



Renewable energy use in Irish waterworks

Renewable energy at water utilities

WARES Conference

Oulu 4th June 2014



Iarla Moran - Senior Executive Engineer, Mayo County Council



County Mayo

Contae Mhaigh Eo

- 3rd largest county in Ireland
- Population 130,000
- Principle Towns
 - Castlebar
 - Ballina
 - Westport
 - Claremorris
- Significant renewable energy resources



Mayo County Council

Comhairle Contae Mhaigh Eo



- Regulatory Authority
 - Implements laws
 - Makes regulations
- Local Authority
 - Implements government policies
 - Provides government services
- Development Authority
 - Moving county forward
 - Local Enterprise Office LEO



Mayo County Council

Comhairle Contae Mhaigh Eo



- Water Services - SLA
- Roads Authority
- Planning & Enforcement
- Housing
- Motor Tax
- Landfills & Amenity Centres
- Fire Service & Safety
- Civil Defence
- Marine
- Environment
- Parks & Playgrounds
- Swimming Pools
- Walks & Greenways
- Burial Grounds
- Beaches & Water Safety
- Libraries
- Arts Office
- Public Lighting



Mayo County Council

Comhairle Contae Mhaigh Eo



- Local Enterprise Office
- County Childcare Committee
- Sports Partnership
- Mayo Community Forum
- Mayo.ie
- Jackie Clarke Collection



Oifig Fiontair Áitiúil
Local Enterprise Office



Leabharlann Chontae Mhaigh Eo
Mayo County Library

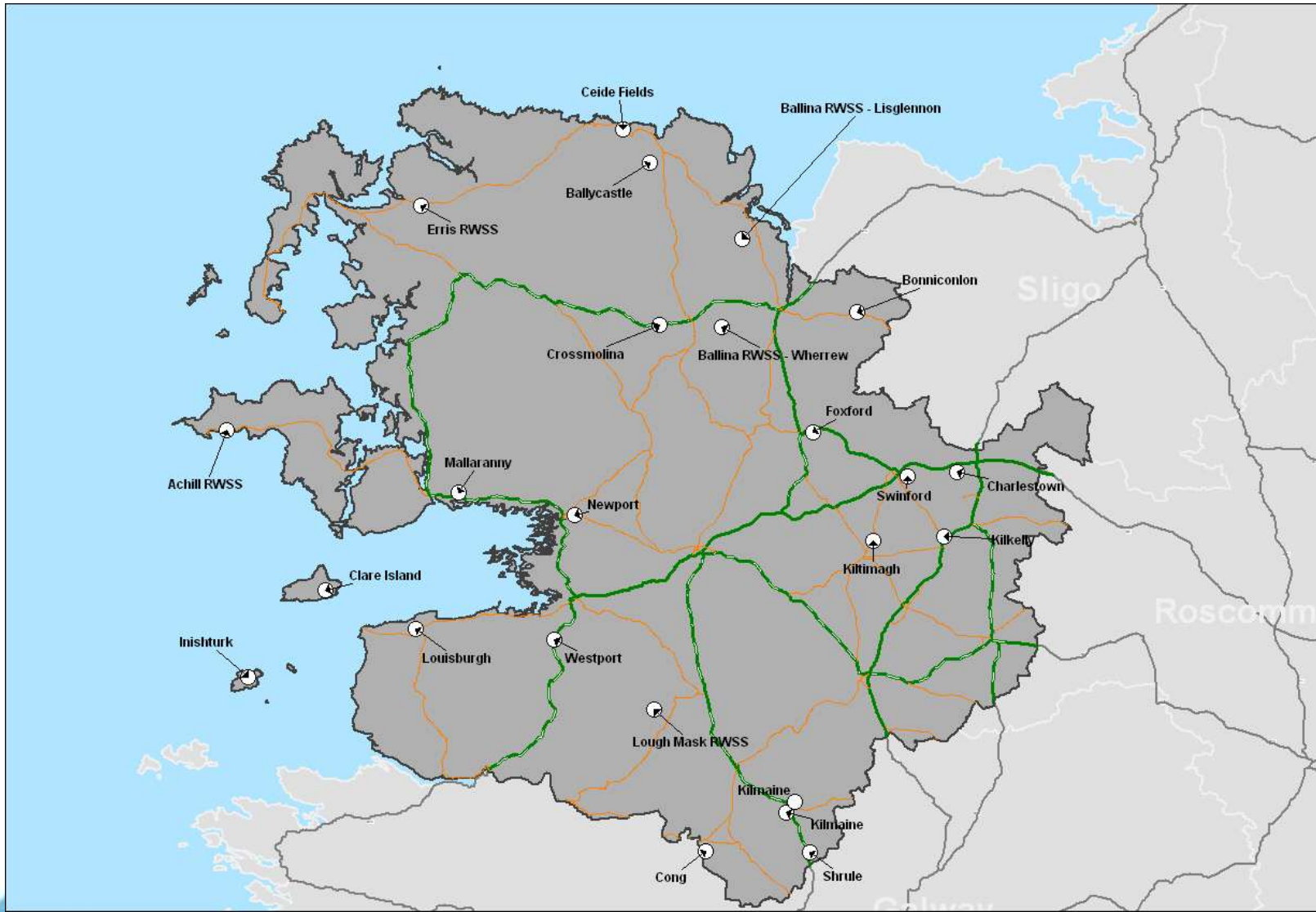


Water Services

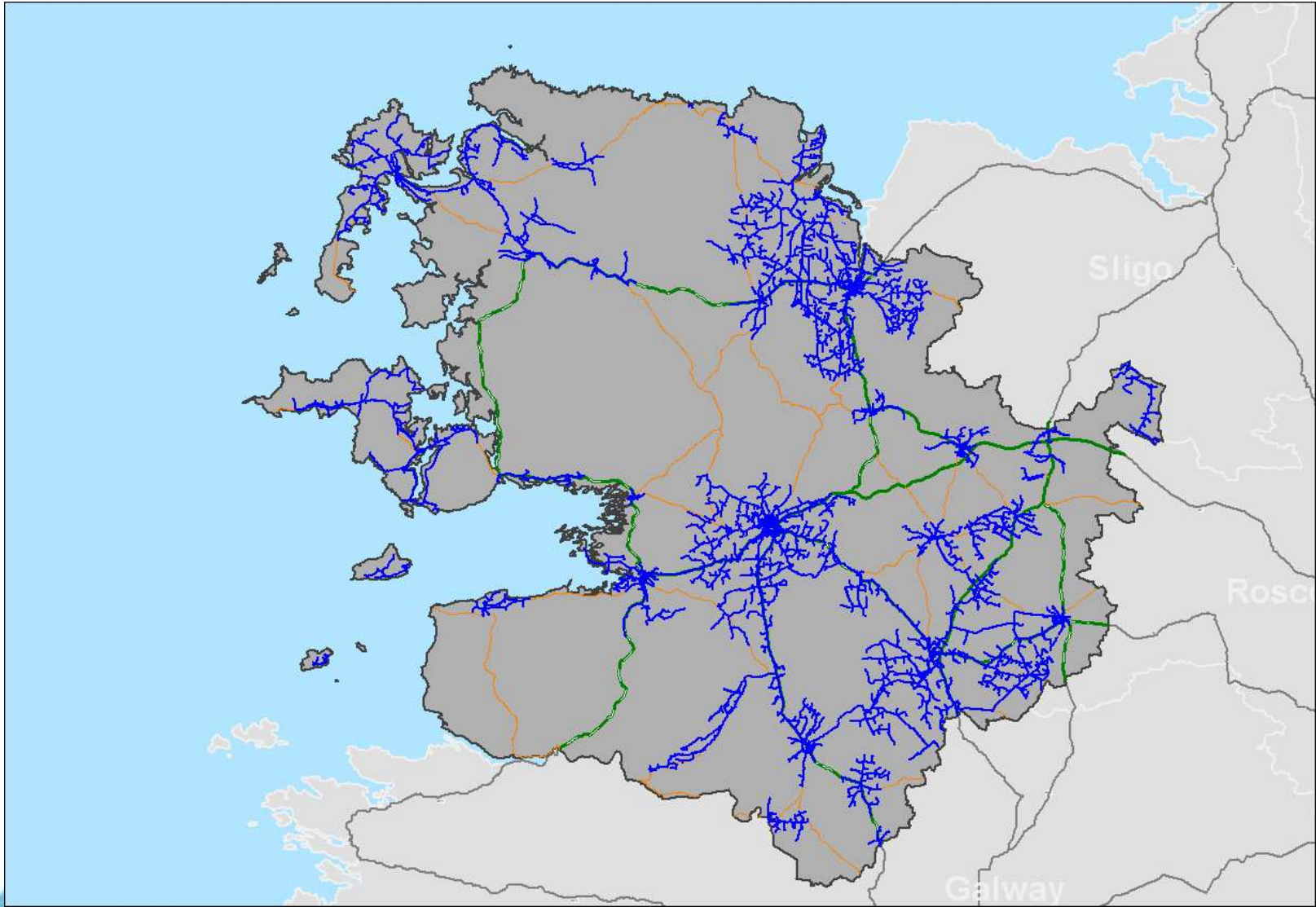
- 2,183 km of water mains
- 22 Water Treatment Plants
 - 32,500 domestic customers
 - 11,000 Non-domestic customers
- 230 Group Water Supplies
 - 160 fed off Public mains
 - 70 with private source
 - 7,200 domestic customers



Water Treatment Plants



Water Network

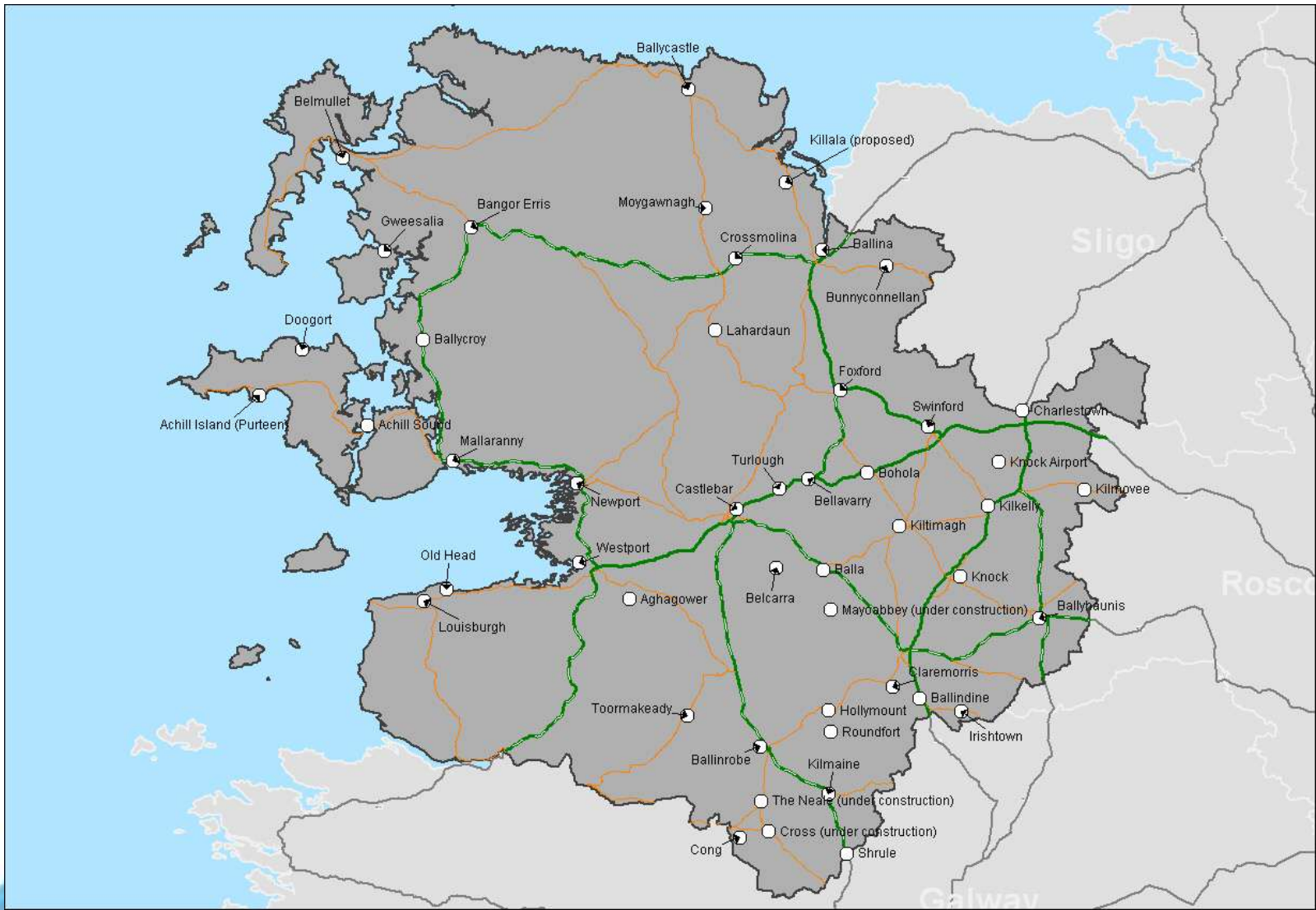


Waste Water Services

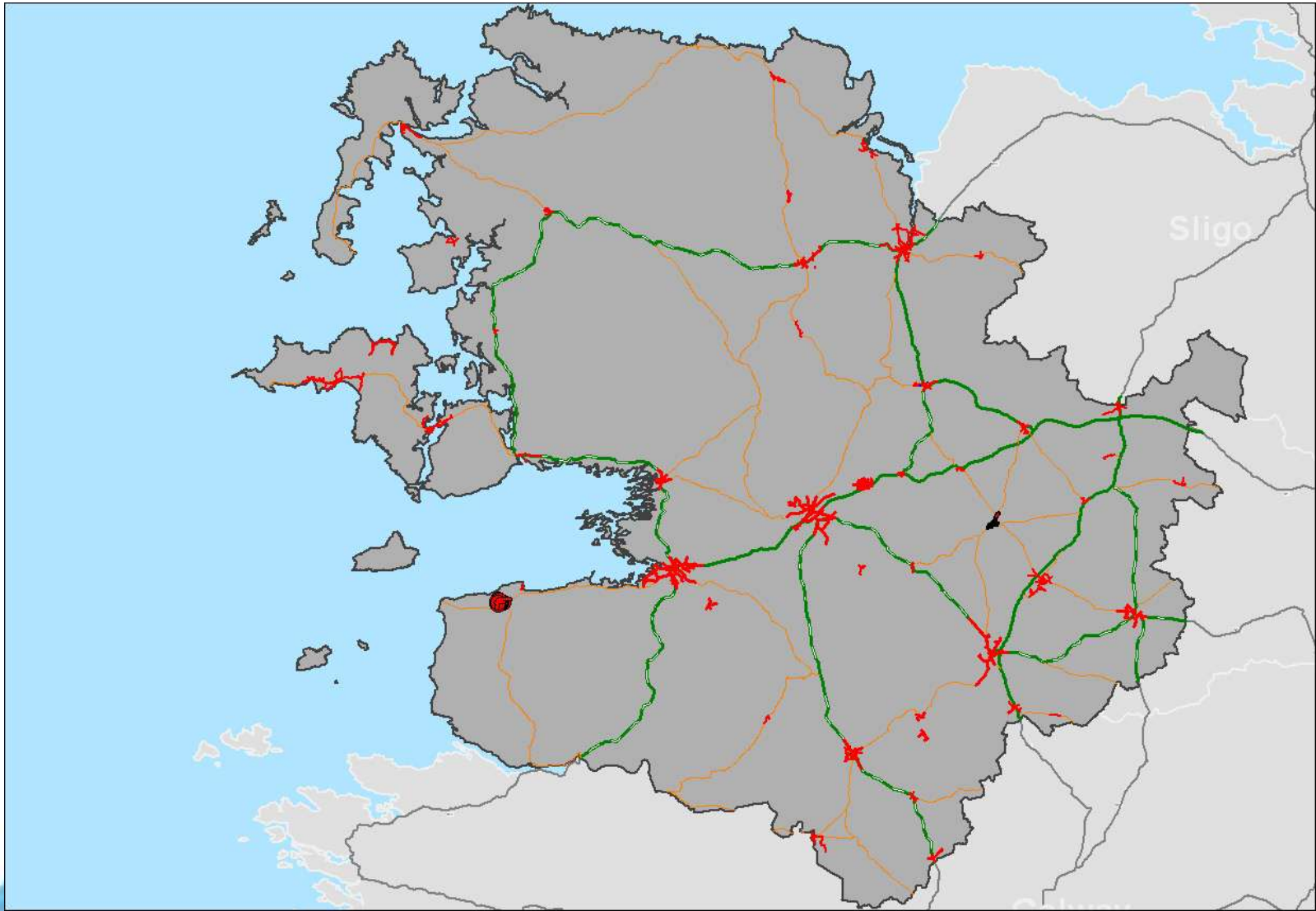
- 48 Waste water treatment plants
 - 21 large Plants
 - 27 small Plants
- 400 km of Sewerage Network



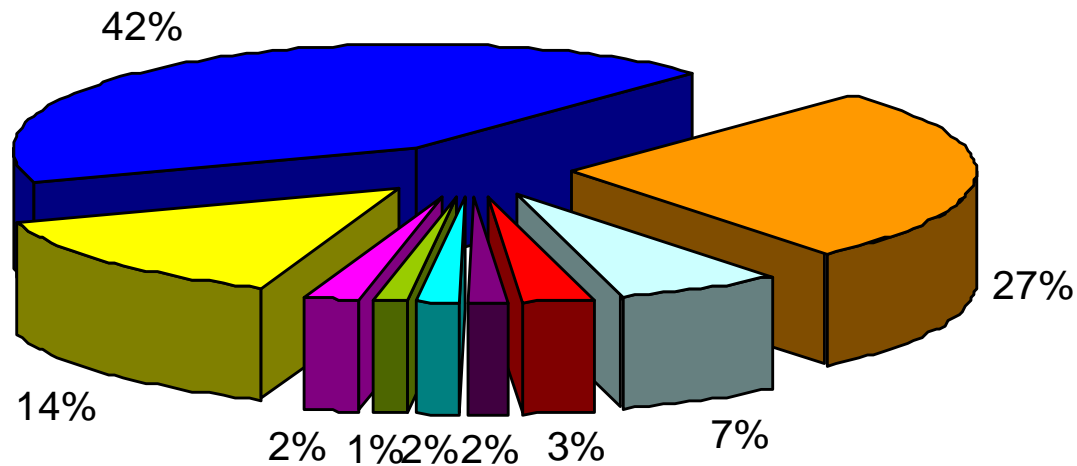
Waste Water Plants



Sewerage Network



Electricity Use Share



- Public Lighting
- Water
- Sewage
- Office
- Fire Stations
- Libraries
- Swimming Pools
- Landfills
- Other



Mayo Pilot Sites

- Mayo Assets (Irish Water)
 - 22 Water Treatment Plants
 - 48 Waste Water Treatment Plants
- Initial Assessment
- Cross section
 - Size, Location, Type, Scale, Ownership
- Technologies
 - Wind, PV, Hydro



Mayo Pilot Sites

#	Plant Name	Asset Type	Easting	Northing	Technology	Scale
1	Achill Island Central	Wastewater	62030	303860	Wind/Solar PV	50kW/10kW
2	Achill Regional	Water	58220	304520	Wind/Hydro	20kW/5kW
3	Erris Pumping Station	Water	81871	330704	Wind	100kW
4	Lahardaun	Wastewater	113179	311209	Wind/Solar PV	5kW/5kW
5	Lisglennon	Water	119890	327300	Wind	100kW
6	Lough Mask Scheme	Water	Countywide		In Conduit Hydro	100kW
7	Mayo Abbey	Wastewater	126170	280030	Solar PV	5kW



Pilot Site Locations



Mayo Pilot Sites

- Detailed feasibility
 - Excess embedded hydraulic energy study
 - Clar ICH
 - RETScreen – Tipperary Energy Agency
 - Engagement with Irish Water
 - Engagement with manufacturers and suppliers



#1 Achill Island Central



#1 Achill Island Central

Plant Details	
Type	Waste Water
Size	4,000 PE
Average Load	18kW
Annual Energy Cost	€25,226.00
Annual Energy Use	160MWh
Wind Speed (50m)	8.5m/s
Annual Energy/kW PV	900kWh



#1 Achill Island Central

Solar	
Technology	Solar PV
Size	10kW
Area	70m ²
Capital Cost	€17,000.00
Payback	12.4 years
10 Year NPV	-€2,149.00
10 Year IRR	1.10%
Plant Use	100%
Energy Production	9MWh

Wind	
Technology	Wind
Size	20kW
Hub Height	20m
Capital Cost	€100,000.00
Payback	7.7 years
10 Year NPV	€40,154.00
10 Year IRR	10.20%
Plant Use	100%
Energy Production	76MWh



#2 Achill Island Regional



#2 Achill Island Regional

Plant Details	
Type	Water
Size	2.2 MI/day
Average Load	12kW
Annual Energy Cost	€14,534.00
Annual Energy Use	108MWh
Wind Speed (50m)	8.5m/s
Average Flow	1,300m ³ /day



#2 Achill Island Regional

Hydro	
Technology	Hydro
Size	6kW
Head - Flow	60m - 15l/s
Capital Cost	€30,000.00
Payback	5.6 years
10 Year NPV	€41,679.00
10 Year IRR	18.10%
Plant Use	100%
Energy Production	40.9MWh

Wind	
Technology	Wind
Size	11kW
Hub Height	15m
Capital Cost	€55,000.00
Payback	6.4 years
10 Year NPV	€33,160.00
10 Year IRR	17.00%
Plant Use	100.00%
Energy Production	47.6MWh



#3 Erris Pumping Station



#3 Erris Pumping Station

Plant Details	
Type	Water
Size	4.5 Ml/day
Average Load	79.2kW
Annual Energy Cost	€98,876.00
Annual Energy Use	650MWh
Wind Speed (50m)	8m/s



#3 Erris Pumping Station

Wind	
Technology	Wind
Size	75kW
Hub Height	24m
Capital Cost	€375,000.00
Payback	7.4 years
10 Year NPV	€150,096.00
10 Year IRR	13.00%
Plant Use	100.00%
Energy Production	282.5MWh



#4 Lahardau



#4 Lahardaun

Plant Details	
Type	Waste Water
Size	500 PE
Average Load	1.15kW
Annual Energy Cost	€1,945.00
Annual Energy Use	10.1MWh
Wind Speed (50m)	7.25m/s
Annual Energy/kW PV	900kWh



#4 Lahardاون

Solar	
Technology	Solar PV
Size	4kW
Area	28m ²
Capital Cost	€6,800.00
Payback	8.5 years
10 Year NPV	€1,821.00
10 Year IRR	8.10%
Plant Use	100.00%
Energy Production	4MWh

Wind	
Technology	Wind
Size	3kW
Hub Height	10m
Capital Cost	€8,000.00
Payback	8.4 years
10 Year NPV	€2,371.00
10 Year IRR	8.60%
Plant Use	45.00%
Energy Production	4.5MWh



#5 Lisglennon



#5 Lisglennon

Plant Details

Type	Water
Size	4.5 Ml/day
Average Load	21.9kW
Annual Energy Cost	€30,807.00
Annual Energy Use	192MWh
Wind Speed (50m)	8.5m/s



#5 Lisglennon

Wind	
Technology	Wind
Size	25kW
Hub Height	25m
Capital Cost	€125,000.00
Payback	6.8 years
10 Year NPV	€68,388.00
10 Year IRR	16.00%
Plant Use	100.00%
Energy Production	108MWh



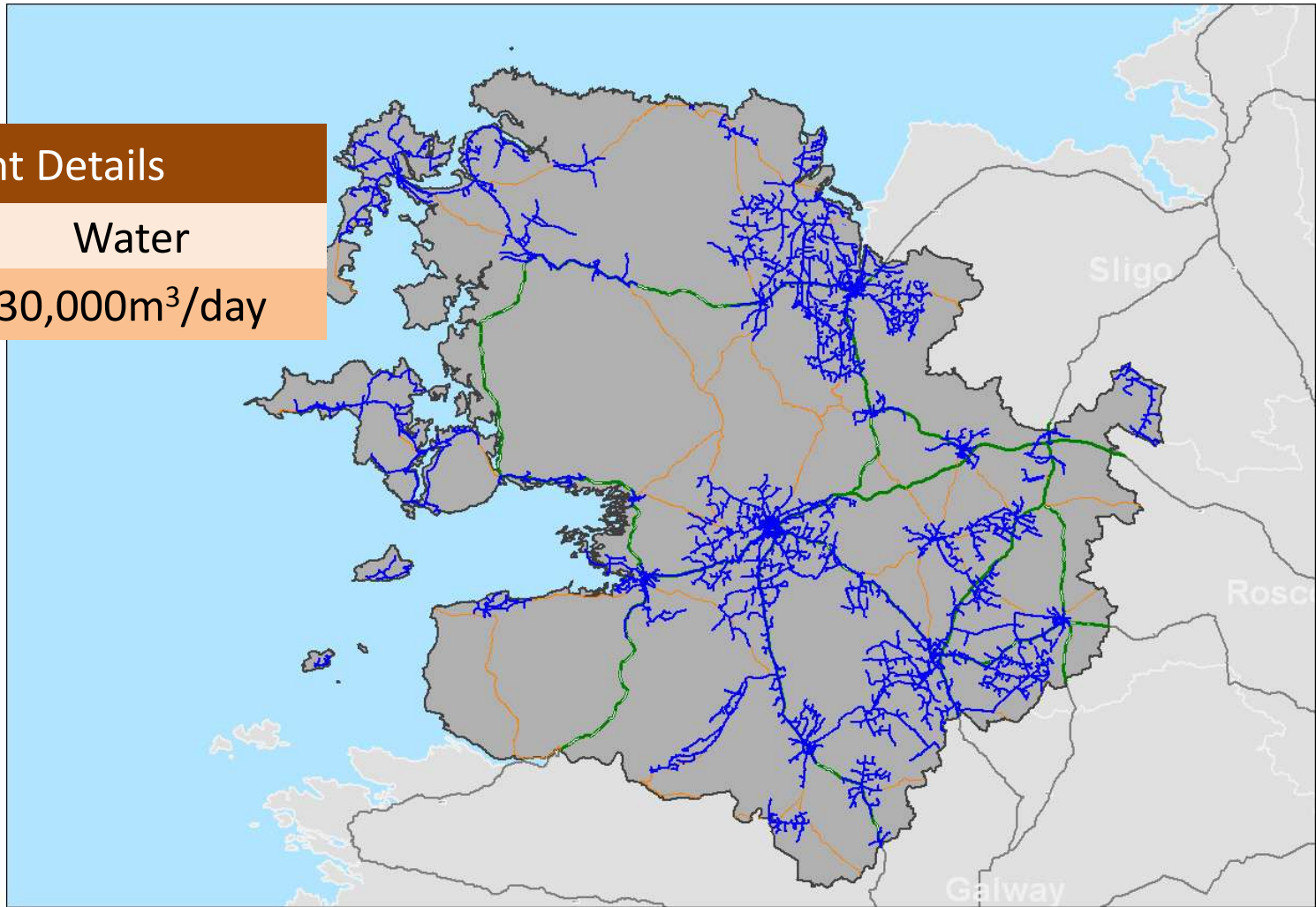
#6 Lough Mask Regional



#6 Lough Mask Regional

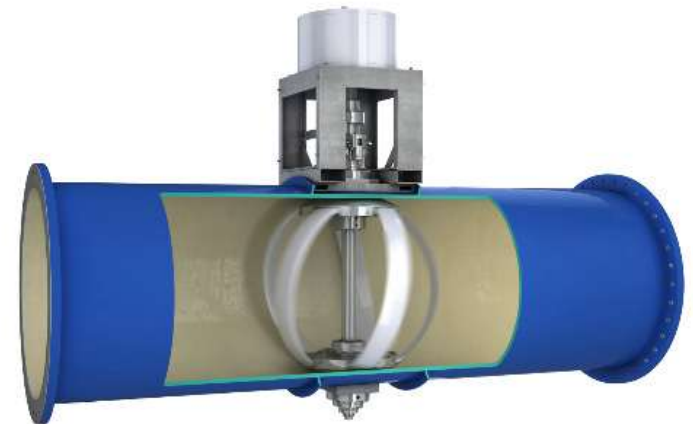
Plant Details

Type	Water
Size	30,000m ³ /day



#6 Lough Mask Regional

Hydro	
Technology	In-pipe Hydro
Size	14kW
Flow	1.1 - 1.4m/s
Capital Cost	€70,000.00
Payback	4.8 years
Energy Production	120MWh



#7 Mayo Abbey



#7 Mayo Abbey

Plant Details	
Type	Waste Water
Size	300 PE
Average Load	1.5kW
Annual Energy Cost	€2,628.00
Annual Energy Use	13MWh
Annual Energy/kW PV	850kWh



#7 Mayo Abbey

Solar	
Technology	Solar PV
Size	1.25kW
Area	12.25m ²
Capital Cost	€2,975.00
Payback	3.7 years
10 Year NPV	€5,816.00
10 Year IRR	30.30%
Plant Use	100.00%
Energy Production	1.53MWh



Mayo Pilot Sites

- Local Manufacturers
 - C&F Green Energy
 - Heverin Renewable Energies



Operating Sites



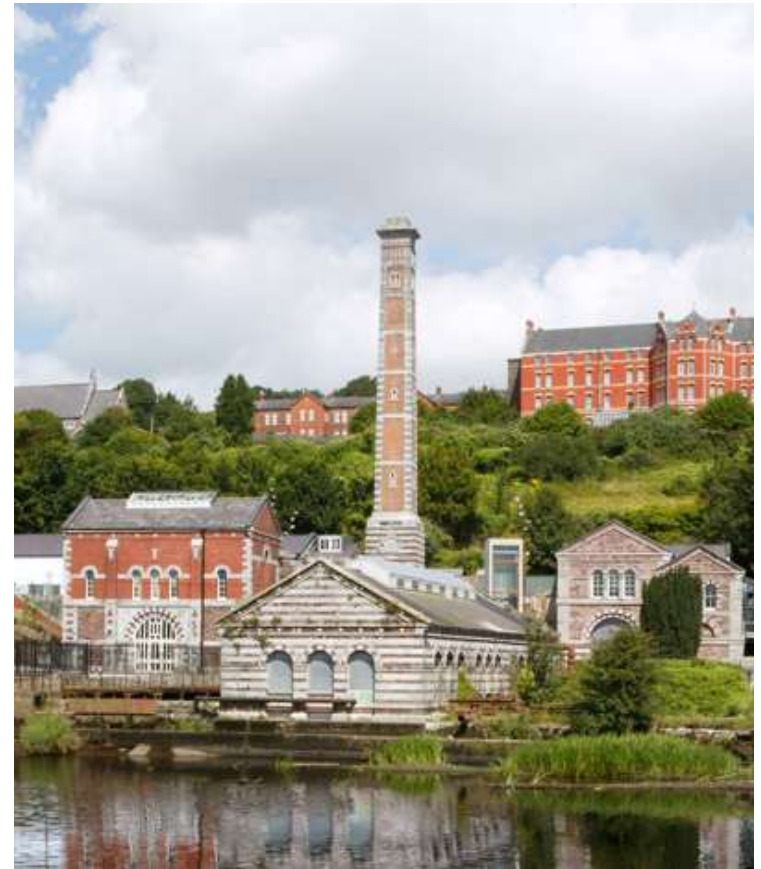
Vartry Reservoir

- Dublin City Council
- 90 kW Hydro
- Elevation difference
- 900mm pipe
- Electricity used on site



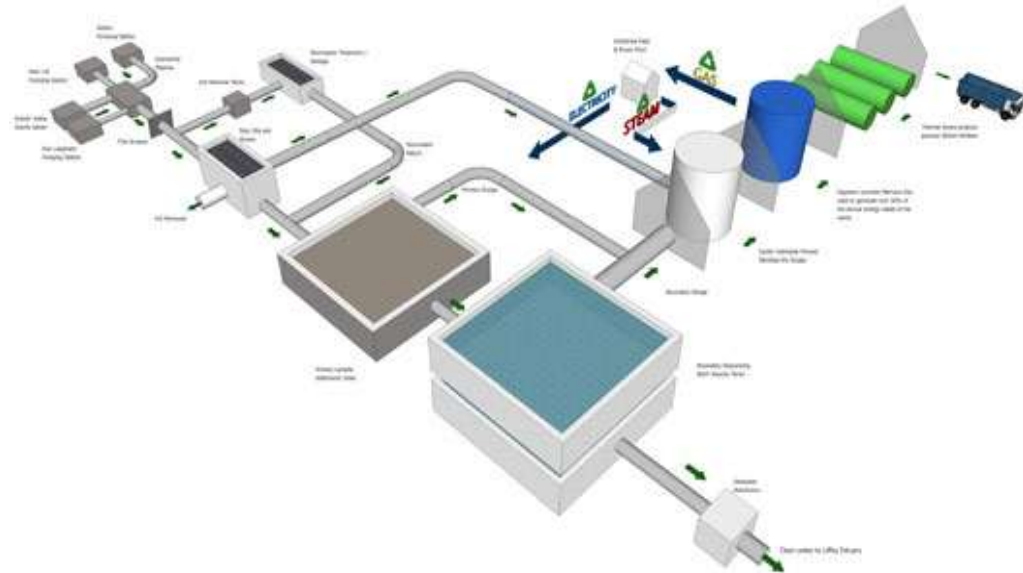
Lee Road Hydro Station

- Cork City Council
- Old city waterworks built 1890
- 5 turbines running pumps
- Refurbished & generators added 1990
- 265kW



Ringsend WWTW

- Dublin City Council
- 2.5 MW Biogas
- 2.1M PE
- 4 x 1 MW turbine
- Louth Co. Co.
 - Dundalk WWTW
 - Drogheda WWTW



Lough Guitane WTW

- Kerry County Council
- 250 kW Hydro
- Owgarrif river intake
157.5 mOD
- Turbine building 82.0
mOD
- Hag's Glen 1,250kW



Carna Cill Chiarain WTW

- Galway County Council
- 20 kW Wind
- C&F Green Energy
- Waterford Co. Co.
 - No. of micro wind



Thank You



www.mayococo.ie

