





Gaotha go Rothaí

Wind to Wheels

Fáilte Róimh







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Wind to Wheels

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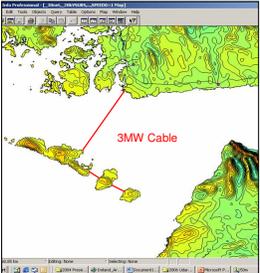
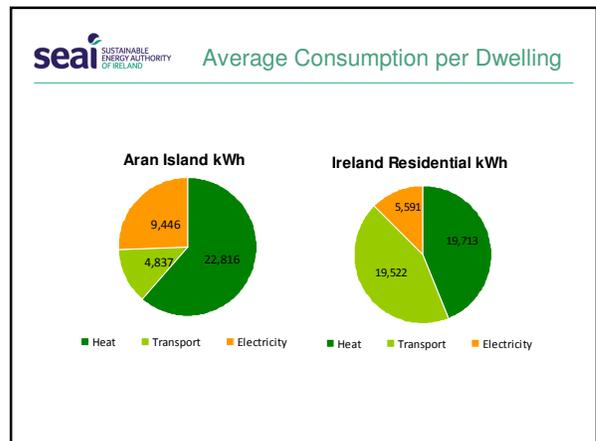
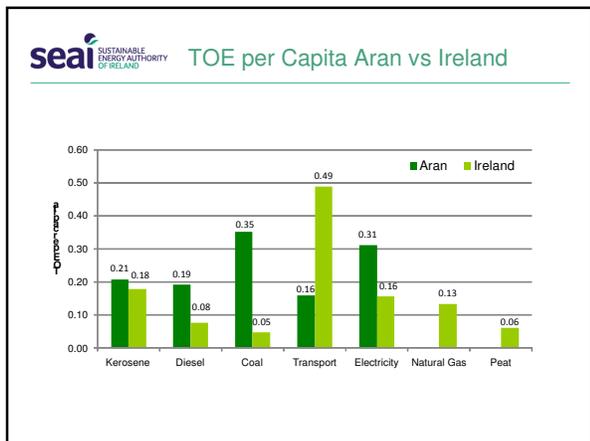
Overview

- Aran Islands Energy Snap Shot
- All Electric Wind/Ocean Concept
- Preliminary Study Results
- Technology Development and Demonstration:
 - Gaotha go Rothaí – Wind to Whels
 - Rationale & Goals
 - Components
 - The Cars

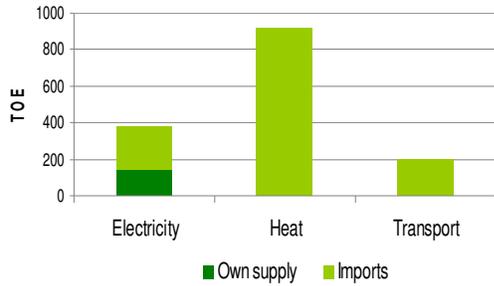


Energy Snap Shot of Aran Islands

- 1,500 Tonnes of Oil Equivalent**
 - 62% Heat (% coal, kerosene)
 - 25% Electricity
 - 13% Transport (8,400km av)
- 1.2mEuro Energy Bill for Islands pa**
- Renewable Energy Resources
 - Wind
 - Max Capacity = 3MW
 - 675kW wind farm on Inis Meain
 - Special Area of Conservation
 - Wave
 - 17.5MW within 5km (3MW!)
 - Tidal
 - Current speed <2m/s so tidal energy not viable

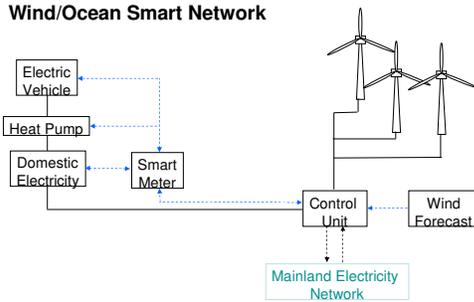
Aran Islands - Total Primary Energy (tonnes of oil equivalent)



Wind/Ocean Energy Powered System for Islands Aran...and Ireland

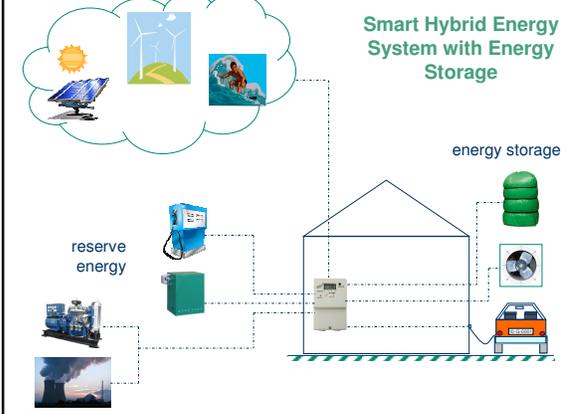
Why do we need a "Smart Grid"?

Wind/Ocean Smart Network



intermittent renewables

Smart Hybrid Energy System with Energy Storage



What is "Reserve"?

- Energy Source used when Wind is Unavailable
- Generated from mainly **imported fuels** – oil, gas, electricity
- Petrol, Diesel used in the case of a Plugin Hybrid EV
- (Kerosene for Heat)



- Power Station



- Diesel Gen/CHP



- Electricity Imports (UK)

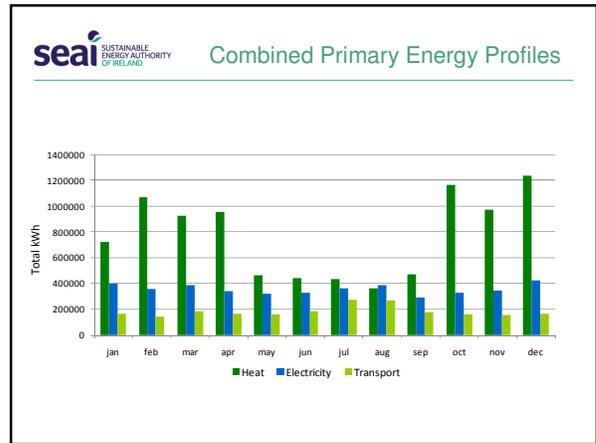
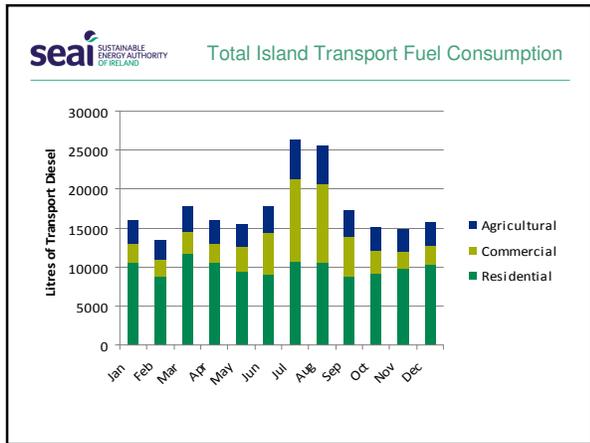
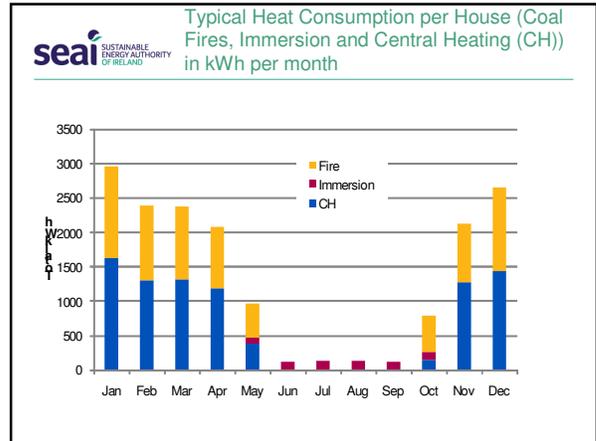
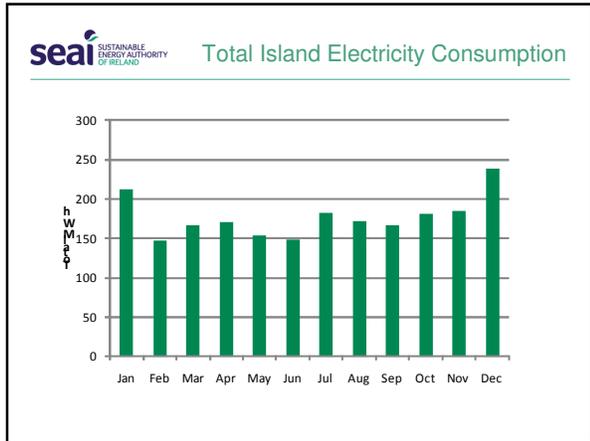


- Petrol/Diesel Pump



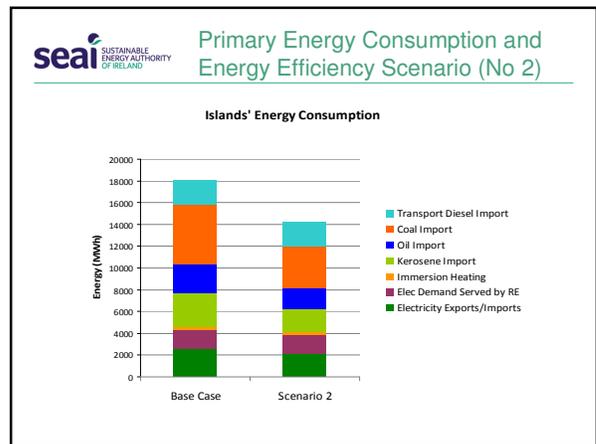
- (Kerosene)

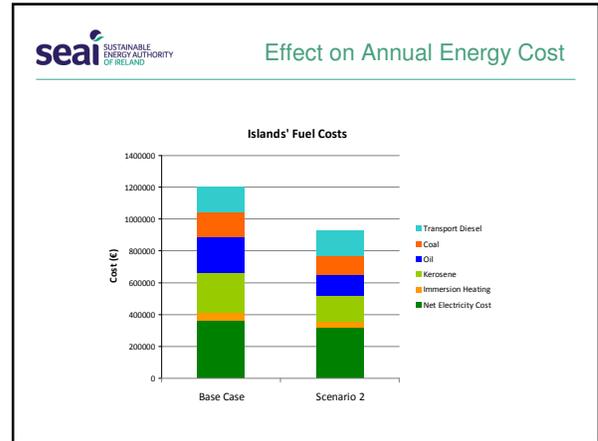
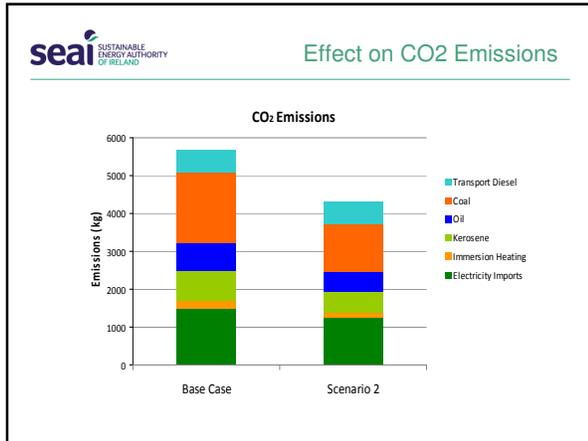
Aran Islands Study - Electricity, Heat and Transport Profiles



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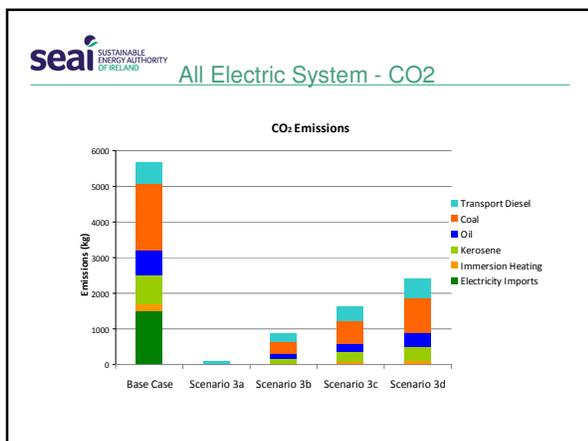
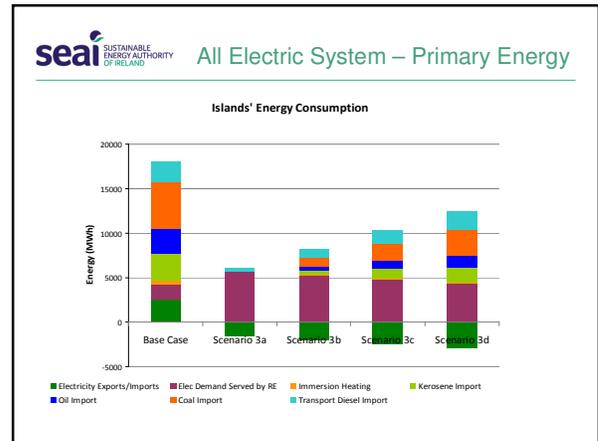
Step 1 – Energy Efficiency





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Step 2 – Smart Grid Wind/Ocean with Electric Vehicles and Heat Pumps – All Electric System



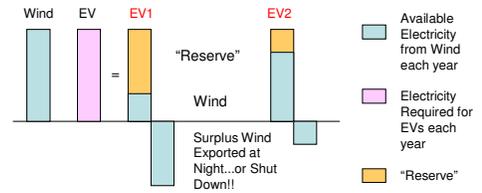
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Conclusions of Study

- Conclusion:**
 - There is sufficient Wind & Wave resource accessible to supply ~70% of Electricity, Heat & Transport....**but intelligent energy storage technology is required**
 - Irish Government Target is 16% Renewable Supply by 2020

Development of Smart Grid Technologies – Electric Vehicle Demonstration

How Can Storage Really Help Minimise Energy Imports for Transport (and Heat)?



Case 1 (EV1) = No Intelligent Storage
 Case 2 (EV2) = With Intelligent Storage (much higher wind utilisation)

Gaotha go Rothaí Project Rationale

- **Develop an Intelligent Autonomous Control System which**
 - Maximises Wind in Transport Usage
 - Minimises Energy Costs
 - Meets Customers consumption requirements reliably
 - Provide Blue Print for a National System
- **Demonstrate benefits of EVs**
 - Low fuel cost
 - High reliability and low maintenance costs
 - Increases future sustainability of life on our islands



The Components

- **Smart Charger Unit**
 - Smart Meter
 - Timer Switch
 - GSM Transmitter
 - 3hr Charge Over-Ride Button
- **Remote Receiver – Dublin**
 - 24hr electricity monitoring
 - Programming of Timers
- **Optimiser Algorithm – Remote Server**
 - Data from Wind Turbines & Market
 - Consumption Profile for Trial User
 - Daily Instructions to each Smart Unit



The Car – Mega ECity

- **220mpg or 1.3Litres/100km**
- **Annual Elect = 90-180 Euro**
- **Up to 80% fuel cost saving**
- Range = 60km (max length of Inis Mór = 15km, speed limit 50kph)
- Max speed = 60kph
- Aluminium Chassis and ABS Panels – low corrosion
- Regenerative Brakes – reduced brake wear, high efficiency
- Minimum parts count
- Charging at home - not dependent on boat supplies



Irish Project Contractors

1. Charge Point Manufacturers =
2. Electric Vehicle Suppliers =
3. Vehicle Owners and Trial Managers =

Go raibh maith agaibh.

Ceisteanna?

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