of jobs which could be generated through a renewable energy and wider green transition on the Isle of Wight.

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1. Introduction

This report looks at the job creation potential of the Isle of Wight's contribution to the global challenge to become environmentally sustainable: both in terms of the use of resources and in leading locally to reduce its impact on climate change.

This means transitioning from a world where the physical, social and biological assets we rely on are deemed to be there to exploit, to one where humanity is aware of its interdependence with them. It does this by assessing which of the key sectors currently presents a challenge to the Isle of Wight's long term future in a carbon-constrained world, and then proposes changes within these sectors to overcome these barriers.

This report brings together a set of job creation metrics for a range of activities across different sectors. These are then used to estimate the numbers of jobs that a green transition could create on the Isle of Wight. This is then illustrated through a number of case studies. Finally, the report outlines the next steps to implement such proposals, and discusses the possible impacts creating these jobs could have on the Isle of Wight.

1.1. Motivation – Why Green Jobs?

There are many reasons to look at challenges like Climate Change from a jobs perspective, although perhaps the starkest is unemployment. Why is society paying (both socially and economically) for people to be unproductive when there is such a massive amount of work to be done, in such a short time, in order to avoid runaway climate change? There is currently a massive opportunity not only to avoid the vast amount of future human suffering a substantial rise in global temperature is likely to cause, but at the same time to improve the quality of life of citizens, the resilience of communities, and the productive capacity of the local (and wider) economy.

There are currently a great number of structural and systemic problems with the UK economy, and a number of these are particularly prevalent on the Isle of Wight. This includes structural under-employment and unemployment. The aim of creating 'Green Jobs' on the island also aims to address the following challenges:

- Lack of skills and/or training or access/support/flexibility limits the ability of people to enter the employment market;
- Lack of career possibilities for young people;
- Lack of regular work in rural areas;
- Lack of the kind of work which employees find rewarding and believe to be socially useful;
- Lack of skilled, technical and research jobs on the Island; and
- Lack of spending in local economies (e.g. too much centralisation of contracts).

This work follows on from the work completed by The Campaign against Climate Change in its One Million Climate Jobs report [1] which proposes that a national government department should be created to employ 1 million people to implement the infrastructure transition required to avoid climate change. This report localises and broadens this proposal to create a much more detailed local strategy which should enable the Isle of Wight Council and local communities to understand the particular local opportunities such a plan presents. This report does not assume that all of the new jobs would be in the public sector, although that was an appropriate assumption for the nationally focused One Million Climate Jobs report. Looking at the jobs creation aspect from a more local viewpoint allows a much broader range of employment opportunities to be considered, and although many of them could be public or third sector jobs, some lend themselves much more to smaller local businesses, co-operatives, or other organisations.

1.2. Motivation – Localising the Climate Challenge

Globally, the remaining carbon budget for an 80% chance of avoiding a 2 degrees rise is about 628 Giga tonnes of greenhouse gas emissions, expressed as carbon dioxide (CO2e), while global emissions currently amount to around 40 Giga tonnes each year. This means the objective should be to limit the **total** emissions, as opposed to just getting emissions down to a certain level, by a certain date.

The UK's total domestic greenhouse gas emissions were 497 $MtCO_2e$ in 2015 [2] with an additional estimated 350 $MtCO_2e$ imported (2010 data) [3]. An estimated 23% of this total is non-CO_2 greenhouse gas emissions, based on 2014 figures. Overall, this accounts for around 13 tonnes CO2e/person each year. The UK is committed to reducing this total to 160 $MtCO_2e$/year by 2050. This alone requires a greater than five-fold reduction from current greenhouse gas emission levels to 1.5-2tCO2e/person, based on the government's predicted 77 million future population and current 2050 greenhouse gas emissions allowance.

In 2014 the Isle of Wight's reported CO_2 emissions were 4.2 tonnes CO_2 per person, around a third of this current consumption total (based on a total of 589 $ktCO_2e$ in 2014 and 140,000 population). This lower figure reflects the fact that the Isle of Wight currently imports lots of goods and energy, meaning a significant proportion of its emissions are emitted off the island and therefore not included in official local carbon emissions data. This report makes the case for reducing these imports alongside decarbonising the Island's own economy, which would increase the on-island employment and the associated community and local economic benefits.

However, following the Paris Climate Agreement, the government's Committee on Climate Change considered what the effect of meeting the commitment to pursue efforts to limit global warming to 1.5°C would mean. They conclude that what is required is a reduction to zero of CO_2 (and other long-lived greenhouse emissions) in the 2030s, unless technologies to remove CO_2 at scale from the atmosphere are realised – or a decade later if that is achieved [4]. A precautionary approach is for a target for CO_2 and other long-lived greenhouse gases of zero net emissions by 2030, as set out in this report. This will need to occur both for emissions on the Isle of Wight (the focus of this report) and for the carbon embedded in the wider UK and global economy.

There is also a compelling argument that because the United Kingdom and Western Europe were some of the first nations to industrialise, and therefore have some of the highest per capita historic emissions since the start of the industrial revolution, we should decarbonise sooner. Currently many countries with lower per capita historic emissions are making significantly more progress in decarbonising than the UK, which gives them an advantage when exporting low carbon technology.

1.3 Isle of Wight – Current Situation

Figure 1 shows how the direct CO_2 emissions (around 1/3 of the total noted above) are broken down by sector for the island. It does not include non-CO_2 greenhouse gas emissions, which make up around 20% of UK emissions when counted as CO_2 equivalent.

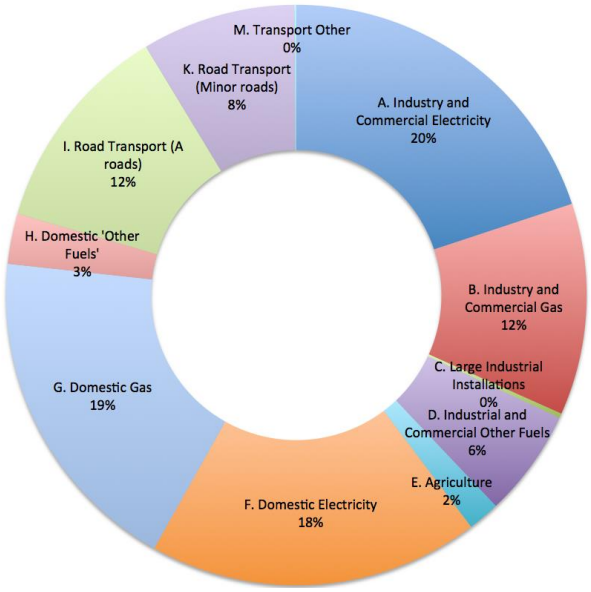


Figure 1 IoW Local Emissions in 2014 ($ktCO_2$) [44].

This shows that currently 38% of emissions arise from electricity generation, 20% from transport, and 31% from Natural Gas consumption. The remaining 11% are mainly from agriculture and 'other fuels'. The latter include wood, coal and oil used in domestic properties for domestic heating. It is assumed that a significant part of the industrial and commercial 'other fuels' could be for industrial processes. It is not clear if this includes the fuel used for the Island's ferry services.

1.4 A Vision-centred Strategy: to bring about a Different Future

This strategy does not aim to make the 'local economy stronger', which is often talked about as addressing a lack of jobs and housing or an infrastructure gap. Nor does it try and locally solve the growing austerity funding gap for council care and other frontline services. This strategy instead looks at the wider gap between these current challenges, and what a socially, environmentally and economically sustainable future looks like. This is illustrated by quantifying the scale of the transition required in terms of the employment in one specific place: the Isle of Wight.

There are constraints, and many of these are imposed from outside, by centralised power held elsewhere, but the building-blocks to create a different built environment and stronger and more sustainable economy are held locally – because it is the local community, workplaces and environment on which such a local economy will largely depend. Therefore this strategy does not start by estimating the constraints, but by setting out what is required. It is important not to be bound by history: new challenges require new ways of mobilising investment, entrepreneurial effort, ingenuity and collaboration.

Realising this strategy will allow ***all*** people to contribute and benefit – through work completed ***as well as*** the resulting shared environment. It is hoped that this strategy will inspire different people and organisations to explore new ways to work together to realise a better life not just for ourselves, but for our children's children.

1.5 Approach

As a result of the above emissions breakdown it was decided to look at transition in the following sectors:

- Renewable Energy – electricity generation
- Energy Efficient Buildings (domestic, community/public sector, commercial & industrial)
- Better Transport – improving accessibility and shared use, while reducing emissions
- Farming and Forestry – food production, wider sustainable resource use (e.g. woodland)
- Reuse and Recycling – of waste that is currently being incinerated or buried

The first three sectors are very obviously defined by the current emissions breakdown, as they together contribute the majority of the direct CO_2 emissions on the Isle of Wight. Farming and Forestry makes up a significant proportion of the remaining 11% as it includes agriculture and activities like woodland management. In terms of CO_2 emissions, it is less significant than first three sectors, but it does cover almost all of the currently unquantified non-CO_2 greenhouse gas emissions associated with land-use on the island. There is also a significant amount of energy required to create the fertilisers, pesticides and herbicides currently required by agriculture. The associated CO_2 emissions are currently not included in the IoW emissions total if they occur off the island. Finally, the focus on Reuse and Recycling aims to reduce the total amount of waste while increasing how much is reused and recycled into new products and materials locally. This will reduce the amount of goods (and hence embodied carbon) brought to the IoW and create new local (re)manufacturing jobs.

This strategy does not currently consider the large proportion of the goods purchased on the IoW that have been imported, either from the rest of the UK or from other parts of the world. As these emissions do not occur within the boundaries of the IoW they are not included in the local (direct) IoW emissions estimates.

Box 1. The Shift to More Indirect (Imports) Emissions in our Carbon Footprints

Over the last 20 years the UK has been largely assisted in reducing its emissions through in effect relocating significant emissions (and jobs) overseas. As a result the UK is increasingly reliant on imports for many of our goods, which means, as on the Isle of Wight, that much of our consumption, both in terms of resource use and carbon emissions, occurs outside of our borders.(In 2010 this was around 24% of the UK carbon footprint: contrasting data from national statistics [5]: 590.4 MtCO2e and the Government's Committee on Climate Change [6]: 775 MtCO2e.)

The UK's manufacturing sector, and heavy industry in particular, has shrunk massively over this period such that we now import the majority of the goods we buy in the shops as well as significant quantities of commercial products, vehicles and building materials. The emissions linked to this consumption are still produced, but count in other countries' carbon emissions. Also not included are the additional emissions from transporting goods both imported and exported around the world [7].

2. Modelling green jobs potential across different sectors

This section outlines the results of our modelling in terms of jobs metrics and estimation of the green jobs potential for the Isle of Wight. The assumptions supporting these numbers are set out in Annexe 2 - Jobs modelling methodology.

2.1. Jobs Metrics

Table 1 summarises the job metrics used in this report. They are conservative estimates, particularly where there is significant uncertainty. Certain rows include offsets for job losses (see notes).

	Jobs	Source	Unit Quantity	Unit Units	Jobs per Unit
Reuse & Recycling	Municipal solid waste (MSW)	FOE – More Jobs, Less Waste	1000	Tonnes	2.9
	Commercial and Industrial waste (C&I)	See Notes[4]	1000	Tonnes	1.5
	Construction and demolition waste (C&D)	See Notes[4]	1000	Tonnes	1.5
	Waste disposal (landfill and incineration jobs)	Waste Watch	1000	Tonnes	0.3
Farming & Forestry	Farming	Estimate from Scaled report into Labour intensity of farming methods	100	ha	2.1
	Woodland Management	Scaled from National Estimates from Forestry Commission	100	ha	0.3
	Timber Processing (indirect)	Forestry Commission Multiplier for induced jobs	100	ha	0.1
Energy Efficient Buildings – Retrofit	Improving energy efficiency of dwellings	Birmingham Green New Deal	1000	Dwelling/y	81.5
	Improving energy efficiency of public buildings	No Estimate	1000	m2 floor	0
	Improving energy efficiency of commercial buildings	No Estimate	1000	m2 floor	0
	Adding renewable energy to (existing) dwellings	Own Assumption	1000	m2 of Solar Thermal	40.8
	Adding renewable heat to public buildings	No Estimate	1000	m2 floor	0
	Adding renewable heat to commercial buildings	No Estimate	1000	m2 floor	0
Caretaking	Roads	No estimate	100	miles	
	Cycle Paths	No estimate	100	miles	
	Dwellings	Birmingham Green New Deal	1000	dwellings	3.1
	Public Building	No Estimate	1000	m^2 floor	
	Commercial Buildings	No Estimate	1000	m^2 floor	
Better Transport	Driving buses	From current bus miles and labour statistics produced by the ONS	1000	bus miles	0.06
	Maintaining buses	From current bus miles and labour statistics produced by the ONS	1000	bus miles	0.02
	Jobs maintaining Private Vehicles (ICE)[3]	From current vehicle and labour statistics produced by the ONS & DVLA	1000000	v-miles	0.74
	Jobs maintaining Private Vehicles (Electric)[3]	From current vehicle and labour statistics produced by the ONS & DVLA	1000000	v-miles	0.54
Renewable Energy Generation	Onshore wind construction	Per MW install per year – 1.3 Million Climate Jobs Report – Online Companion	1	MW/y	9.0
	Onshore wind maintenance	Per MW install per year – 1.3 Million Climate Jobs Report – Online Companion	1	MW	0.3
	Offshore wind construction	Per MW install per year – 1.3 Million Climate Jobs Report – Online Companion	1	MW/y	18.0
	Offshore wind maintenance	Per MW install per year – 1.3 Million Climate Jobs Report – Online Companion	1	MW	0.7
	Tidal Stream	Total[5]	1	MW	2.1
	Wave	Jobs per MW – Power to Transform the SW	1	MW	1.8
	Solar PV overall	Birmingham Green New Deal	1	MW	2.0
	Hydro (River Run)	Scotland Hydro – Install	1	MW/y	48.5
		Scotland Hydro – Maintenance	1	MW	1.3
	Anaerobic Digesters (Sewage)	Power to Transform the South West	1000	MWh/y	1.5
	Smart Grids & Energy Storage	Power to Transform the South West	1000	MWh	0.1
	Upgrading Island's Grid Interconnect	No Estimate			

Notes:
1. Assumes jobs lost in car sales are offset by new jobs car-share scheme and driving taxis/shared taxis.
2. This assumes these are 50% less jobs intensive than MSW recycling due to larger volumes.
3. For an explanation of workings see Annexe 2 - Jobs modelling methodology.

Table 1 – Shows the jobs factor estimates for each sector.

2.2. Jobs for Isle of Wight

	Job Purpose	Job Type	Units needed for 1GW Quantity	Units	Jobs /FTE	Existing Jobs	Total New Jobs Transition[1,2]	Long Term[2]
							(both relative to today)	
Reuse & Recycling	Municipal solid waste (MSW)	New	31213	Tonnes	2.9	-	46	92
	Commercial and industrial waste (C&I)	New	55048	Tonnes	1.5	-	41	81
	Demolition and construction (D&C)	New	54725	Tonnes	1.5	-	40	81
	Waste disposal (landfill and incineration jobs)	Jobs lost	140987	Tonnes	0.3	-	-21	-42
Farming & Forestry	Farming	Total	20859	100ha	2.1	1270	87	173
	Woodland Management	New	4549	100ha	0.3	-	6	12
	Timber Processing (indirect)	New	4549	100ha	0.1	-	3	5
Energy Efficient Buildings & Retrofit	Improving Energy Efficiency of Dwellings		51,085	Dwelling/y	81.5	0	320	
	Improving Energy Efficiency of Public Buildings			m^2 floor/y	No Estimate			
	Adding renewable energy to Dwellings	Construction	51,085	Dwelling/y	40.8	0	160	
	Adding renewable energy to Public Buildings			m^2 floor/y	No Estimate			
	Retrofitting Commercial Buildings	Construction	621,000	m^2 floor/y	No Estimate			
Caretaking	Roads	Maintenance backlog	unknown	per mile	No Estimate			
	Cycle Paths	Additional	unknown	per mile	No Estimate			
	Dwelling[6]	Additional	68,113	dwelling	3.1	0	107	214
	Public Building	Additional	unknown	m^2 floor	No Estimate			
	Commercial Buildings	Additional	621,000	m^2 floor	No Estimate			
Better Transport	Driving buses	Total	10,149,063	bus miles	0.06	207	206	412
	Maintaining buses ICE	Total	10,149,063	bus miles	0.02	54	54	108
	Installing electric vehicle infrastructure				No Estimate			
	Bike Maintenance & Sales				No Estimate			
	Jobs maintaining Private Vehicles (ICE)[3]	Total	2,416,444	v-miles	0.74	291	-289	2
	Jobs maintaining Private Vehicles (Electric)[3]	Total	209,804,155	v-miles	0.54	0	56	113
Renewable Energy Generation	Onshore wind	Construction	18	MW/y	9.0	-[4]	12	0[7]
	Onshore wind	Maintenance	18	MW	0.3	-[4]	3	6
	Offshore wind	Construction	300	MW/y	18.0	-[4]	415	0[7]
	Offshore wind	Maintenance	300	MW	0.7	-[4]	99	198
	Tidal Stream	Total[5]	30	MW	2.1	-[4]	32	64
	Wave	Total[5]	0	MW	1.8	-[4]	0	0
	Solar PV (roof mounted)	Total[5]	10	MW	2.0	-[4]	10	20
	Solar PV (field mounted)	Total[5]	146	MW	2.0	-[4]	143	287
	Hydro (low head: run of river schemes)	Construction	0.3	MW	48.5	0	1	0[7]
	Hydro (low head: run of river schemes)	Maintenance	0.3	MW	1.3	0	0.2	0.4
	Existing RDF/CHP plants (potential fuel conversion)	Total	1.7	MW	No Estimate			
	Anaerobic digestion (of sewage)	New		MW	No Estimate			
	Upgrading Island grid interconnector	Total		MW	No Estimate			
	Smart grids and energy storage	New[5]	1,265	GWh/y	0.1	0	127	127
	Demand reduction	0	0	0	0.0	0	20	20
					Totals	553	**1679**	**1972**

Table 2 – Shows the transition and long term jobs estimates for the Isle of Wight.

Table 2 Notes:
1. For non-construction or retrofit jobs the Transition value is the number of jobs half way through the transition (2023) assuming linear transition.
2. Transition period proposed to be between 2017 and 2030 so long-term jobs figure is for 2030+.
3. Currently assumes jobs lost in car sales are at least absorbed by additional jobs running car share scheme and driving taxis and shared taxis
4. Unknown current employment figures
5. Breakdown of construction and maintenance jobs not available
6. Based on eight hours annual maintenance needed after retrofit (from reference). 2/3 of this is assumed to be additional as some boiler maintenance will be lost.
7. Due to fixed life span of turbine you could estimate average long term FTE from replacement renewable energy installation at end of life. Currently Ignored.

Using the above metrics and data from the Isle of Wight the potential for creating new jobs in these areas was estimated. This is based on a target implementation date of 2030. The number of transition jobs (increasing up to 2030) and permanent jobs (from 2030) was estimated. This potential to create green employment is set out in table 2 above. These job totals are combined with indicative scaling factors for items such as training (see table) to give a total jobs estimate for the proposed transition. This includes both training (around 50 jobs) and supporting workers with additional needs (an estimated 50 jobs in transition, more in the longer term). This gives total net new jobs estimates, calculated half way through the transition and in 2030, of 1,780 FTE and 2,150 jobs (FTE).

Total additional Jobs per Sector	Transition (2023)	Long Term (2030)
Reuse & Recycling	106	212
Farming & Forestry	95	190
Energy Efficient Buildings – Retrofit	481	0
Caretaking	107	214
Better Transport	27	634
Renewable Energy Generation	843	701
Energy/Resource Demand Reduction	20	20
Other Jobs	101	178
Total	**1780**	**2150**

Table 3 – Summary of transition and long term jobs estimates by sector for the Isle of Wight.

2.3. Comparison with Top-Down Estimates

Assuming the population of the UK is ~70 million, then the One Million Climate Jobs [1] proposal creates around 15 jobs per 1000 people. If these jobs were equally distributed between regions based on population (which is unlikely), this would mean around 2150 additional jobs on the Isle of Wight. This happens to match the figure calculated in this report, although differences from such top-down estimates would be expected, for the following reasons among others:

- The number of jobs related to offshore renewable energy will vary across the UK
- This report's jobs estimates are probably more conservative than those of the One Million Climate Jobs. They are based on fewer generalisations, with updated metrics included wherever data has been identified, and jobs lost subtracted where identified.

- The jobs estimates in this report only cover jobs created directly in the sectors identified (there are still some data gaps). The proposals in this report will also create additional jobs elsewhere, such as in the supply chain of different sectors.

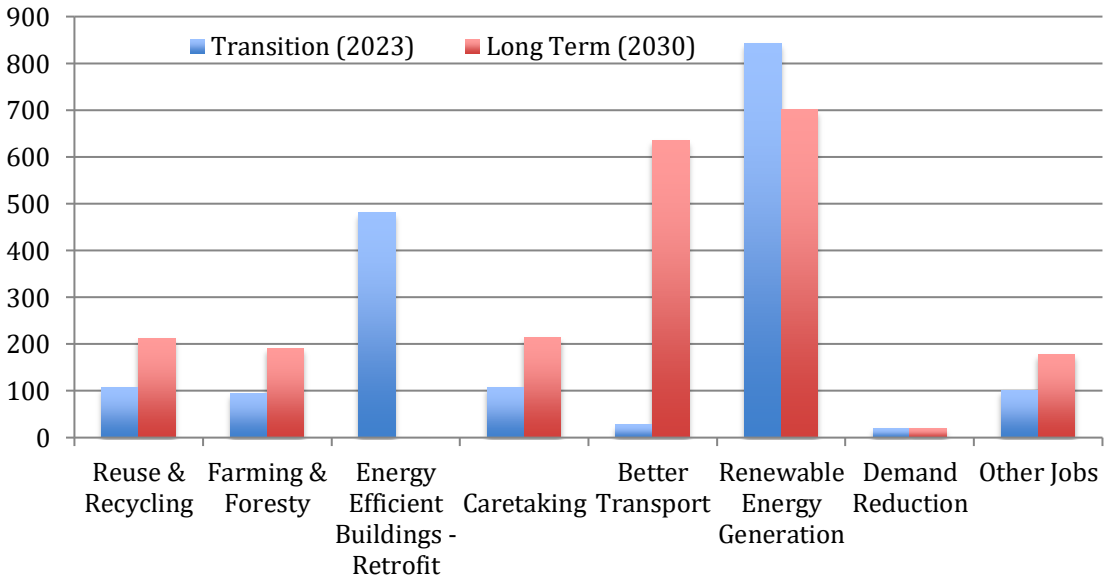
- Induced jobs across the rest of the economy, through spending into the local economy and increased localisation of the economy, have not been included.

2.4. Justification & Further Research

For the explanation of the jobs estimates above please refer to Annexe 2 - Jobs modelling methodology. This details the assumptions made and limitations to the current estimates. However, these considerations do not detract from the scale of the opportunity set out in this report. Annexe 3 - Further Work includes proposals for further research and modelling which would help improve the estimates. For example, calculation of the average and peak modelling of the Isle of Wight future energy needs to determine the amount of energy storage, grid and interconnect capacity required, and how this relates to decarbonisation of space heating and transport. This would also allow the amount of energy the IoW would need to import/export to be estimated. However, the precise future energy needs together with real labour intensity of some tasks (such as retrofitting buildings or properly maintaining infrastructure) will depend on productivity, and the reality will always differ from estimates. The opportunity to improve estimates should not be a barrier to delivering these tasks.

2.5. Summary of Potential to Create New Green Employment

A breakdown of the potential new green jobs proposed on the IoW is presented below.



Note: The 'Transition' jobs figures are those estimated at the half-way point of the transition period, which for 2017-2030 is 2023.

Figure 2 – Breakdown of new jobs potential by sector for both the Transition and Long Term.

The vast majority of the transition jobs are in retrofit of buildings and installing renewable energy. In contrast, the majority of the long-term jobs are predicted to be in better transport and renewable energy. However, these are complemented by a smaller number of jobs across a whole range of sectors, key to creating a sustainable economy on the Isle of Wight.

3. Green Jobs Case Studies

3.1. Introduction - Envisioning an Isle of Wight Green Economy

What will these ~2000 new jobs on the IoW look like? Who will be the employers? Will they be full time and well paid?

This section explores what the proposed transition could look like in a range of existing, viable enterprises and initiatives, both scaling up those already on IoW and replicating from further afield. This approach, using proven business models from the private, public and third sector, shows that this strategy is deliverable. The rest of this section highlights the possibilities and opportunities that could deliver this strategy's potential for new jobs overall, and specifically in each sector. This aims to improve the understanding of how this can achieved, what sort of changes might be expected in each sector, and how these benefits could be shared.

The changes proposed should lead to a more creative and vibrant, sustainable and resilient Isle of Wight economy, one where localisation enhances local distinctiveness and the wellbeing of local communities. This strategy should strengthen local supply chains and benefit small and medium sized enterprises. The transition jobs and long-term enterprises and new employment created will lead to more money being generated and spent locally, increasing the circular nature of the local economy.

Such a local economy, built around increased sharing of resources that reduces consumption to within an ecologically sustainable resource footprint and drastically cutting the climate impacts, is consistent with the notion of a *Circular Economy*, popularised by the Ellen MacArthur Foundation, which is based on the IoW. The new enterprises could improve the efficiency with which local assets (land, energy, vehicles, other resources) are used, reused and shared. This shift to a more ecologically sustainable island economy should also deliver wider positive social outcomes – not just in terms of improved livelihoods but in terms of community engagement and trust, as well as wider benefits returned to local communities.

In addition, development of a sustainable island energy network could be linked to significant investment to change the way the grid operates, with more supply and demand balancing done locally. This contrasts with the notion of developing more wind power in the North of England and more solar power in the South – as more energy is generated and used locally. This would represent a more *circular economy – for energy*, with more power moving around

local networks and less transmission via the (national) grid. This would require it to be feasible and cost effective to connect locally.[1]

Thus a jobs-intensive focus on enterprises that improve quality of life locally (and also globally) will lead to a shift in values, from viewing success as being something that raises levels of individual consumption and waste, to a society that makes better use of what it already has: reusing and remanufacturing not just products & materials currently thrown away but revaluing the rural economy, and seeing all members of the society as valuable – whether active or currently excluded from the economy. For example, agriculture would undergo a significant shift away from the intensive use of artificial fertilizers and pesticides towards methods which value and enhance rather than work against the natural environment. This will mean more people being employed in the rural economy, particularly in key parts of the growing season, which may necessitate more flexible working practices. Another example is an increased focus on 'caring for what we already have. This rethinking shifts from a 'throw-away' mentality to maximising financial and resource value through repairing and re-selling broken furniture and increasing reclamation from construction sites. And it means housing policy that focuses on enhancing our existing stock, utilising what is empty or in a state of disrepair, and on energy-efficient makeovers of our homes and other buildings. It would mean extending such a 'stitch in time saves nine' approach to infrastructure maintenance: filling cracks and potholes early, not wasting money as assets deteriorate to the point when they cause accidents and require far-more-expensive replacement. And caring for each other, which will be aided by more live-work communities and valuing of the public sector as well as private work done through our economy.

In a wider sense, increasing physical activity, valuing and caring for environment and community, will lead to a more healthy and caring 'circular economy': one where every person, household, community and the wider environment is also healthier and better cared for. Such a vision could also increase the synergy between greening the productive economy on the island, and the promotion of sustainable and eco-tourism, creating further employment and economic resilience.

And quality-of-life will not just be an outcome of these new jobs, but delivered through expanding livelihood options that improve the diversity of skills and employment opportunities. The intention is to ensure that where jobs are lost through more sustainable options, the skills will be transferable. Many of the existing enterprises illustrated below show how these new jobs often combine white and blue collar skillsets.

Finally, this strategy does not view 2030 as an end-point, but a target through which to plan a shift in what and how the Island economy looks like. This will have to be an evolving process which gains momentum as the complex web of connections of society are rewoven together more locally. This strategy aims to illustrate possible starting points for what will be for many a learning journey, which not just the Isle of Wight but communities and local economies across the world embark on together.

[1] Current UK legislation means that to sell that electricity from a UK home to a neighbour a supply license is required (which typically costs £500,000) to 'notionally' send the power to the power station and back, incurring costs. The argument is that someone has to pay for the transmission network.

3.2. What impact will these additional jobs have on each sector?

3.2.1. Reuse and Recycling (212 additional FTE Jobs 2030)

The major change will be a cultural shift from waste being a 'problem to be managed' to a valuable resource that can be reused, repaired and repurposed, and ultimately re-sold, re-loved or shared in different ways.

Currently IoW household waste is separated into bins for paper and cardboard, recycling and waste that is landfilled or incinerated.[2] The latter accounts for around a half of all household waste, which is just a fraction (around 1/7th) of total waste produced. This could quickly be reduced to 10% or less of the total, as is already the case in some communities in Europe. The paper and cardboard category is likely to change little (but could be processed more locally).[3] Food waste can be fed to chickens or pigs in household or community gardens, farms and allotments to minimise the amount of grain needed to feed them (grain is land intensive).[4] More items dropped off to two community recycling centres could be repurposed back into use or left for reuse or recycling. This could also work with and scale-up the reuse and recycling by community enterprises (such as the Storeroom 2010 furniture reuse charity). New initiatives could include aiming to increase 'recycling on the go' such as through setting up an exchange for a deposit refund as proposed by the Campaign for the Protection of Rural England [8]).

In the future a lot of what is currently 'recycling' will be reused or even eliminated entirely from the waste stream. This will mean that recycling will no longer be viewed as part of 'waste management'; many items that are currently collected from residents' doorsteps could be minimised as we shift away from single-use packaging towards reusable boxes (e.g. for cereal) or bottles (e.g. for milk).

This will encourage the establishment of new enterprises to extend the life of the wide range of appliances (e.g. cookers, fridge, phones, laptops, televisions etc.), furniture and many other things we use. This will reduce waste and create jobs locally, while saving the resources, including the carbon emissions and the workmanship embodied in making these products in the first place. In the past we used to invest time and money to repair, repurpose and maintain items from clocks and socks to tables and telephones. Whilst most people might not want to return to darning their socks, a transition to once again getting things repaired and modified, passing more of our unwanted items on to people who can utilise them is anticipated. There could be an associated shift from buying to renting appliances, putting the onus on manufacturers designing in reparability and building products that last longer.

The building industry notion of what constitutes good waste management could also shift to recapture the notion of salvage and reclamation, rather than low value material recovery (e.g.

[2] Food waste is sent to Basingstoke to be processed. Amey, who have a 25-year contract to manage the municipal waste, are pressing for incineration of waste on the island.
[3] Currently there are no enterprises that use recycled paper, plastic or steel on the island so most recycling is currently exported.
[4] This requires separation of meat contaminated food waste from veg only food waste and would require changes in the law to be done on a farm scale.

crushing and chipping waste), to achieve much higher value recycling and reuse (thus able to support more jobs). This means existing buildings being refurbished or carefully deconstructed rather than being demolished. And construction will focus on sustainability and reuse in a wider sense as it focuses on improving the energy performance of existing buildings and repurposing empty buildings, rather than on demolition and new-build.

This shift would benefit from wider incentives, such as to shift VAT relief from new-build housing to refurbishment to make better use of existing buildings[5]. Design and construction practices could also better utilise low carbon, local building materials and be designed for flexible repurposing and deconstruction at the end of their life.

It is also worth noting that the Island's landfill will significantly reduce in scale in future, although some landfill will probably still be needed, at least in the short-to-medium term. The Island RDF (Refuse-Derived Fuel) Energy plant could be converted to run off a different sustainable fuel source, such as using bio methane derived from sewage gas, or used for back-up power.

So, as the physical economy shifts from a linear 'take-make-break' material flow (from globally dispersed producers to consumers to being thrown away) to a circular flow of goods and services, waste jobs are likely to shift to become more service-oriented and community-based, within a locally circular, increasingly self-reliant island economy.

Box 2. Categories of Potential new Reuse and Recycling Jobs

- Firstly, additional employment collecting, sorting and processing product for reuse and recycling (sorting into different reuse/recycling/waste streams as locally as practicable); and then
- New enterprises that utilize this reclaimed product and materials, as well as maintaining and repairing consumer goods (as well as buildings and infrastructure) so that they do not go into the waste stream in the first place
- This could also include some innovation in designing new industrial and commercial practices and products that reduce or avoid the creation of waste in the first place.

3.2.2. Farming and Forestry (190 FTE Jobs 2030)

In the future the connections between the urban and rural economy, and within the rural economy itself, will be stronger. More children will grow up having seen where food comes from. This could be through an increase in urban gardening, including community agriculture projects, but also because more communities will support local employment in managing woodland and producing food (and probably energy too), and because more households may choose to have allotments and grow vegetables. Some people may be employed seasonally in agriculture, supplementing their income from other livelihoods at other times of the year.

Such an increased connection to the local environment could result in healthier eating (see 3.1, Annexe 2), with more local seasonal fruit and vegetable consumption, and potentially a reduced level of meat consumption. Cold storage on the island could be extended, powered by intermittent wind and/or solar power. There may also be changes in farming and land

[5] This could also lead to an increase in the retrofit and adaptation of existing and empty buildings as opposed to new build as a way to increase the provision of (social) housing needed on the island.

management practices. For example, livestock may shift from meat to dairy herds, and as more fields rely on organic fertiliser there will be increased crop rotation and probably an increase in the range of crops produced. We envisage the establishment of an abattoir on the island and increased milk and dairy production.[6]

More diversification as well as local consumption should lead to increased profitability (and viability) of the rural economy. This may need to be incentivised through regulations. With more of the island's production consumed locally, and increased productivity in general, the scale of imports will fall, which will reduce food miles and associated transport greenhouse gas emissions.[7] This could increase further if it is incentivised by national government.

Some of this additional work may be done through involvement across communities as well as additional people being paid on a full-time basis. In addition (although not considered in the employment estimates) there would also probably be an increase in the amount of food grown in gardens, allotments and on currently unused urban land.

Potential new jobs: farm workers and smallholders, forestry workers and countryside management, and those in the agricultural supply chain, such as processing and distributing food as well as timber and biomass.

3.2.3. Energy Efficient Buildings (446 FTE Jobs during the Transition)

The first and most obvious changes here will be in our homes: better insulated, resulting not so much in warmer houses (this has been the main impact of improved insulation and central heating over the past 40 years in the UK – increasing building performance and the average temperature in each UK home increasing by 7°C) but much lower energy use and heating bills. Fuel Poverty is a significant problem on the island with 14.9% of households on the island being affected and one of the main causes being inefficiency of both housing and heating systems [9].

More energy efficient buildings will reduce the cost of living sustainably on the IoW. This is best achieved through street-by-street retrofit programs, as trialled over the last decade prior to the failed attempt to incentivise this on a house-by-house basis by big companies through the 2010-2015 government's Green Deal programme. This should improve thermal insulation and air tightness, as well as cost-effective renewable energy installation of solar photovoltaic panels and solar thermal water heating systems. An illustration of how this could be done is included in the text box below.

[6] Currently milk from all but three dairy farms (who process and sell their milk locally) is shipped off-island for processing.

[7] This could be supported by a buy local campaign and a Made on the Island brand to maximise income generation. It could also enhance the tourist experience of visiting the IoW. A buy local campaign and Made on Island brand could both increase income generation and create jobs in the local economy. For example, the IoW is a major producer of tomatoes and the Garlic Farm is a major tourist attraction.

Box 3. Street-wide Energy Efficient Retrofit of Homes

The first stage for any street is a street survey of each house to assess the energy efficiency options and where renewable energy options are appropriate. Residents will be contacted to choose measures, consult with tenants (as appropriate) and confirm the time frame for installation. Different arrangements may be made for owner-occupied and privately rented homes. Socially rented properties may be delivered separately. (Noting that many more of these properties have already been improved to some degree, with private-rented accommodation often in the poorest condition. The New Green Deal aimed to address this disparity but its reliance on a high commercial interest rate was not attractive and it was discontinued.) In addition there could be a later retrofit process to shift properties to heat pumps (to improve efficiency of electric heating) or generating biogas (including using surplus wind energy) as an alternative to replacing the gas network where it is the main system to supply heat to buildings. This could build on pilots such as the 67 homes community retrofit by Sustainable Chale on the IoW (see chalecommunityproject.com and the Energiewende programme in Germany.

In addition, higher building standards should be established to encourage and/or require new buildings to be zero carbon (as was previously proposed for all new build housing by 2016).

A similar retrofit program should be undertaken for offices and commercial buildings, retail premises and for schools, hospitals, community buildings, the hotel and restaurant sector, and for other non-residential buildings. This programme could also provide employment to those currently unemployed outside the tourist season.

In addition to retrofitting buildings, there is an opportunity to reduce the energy used to maintain buildings and infrastructure by keeping these in better repair. For example, fixing a pothole early could prevent the condition of the road deteriorating so much that far more carbon (and cost) intensive road reconstruction or resurfacing is required. Better stewardship of the built environment, as well as of the natural environment (noted under Food and Farming above), will increase employment and save future capital expenditure requirements.

Potential new jobs: insulation fitter, renewable energy (e.g. solar PV/solar thermal) community retrofit surveyor/architect/managers, building maintenance engineers, caretakers, local highway/infrastructure maintenance personnel.

3.2.4. Renewable Energy (701 FTE Jobs 2030)

This strategy builds on the earlier Eco-Island target to make the Isle of Wight self-sufficient through scaling up renewable energy. Even with the scale of changes suggested above (notably for transport and building retrofit) there will still be a significant (albeit reduced) overall energy demand, and likely increased electricity demand on the IoW. Therefore, shifting to a 100% renewable energy supply network will be crucial to decarbonising the IoW economy. This will also require changes to upgrade and alter the electricity network to accommodate more localised electricity generation as well as to enable load balancing between different locations.

Visible changes will include a significant expansion of PV panels widely deployed on roofs. In the medium-term, with grid connection and/or storage investment secured, solar

installations should be able to progress without a subsidy, assuming PV capital costs continue to fall, electricity prices rise and the cost of money is unchanged.

There is potential to include the installation of micro hydroelectricity plants in small rivers around the island and some onshore wind in the generation mix. In addition, there is likely to be some heat generated from biomass and anaerobic digestion (AD) of sewage and on farms. An AD plant could feed into, and help to green, the IoW gas network. This could be complemented by surplus peak generation capacity from intermittent renewable generation (i.e. solar, wind, tidal, etc.) being utilised to generate gas for fuel and heating, thus smoothing the balance between electricity supply and demand.

These changes will enable the IoW to at least meet its energy needs from renewable sources. However, for it to become zero carbon it must phase out its reliance on fossil fuel generation plants (including off-island), so that the renewables provide for an increased sustainability as opposed to increased scale of energy supply.

However, many renewable energy resources (wind, tidal and solar) are intermittent. Therefore it is likely that the island's interconnector to the national grid will need to be upgraded and supplemented by short-term energy storage. This would include conversion of the existing IoW incinerator to run off sustainable fuels, and investigating the co-location of eco-enterprises (or greenhouses) to utilise the waste heat from this plant (and from AD plants). One example of short-term energy storage is to generate hydrogen or ethanol, using surplus electricity, which can be stored and used to generate electricity at other times, or used to make industrial products such as ammonia. Hydrogen generated in this way could also be used to power rural buses and emergency service vehicles. Additional energy storage could take the form of battery banks (in homes, vehicles and/or in industry). However, the most cost effective solution will also involve changing how energy is consumed. For example, automatic control of non-time-sensitive activities like charging electric vehicles, making hydrogen, heating home hot water tanks or storage heaters could be timed to occur when there is surplus generation capacity.

Potential new jobs: Wind/Tidal/PV farm managers/technicians and engineers/community liaison and planners, crane driver, marine biologist. surveyor, various engineering roles in electrical generation, storage, balancing etc.

3.2.5. Better Transport (634 FTE Jobs 2030)

UK transport emissions have hardly changed since 1990, lagging behind all other sectors in the UK – because transport continues to expand and to be highly dependent on burning fossil fuels, as highlighted in the Figure below.

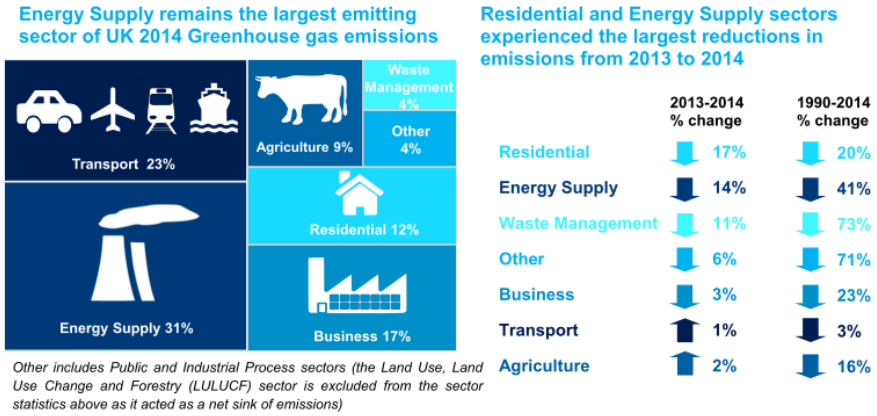


Figure 3. Infographic of UK Carbon Emissions in 2014. Source: [5] infographic.

The scale of reduction of greenhouse gas emissions required globally (as well as legislated already by the UK government) will require a shift to public transport and increased accessibility (enabling non-motorised transport) as well as new fuel sources to replace diesel and petrol (e.g. electric vehicles).

The first noticeable change could be expansion of ***public transport*** provision to provide a day-to-day alternative to driving – both through increased frequency on existing routes (extending the current service which is mainly hourly, during the daytime), and new routes, connecting different parts of the island. This will include rolling-out new electric and hydrogen buses. Every community should have a regular service to key amenities (shops, work places, hospital, ferry terminal), including at off-peak times. Some routes may use a "bus-taxi" or similar alternative, to avoid low occupancy on large vehicles, particularly outside of the train route from Ryde to the Bay Area. An increase in car share or similar schemes will also add flexibility. Taxis (including shared taxis) may also play an increased role, especially outside peak times. Some rural communities will still rely on private vehicles, but possibly in a more communal way, to increase vehicle utilisation.

In addition, there will be ***significant changes to the vehicles used***. It may be appropriate to replace buses in urban areas with trams or trolley buses so they can run directly off the electricity grid. Where this isn't viable (e.g. more rural routes), buses could still be electrically powered, but will store energy on-board, such as using batteries, capacitors or hydrogen. Private vehicles, vans, minibuses are likely also to be a mix of electric vehicles (EVs) and hydrogen vehicles in the future. Smaller buses (like the earlier smaller 20-seater Wight buses) and 'bus-taxis' might provide a more flexible model than large vehicles, particularly for rural routes. There could be a network of electric cars for an extensive car-share (for residents) and rental (for visitors) scheme.

These two changes will both reduce the amount of energy used for transport. Modal shift from private to public and active transport will reduce the energy use in fuel per passenger-km. Also, the shift to electric vehicles will increase energy efficiency, particularly in urban settings.[8] The transitions in type of vehicles and from private car to increased public transport

[8] The efficiency of electric vehicles (relative to using internal combustion engines) is higher due to their use of regenerative braking. This is particularly the case in urban driving due to its stop-start nature.

are likely to occur together. Initially, this could be through promoting the idea of 'our second car is now an electric second car - or electric bicycle' alongside promoting improved provision and use of public transport.

Agricultural vehicles and machines will probably remain internal combustion engine driven, but should use bio fuels grown onsite, chip fat oil or hydrogen as fuel. Heavy goods vehicles use significant quantities of fuel per mile. They could also shift to using hydrogen or bio fuels, as well as reducing the tonnage transported and distance travelled. More long-distance freight could, in future, travel by rail to/from Southampton or Portsmouth before goods are imported to or exported from the IoW.

There will also be a very ***visible transition*** of the island's road networks, particularly in urban areas. Fewer lines of parked cars, more pedestrianised roads and segregated cycle lanes, fewer multi story car parks, and electric charging points displacing petrol stations in the longer term. More roads (especially in urban areas) might be prioritised for buses and bikes only. This should allow wider pavements, and with few non-electric vehicles passing by, streets should be quieter with clearer air, improving the quality-of-life and health of residents.

Electric bikes could be a viable initiative focused on the aim of having a healthy and mobile older population on the IoW. Promotion of e-bikes could have greater uptake than cycling alone. Also, as e-bikes can progress at a more steady speed of up to 15mph[9] (including up hills), they are likely to have a smaller traffic impact.

The promotion of cycling and e-biking could be supported by a campaign to reduce speeds on minor roads. Currently some people are dissuaded from cycling or walking by the fear of vehicles. Jersey has a 40mph blanket speed limit across the island. A dual campaign of *'20's plenty'* in urban areas, combined with a *'40's fine'* speed limit in rural areas of the IoW would improve both pedestrian and cycle safety and uptake.

These changes would be supported by an investment in ***cycling infrastructure*** on the IoW: better utilising some of the IoW's dense network of footpaths and bridleways, and creating an effective cycle network to link together the major conurbations (as the rail network did historically). This could complement the focus on the railway initiatives of the IoW's 'transport partnership group'. New longer distance routes could complement existing ones, such as the Cowes – Newport - Sandown link:

- Freshwater to Newport could (mainly) utilise an old railway link but has outstanding right-of-way issues, so might need diversions, at least initially.
- SE Wight (Ventnor, Shanklin etc.) has significant summer employment, and associated day and shift-work commuting, much of which is relatively short distances. This area could benefit from a good local (cycle) network.

Together these elements could be brought together into an overarching cycle strategy for the island.

[9] Manufacturers are required to restrict the top speed to 15mph by law.

Finally, transport should be changed to become more ***accessible***. Improving accessibility of transport for the IoW's indigenous population is estimated as having the potential to improve tourism by 14%.[10] Reducing transport needs would also mean more community needs being met locally, thus increasing the viability of enterprises such as the 'local' pub, corner/village shop, or community centre (which could host different local enterprises). Increasing the utilisation of these 'final mile' services will increase community wellbeing. The proposed jobs (above and below) should be located as far as practicable to meet local employment need, maximising the opportunities for 'live-work communities'. Such re-localisation could also support the use of mobility vehicles along the lines of the Buxton Transport Scheme.

Potential new jobs: bus driver, taxi driver, car/bus share scheme manager, bus maintenance technician, road/cycle way maintenance worker, road layout planner.

3.2.6. Other Jobs (131 FTE Jobs 2030)

Whether, how fast and how well the transition is implemented depends heavily on these jobs. Some of the skills needed might require new training, both to train workers in these new skill areas but also to support new enterprises to start-up. For those who require some adjustment to participate in the work place, whether due to disability, dependent children, mental health or any other reason, there will also be jobs facilitating these people's contributions.

The Isle of Wight has a significant number of people unemployed, on disability benefits or low income, and with low or no qualifications. There is a need for 'stepping stone' training that enables this group to aspire to, and then secure, skilled employment. The IoW is also ageing demographically. This presents an opportunity for adults over fifty to be helped to retrain or to update existing skills to enable them to fully participate in new skilled job creation.

Also, such a green transition requires that the vital community services already provided by local councils and the public sector continue and expand. Thus, this plan is an addition, not an alternative strategy, to the full range of public sector and community services required to sustain a high quality of life for all. As this strategy enables the economy to localise, opportunities to improve the way society cares for all people, in ways that live within environmental limits, should increase. But these are in addition to the opportunities in this plan. For example, while energy-efficiency retrofitting will reduce the running costs of homes, it is not a substitute for ensuring that the mix of housing provided includes sufficient housing that is affordable for all residents. Therefore, this plan needs to work alongside ensuring that local councils and other public services are provided for and properly funded by central government[11]. This approach could work alongside the IW town and parish councils and IWCC, as the former are increasingly taking over services cut by IWCC and these very localised authorities could invest in local initiatives in partnership with their communities.

Potential new jobs: trainers, innovation support, community organiser, support worker, volunteer coordinator, workplace supervisor/trainer/mentor.

[10] Jan Brookes, Green Dragon Enterprise Day, Aspire Centre, Ryde, May 2016.
[11] In reality the IoW is facing significant cuts, both for the council and also for the NHS. The IWCC is planning to make £20m of cuts by 2020 to balance its books.

3.3. Case studies

The table below is for illustrative purposes, aiming to signpost the types of enterprises that could enable this green economic strategy to be realised.

Reuse & Recycling	**IoW**: Biomass projects, Men in Sheds (combine repair with addressing social isolation – could extend to divert more waste from landfill) **UK**: Bristol Bike Project, Deconstruction. **Worldwide**: Habitat for Humanity Restores (USA)
Food, Land Management & Forestry	**UK**: Community Farm (Southampton, Stroud and other case studies), Abundant Earth (Durham), Steward Community Woodland, Permaculture Association (various case studies)
The Built Environment	**IoW**: Eco Island Project (Building Centre), Chale Community Project, Footprint Trust fuel poverty outreach programme. **UK**: Kirklees Warm Zone, Energy Retrofit (e.g. Wandsworth),
Better Transport	**IoW**: Eco-Island Hydrogen Refuelling, IoW Authorities Sustainable Transport, **IoW: Co-wheels (Car Club)** **UK**: NGT Leeds Rejected Trolley Buses, Bio-diesel and electric buses (Brighton – Community Owned, Milton Keynes, London), Brixton Cycle, Cycle Training UK. GO-OP (Public Transport Co-op), Bike Co-op (Oxford), Car Share Co-op (e.g. Cambridge Lift-Share), Electric Bike Share Co-op, Hydrogen Buses Aberdeen, Worldwide: Trolley Buses (Trolley-project.eu, Seattle, Beijing, Mountreux, Schaffhausen), HyTrEc (Europe), Worldwide: Ampere - Norway (Electric-Powered Car Ferry), Green City Ferries - Sweden (Electric Passenger Ferries)
Renewable Energy Generation	**IoW**: Perpetus Tidal Energy, Wight Community Energy **UK**: Hydro Coop (Scotland, Wales), Wind Power Support (Grimsby), Powerstar, Energy Coop (Brighton, Aberdeen, Somerset, Bath, Hackney, Scotland), Wind Farm Coop (Boyndie), Community Scale AD **Worldwide**: Evergreen Cooperatives (USA)
Community/ Other	**UK/Worldwide**: Green business and enterprise parks/zones - Working families – Case Studies, Transitions London – Case Studies, Local Currencies (various): potential to replicate on IoW to support local economy **IoW:** Community-ownership of assets already/proposed - community swimming pool in Ryde, ice rink (proposed) Strong communities: create case studies of existing community strength on IoW, to build on, as starting points. Eco-tourism initiatives, working with existing businesses to create more sustainable and accessible tourism on the IoW. **IoW**: Potential to create local alternatives to AirBnB, taxi service collective.

Table 4 Green Enterprise Case Studies

Other case studies will relate to the type of business models required, such as: skills and innovation hub, supported workplaces and enabling back to work, the role for architects, stewardship 'caretaker' roles and wider strategies linking green jobs to a more caring society.

4. The Next Steps

How would these jobs be created on the Isle of Wight? What would need to change? What work would need doing? How could these new activities be financed, including support for new enterprises to start-up where this activity is entirely new?

This report is not a complete transition plan for the Isle of Wight to become sustainable. This report does however highlight that such a project requires strategic planning – from enabling the desired transport modal shift to reducing building heating needs and expediting renewable energy provision.

4.1. Strategic Plans for Different Sectors

One approach to implementing this plan could be to produce a specific implementation plan for each sector. Potential elements of such plans are set out in the table below.

Such plans should be created collaboratively with communities and interested parties (including residents and existing businesses and other stakeholders) across the IoW. Producing these plans need not delay action, but could improve collaboration in ways that address potential barriers to progress and help secure the required resources and investment.

IoW Retrofit-for –the-Future Plan	• Separate plans for different building types (e.g. retail, hotel/leisure sector, homes (private, social, owner-occupied), community buildings, offices, industrial areas, care/residential homes. • Baseline assessment of how these vary, including geographically, and categorise according to scale/type of retrofit required. Prioritise them. • Identify funding sources. Prepare plan, identify leadership. Consult on strategy, including to secure support. • Shortlist potential key delivery organisations, identify training needs.
Renewable Energy Plan	• Strategic plan to set out strategy to ensure sufficient capacity provided. • Identify all potential sites for each renewable resource and explore issues that each site/project might face. • Consult on provisional plan, to agree a preferred plan of where schemes would be preferred to be located, and to enable financial support (and benefits) to be secured. • Explore incentives/regulations to encourage schemes to align with plan.
Sustainable Transport Plan	• Baseline of current transport use, start-end destinations, potential support/appetite for modal shift. • Assess the vehicle and infrastructure that need building. • Assess which existing public transport routes could sustain extra capacity/ more regular services, and which additional routes have best potential to be viable, what accessibility needs of more isolated/ rural communities. • Strategies to improve accessibility, particularly in urban areas and in planning housing to better match (live/work) current/future employment plans. • Review different technical and financing options for providing transport services (e.g. EV bus/ Hydrogen bus/Trolley Bus/Tram/Ultra Capacitor Bus). • Plan for supporting measures to promote required behavioural change.
Rural Economy and Sustainable Natural Resource Use Strategy	• Assess all the land on the island and identify opportunities to improve sustainability of land/resource use, review potential use of vacant plots • Identify opportunities to improve urban land use (planting, etc.) • Identify potential sites for wood processing facilities, community-growing projects and localised food processing facilities. • Engage with farming/countryside stakeholders to review opportunities to develop strategy for transitioning away from chemical fertilisers, pesticides and herbicides with end objective to improve the quality of the soil • Propose measures required to trigger the behavioural change required in terms of buying locally, diet and time spent growing your own.
Zero Waste Strategy	• Baseline assessment of the current waste streams on the island • Assess extent to which these can be reduced and then propose targets based on EU best practice, together with measures to support new/ scale reuse/recycling etc. enterprises/initiatives. • Strategy to improve waste segregation across all sectors (including by public, private and community sector - e.g. deposit refund scheme). • Better reuse and recycling collection points, recycling facilities, repair hubs, and material storage depots need to be agreed, allocated and initiated. • Identify potential sites for processing/reusing/remanufacturing etc. • Plan to limit transport needs but maximise overall (embodied) CO2 savings.
Green Enterprise Development Strategy	The IoW Community Action (island-wide voluntary sector organisation) already has a number of social enterprises such as Riverside Centre, local Post Offices and a bakery. This could be the starting point for an island-wide community initiative development unit and community investment fund. The IW could access finance through the increasing number of UK community investment funds, such as Big Issue Invest. The Green Dragon's Enterprise Day in May 2016 showcased some potential and existing local initiatives. Existing case studies include: • Bridge (led by Richmond Fellowship) is a proposed social business innovation hub that will support people with mental health issues to develop new enterprises that will benefit the community and create employment. • Aspire in Ryde is a local community innovation centre that has been converted from a disused church (initiatives include recycling paint and old bikes).

Table 5 Indicative Plans for Different Sectors

4.2. A Southern Powerhouse: Securing the Resources and Investment Required

The Isle of Wight could be a 'Southern Powerhouse': a strengthened economy that drives the transition to a sustainable island, largely on the back of the power of the sun. Reduced fossil fuel dependency will be matched by increased renewable-powered electricity, innovation and entrepreneurship as well as grid capacity (interconnector) and/or energy storage solutions. Energy infrastructure will underpin the shift to a circular economy – as a vision not just for energy and resource use, but for the way the future Isle of Wight economy is sustained.

This strategy aims to create new jobs that improve 'quality of life' while providing a decent, at least a living, wage. Improving wellbeing and earnings will help encourage more Islanders to choose to stay on the island. This strategy also targets the '*greypreneurs*': encouraging the over 50's to start second careers using their financial and mental resources, which will help the IoW to better provide for future generations[12].

In many cases, creating new employment will require supporting opportunities for new organisations and initiatives: whether new businesses, social enterprises and co-ops, public sector operations or not-for-profit or community charities or community-benefit organisations. Also, this strategy for a new green transition, and the additional employment this generates, should be reflected in strategic economic plans and in the IoW Local Plan.

We propose that this could be coordinated through a **green enterprise innovation hub**, linked to relevant departments at Portsmouth, Bournemouth (including a link to National Coastal Tourism Academy) and (renewables and energy storage expertise) Southampton Universities. It could also be supported by identifying specific locations for these new enterprises to flourish. This could be linked to low-cost start-up/ community-benefit and innovation units within existing or new **green enterprise areas** (see box below).

Box 4. Proposal – Establish Green Enterprise Areas on IoW

The IWCC has established a Regeneration Unit and has designated Regeneration Areas with sites allocated for business development, growth and employment creation. One of these could be designated a green enterprise area. A working group could be established to bring together green entrepreneurs and investment funds interested in sustainable and ethical investment to develop a business model focused on a model site. This could lead the island to be a 'green beacon hub' for the UK. It could also act as a site to establish local production clusters that demonstrate a circular eco-friendly economy.

Ryde East could be a good potential location, as this is the largest populated area and has the highest levels of deprivation on the Island, with wards in the UK top 10 of deprived wards. There is also a large housing development proposed here, so a green innovation centre could work to support upskilling to deliver more sustainable construction alternatives.

[12] This could link to the island-wide Ageing Better Programme led by Age UK IW, and funded by Big Lottery. This includes an entrepreneur scheme for older adults.

This could be linked to the IoW 'Tech Island Initiative', which aims to create more high technology jobs on the island, and is supported by the RSA and the Chamber of Commerce through their economic advisory committee. This initiative aims to build a process that enables entrepreneurship to thrive.

This would support the continuation of the island's longstanding tradition of toolmakers, engineers and engineering. This includes GKN and BAE systems, which have developed strong expertise in composites on the IoW, and continues with companies such as IFPL, Vestas and Gurit, who are recruiting many of their higher skilled staff from beyond the IoW. This reflects a national skills shortage for some of the higher skilled roles and is compounded by some mid-career workers not choosing to start a family on the IoW.

Increasing the attractiveness of the overall (green) island economy, as well as local training, will enable more workers to be provided locally. For example, a recent job's fair at the Vestas R&D plant and Vestas MHI plant13 sought seventy new semi and high-skilled (but not degree trained) shop floor jobs.

An innovation centre would link the 'best location for upskilling' to where the subsequent jobs are provided. An example of this concept is the innovation centre attached to Nottingham's state of the art hospital, which is considered the best place to be trained, thus providing the expertise the hospital needs. This would build on the existing Vestas Innovation Centre on the IoW and link to the wider supply chain this supports, such as Gurit, an IoW based firm that makes epoxy resins used in wind turbine blades, and other initiatives such as Whippingham, an IoW council building operating as a composite centre.

New green transition initiatives could be linked with initiatives from the public sector, local communities or entrepreneurs. Progressing many of these initiatives will require investment, skills, finance and /or premises to be secured. For example through:

- **Community-led and Private-led initiatives,** including through community share issues (e.g. by co-operative or community benefit societies) and other community funded projects (including assets purchase). This might benefit from public coordination to assist in allocation of sites to reduce start-up costs/risks (e.g. new green enterprise areas). These could be delivered jointly with communities and/or the public sector. Funding could be sought from existing and new green investor links including Big Issue Invest, Triodos Bank, Wight Community Energy, and through engagement with the IoW Chamber of Commerce (see box below).

Box 5. Wight Community Energy (iowcommunityenergy.org)

Wight Community Energy is a solar farm owned by local community investors. The plan is to eventually establish a community investment fund from profits to tackle issues such as local fuel poverty. The initiative aims to secure investment from local people with investment resources to invest on the island, and to provide an equitable return. There is an increasing number of older adults retiring to the IoW that have investment capital, which such initiatives can utilise.

[13] This is a joint venture between Vestas and Mitsubishi Industry manufactures turbine blades.

- **Public sector-led schemes**, which could target local economic sustainability through council service provision. This should target infrastructure needs (e.g. electricity charging points) and coordinate activities that will be more efficient if planned (e.g. rooftop solar PV). Such initiatives could be supported through schemes such as the Solent Local Enterprise Partnership (LEP) and government departments (e.g. DCLG's current community economic development fund and BEIS) and (at least for now) the EU. This may include opportunities associated with political devolution plans.

- **Different (procurement) approaches and funding from the council**. For example:

    - new targets and jobs for reuse and recycling may require the waste management contract to be renegotiated.

    - expansion of bus travel will depend on subsidy for those with disability and care needs and older people, which may require both council and government support.

- **Changes to local and national funding priorities**, as set out in the box below.

Box 6. Changing Incentives (and removing Perverse Incentives) to fund green jobs

Some of the biggest externalities are around fossil fuels and farming subsidies and the hidden costs of air pollution and climate change:

- **Fossil fuel subsidies** in the UK were estimated at £650m in 2013/14 [1]. If this was redirected to fund a green transition across the UK this would represent an additional £1.3m each year for the IoW.
- Recent cuts to **Feed-in-Tariffs** have reduced viability for new renewable schemes.
- If **farming subsidies** encouraged sustainable farming practices (as set out here) rather than mainly accruing to landowners they could increase incentives for sustainable land-use and a stronger rural economy.
- If the principal producers of **air pollution** were taxed according to associated health impacts, this could improve public health, NHS finances and fund better transport solutions.
- Transport infrastructure funding reflects a **perverse incentive** towards large over local schemes. More funding goes to large schemes (with a lower ROI) to make it easier to travel further, rather than local schemes that improve accessibility and road safety and have better sustainability, job and local economic outcomes.

This requires a change in approach to investment:

- **Making decisions that include all externalities** (e.g. the social cost of structural under/unemployment, mental health and exclusion, the environmental cost of waste, air pollution and climate change, wider social return on investment) will change what is the economically 'best' option in many cases. This may require different economic tools, or different overall strategies;
- **Making longer-term decisions**. Many of the opportunities presented in this plan tend to be longer-term, and are better value when viewed in that way; and
- **Different incentives, regulations and initiatives** to better utilise existing sites or buildings – including by local government and national government departments. (This should better prioritise investment to improve social and environmental sustainability – these should be the options that deliver the highest financial return.)

4.3. Business Models

The strategy will be constructed from the various business models that underpin the new jobs required across various sectors, both within new and existing enterprises:

- **Transition.** Some may be delivered by existing businesses expanding or transitioning into new services. For example, some car mechanics may diversify into electric vehicles or shift to maintaining the additional public transport vehicles. As the original Lucas Plan [10] shows, workforces, if given enough warning, can come up with their own plan for making use of their skills and experiences after their original primary business starts disappearing.

- **New.** Some of the new enterprises are relatively small and simple, and may be replicated in different communities. Others will be larger and complicated, operating at a larger scale. Some might be initiated and/or run by communities or entrepreneurs, while others may be better facilitated by the public sector.

- **Build on Existing (Vestas+).** This strategy sits alongside that of building on the strategic importance of Vestas, not just as a nationally important renewable energy

centre of excellence and manufacturing, but a centre for technical excellence on the IoW.

Further work will enable this outline strategy to be better quantified (as set out in this section and Annexe 3) and enable investment and resources to be secured, including the upskilling required to support new enterprises and initiatives.

4.4. Supporting the Transition

It would be wrong to assume that the ideal employees for all the employment opportunities set out above are currently underemployed or unemployed on the Isle of Wight. This means that the total number of jobs created will be higher, for at least three reasons:

- **Training and Upskilling.** There will be a significant amount of upskilling and retraining required to support the creation of these new jobs, which will create new job opportunities in its own right.

- **Part-time and Flexible Working.** Not all of those seeking new work on the IoW will want full time positions. However, the job estimates in this report are based on well paid, full time jobs. Therefore, the total number of people employed will be higher than the 'full time equivalent' number of jobs proposed in this strategy.

- **Supported Working and Coordination Roles.** Some of those able to work will have disabilities or other support needs. Similarly, some areas assumed to be conducted by volunteers (e.g. some fruit and vegetable production) will require paid coordinators.

- **Community engagement support, especially to support vulnerable residents.** Supporting residents through guidance, assistance and information towards more sustainable living will also help move households out of fuel poverty. An example of this is the current fuel poverty programme of the Footprint Trust, which could be extended to cover the whole island. Similar assistance could be provided to support the shift to sustainable transport and to promote local and sustainable food options. At least twenty jobs are envisaged in this area, in addition to support through the IoW council.

This will result in some additional jobs also being created. Some of these are set out below.

Training. Significant (re)training will be required to enable all of the jobs proposed to be filled. This strategy will require increased Skills Agency funding and support for adult education (for which all funding has recently been cut on the IoW). This will support the upskilling and increase the diversity of IoW employment opportunities from the current focus on low education level job creation on the island. This is expected to require a total of around 50 new jobs.

Supporting Volunteers and workers with access needs. There is much evidence that sets out that many people who could contribute through work are often excluded from the workplace. This includes:

- **Older people.** Many older adults, over 50 and 60, who could be brought back into the skilled jobs market.

- **Those with mental health issues and disability.** Around 5000 (1 in 50) of the IoW working age population are receiving disability benefit, of whom around 2500 have mental health issues. This represents a high level of people excluded from work, who require skills and support for their rehabilitation.

- **Veterans.** The IoW has the highest recruitment rate for long-term service into the UK's armed forces. This includes significant recruitment to the Navy (higher than from Portsmouth). There is an opportunity for rehabilitation, to re-utilise the skills of these veterans.

This represents a significant loss of wellbeing and productivity. This may be because the different support needs of individuals are not always accommodated, which in some cases might require additional training (including in basic literacy and numeracy), interim or ongoing support, and in some cases more flexible hours or other measures to allow them to participate in work. While this might mean lower efficiency of some activities in terms of person hours required for some tasks, it opens up employment opportunities to many who do not currently have this opportunity, which will improve the quality of life of these individuals, and create a stronger, better society as a result. This increase in employment might be partially met with a reduced pressure on NHS or welfare services – which is not currently reflected in the employment estimate in this report[14].

This report has therefore assumed a 30% uplift for 10% of the jobs during transition and a 30% uplift for 20% of estimated long-term employment opportunities to reflect additional support requirements needed to open up these employment opportunities to more people.

Coordinators, Managers and Administrators. Many of the jobs proposed require new enterprises and work streams to be created: they are not just 'more of the same' in existing workplaces. Therefore these jobs will need to be initiated, championed, planned, innovated, coordinated, and supported with facilities and legal and financial agreements for these different projects to take-off. This will include new managers and volunteer support from communities. In may include veterans and '*greypreneurs*', many of whom will have previously worked as engineers on the island. This report has not included these jobs as it would be hard to quantify, and as many enterprises may be small in size this might be included in the overall job estimates. A key challenge is to share ownership of this strategy and bring it about.

[14] Locally the "My Life A Full Life" initiative is jointly led by the NHS and council, focusing on well-being (mental and physical). It aims to upskill local people and drive up local incomes, and recognises the needs for a synergy between job creation and well-being. This could improve quality of life through connections to nature and a more healthy lifestyle for both residents and tourists.

4.5. Making it Happen

This plan outlines what is possible. What happens will be the result of the choices made collectively: in communities, by the Isle of Wight's council, by existing businesses and other organisations, as well as by new ventures and enterprises.

This plan is therefore just a starting point, but hopefully it will assist in kick-starting the real impetus in the Isle of Wight's communities to bring this about.

5. Overall Conclusion and Recommendations

This report highlights that a transition towards a green economy on the Isle of Wight has the potential to create a significant number of jobs both during the transition and in the long term. The jobs estimates are likely to be under-estimates, and may also produce further knock-on employment both through supply chains and as these jobs strengthen the local economy. The new jobs created will address a direct social need for better employment prospects while enabling the IoW to respond to the challenge of avoiding dangerous climate change. In addition, the proposed green transition will create many volunteering and training opportunities on the island.

Delivering the green transition will require significant investment and the desire and leadership to bring about this change in new and existing enterprises. The scale of the challenge will require real leadership and long-term thinking from local government, key businesses, new entrepreneurs, and those enabling the investment, resources and skills needed to be provided.

Replicating such a transition across the UK would start to tackle the UK's trade deficit and represent a significant shift from London and city-centred infrastructure-led growth in consumption and inequality to a jobs-rich transition to more sustainable local and sub-regional economies across the UK. This will be driven by the creation of circular economies, where embodied carbon is better retained through repairers, recyclers and caretakers, and overall energy and resource demand reduced; and it will be driven by renewable energy, with more local food and materials sourced from more sustainable land management. It means a shift from infrastructure investment dominated by the transport sector to investing in renewable energy and the 'circular economy'. It also requires a shift from expanding the built environment to improving the quality and energy efficiency of that which exists already.

All in all, this proposal represents a significant and much need change in direction from the current path the Island is on. This is part of the globally required shift from development that 'harnesses the power of nature for the use and will of mankind' to increasingly human-scale production that enables communities to live well within environmental limits. Enterprises may be more cost-effective because they are clustered locally, rather than scaled regionally. To achieve this transition requires leadership in making this a reality in as many locations as possible. This strategy sets out the opportunity for the Isle of Wight to join those already showing that another future is not just possible, but is being created now.

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Annexe 1 – Modelling Spreadsheet

The table below summarises the calculation sheets of the Local Jobs Calculator which was created for this report. This was used to select generic job intensities metrics, and then to produce the estimates of potential new jobs on the Isle of Wight included in this report. The table also contains descriptions of the purpose of each sheet. For further details please contact <info@greenhousethinktank.org >.

Sheet Name	Category	Description
Jobs per Unit Summary	Generic	Summary of all job metrics for all sectors.
Waste Jobs Model	Generic	Calculation of jobs per amount of waste.
Transport Jobs Modelling	Generic	Calculation of jobs per vehicle and bus mile.
IoW Scaling Summary	IoW	Summary of all jobs created on the Isle of Wight, both for the transition as well as the long term.
IoW Waste	IoW	Data and calculation on waste and recycling demand on the Isle of Wight
IoW Food	IoW	Isle of Wight food need (diet) and land use model. Includes current IoW agricultural employment data.
Base IoW Stats	Original Data	Includes a copy of various data sets from the Office for National Statistics as well as other sources used in the calculations.
Jobs per Unit OUTPUT	Report	This report contains a simplified and formatted version of the key data in the 'Jobs per Unit Summary' sheet for inclusion in the report.
IoW Jobs OUTPUT	Report	This report contains a simplified and formatted version of the key data in the 'IoW Scaling Summary' sheet for inclusion in the report.

Table 6 – Shows a Summary of Modelling Spreadsheet

Annexe 2 - Jobs modelling methodology

1. Introduction

Due to inconsistencies in the data available across different sectors, there is significant variation in methodology between different sectors. There are also various areas for which high quality primary research was not available, or research did not provide data in a format that allowed it to be generalised, so that it could be scaled. These areas are outlined in Annexe 3 along with recommendations for further modelling of energy supply and demand that would provide more accurate and detailed estimates to underpin this strategy.

In general, we have chosen a conservative estimate of the number of jobs created, particularly where there is significant uncertainty in the base data. This should mean that our jobs estimates and factors provide for a minimum number of new jobs created, as opposed to a central estimate. We also highlight below various areas where jobs may be created as a result of the transition, but for which data was not available, so jobs numbers were not quantified. As a result, the total estimate of jobs is also conservative.

The only general assumption used was that where reference was made to part time workers, two part time workers are considered equivalent to one full time equivalent (FTE) worker and that a full time worker is equivalent to being employed for 1680 person hours per year.

The following sections detail the justification of the jobs metrics used for each sector in turn, and the resulting number of new jobs estimated for each sector on the Isle of Wight.

2. Reuse and Recycling

Due to the availability of research (and tonnage waste data), the jobs estimate for Reuse and Recycling was separated into three parts. Firstly, the jobs which would be created through changing the way items are collected for reuse and recycling; secondly, the jobs that would be created with higher reuse and recycling rates; and finally, the potential jobs in utilising the tonnage collected to reuse, repair and recycle for new products and materials, using data collated for a business plan to create an eco-business park.

Compost is covered in all of the three waste streams considered (municipal solid waste, MSW; commercial and industrial waste, C&I; and construction and demolition waste, C&D). Sewage is assumed to be anaerobically digested as set out in Annexe 3.

There were no useable estimates of C&I and C&D waste for the Isle of Wight, so volumes were estimated based on UK waste composition data, and scaled from the MSW totals. (See Annexe 3).

2.1. Moving away from mixed collection – example: Deposit Refund Scheme

A report by CPRE proposes a national DRS scheme and estimates the jobs it would create [8]. The scheme is based around people getting money back when they return beverage containers for recycling, the cost being offset by higher upfront costs. This would place the onus on consumers to return containers to the retailer rather than on councils to collect and separate recycling. This report proposes that if products are returned to retailers, and then to

manufacturers, a lot of financial externalities would be removed from the design and manufacturing industries. While this was only considered feasible for public participation it also has jobs estimates for other waste streams, considering a value of 0.09 FTE per 1000 tonnes of MSW used – which was calculated by dividing estimates of total additional jobs by total tonnes of MSW produced in the UK. This appears to underestimate the number of jobs required if the waste was not to be returned via the retailer to the manufacturer.

2.2. Job Factors - Reuse and Recycling

Taking the potential for new jobs from the More Jobs less Waste report [11] and scaling them relative to an extra 1000 tonnes MSW recycled gives 2.9 direct jobs, 1.5 indirect and 0.7 induced jobs. This report uses 2.9 FTE per 1000 extra tonnes recycled using the breakdown of Jobs from Zero Waste Plan for Scotland [12] – i.e. indirect and induced jobs are not included. A value of 1.5 FTE per 1000 tonnes reused and recycled for C&I and C&D (excluding soil excavation) is assumed, to account for potential efficiency from operating at scale for these waste streams.

2.3. Reuse and High Value Recycling

This report uses a metric that 0.3 jobs are lost in landfill and incineration per 1000 extra tonnes recycled [13]. This figure is based on 1 to 10 labour intensity ratio between waste disposal and reuse and recycling projects.

2.4. Reuse and Recycling Demand on the Isle of Wight

This report has assumed a 90% MSW recycling rate is possible (based on best practice [14]). Currently 51% of the 71,948 tonnes of household waste generated is not recycled, so the report assumes an additional 41% or 31,213 tonnes of MSW could be reused and recycled on the IoW [14].

This report estimates the amount of C&I waste produced on the Island as 134,783 tonnes using ratios of MSW to C&I for England [15,16]. Using the same increase in recycling as MSW (41%) this report assumes an additional 55,048 tonnes of C&I waste could be reused and recycled on the IoW.

This report estimates the amount of C&D waste produced on the IoW as 133,991 tonnes using ratios of MSW to C&D for England [15,16]. Using the same increase in recycling as MSW (41%) this report assumes an additional 54,725 tonnes of C&D waste could be reused and recycled on the IoW.

This report notes that there are currently two landfill operations on the island as well as a push towards more incineration. Almost all of the island's recycling is currently exported for processing.

3. Farming and Forestry

For the purposes of this report the IoW biological resources are classified as follows:

- Land classified as: farmland; woodland; allotments, vegetable patches (gardens), community growing spaces and orchards.
- Specific Natural Resources classified as: biomass wastes; wild animals; farm animals; food waste; different tree resources (orchard, wild fruit bushes/trees, forestry for wood fuel/timber).
- For the purposes of this report it is assumed that due to diminished fish stocks needing to recover there is little scope for additional employment in the fishing industry. It is also assumed that all other biological resources are not significant in job creation potential.
- Natural but non-biological resources on the IoW include sand, chalk, flint and other quarried materials. The increase in reuse and recycling in this strategy will reduce the need for quarried products, and inert landfill, but detailed analysis in this area is not included in this strategy.

3.1. Land use Considerations

The approach taken is to focus on how food is produced (which affects rural employment) rather than what food is consumed. The focus is on what opportunities to increase the sustainability of food production on the IoW have for job creation, by focusing on food production that maximises the sustainability dividend through being produced locally. The job estimation approach proposed assumes integrated permaculture based farming methods on all of the island's farmland, which does not define any dietary shifts, such as reducing meat consumption.. This section proposes a land use and food production system compatible with job estimation proposal and with the following aims:

- The approach aims for the UK to minimise its imports, not only of food, but also fodder, fertility, fibre and fuel.
- The approach aims to reduce and/or remove dependence on fossil fuel intensive fertilisers as well as pesticides and herbicides.
- This strategy includes farming of animals, albeit more for dairy than meat production. The land requirements modelled include animal manure, which reduces the need for green manure (and inorganic fertiliser). This proposal does not consider the use of human sewage for farming, which while technically advantageous would also involve significant changes in sewage infrastructure and usage that are beyond the scope of this report.

The above plan would reduce the scale of longer distance transport of food required in the IoW, and by implication, in the UK. In producing a more detailed proposal that defines areas needed for production of different foodstuffs and other biologically derived materials, various assumptions have had to be made.

The main modelling assumptions are as follows:

- The estimate is an outline at this stage, considering just the quantity of land on the Isle of Wight currently used for different purposes, not exploring the specific land types or condition. A more detailed baseline would improve the conclusions made in this area.

- This plan assumes that a significant proportion of fruit and vegetables are grown and harvested by volunteers on communal or private property close to homes (e.g. in allotments, gardens, and urban agriculture etc.). This volunteer input is not reflected in the job estimate. As a result of this, less arable land is dedicated to horticulture.

- Assumptions for livestock are indicative only, that: beef cows will only be the surplus from dairy herds; two thirds of pigs' diet will be crops residues and food waste; chickens are fed on grain; sheep are kept on land unsuitable for other uses, for both meat and wool (noting its current low market price) and grazed on land unsuitable for crops or cattle.

- Waste from wheat varieties (notably with lower grain yields) could also produce a by-product in the form of stem which could be used in sustainable construction products and on roofs (thatch) as well as for as biomass.

- Just over a million hectares nationally can be supplied with nutrients through ley farming (alternating the use of land between arable and pasture). And a further 750,000 hectares could be fertilized with a proportion of the available animal manure (although capturing this might require changing livestock management practices). Any shortfall would have to be met by green manure, at a rate of one hectare for every two cultivated.

- It is assumed that around 10% of arable land is utilised to produce biomass/biofuel, produced on farm and used to run agricultural machinery.

- The increased focus upon, and sustainable productivity of, the rural (as well as urban!) landscape will be an important part of the transition to a more localised economy. This will also likely sustain additional rural and peri-urban agricultural employment.

The table below replicates the national strategy set out by Simon Fairlie in the Land's 'Can Britain Feed Itself' article, with land areas scaled to the IoW using data from agricultural surveys [17] [18] [19]. The plan sets out the consumption level of the IoW population based on the sustainable (lower land take) scenario, with the exception of fruit and vegetables, energy crops, woodland, green manure, milk and woodland, which have been considered separately as follows:

- Vegetables and fruit areas are based on scaling from the UK to IoW population;

- Energy crops are based on the 1:6 ratio between Energy crops and cereal, potatoes and sugar crop areas from the national proposal.

- The area for milk production is calculated from IoW demand, based on the overall factors in the UK-wide proposal; and

- The area proposed for green manure is calculated as the difference between the total arable crop area and the total area of arable land grazed by cattle.

This allows the island's potential (lower bound) of food imports to be estimated based on a sustainable diet. This is determined as around 11%. Therefore, it is reasonable to assume that all the currently farmed land will need to be farmed in the longer-term, although it is proposed that the way this is farmed is likely to change with time.

	Consumption		Calories in diet	IoW production	Yield	Arable land	Perm: pasture
	Grams/ person/ day	Notes	kcal/ person / day	tonnes /year	tonnes /ha	ha	ha
Cereals for human food	448		1526	22,893	4.3	5324	
Potatoes	453		300	23,148	25	926	
Sugar	32		100	1,635	7.5	218	
Vegetables and fruit	500		150	25,550		231	116
Hemp and flax	13.7	5 kg/year		700	3	233	
Horse or biofuel (energy crops)						1071	
Green Manure						620	
Milk (incl butter, cheese)	568		330	29025	3.7 (3.26 net)	6560	4098
Beef (grass reared)	33		86	1,686	0.4		4216
Cereals for pigs	36	(bacon)	180	1840	4.3	428	
Cereals for hens/eggs	30	(egg/chicken)	50	1,533	4.3	357	
Fish	11		11	562			
Timber, firewood				13647	3		
TOTAL LAND REQUIRED [+ calories produced]			[2767]			**15,954**	**8,430**
Current Land Available						10,045	10,814

Table 7 Estimated Potential for Food Production Scaled for the IoW. Source: Calculation Model.

3.2. New Farming Jobs

This report assumes that the labour intensity of proposed farming practices relative to current farming practices is equivalent to the differential in labour intensities per hectare between non organic and organic farming. This assumption has primarily been made because of a lack of data around the labour intensity per hectare of farm scale permaculture for different types of farming.

As a result of the above it is assumed that the average labour intensity of proposed farming is 2.1 FTE per 100 ha on top of current levels. Based on 4.33 FTE for organic and 2.19 for non-organic farming per 100 ha in the UK and Ireland currently [20].

There is also an assumption that a large proportion of fruit and vegetables are grown/picked by volunteers on communal or private property (e.g. allotment and gardens). These volunteer hours are not estimated or included.

3.3. Woodland and Biomass Jobs

This report looked at the biomass potential on the IoW, but did not estimate the number of jobs associated with changing land use. The estimates of 0.26 direct jobs and 0.11 induced jobs per 100 hectare have been calculated by scaling estimates of job created through increased active management of forestry from national figures produced by the Forestry Commission [21] [22].

This report assumes that almost all of the IoW woodland would become actively managed for both timber and biomass, as well as habitat diversity. This estimates a potential wood production of around 15,000 tonnes of wood per year [Source: The Potential for Wood Fuel Supply on the Isle of Wight]. In addition, there could also be a further 6,700 tonnes from arboriculture on farm and parkland. Agricultural residues could also be further utilised (an estimated 10,000 tonnes of briquettes). This biomass is assumed to be used on the IoW for heating, as well as for timber.

4. Energy Efficient Buildings

The section covers the retrofit of homes; industrial, commercial and public sector buildings; and improved maintenance and management of buildings to extend their life and improve thermal efficiency. This energy-efficient retrofit of existing buildings will reduce heat demand and overall energy demand, but will lead to some increase in renewable energy/electricity demand.

4.1. Retrofit of Dwellings

Most of the available job intensity data is for cavity wall and loft insulation as well as fitting new boilers. However, energy efficient retrofit could also include internal and external insulation for older properties with solid walls as well as roof mounted solar PV/solar thermal panels and other appliances such as heat pumps. A more detailed strategy would require a baseline of housing type and current energy efficiency for the IoW.

For the purposes of this report we have assumed that 75% of dwellings need energy efficiency improvements and will benefit from renewable energy installation. Reports on basic insulation fitting estimate around 5.1 direct FTE jobs per 1000 homes insulated [23]. However, a report by Cambridge Econometrics & Verco for Consumer Focus estimated that the total induced jobs figure could be as high as 141.8 FTE per 1000 homes [24].

This report takes 81.6 FTE for energy efficiency retrofit from Birmingham New Deal project [25] and 40.8 FTE for adding renewable energy. The later assumes a combination of heat pumps (ground or air source), solar thermal, wood burning stoves/ranges (where not existing) and direct electric heating to houses to cut dependence on gas for heat and minimise dependency on electricity for heat will take half as much labour as improving the energy efficiency of dwellings. This assumption has been made due to a lack of primary research and data into labour intensities of such operations on the scale proposed (street-by-street).

4.2. Retrofit of Industrial, Commercial and Public Sector Buildings

This report has included adding solar PV to commercial and public sector roofs under the energy sector. This report doesn't currently estimate jobs created through other energy efficiency improvements or renewables installed in commercial and industrial buildings.

4.3. Asset Management

The additional maintenance required for retrofitted dwellings is assumed as eight hours per dwelling, as this is the estimate for retrofitting houses in the Birmingham Green New Deal report [25]. This assume not all of this will be paid work (assumed one third is DIY) so takes a lower (2/3) figure. This equates to a total of 3.1 FTE per 1000 dwellings [25].

This report doesn't currently estimate extra jobs needed to maintain improved buildings in the commercial and industrial sector. An increase over the existing numbers of facilities managers and maintenance teams is anticipated.

5. Better Transport

The report is based on the need to plan for future transport needs differently. Instead of a 'predict and provide' approach that increases mobility, the priority is to improve accessibility and localise the economy. Therefore, the main focus is on modal shift from private to public and active transport, with some localisation (with commensurate reduction in scale) of other goods and services. This process of localisation will lead to some additional jobs being created in local service provision, but this has not been estimated here.

This report focuses on the road network – assuming that the island's one railway line continues as at present. The report estimates the new direct jobs by multiplying the job metrics per million vehicle miles for each transport mode with an estimated future total number of miles travelled for each transport mode. The latter is estimated based on a proposed modal shift for the island (including proposed fuel changes). It is estimated for a population assumed to remain static.

5.1. Proposed Transport Modal shifts

This report assumes that shifts between high-speed rail journeys, flying and long-distance driving occur off island, so does not include these in the model. It is assumed that IoW residents travel significantly less by train than the average UK resident, and significantly more by ferry each year. The future transport model considers the following transport categories:

- Private vehicles (including taxis and shared taxis);
- IoW public transport (buses and light rail, including the Island Line);
- Walking and cycling; and
- Links to off-island transport (ferry use, road and rail links, flights by IoW residents).

Freight (imports, exports, on-island transport) is considered separately. These categories have been used to consider a modal shift for the IoW, which has been modelled as:

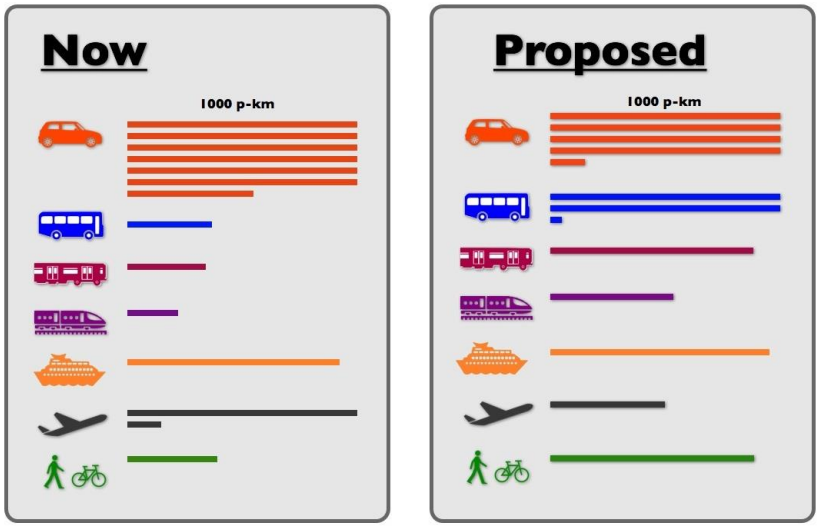

Figure 4 Isle of Wight Proposed Transport Modal Shifts

This is based on the modal shift used in the Zero Carbon Britain 2 report as illustrated below:

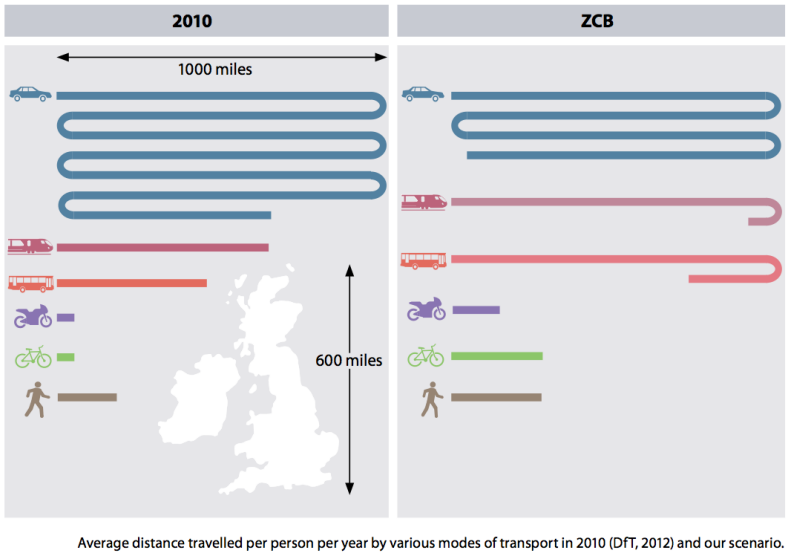

Figure 5 Modelled Transport Model Shift, Source: Zero Carbon Britain 2 [26].

5.2. Private Vehicles

The majority of private vehicles in the proposed transport system will be pure electric vehicles (EVs) or hydrogen powered vehicles, which allows them to be completely powered by renewable energy. National employment statistics underpin our estimation that vehicle maintenance accounts for around 0.74 FTE/million miles for ICE vehicles and 0.54 FTE/million miles for EVs (See Annexe 1 Transport jobs Modelling Sheet for working). It has been assumed that hydrogen vehicles require similar levels of maintenance to EVs.

Therefore, there could be jobs lost in the transport sector linked to fewer total vehicle-miles travelled, leading to reduced private vehicle purchases as well as lower private vehicle maintenance requirements. This would be (at least partially) offset by additional jobs running

car share schemes and driving taxis, as well as the additional jobs in public transport estimated below.

5.3. Public Transport

There will be a significant number of new jobs created by transitioning from diesel buses to electric buses, as well as to operating a significantly higher frequency of bus services and number of bus routes. While this could, in theory, include trolley buses or trams in the more urban areas, reflecting an overall increase in public transport p-km, it is envisaged that most or all of the new buses would be required also to run in rural areas, so would be electric and/or hydrogen-powered.

The number of additional jobs associated directly with running more bus routes, and increasing the frequency on existing routes, is estimated. However, this report assumes no change in jobs/bus mile in terms of maintenance regardless of the technologies adopted. In addition, the current jobs estimates most likely understate the requirement for new jobs associated with the proposed transition due to the current estimates not accounting for any jobs to build transport infrastructure, due to lack of primary data available. For example, this report has not quantified the jobs required to install electric charging points, introduce hydrogen at refilling stations or build additional bus stops and depots. This could be developed further in future: please see Annexe 3 –further work. In addition, there could be jobs associated with the facilities for energy conversion/storage required to power the transportation, and using the batteries for load balancing.

5.4. Active Transport

This report assumes that walking and cycling increase from an average of 350 passenger-km per person per year (3.6%) to approximately 600 passenger-km per person per year (6%). This is probably a conservative estimate and could be boosted further with greater roll out of electric bikes. This will create new jobs in bike maintenance and creating additional cycling infrastructure, although this has not been quantified in relation to employment.

5.5. Transport as Energy Storage

The concept of V2G could be used to link electric transport (e.g. cars, buses, bicycles) to an island renewable-energy network. This would work by hooking up all vehicle batteries to the grid when vehicles are parked, to enable electricity to be bought and sold on the network. In such a scenario, one electric car represents 30kWh of battery storage capacity. There are several pilots of this already and Nissan are looking at the feasibility of trialling this at a larger scale. The feasibility of this is increasing with falling battery costs.

6. Renewable Energy

Estimating the employment associated with increasing the IoW's renewable energy generation capacity was a two-stage process. Firstly, the job intensity of both installing and maintaining different generation technologies was collated, generally in terms of FTE employed per MW of installed capacity. Additional jobs metrics are also sought for storage technologies and energy distribution improvements. Secondly, this was scaled following an estimation of the potential mix of renewable energy technologies that could be built on (and

around) the island. In addition, there will be additional employment opportunities associated with expansion of the Isle of Wight as a centre of expertise for wind power installed across the UK.

These two areas of additional renewable energy generation on the Isle of Wight are covered in the two sub-sections below.

6.1. Energy Jobs Metrics

Offshore Wind. The estimate used here is 18 FTE jobs/MW installed in construction and 0.66 FTE jobs/MW for subsequent maintenance. The figures used are from the One Million Climate Jobs report which justifies the metrics used, based on various sources [27].

Onshore Wind. The estimate used here is 9 FTE jobs/MW installed in construction and 0.33 FTE jobs/MW for subsequent maintenance. The figures used are from the One Million Climate Jobs report which justifies the metrics used, based on various sources [27].

Tidal Power. The estimate of 2.13 FTE jobs/MW installed is based on work by the Resilience Centre [28].

Hydropower. The figures used of 48.5 FTE jobs per MW installed in construction and 1.3 FTE jobs per MW maintained are from the British Hydro association for smaller projects (below 100 KW) [29], which is consistent with the Isle of Wight's limited hydro potential.

Solar (photo-voltaic panels). Specific figures for solar PV installation have not been included. This is currently assumed to be included in jobs retrofitting commercial buildings. Further research could be undertaken in this area.

There will also be jobs in looking after the existing (and new) solar parks on the IoW. Anesco (www.anesco.co.uk) carries out maintenance of many solar parks. Engenius (based in Cowes) was sold to become part of the Minus7 group (also based in Cowes). This is estimated as a maximum of 50 long-term jobs.

Bio-Energy. No jobs metrics for bio-energy were identified. It is assumed the IoW refuse derived fuel powered energy-from-waste plant (incinerator) is converted to run from island biomass or biogas. This anaerobic digestion, produced from sewage, food waste (currently processed in Basingstoke) and farm waste would produce a (limited number) of additional jobs. Jobs associated with biomass production from sustainable (wood)land management are covered separately above.

Storage and Distribution. The potential for job creation in this area is considered to include:

- Increased IoW grid capacity to meet increased demand from the electrification of transport and in the long-term, heating and cooking. The report is based on a preliminary estimate, which could be modelled further.
- Increasing size of grid interconnector to the mainland.
- Additional grid capacity to support larger renewable energy projects in remote areas.
- Addition of on-island electricity/energy storage for load balancing.

This report assumes 0.1 FTE employed per GWh is required on the island for increasing electricity distribution and storage (Source: Resilience Centre (2015). The employment

associated with upgrading the Island's interconnector with the mainland has not been estimated.

6.2. Electricity Generation and Wider Energy Strategy for the Isle of Wight

This plan is based on the assumption that the IoW's renewable energy capacity is estimated, and that this scale of generation capacity is then provided. This is supported by initial estimates of energy requirements that indicate that the scale of generation summarised below could approximately meet the (significantly increased) total future annual ***electricity*** demand on the island. Even with significant storage capacity being built on the IoW the island would still be heavily dependent on the mainland for meeting peak demand under worst case generation conditions, and sharing excess power at other times for use off-island. This could be reduced to some degree through on island energy storage and demand response, as discussed in the main report. The indicative electricity needs to fully power the transport system outlined in section 5 above represents around 40% of the predicted total future electricity generated by renewables resources on the island. Although some of this will be hydrogen-based, which will enable significant demand shift, a large proportion of the rest is likely to be battery-electric to allow for demand response based on grid load conditions.

Generation Source	Future Installed Capacity	Load factor	Electricity Produced
	MW	**%**	**KWh/y**
Onshore Wind	18	28%	44 GWh/y
Offshore Wind	300	37%	972 GWh/y
Tidal Stream	30	36%	95 GWh/y
Solar PV (Roof mounted)	10	11%	10 GWh/y
Solar PV (Ground mounted)	146	11%	137 GWh/y
Hydro (River Run)	0.3	53%	1.4 GWh/y
Existing RDF/CHP Plant	1.7	44%	6.6 GWh/y
Total	**73.1**		**1,265 GWh/y**
		Estimated Electricity Demand	**1,408 GWh/y**

Table 8 - Shows Modelled Future Energy Demand for the Isle of Wight

This table demonstrates that renewable energy sufficiency is technically feasible on the Isle of Wight (alongside some demand reduction). Different strategies could be considered with more solar generation and less wind power (for example), but these need to be considered alongside an upgrade for the grid connector to the mainland, and what storage solutions are developed on the island.

See Annexe 3 – Further Work for proposed detailed modelling of the Isle of Wight's future energy supply and demand from other sectors, linked to a future renewable energy strategy.

The different renewable generation types included in the table above are set out in more detail below.

Wind Generation.

Offshore Generation. This is the renewables type with the greatest potential. The maximum practical offshore wind capacity in the waters immediately around the IoW has been estimated as 50MW [30], which would generate about 160 GWh each year.

The Navitus Bay project was recently proposed near the Isle of Wight (see Figure). However, this project was turned down by the High Court. So it is unlikely to proceed unless the risk of this being repeated (here, nearby) is overridden by government, which is unlikely now as the present government supported this decision. So it is likely to be 10+ years delay before there is a chance of significant wind capacity being built in this area.

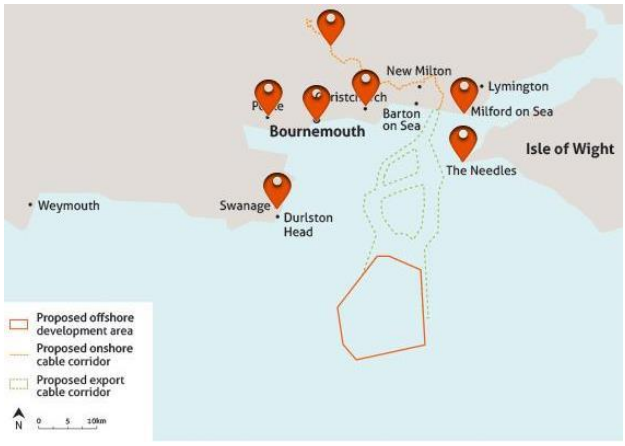

Figure 6 The proposed Navitus Bay project area [35]

This scheme alone would have generated between 670 - 960 MW, but as the electricity wouldn't have brought ashore on the IoW it has not been included in generation calculations. However, the wind farm was predicted to have created 1,700 jobs during construction and 140 maintenance jobs, of which a significant proportion could have been provided on island. However, this is treated as a windfall, not currently included in the job estimate for the IoW.

For this report 300MW of offshore wind has been included, which is significantly more than the potential in the island's immediate coastal waters, but significantly less that the generation capacity of the Navitus Bay project.

It is noted that while the wind speed in the English Channel averages around 2 metres/second lower than in the North East of England (such as off the coast of Newcastle), which means around 20% lower output there could still be benefits in installing offshore wind generation all around the UK as a way on reducing intermittence (at least to a limited degree, as sometimes the wind tends to be strong in different locations at different times). However, this contrasts with the notion of developing more wind power in the North of England and more solar power in the South – as more energy is generated and used locally.

Onshore Generation. This takes an estimate of the maximum practical onshore wind capacity for the IoW of 18MW [30], and this would generate around 45 GWh/year.

The deliverability of the wind capacity set out here is likely to depend on central government leadership in requiring spatial planning of renewable energy generation – in the same way that it plans locations of major energy (and other infrastructure) and requires local councils to produce waste and mineral plans.

Jobs in Wind Power Supply Chain on the Isle of Wight. There is also potential for additional employment in expanding the Isle of Wight's key role as a hub for renewable energy supply – including of the Vestas plant.

Large scale expansion of offshore wind (such as the significant GW wind potential of the Dogger bank area, which is free of shipping lanes or local planning issues) would lead the IoW production to expand, as many of the blades used in the UK offshore industry are designed and made on the Isle of Wight.

If offshore wind were offered the same rate of subsidy provided by the UK government to the Hinkley C nuclear plant in 2016 then the wind industry would be queuing up to install new offshore wind. In the short to medium term, the subsidy level required to the wholesale electricity price of new wind power is anticipated to be significantly less than the subsidy provided to support new nuclear power.

Tidal Power. This is based on estimation of the IoW's maximum practical tidal stream capacity of 3MW [30], which would generate around 9.4 GWh/year.

Hydropower. It is estimated that the IoW's maximum practical hydropower capacity is limited, at around 0.3MW [31], and this would generate around 1.4 GWh/year.

Solar (photo-voltaic panels). This report assumes that Solar PV is utilised on commercial, industrial and public sector roof space, as well as poor quality land that is only usable for grazing sheep, which can continue (albeit to a more limited degree) once panels are installed. This could be 1MW of roof mounted solar capacity and 146MW of ground mounted (based on 1% of (poorer quality) pasture land).

However, the Island electricity network already exports to the mainland, and is running at maximum capacity in the summer (due to lower on-island demand, and higher generation by existing solar farms). Scottish and Southern Energy (SSE) won't allow further connections to the grid on the IoW, except with constraints. The question is, who would pay the additional cost for an upgrade of the IoW connection? Is it right for poor consumers to pay more on their electricity bills so that wealthy solar PV owners can export their power? The value of grid upgrade, and the way subsidy is provided to new generation capacity, should ensure that the economic benefits are shared, and this is part of a strategic plan for a sustainable IoW. This will likely require generation, storage and shift of demand from fuel to electricity (e.g. for transport) to be planned together.

Bio-Energy Generation. This is predominantly covered in retrofit and woodland sections. Biomass is not proposed for electricity generation, only for localised heating to supplement heat pumps, although some farms might have their own micro-CHP plant[15]. The main bio-energy source is anticipated to be biogas from the anaerobic digestion of sewage. Any electricity generated is likely to be limited, and as there is already a gas-fired power station on the island this is unlikely to create many additional jobs. Therefore, no employment estimate is currently included.

Electricity (and wider energy) Storage and Distribution. There is significant further work to estimate the amount of Storage and Distribution required to facilitate the energy supply and demand proposed in this report. It is believed that the island interconnect capacity is currently limiting installation of more PV.

The main constraint on additional electricity generation is the peak load capacity of the grid. An alternative to increasing mainland interconnector capacity (or part of a wider strategy) could be to install distributed battery storage or produce hydrogen, which could also be a substitute for domestic gas or a fuel for transport. Current IoW production of hydrogen is

[15] Some research has been conducted, in conjunction with the sustainability officer of the IoW council.

piloted by a company on the south of the island, which includes a hydrogen powered boat[16]. This would help smooth the supply-side peak and provide additional standby electricity supply for lulls in renewable generation.

These solutions will need to be supported by appropriate electricity supply and demand pricing. In addition to using hydrogen or batteries for short-term storage, seasonal storage solutions will need to be considered along with measures to increase the flexibility of demand to fit in with renewable generation. This is included in Annexe 3 Further Work.

[16] www.itm-power.com/project/island-hydrogen, www.bbc.co.uk/news/uk-england-hampshire-36149606.

Annexe 3 - Further Work

The further work is divided into three categories: missing jobs metrics, missing IoW data and more detailed modelling to support implementation of the strategy.

Missing Job Metrics:

The following lists areas where the jobs metrics would benefit from additional information for further analysis:

- Labour intensity of demolition and deconstruction per tonne of C&D waste produced.
- Labour intensity per hectare of permaculture farming practices (e.g. average and by farming type).
- Labour intensities of fitting heat pumps, solar thermal and direct electric heating to dwellings (e.g. person hour per typical dwelling) and to commercial, industrial and public buildings (e.g. person hours per 1000m^2 of building).
- Labour intensities of installing solar PV panels, for commercial and domestic scale installations.
- Additional jobs through more labour based approaches to road maintenance, such as early filling of potholes and increased frequency of routine maintenance (e.g. drain clearance) to reduce the frequency of major resurfacing/reconstruction (e.g. jobs or person hours per mile of carriageway).
- Additional jobs in cycle path maintenance (e.g. jobs or person hours per mile of cycle path). [Anticipate this to be minimal].
- Labour intensity of installing electric vehicle charging infrastructure (e.g. person hours per changing point) [Anticipate this to be minimal].
- Jobs in design and implementation of schemes to increase walking and cycling.
- Labour intensity of maintaining different types of public transport system (e.g. per million vehicle miles, but could be estimated from case studies if total maintenance staff and total vehicle miles were known).
- Jobs per MWh of energy storage – for both installation and subsequent maintenance (e.g. pumped hydro, compressed air, hydrogen production, gravity power module, flywheel etc.).
- Jobs per MW to maintain current electricity grid and to enhance grid.

Missing Data on the Isle of Wight:

Where IoW statistics were not found, job figures and other data were scaled from UK statistics:

- Tonnes and composition of C&I and C&D waste produced on the IoW.
- Hectares of land on IoW suitable for difference land uses (e.g. pasture, arable, upland grazing only, horticulture etc.). Estimates of the total land which could be used for each at a time would be ideal.

- Floor area of public sector buildings (no data identified for IoW or for the UK).
- Percentage of homes on Isle of Wight (or for the UK) which could be retrofitted with solar thermal, heat pumps etc.
- Percentage of commercial, industrial and public sector floor space on IoW (or for the UK) which could be retrofitted with heat pumps, solar thermal etc.
- Amount of electric vehicle infrastructure needed per capita and/or per km, vehicle distance or per road network (e.g. charging points per 1000 EV v-miles).
- Current miles of cycle path/lanes on the IoW
- Breakdown of industry CO2 emissions and energy demand for the IoW (and associated summary of current industrial operations, and their scale).

Further Modelling for the Isle of Wight:

There are some important pieces of modelling and analysis required for the Isle of Wight to make the transition proposed in this report. These are outlined in the subsections below.

More Detailed Recycling and Reuse Jobs Modelling

If a breakdown of the MSW, C&I and C&D waste streams were available it would be possible to better model the jobs creation potential through considering labour intensities associated with the collection, processing and resale of different products and materials rather than using an average jobs ratio. This would allow a more detailed zero waste strategy to be developed.

More Detailed Food and Land-use Modelling

Some initial work has been undertaken to consider whether changes in land use and animal management could increase sustainable food production on the island (reducing scale of imports and food miles) whilst removing (or at least significantly reducing) the use of fossil fuel intensive fertilisers as well as herbicides and pesticides. Such improved land management could also improve soil fertility. This requires more detailed data on farmland and consultation with farmers and other rural stakeholders to determine what is feasible.

Modelling Energy Saving from Building Retrofit

The report proposes that every dwelling has some combination of the following to maximise its energy efficiency for heating:

- Ground source and air source heat pumps
- Solar thermal
- Cavity wall, internal and external solid wall insulation, loft insulation, window double/triple and secondary glazing
- Draught proofing
- Direct electric or biomass heat sources to top up heat pumps and solar thermal.

- Energy efficient gas boiler (interim, or with alternative biogas supply).

Modelling is required to estimate the future electricity and total energy demand for IoW homes once they have been retrofitted with these changes, so that the total future energy supply and demand for the IoW can be estimated.

Detailed Isle of Wight Transport Modelling

There are a few areas within transport that require more detailed modelling, some of which would be best carried out prior to implementation.

For example, detailed proposals are required to assess and plan where new cycle lanes and paths should be built, and where urban areas could be pedestrianised, traffic calming introduced, or where buses and/or cycling better prioritised.

Modelling could also assess to what extent total vehicle movements might be reduced through increased vehicle occupancy rates through a combination of car share schemes, taxis and shared taxis. This should be considered alongside improved public transport services. As well as determining overall traffic impact it could be used to model how to best maximise accessibility of people living in rural areas without high car ownership.

Significant modelling and strategic planning would be required for public transport improvements. The current bus routes and rural urban split on the island are show in the figure below. This should review which routes should have more regular services/increased capacity and where new routes may be introduced. In addition, plans should include how new technologies can be used to upgrade/replace vehicles to improve fuel efficiency and switch to sustainable fuels/electricity. In addition, it is noted that the feasibility of more sustainable ferry crossings could be undertaken. This transport planning should model the current IoW demographics, as well as trends towards an ageing population.

Figure 7 – Shows the Isle of Wight Bus Network Map [32] and IoW rural-urban split [33]

Modelling improved public transport and other transport changes noted above will enable the impacts on overall energy/electricity supply and demand (as well as likely future carbon emissions) for transport to be estimated.

Modelling the IoW Electricity Supply and Demand

Electricity supply and demand will need to be modelled in order to specify the size requirements for the island-mainland grid interconnector, together with energy storage needs and day-to-day and seasonal variations in grid capacity requirements. This modelling will need to include estimate of the Demand Response capabilities that could be created on the island along with a plan of how to enable them. This will require inputs from the modelling outlined for buildings and transport above. This work would need to be done in consultation with Scottish and Southern (operated of electricity distribution network on the island) and the National Grid (to ensure they could provide the load balancing capacity required from the mainland).

Additional Areas to Model Job Creation Potential

The following areas would also benefit from additional jobs, in the transition and longer term. This would require additional metrics to be included in the jobs model:

- Better Care - Localised health care with more support for treatments other than prescriptions and a focus on prevention rather than treatment. E.g. sufficient preventative not reactive adult social care and care for physical and mentally disabled. Could reduce short-term bed blocking and longer term health spending.
- Public health – dealing with environmental externalities. Likely to reduce health spending in the longer-term.
- Minimum level of council staffing in other key areas to sustain front-line public service outcomes.
- Mitigating past pollution and reducing future pollution.