

E-Lighthouse Project Info

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e-Lighthouse project info background

2010 – 2013 IEEB INCREASING ENERGY EFFICIENCY IN BUILDINGS

2012 – 2014 RESCA RENEWABLE ENERGY SOLUTIONS IN CITY AREAS. PILOT AREA UTILIZING ENERGY EFFICIENT SOLUTIONS AND RENEWABLE ENERGY SOURCES INCLUDING HYBRID SOLUTIONS.

2014 – 2016 FUTURE BUILDINGS AND RENEWABLE ENERGY PILOT AREA UTILIZING ENERGY EFFICIENT SOLUTIONS AND RENEWABLE ENERGY SOURCES INCLUDING HYBRID SOLUTIONS



2016-2019 E-LIGHTHOUSE



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e-Lighthouse project info key components



Retrofitting of public buildings



Waste as energy and the reuse of waste



Smart energy solutions for public infrastructure and housing



Energy reduction solutions for buildings and waste management



Raising Awareness



Domestic energy retrofit



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WP1 ENERGY SAVINGS IN MUNICIPAL BUILDINGS AND LIGHTING

WP2

ENERGY-EFFICIENCY ADVICE AND ENERGY SAVING FOR DOMESTIC RENOVATION AND NEW BUILDINGS

WP3

IMPROVED WASTE UTILIZATION WASTE FOR ENERGY AND REUSE

WP4

EVALUATION, VALIDATION OF TRANSNATIONAL PRACTICES

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WP1 ENERGY SAVINGS IN MUNICIPAL BUILDINGS AND LIGHTING

WP2

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ENERGY-EFFICIENCY ADVICE AND ENERGY SAVING FOR DOMESTIC RENOVATION AND NEW BUILDINGS

WP1 CORK COUNTY COUNCIL CITY OF OULU CITY OF UMEÅ BODÖ SCOTLAND GREENLAND

WP2 CITY OF OULU ALL

KIERTOKAARI OULU

CORK COUNTY COUNCIL

WP3

UMEÅ

BODÖ

GREENLAND



WP3 IMPROVED WASTE UTILIZATION WASTE FOR ENERGY AND REUSE

WP4

EVALUATION, VALIDATION OF TRANSNATIONAL PRACTICES



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Regional Development Fund

NORDLAND RESEARCH INSTITUTE

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WORKPACKAGES

WP1 ENERGY SAVINGS IN MUNICIPAL BUILDINGS AND LIGHTING

WP2

ENERGY-EFFICIENCY ADVICE AND ENERGY SAVING FOR DOMESTIC RENOVATION AND NEW BUILDINGS

WP3 IMPROVED WASTE UTILIZATION WASTE FOR ENERGY AND REUSE

PROCEDURES

250 public buildings
retrofitted (5% less energy,
3% more renewables)
40 deep renovation

2500 houses retrofitted (25% better energy efficiency)
2000 new houses with better energy qualification (10%)

Reduce energy use by **15%** in waste management 20% less CO2

SMART SOLUTIONS (examples 12/16)

- **1** Energy Management Software Tool (Ireland)
- **2** County Hall Campus Solar Shading (Ireland)
- **3** ISO 50001 Energy Management)Ireland)
- **4** Energy visualization in public kitchen
 - Geothermal heating in municipality building (Oulu)
- 6 Sustainable Energy Communities SEC concept (Ireland)
 7 Best Practice for utilising 3D Modelling for Energy Efficiency (Scotland)
- **8** Smart Energy monitoring to influence behavior (Ireland)
- Energy signature as a tool to identify building's energy use variations (Sweden)
 - MivaMag Technology for Wastewater treatment (Norway)
- **11** Waste incineration models (Oulu)
 - Gas purification plant for biogas (Oulu)



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e-Lighthouse project - example 1 Retrofitting of public buildings

WP1 ENERGY SAVINGS IN MUNICIPAL BUILDINGS AND LIGHTING

UMEÅ (Sweden)

Energy savings in municipal buildings and lightning **Energy saving actions** 44 buildings with improves energy

efficiency

Implemented actions includes:

- LED light
- Ventilation upgrade
- Upgraded steering and control systems





Energy saving results

- Baseline energy use 29288MWh-> energy use after actions 28058 MWh
- Total energy savings **4,2%**



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Final seminar presentation Erik Eklund, City of Umeå Gireesh Nair, Umeå University

e-Lighthouse project - example 2 Energy Efficiency in Households

WP2

ENERGY-EFFICIENCY ADVICE AND ENERGY SAVING FOR DOMESTIC RENOVATION AND NEW BUILDINGS

UMEÅ (Sweden)

• 180 households with improved energy efficiency

Actions included

- heat pump (geo / air)
- insulation of attic/walls
- behaviour actions, guidance



Enchaced energy advice:

- follow up consultations
- data collection
- spesific actions

Energy saving results

• Energy savings of appr. 11%

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Investing in your future European Regional Development Fund *Final seminar presentation Erik Eklund, City of Umeå Gireesh Nair, Umeå University*

WP2

ENERGY-EFFICIENCY ADVICE AND ENERGY SAVING FOR DOMESTIC RENOVATION AND NEW BUILDINGS

NCE Insulation Ireland

• 24 retrofit measures evaluated

Actions included

- Compact fluorescent lamps
- Full window replacement
- Mechanically assisted power flushing and magnetic filtration system
- External door replacement
- External wall insulation
- Cavity wall insulation





Actions included

- Air to water heat pumps with FIC
- Air to air heat pumps with FIC
- Solid fuel room heater
- High efficiency gas or oil fired boiler with integrated heating controls upgrade
- Electric energy monitor
- Roof insulation

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Retrofit Measures	P1	P2	P3	P4	P5	P6	TOTAL	%
Compact Fluorescent Lamps (CFL's)	75	133		107	90		405	54.14%
Full window replacement		13	82	76	120	46	337	45.05%
Mechanically Assisted Power Flushing and magnetic filtration system		36	84	64	93	44	321	42.91%
External door replacement		6	32	70	120	49	277	37.03%
External Wall Insulation		33	68	72	77		250	33.42%
Cavity Wall Insulation	67	70	54	24	18		233	31.15%
Air to water Heat Pumps with FIC		5	21	60	93	44	223	29.81%
Air to Air Heat Pumps with FIC		66	51	3	36	3	209	27.94%
Solid Fuel Room Heater		22		58	96	47	223	29.81%
High Efficiency Gas or Oil Fired Boiler with integrated heating controls upgrade		32	63		10		105	14.04%
Electric Energy Monitor					49	49	98	13.10%
Roof Insulation	8	15	58	2	4		87	11.63%



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Retrofit Measures	P1	P2	P3	P4	P5	P6	TOTAL	%
Attic Insulation	25	21	27	9	4		86	11.50%
Light Emitting Diodes (LED's)					36	49	85	11.36%
Roof Ventilation	25	20	21				66	8.82%
Solar Thermal			3			49	52	6.95%
Hot water cylinder jacket	10	11	9	6	1		37	4.95%
PV Panels					36		36	4.81%
High heat retention hot water cylinder					36		36	4.81%
Mechanical Extraction Vent	11	7		6	7		31	4.14%
Draught Proofing	3	5	12	2	3		25	3.34%
Wall ventilation	8	7		7			22	2.94%
Magnacleanse				15			15	2.01%
Entry level heating controls upgrade			1				1	0.13%
BER Assessments	76	134	189	132	168	49	748	100.00%



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Impact of different retrofitting measures

	ltem	Measure	Energy Rating (Label)	Energy Consumption (kWh/m ² /year)	Running Costs (Gas @ 6.0c/kWh) (Solid Fuel @ 5.0c/kWh) (elec @ 15c/kWh)	Annual Savings	% Savings	Capital Cost	Payback (Years)		
	1	Current Condition	F	425.93	€1,934	N/A	N/A	N/A	N/A	Basic	
	2	Roof insulation (300mm MW)	F	396.88	€1,797	€137	7%	€1,060	7.8	0	Τ
	3	Cavity wall insulation (100mm bead)	D2	295.16	€1,319	€615	31%	€1,235	2.0	Core	
	4	Heating controls upgrade	E2	346.62	€1,490	€443	19%	€2,200	5.0	Retrofit	
	5	Multifuel stove	F	389.93	€1,794	€139	8%	€1,200	8.6		V
ltems 1 - 5	6	Complete core retrofit	C2	184.34	€808	€1,125	57%	€5,695	5.1		
ltem 6 +	7	Air to water heat pump (390% eff)	B2	111.56	€482	€1,452	74%	€12,195	8.4		个
Item 6 +	8	PV system (1.2kWp per house)	B2	121.96	€720	€1,213	71%	€8,195	6.8		
ltem 6 +	9	Solar thermal system	B3	128.23	€521	€1,413	70%	€8,895	6.3		J
ltems 6 - 9	10	Combined heat pump, PV & solar thermal system with smart controls	B1	82.45	€447	€1,486	81%	€17,895	12.0		
		Less SEAI grant aid (30%)						-€5,369		Plus	个
		Less local authority subsidy						-€2,000			
		Less energy supplier subsidy						-€900		Subsidies	\checkmark
		Net totals				€1,486	81%	€9,627	6.5		









Cork City Council Housing Regeneration at Mayfield



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