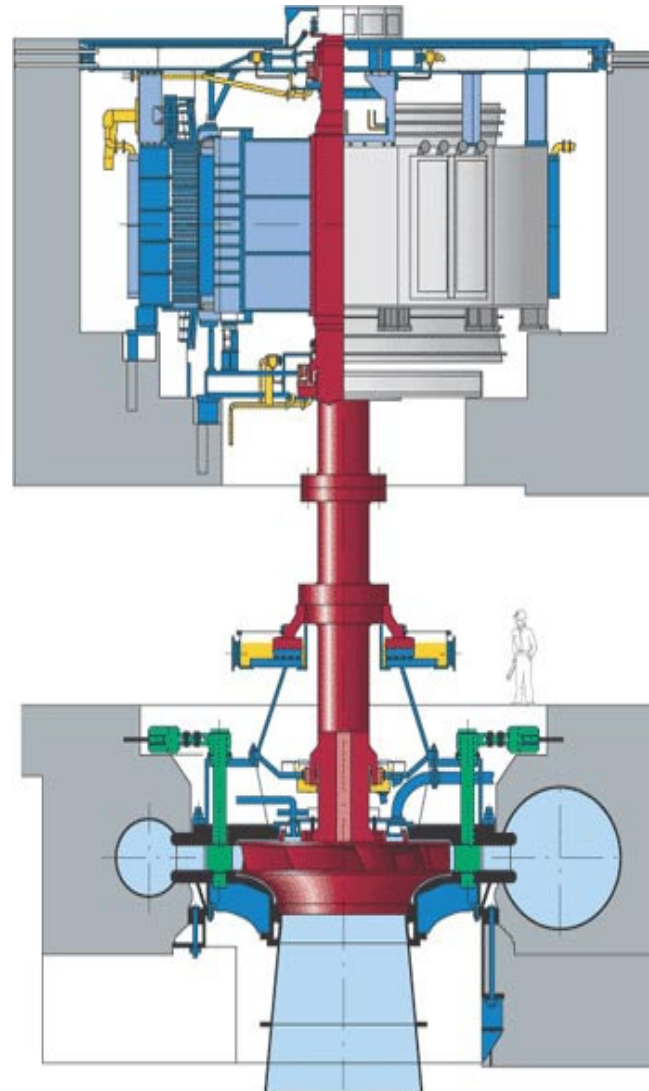


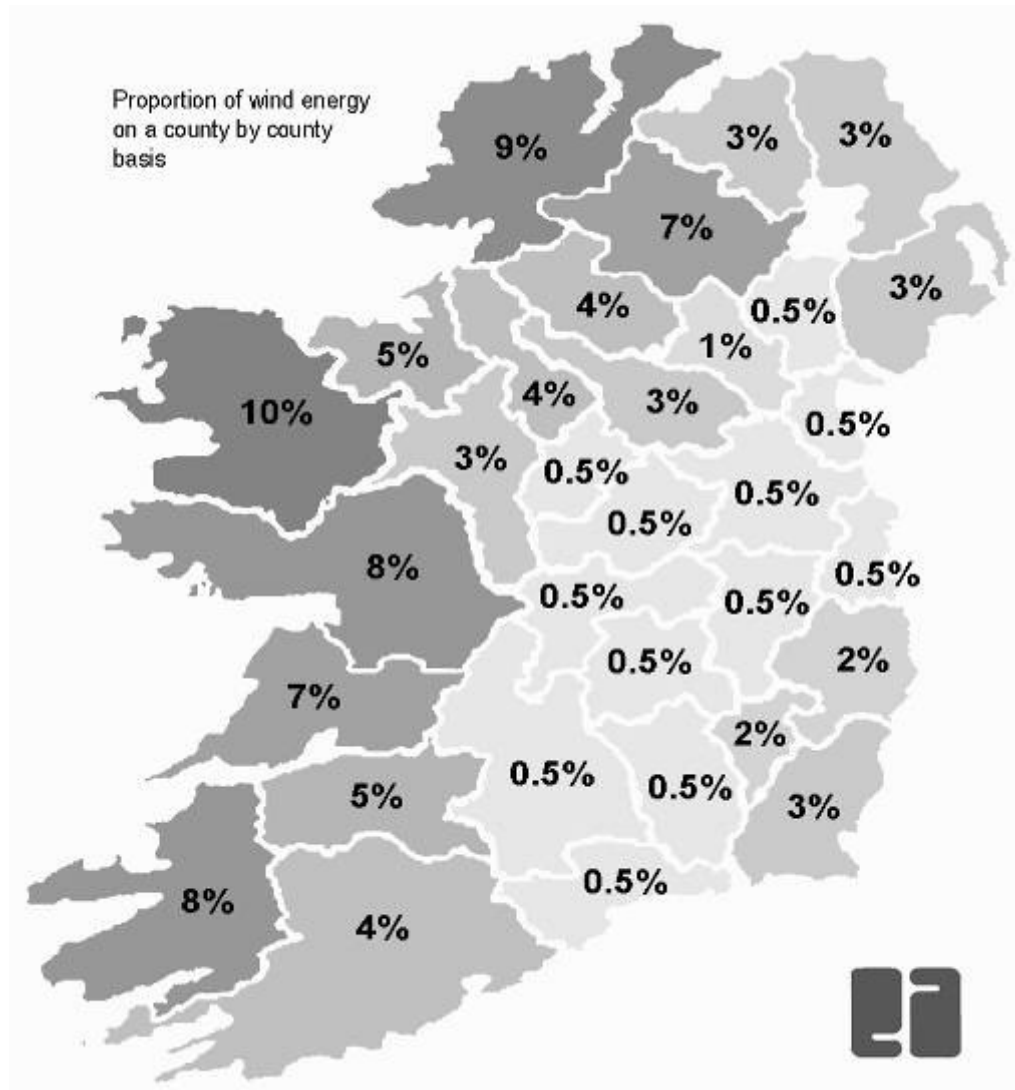
Spirit of Ireland PHES

This is roughly the size of the machines that we need, $\approx 100\text{MW}$.

A typical plant then has 6-10 such machines. They are reversible pump/turbine units.



Ireland- wind resource



STORAGE

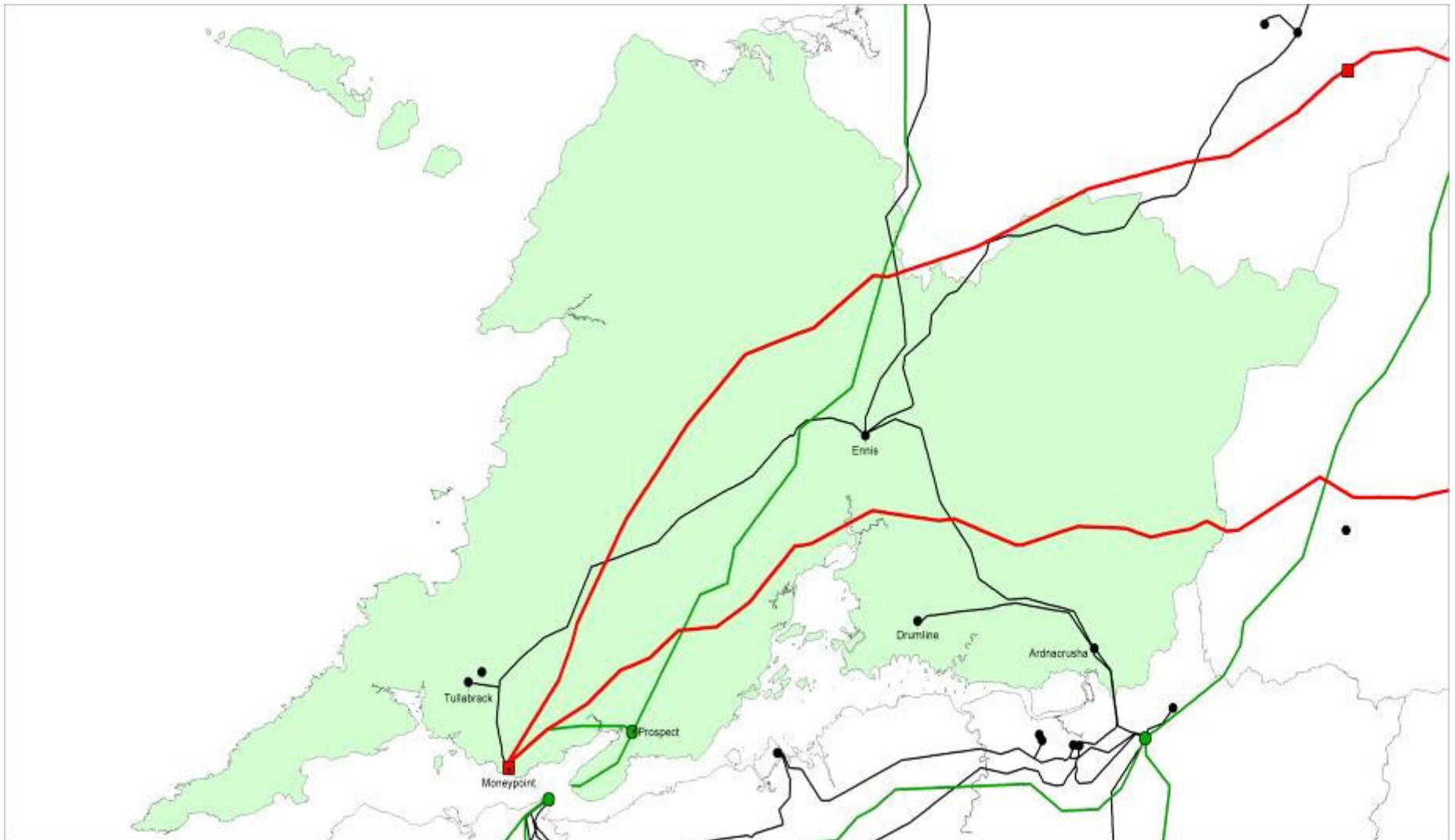
How Does It Work?

Co. Clare - Strategic Advantages

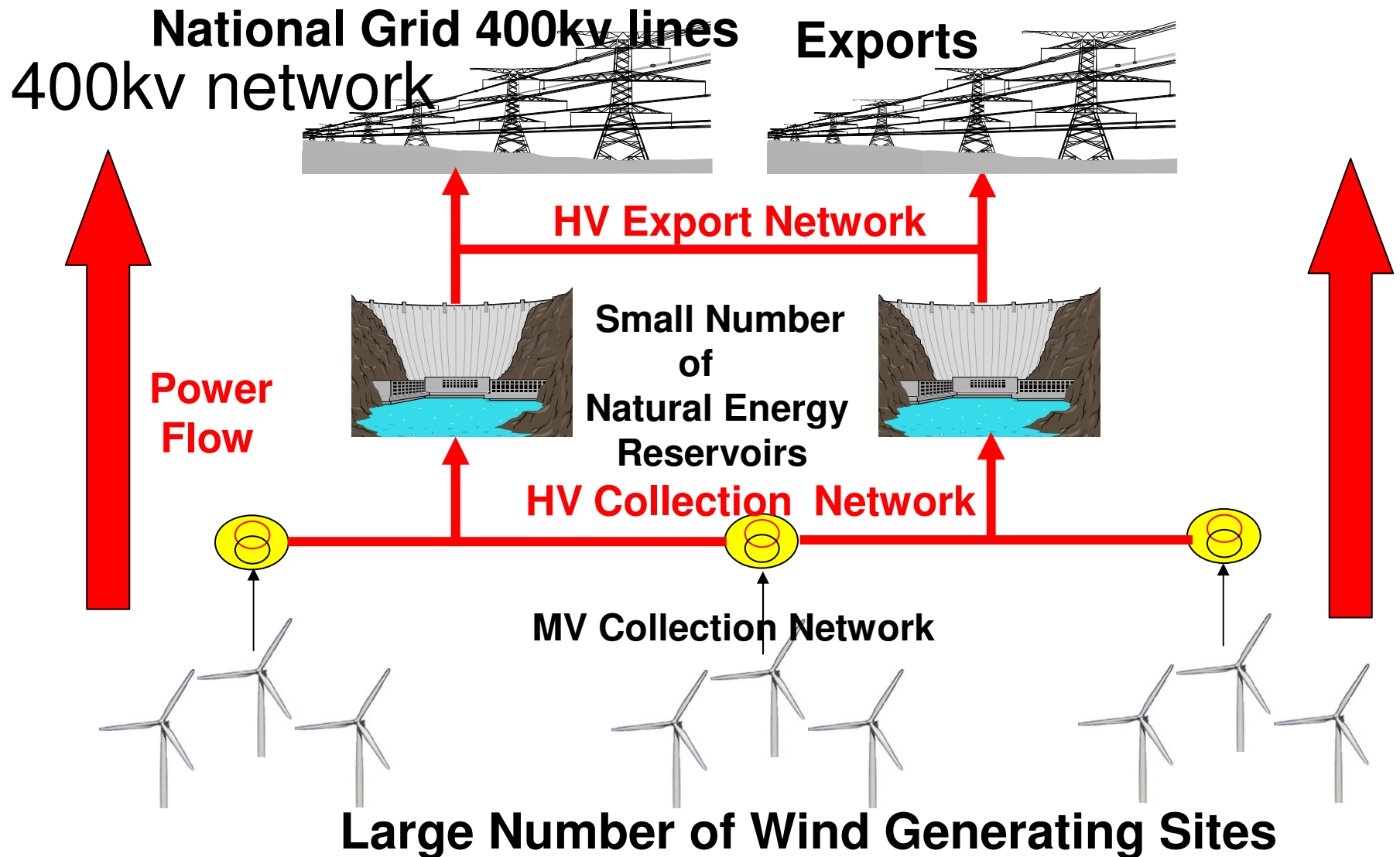


- Clare is the only western seaboard county with the grid motorways
- Clare has adopted the best wind energy strategy in Ireland. Now considered to be best in Class.
- Clare has the renewable energy resource in wind.

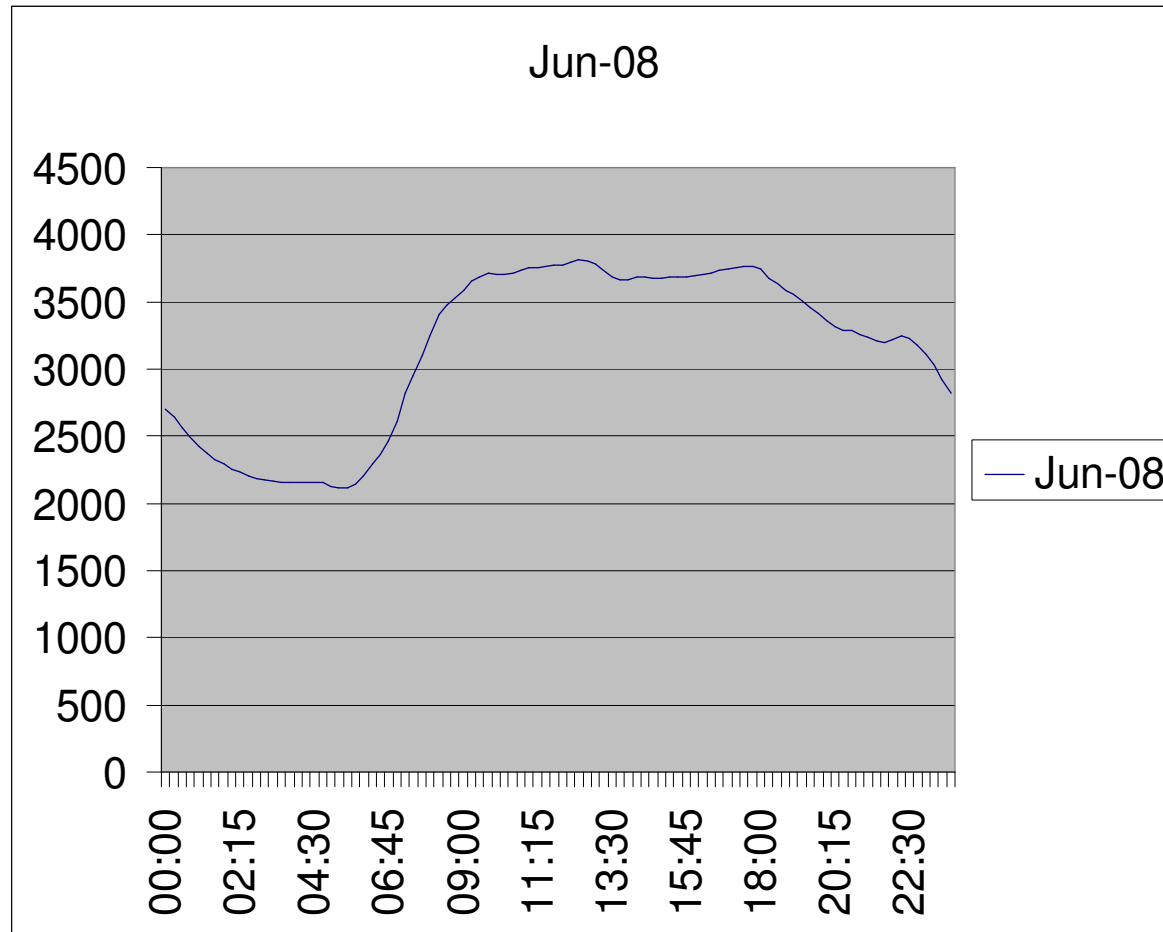
Clare's High Voltage Grid



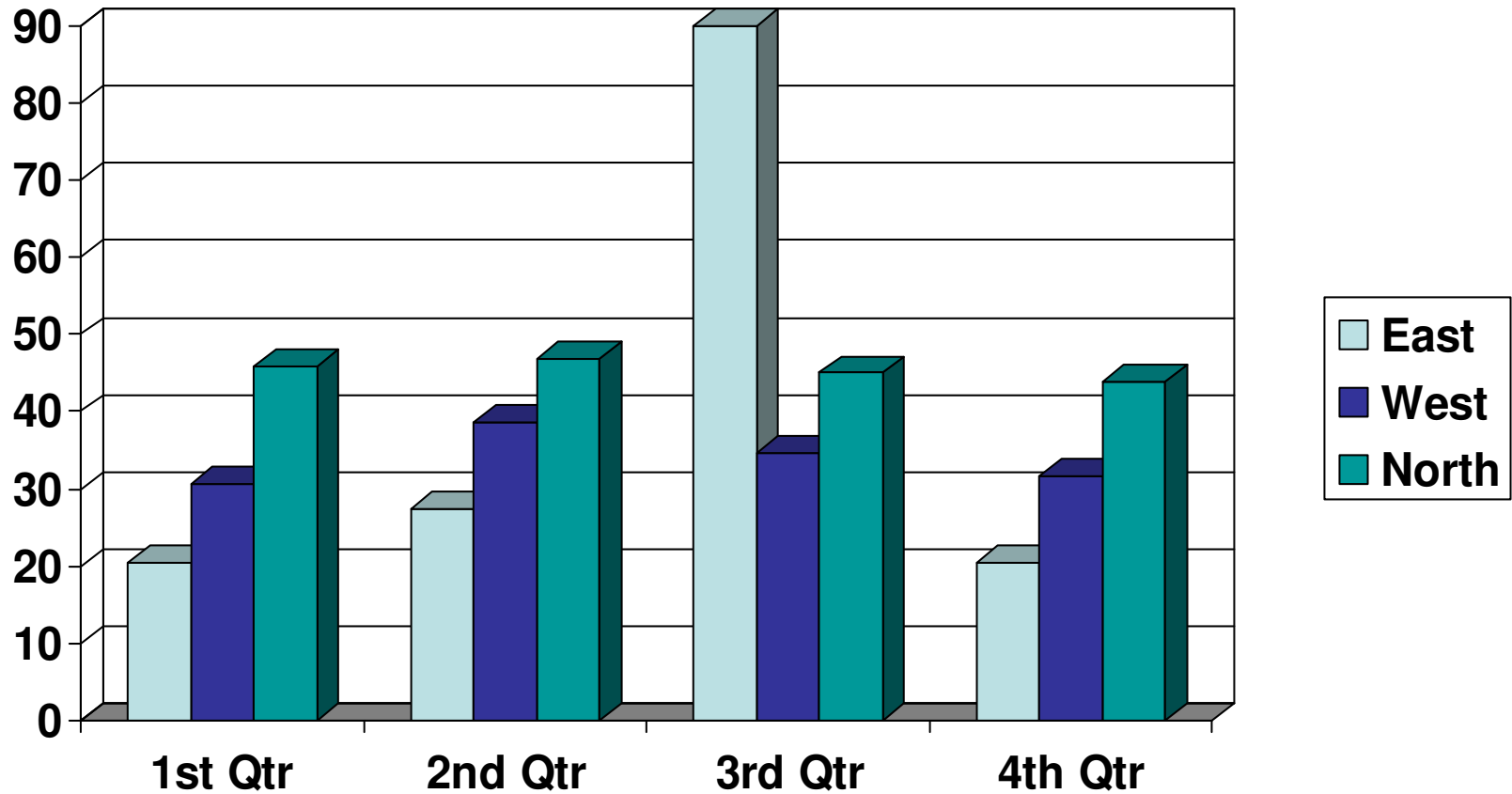
Spirit of Ireland Solution - Clare



Electricity Demand Peaks/Troughs



Regional usage.



Wind turbine towers in Transit

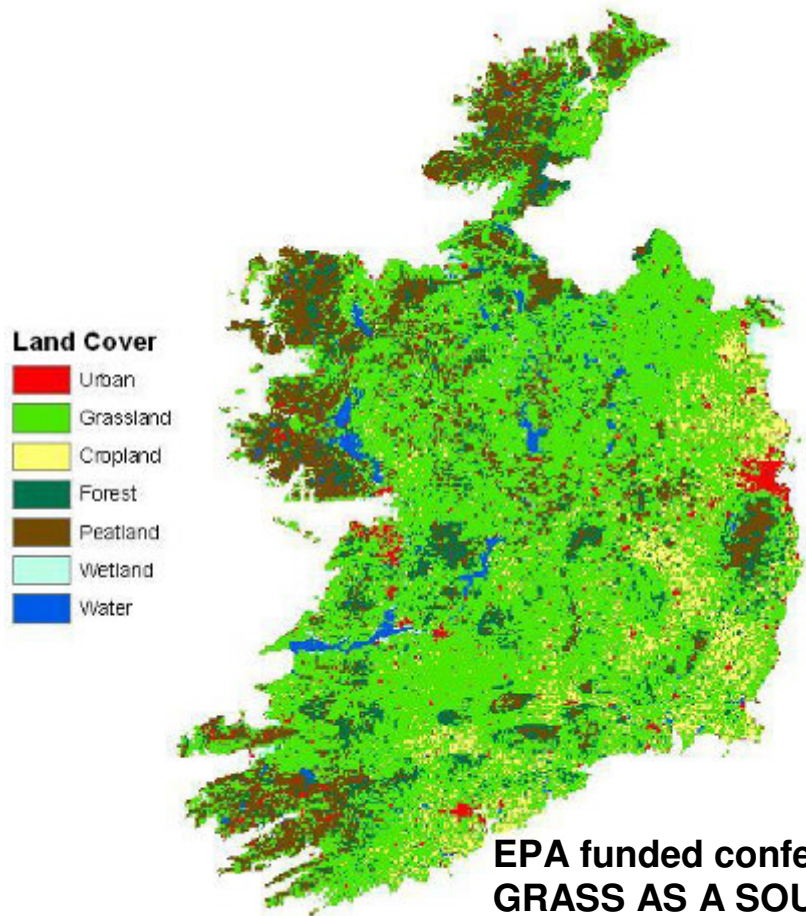


Ecology & Environment



- Peat land considerations/ carbon release from peat.
- Bird populations.

Carbon and peat-lands



	Land cover (%)	NEE	% of total NEE	
Peat	17	-0.12	-0.14	2
Grass	55	-0.9	-3.9	42
Crops	7	-2.9	-1.6	17
Forest	9	-5.2	-3.7	39
Total			-9.27	100

EPA funded conference/ Ger Kiely Hydromet UCC
 GRASS AS A SOURCE OF GASEOUS FUEL
 UCC, April 15, 2010

Typical windfarm footprint

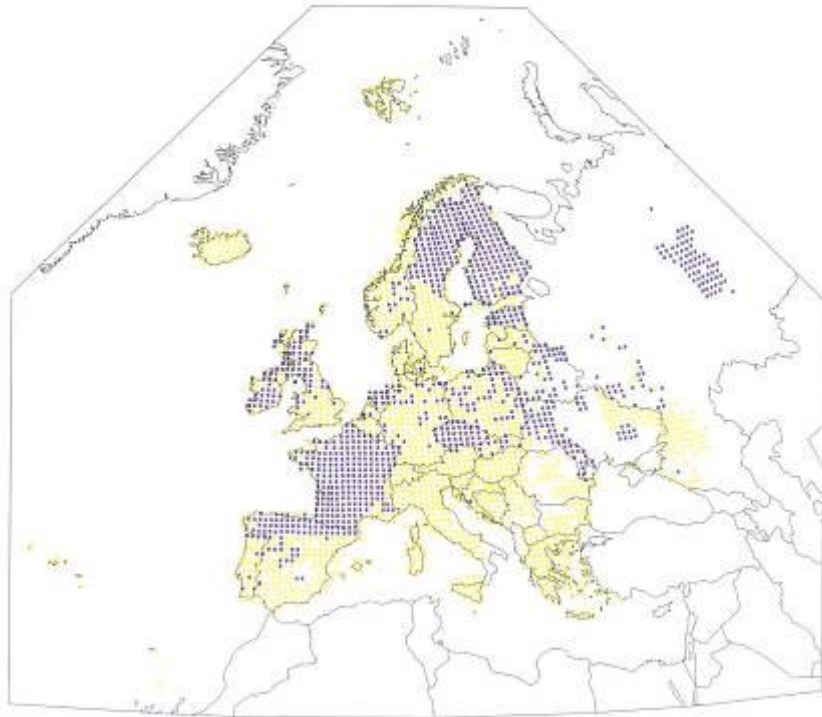
- ♦ Between 1.5- 5.0% of a windfarm area is directly impacted by the development of windfarm.
- ♦ Remaining 95-98.5% can be enhanced and protected, restored..... Overgrazing, forestry, etc.
- ♦ 100mw mount callon windfarm has a footprint of 21.5 hectares in overall site of 2000 hectares. (1.7% of overall site)
- ♦ Carbon saving in typical 100mw wind farm 4,000,000 tonnes over a 20 year operating life.
- ♦ Currently a landowner can plant forestry of up

Bird populations.

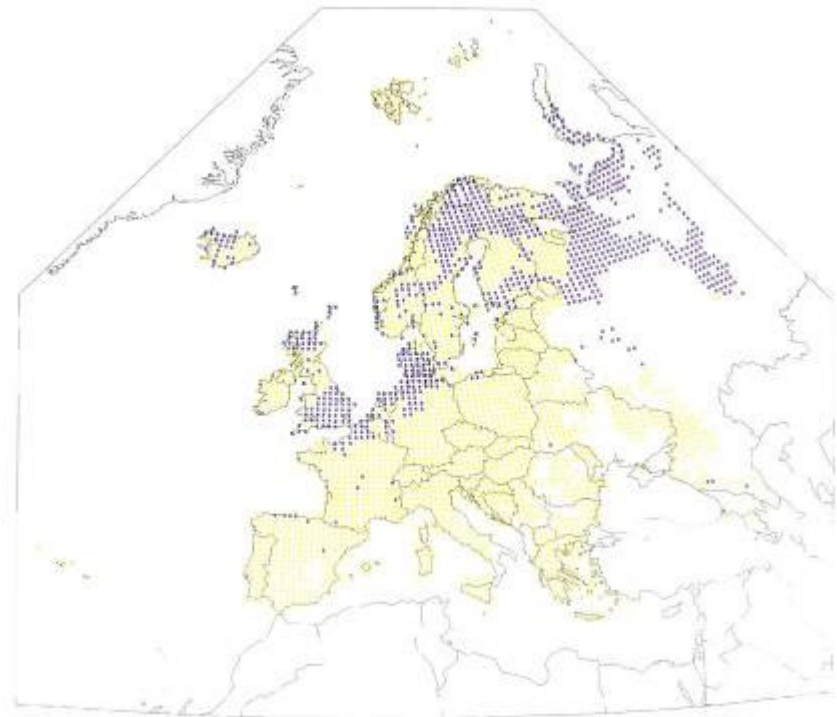
- Huntley et al 2007- Climate warming is predicted to cause the contraction/extension by the end of 21th century.
- Hen Harriers,
- Merlin,
- Red Grouse,
- Golden Plover,
- Snipe,
- Dunlin.

Climate Change to decimate of rare birds?? Hen Harriers.

• 2007

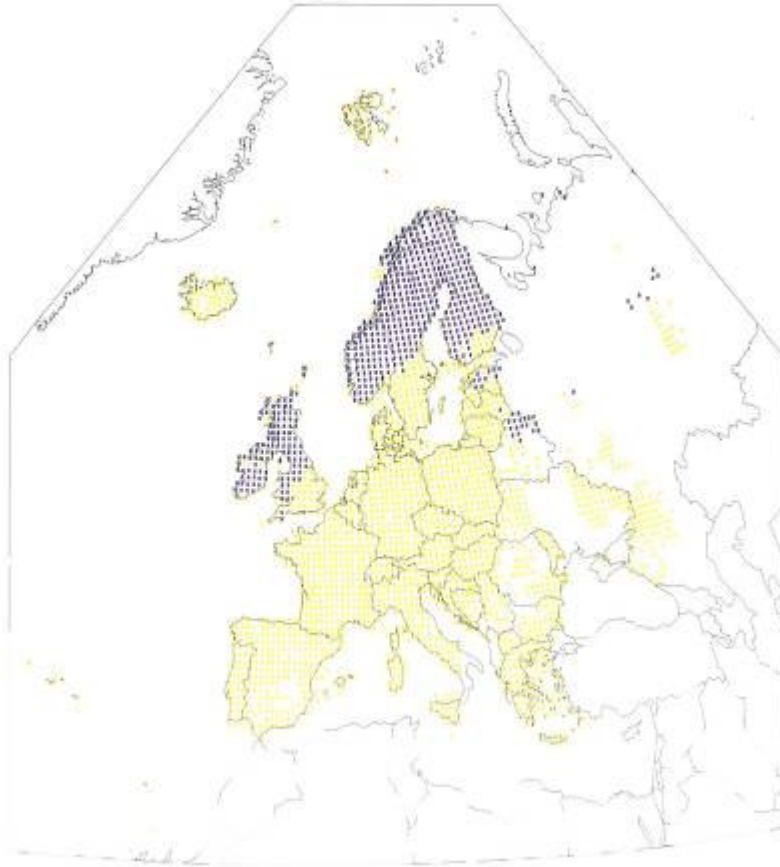


2099

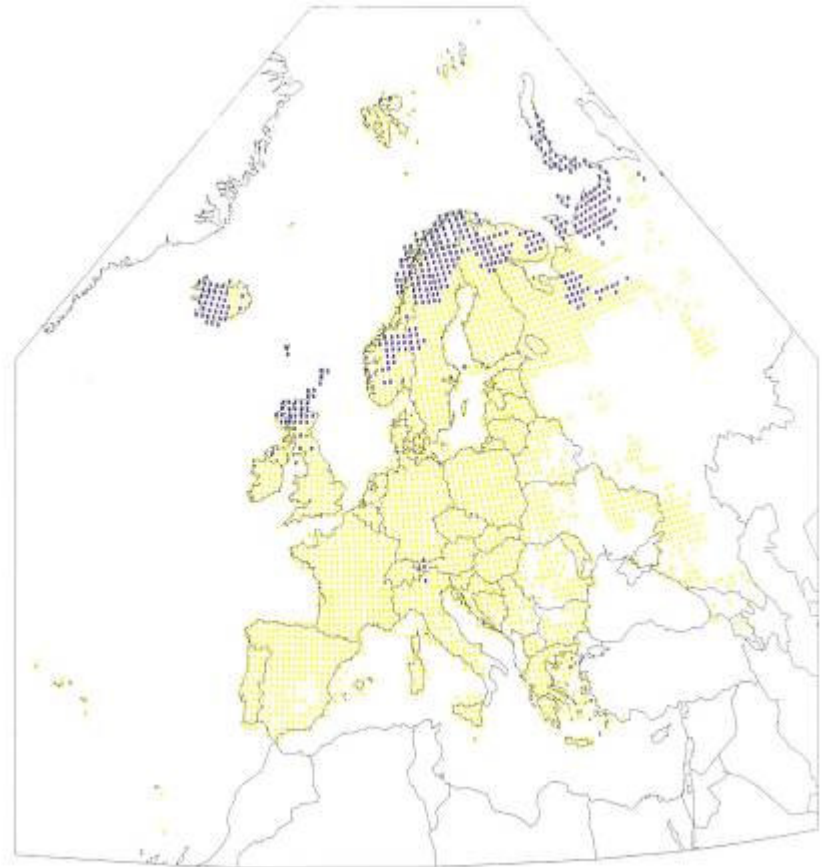


Willow Grouse

2007

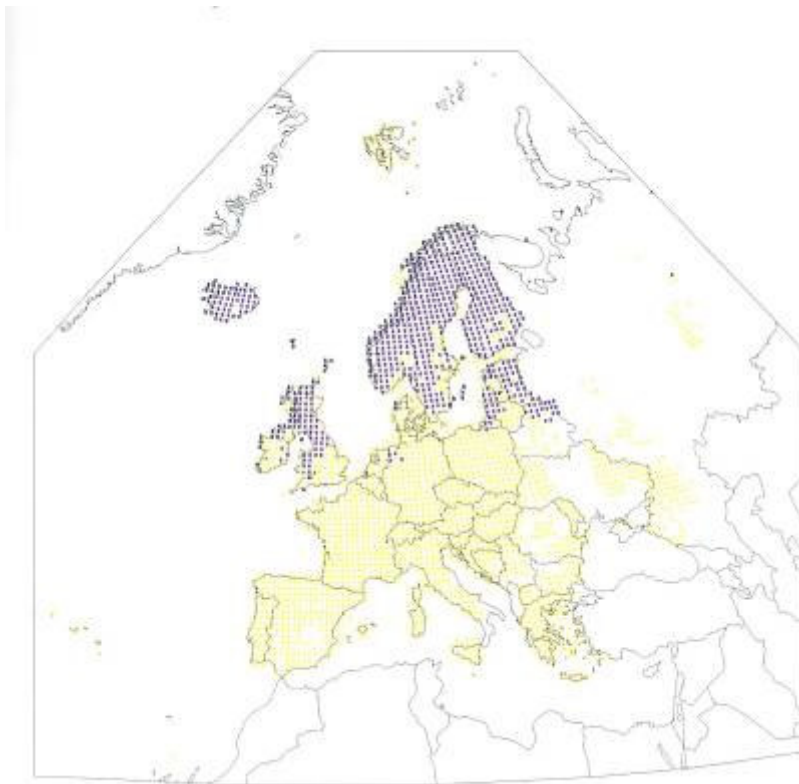


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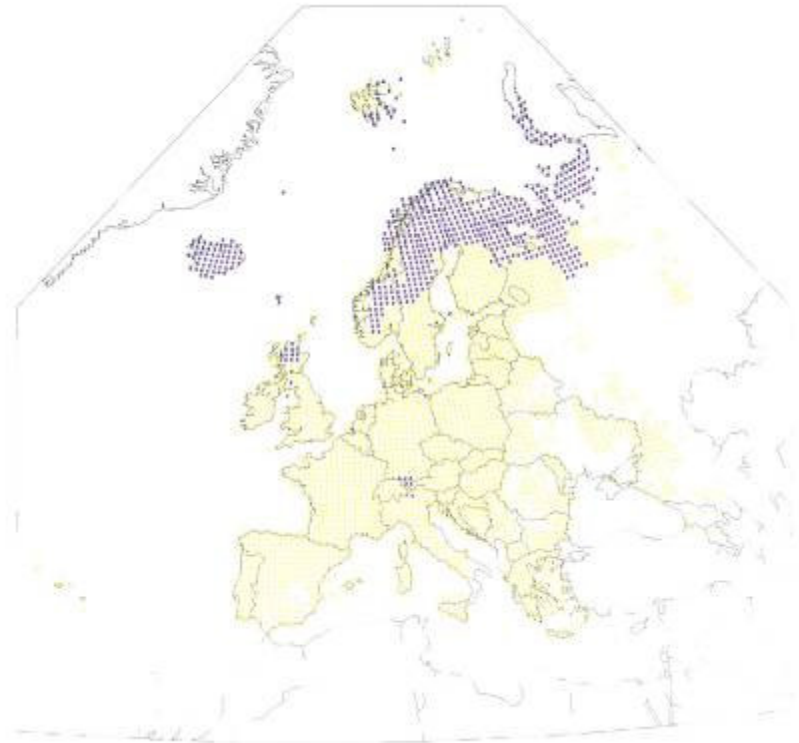


Golden Plover

- 2007

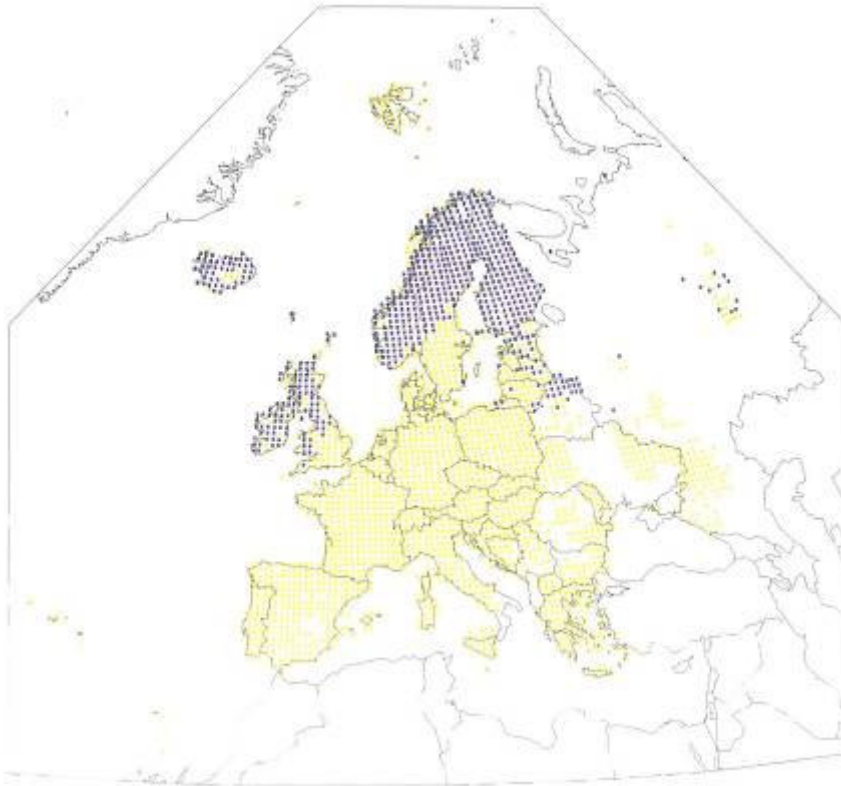


2099

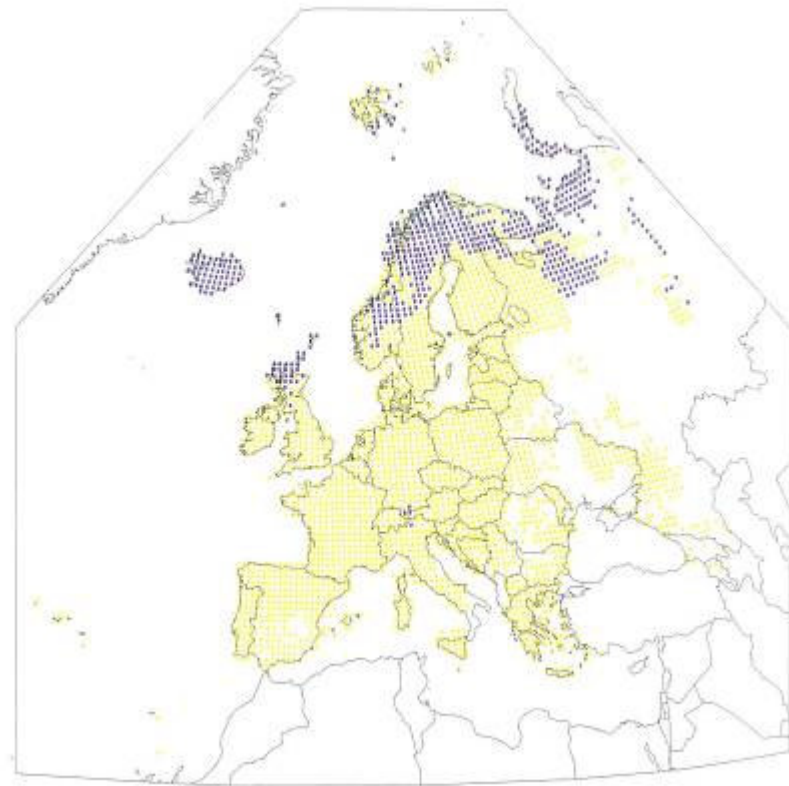


Merlin

- 2007



2099



Ireland's first Natural Energy Power Station

Potential 11,200 JOBS.



Jobs and Investment in Irish Wind Energy Powering Ireland's Economy



IPP Development: Benefits for local communities

Independent Power Projects ("IPPs") benefit communities in several ways. They create jobs, revenue for all levels of government and increased GDP both during construction and throughout their operating life.

Background

IPPs – in particular the clean and green hydro, wind and biomass projects that have been bid into the most recent DG Hydro calls for new power – are very attractive potential new citizens for any community.

A study was commissioned by the IPPBC to calculate the economic impact of an IPP. Using an econometric modelling technique known as an 'input-output model' as adopted by the Provincial Government – a scenario was developed using the inputs for a typical 10 MW hydro project. The model estimated the following economic benefits from the construction of the project:

Economic Impact of an IPP

(€ millions)	10MW	500 MW
Capital Costs:		
Purchased in BG	10.0	0.9
Imported to BG	18.0	1.3
Total Capital Cost	28.0	2.2
Employment (person/years)	120	13
GDP contribution Provincial & Local Tax	8.3	0.8
Federal Tax	0.66	0.1
Federal Tax	0.25	0.1
Total Tax/yr	1.7	0.2

Our example 10 MW power plant cost \$25.0 million to build, \$10.0 million of which was spent in BG, creating 120 jobs during construction, adding almost

¹ Source: AC Milroy of U. Ave and Gilmore's Services, Provincial Economic Impact of Small-Scale Power Production. Special report done at the request of the IPPBC by Gerry Harris, December 2009

\$0.3 million to the GDP and \$1.7 million directly to government revenues.

The employment effects are spread across several sectors of the economy. The 120 person-years that were estimated to be required over the 2 year period required for the construction the typical run-of-river power project and spread across sectors of the economy as follows:

Sector	Person-Years
Construction	13
Manufacturing	17
Retail Trade	9
Finance, Insurance & Real Estate	11
Professional, Scientific & Technical Services	40
Administration & Food Services	11
Other Industries	22
Total	126

IPPs are also the gift that keeps on giving in terms of ongoing employment and local revenue enhancement.

Up to 4 people in our typical example are likely to be directly involved in the operation and maintenance of the facility over its life and several more on an intermittent basis for periodic major repairs and overhauls.

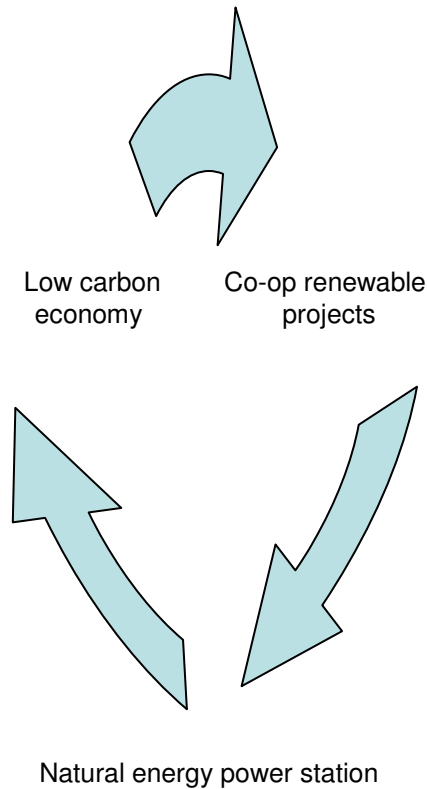
The projects pay local tax levies appropriate to the municipality which – combined with the taxes and fees paid to other levels of government can comprise

I P P F A C T S H E E T



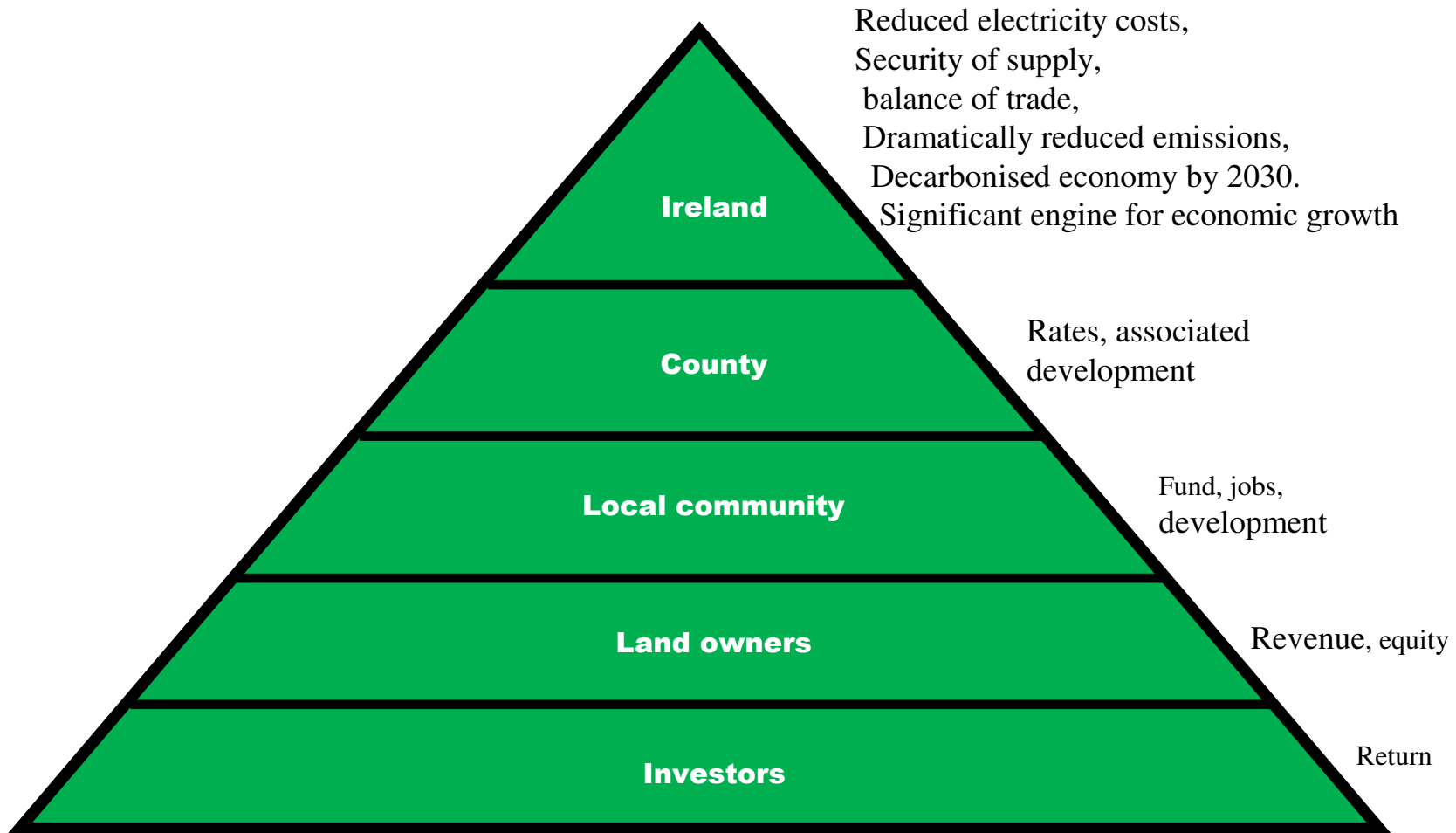
Our mandate is to develop a viable independent power industry in British Columbia that serves the public interest by providing cost-effective electricity through the efficient and environmentally responsible development of the Province's energy resources.

PHES Element



- **Sector Person Years**
- Construction 1040
- Manufacturing 1360
- Retail Trade 720
- Finance, Insurance & Real Estate 880
- Professional, Scientific & Technical Services 3200
- Accommodation & Food Services 880
- Other Industries 2160
- **Total 10320**

Project Benefits.



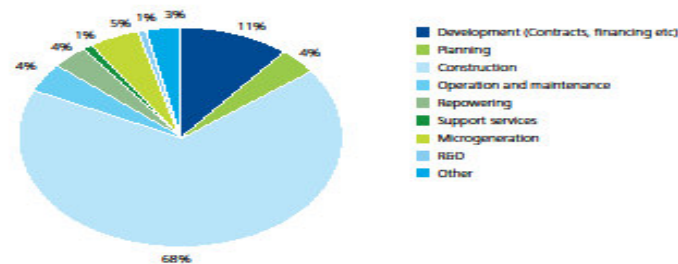
Jobs by Category

In addition to these employment numbers estimated by MW, there are further employment opportunities available in other areas of the sector relating to policy; Research & Development; support services and other which total to 935 potential jobs.

Construction provides the majority of the jobs opportunities available from the wind energy sector. Offshore wind development requires significant construction inputs in order to develop the large scale wind farm projects planned. The scale of expected development in both onshore and off shore, the wind sector offers great opportunities to a sector such as construction, which is currently facing downturn and rising unemployment. It is estimated

that approximately 7,258 jobs will be supported by the construction element of wind farms. Construction includes civil engineering, electrical engineering, labouring, project management, health & safety, turbine transport and cranes and further environmental analysis required to satisfy planning conditions. Also included within these figures are employment numbers in relation to ESB Networks and NIE in relation to the grid connections work required at each wind farm. These estimates do not include turbine installation as it was found during the course of the interviews that the international turbine companies typically install turbines in Ireland using their own internal teams rather than sub-contracting to local Irish firms.

Figure 13
Irish wind jobs by category



Source: IWEA and Deloitte Study

Wind Element Employment.

4. Estimate of Employment Potential

The outcome of our analysis is comparable with the results found by a study undertaken by the BWEA in relation to jobs in the UK wind energy sector by 2020 (1.33 jobs per MW installed) and the EWEA Study (for non-manufacturing related jobs).

By the nature of the source of energy harnessed in wind farms, wind farms tend to be located in outlying areas of the country. This is reflected in the employment numbers being widely dispersed around the country, focussed mainly in Connacht and Munster as outlined in Table 4.

Our analysis has shown that the wind energy sector in Ireland can support 1.50 jobs per MW to be installed on the island, resulting in just over 10,760 jobs being available across the sector up to 2020. This number includes construction operation and maintenance of all wind farms and assumes a steady growth in the industry over the period to 2020. Employment involved in planning, financing, constructing and maintaining MW and wind farms provides 1.37 jobs per MW to be installed. Support services such as administration, payroll and

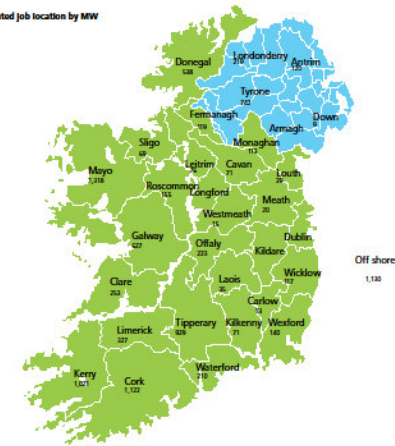
marketing/communications will provide 0.13 jobs per MW to be installed. The location of the MW and the jobs attached to their development totalling 9,831 of the potential jobs is shown in Figure 12. The estimate of employment figures does not take into account any ancillary service industries in the locality of the wind farm which would benefit from the construction of the wind farm and the presence of the people required to get the wind farm developed.

Table 4
Employment Numbers by Province

Connacht			Munster		
County	MW	Jobs	County	MW	Jobs
Galway	399.81	629	Clare	161.57	253
Mayo	840.89	1,318	Cork	716.05	1,122
Roscommon	98.75	155	Kerry	651.55	1,021
Sligo	43.9	69	Limerick	208.57	327
Leitrim	48.5	76	Tipperary	592.21	929
Total	1,431.85	2,245	Waterford	134.06	210
			Total	2,464.01	3,862
Leinster			Ulster		
County	MW	Jobs	County	MW	Jobs
Carlow	8.12	13	Antrim	138.35	120
Dublin	-	-	Armagh	-	-
Kildare	-	-	Cavan	45.32	71
Kilkenny	45.58	71	Derry	264.62	219
Laois	22.13	35	Donegal	343	538
Longford	-	-	Down	7.5	9
Louth	18.23	29	Fermanagh	166.21	119
Meath	12.65	20	Monaghan	72.09	113
Offaly	142.49	223	Tyrone	720.31	742
Westmeath	9.75	15	Total	1,757.4	1,931
Wexford	89.27	140			
Wicklow	74.62	117			
Total	422.84	663			
Off shore					
	MW	Jobs			
	720.89	1,130			

Figure 12
MW to be installed and Corresponding Employment

Estimated job location by MW



Source: BWEA

Added value Proposition

- Denmark benefits to tune of 14 jobs MW wind
- 14% of Germany GDP is from green Economy and growing
- Ireland can have local manufacture- Enercon
- Community involvement and ownership is central. Mount Callan Co-Op partnership Model
- Development of added value in IP and the development of emerging technologies, wave, bio-fuels.
- PHES (NE Power station) planning gains in amenities, interruptive centre, Significant environmental projects and research can be funded and development in partnership with

Iconic Clare



Iconic Developments



Doonbeg Golf course – a model development

Built Heritage.

