GenComm Generating Energy Secure Communities

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Overview

What is GenComm?

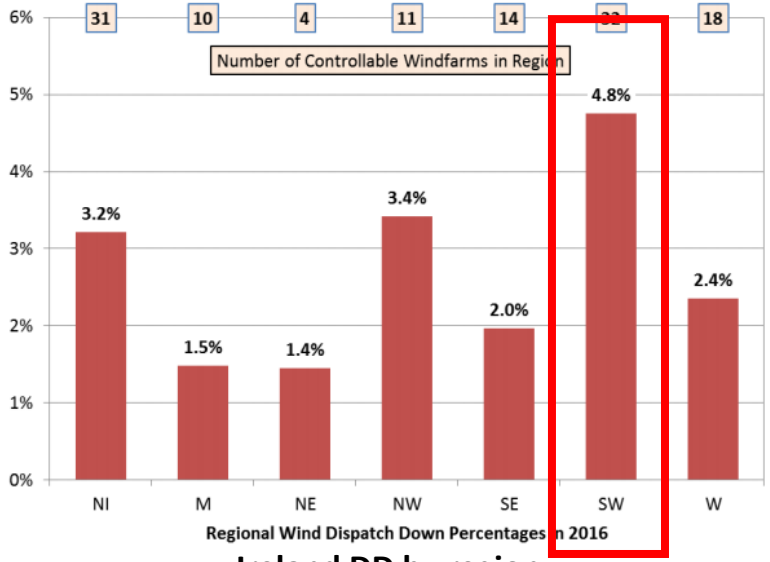
What will GenComm deliver?

Valentia Smart H2GO case study

Next steps for community-scale hydrogen

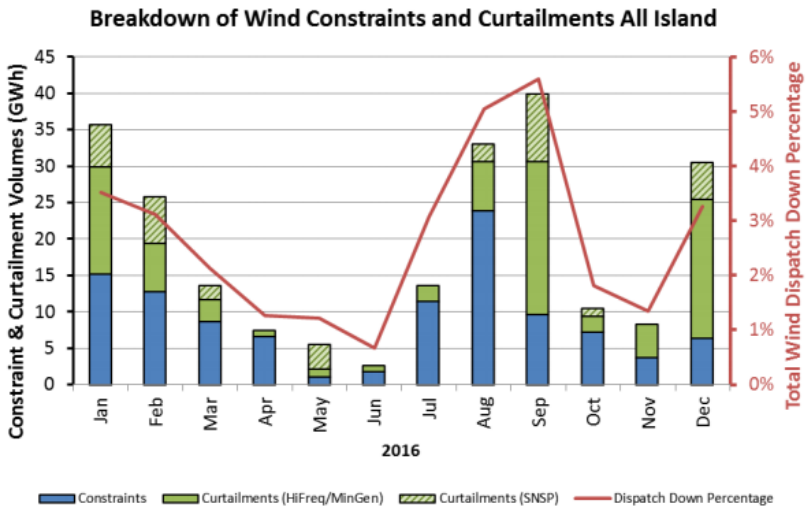
GenComm
Reducing Wasted Renewable Energy

- **G**enerating **EN**ergy secure **COMM**unities
- €9.3 million project 60% backed by EU Interreg NWE
- 10 partners, 5 countries, 3 pilot plants
- Focused on dispatch down (DD = curtailment + constraint) from grid's inability to support large amounts of variable renewables
- Will increase energy security and resilience in renewable-rich, energy-remote communities

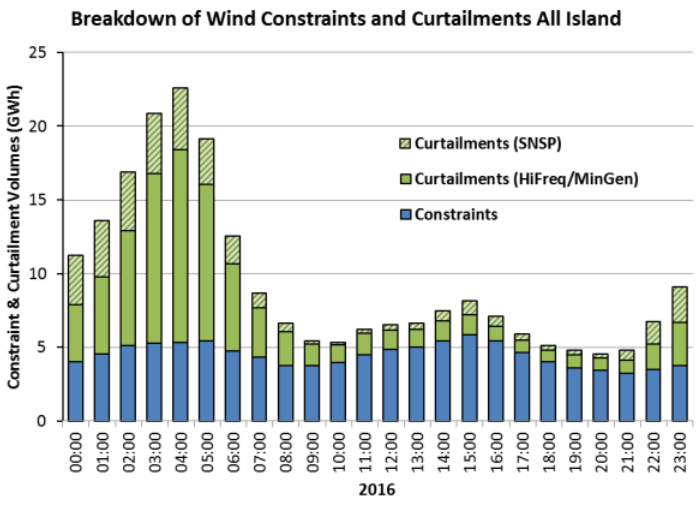


Ireland DD by region

Ireland DD by month

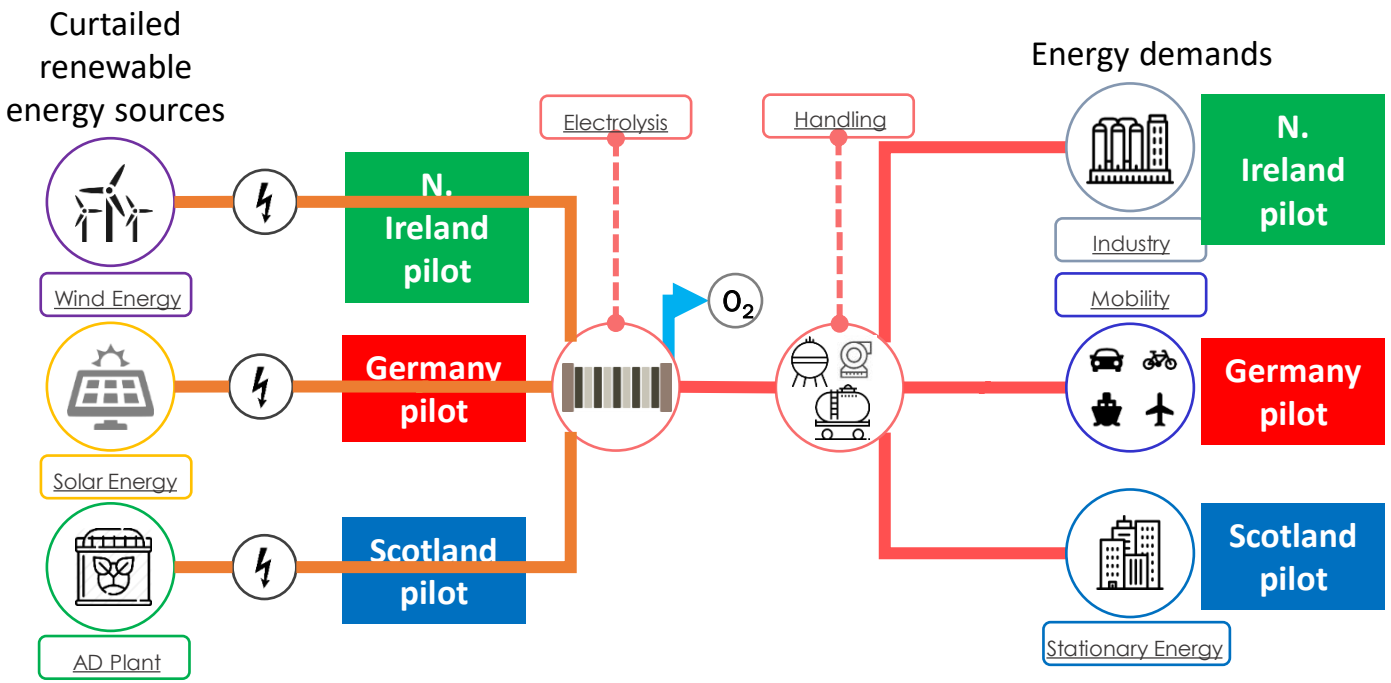


Ireland DD by time

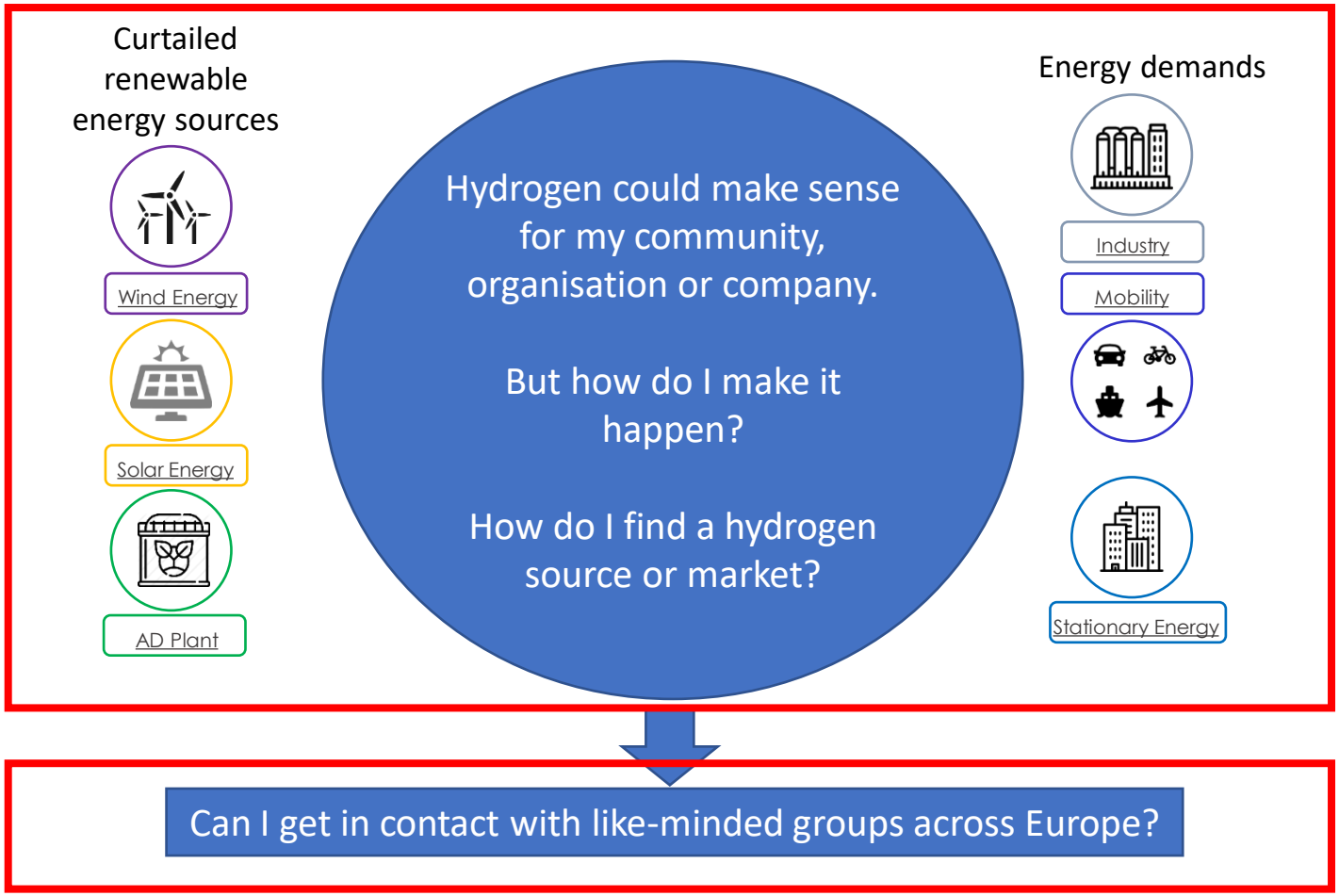


Source: Eirgrid Constraint and Curtailment Report, 2017

GenComm Renewable Hydrogen Pilot Plants



GenComm Deliverables Smart H2GO and CH2F



Smart H2GO Decision Support Tool

CH2F Community Hydrogen Forum

Valentia Smart H2GO Case Study – Objectives

1. To assess quantities of hydrogen needed to meet existing fossil fuel heating and transportation fuel demands.
2. To assess supply chains for different hydrogen production scenarios:
    1. Grid-supplied electrolyser (H_2 generator) on Valentia
    2. Electrolysers using curtailed power at existing wind farms in Kerry
    3. Electrolyser using (a) curtailed power and (b) all power at hypothetical renewable energy supply (RES) on Valentia

Valentia Smart H2GO Case Study – Energy Demands

Energy demand		Energy use (MWh/year) [1]	Assumption (kWh/kg)	Hydrogen demand (tonnes/year)
Heating	Factory	533	LHV H_2 = 33.33	16
	Large public building	33		1
	Large private building	156		5
Trans-portation	Delivery vehicle	69		2
	Buses	30		1
	Marine	58		2
Total		879		**26**

[1] Valentia Energy master Plan

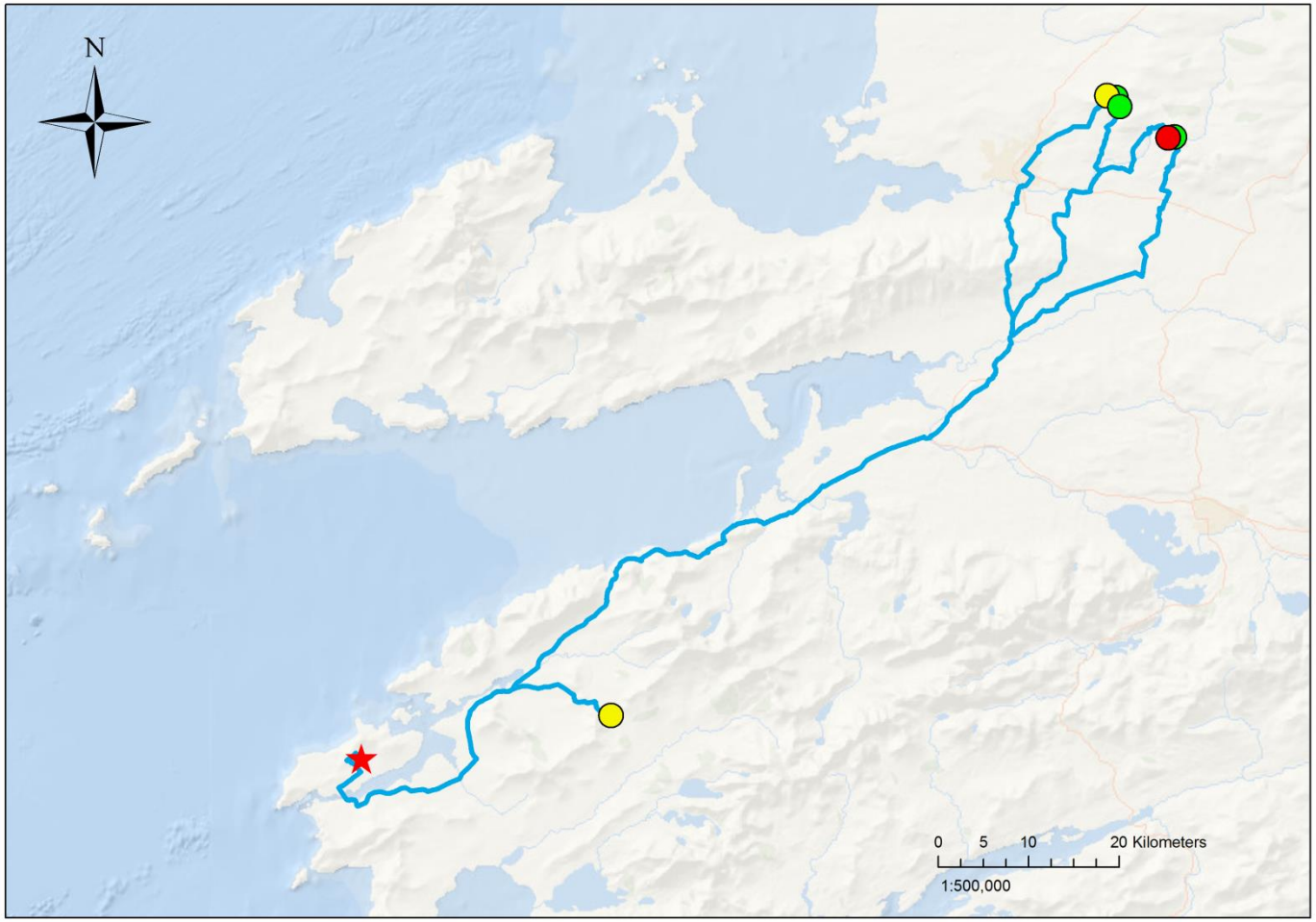
Valentia Smart H2GO Case Study – Results

Scenario	Description	Electrolyser Size & Location	Levelised Cost of Hydrogen	Comments
1	Grid-supplied electrolyser on Valentia	172 kW on Valentia	€18/kg	Hydrogen only as green as grid electricity. Pay for electricity.
2	Electrolysers using curtailed power at existing wind farms in Kerry	Medium to large electrolysers at wind farms 50-150 km from Valentia (see map)	€22/kg	Green H_2, low electrolyser capacity factors mean high costs. Low cost electricity.
3a	Electrolyser using curtailed power at hypothetical Valentia RES	478 kW electrolyser at on Valentia	€20/kg	Green H_2, low electrolyser capacity factors mean high costs. Low cost electricity.
3b	3a but using all power	Medium to large electrolyser on Valentia	€5-15/kg	Green H_2, higher electrolyser capacity factors mean lower costs. Low cost electricity.

1 kg of H_2 gives 200 km

H_2 for buses sells for €12/kg in London

Valentia Smart H2GO Case Study – Scenario 2 Supply Chain



Valentia Smart H2GO Case Study – Conclusions

- Energy demand on Valentia can be supplied by hydrogen, a zero-emission fuel.
- “Grey hydrogen” can be produced on Valentia at €18/kg.
- Green hydrogen can be produced from curtailed power at wind farms 50-150 km away at €22/kg.
- Green hydrogen can be produced at a hypothetical Valentia renewable energy supply at €5-20/kg.

Next Steps for Community-Scale Hydrogen

- Conduct the Valentia Hydrogen Feasibility Study.
- The Community Hydrogen Forum will launch in Q4 2019. Contact rory.monaghan@nuigalway.ie to be kept informed of progress.
- Join Hydrogen Ireland. Ask James Carton about this!
- The online Smart H2GO tool will be launched in Q4 2019.
- For any questions on community-scale hydrogen, contact rory.monaghan@nuigalway.ie.