

# secure

smarter energy communities



## Best practices in SECURE partner regions

Kaija Saramäki (ed.)



Northern Periphery and  
Arctic Programme  
2014–2020



EUROPEAN UNION

Investing in your future  
European Regional Development Fund

KARELIA UNIVERSITY OF APPLIED SCIENCES

*Publication Series* B:53  
*Chief Editor* Kari Tiainen  
*Editor* Kaija Saramäki  
*Graphic Design* Salla Anttila  
*Layout* Kirsi Taskinen

© Authors and Karelia University of Applied Sciences

No part of this publication may be reproduced without  
the prior permission as provided by the Copyright Law in Finland.

ISBN 978-952-275-253-6

Karelia University of Applied Sciences  
julkaisut@karelia.fi

# Best practices in **SECURE** partner regions

Kaija Saramäki [ed.]

This publication has been produced with the assistance of the European Union.  
The contents of this publication is the sole responsibility of the SECURE consortium  
and can in no way be taken to reflect the views of the European Union.

KARELIA UNIVERSITY OF APPLIED SCIENCES 2018  
JOENSUU, FINLAND



# 1. SECURE PROJECT

Smarter Energy Communities in Northern and Arctic Regions (SECURE) project is a project funded by the Northern Periphery and Arctic Programme (NPA). The project runs for three years, from May 2016 to the end of April 2019. SECURE is implemented by eight partners in six countries and is coordinated by the European Regions Network for the Application of Communications Technology (ERNACT).

The NPA funds projects that are beneficial to the programme area's competitiveness and/or entrepreneurship, promote the use of renewable energy and energy efficiency and/or address cultural and natural heritages. The programme area is nine partner countries, which share similar features, including low population density, low accessibility, low economic diversity and high impact of climate change. The geographical differences are present but the aforementioned features are present in many of the partner countries or areas. Because of the similarities, the areas share challenges and opportunities, which can be shared, overcome and realized by cooperation between the areas.

SECURE addresses the NPA priority issue 4: Fostering Energy-Secure Communities through Promotion of Renewable Energy and Energy Efficiency and its specific objective Increased use of energy efficiency and renewable energy solutions in housing and public infrastructures in remote, sparsely populated areas. The aim of the project is to transfer good practices of energy solutions for housing and public infrastructure within the project countries. The project is targeting local authorities, which can implement the energy solutions in their own properties and infrastructure. The communities can learn from the other communities, transfer and possibly

modify the knowledge in their own communities.

The eight project partners complement each other in expertise and competence in housing, public infrastructure and renewable energy. The partners are from Ireland (three), Sweden, United Kingdom, Finland, Canada and the Faroe Islands. The partners can be categorized as local authorities, an energy directorate, university and energy agency. The partners are:

- » **European Regions Network for the Application of Communications Technology (ERNACT), Ireland**, coordinator. ERNACT is an international network of European regional and city public authorities that work together to access European Union digital technology programmes and funding for the benefit of their areas, companies and universities.
- » **Donegal County Council (DCC), Ireland**. DCC is the local government authority for County Donegal and is made up of 37 elected members. The members are elected to one of five Municipal districts in the County and the combined 37 members make up the Plenary Council. The elected members are responsible for considering and making policy in a range of areas. The Executive of the Council is made up of the Chief Executive, 5 Directors of Services and the staff, at various grades, and they provide a range of functions and service under the headings of: i) Community Enterprise and Planning, ii) Finance, Information Systems and Emergency Services, iii) Housing Corporate and Cultural Services, iv) Roads and Transportation and v) Water and Environment.

- » **Leitrim County Council (LCC), Ireland**. LCC is also a local government authority, a county council, responsible for Leitrim County's public services such as planning, building control, waste and water services, etc.
- » **Association of Local Authorities in Västernorrland (ALAV), Sweden**. ALAV is an association of seven local authorities, municipalities. Its main assignment is to protect the mutual interests of all of its seven municipalities. It is also responsible for the Regional Energy Agency.
- » **Derry City and Strabane District Council (DCSDC), Northern Ireland**. DCSDC is a city and district council responsible for the public services (building control, environment, waste and water, etc) of the area.

- » **Faroese Earth and Energy Directorate (Umhvørvisstovan), Faroe Islands**. Umhvørvisstovan is a local energy authority responsible for the public energy policy.
- » **Karelia University of Applied Sciences (KUAS), Finland**. KUAS is a university with high quality research and development activities especially within the renewable energy sector.
- » **Ecology Action Centre (EAC), Canada**. EAC is a public organization working towards a more sustainable Atlantic Canada. It works at regional, national and international level.

The common territorial challenges that the project will tackle in the project areas are the



## 2. INTRODUCTION

high cost and lack of competition in supplying power due to geographic location on the outskirts of Europe and North America, low population densities, cold climate, high relative proportion of income spent on fuel and need to realise the potential of renewable resources. SECURE spans 7 regions - with a mix of maturity levels, climatic backgrounds and solutions.

The project aims at increasing the capacity of the local authorities regarding energy efficiency and use of renewable energy. Increased capacity will reflect in the whole community: clean air, lower costs energy for the authorities resulting in lower costs per inhabitant and possibly lower cost of public services. The capacity building requires knowledge of different energy solutions, developing know-how in technologies. This will be gained from the other project partners or

through other network activities. The good practices can be transferred from one region to another or within the region between different partners.

The communities participating in the project as well as other communities specifically in colder climates, can use these analysis' as a reference to what kind of indicators and elements can be looked at when assessing energy consumption and carbon emissions at a local authority level. The other material produced in the project, for example, the good practices, are a good additional support to the communities. The communities, whether regional or local administration or smaller public or private units, have the potential to make a significant impact on energy policy and its implementation on housing, public buildings and infrastructure.



SECURE project team in November 2017

The best practices have been executed in the SECURE partner regions and have involved public and private instances as well as companies and associations. The practices are examples of actions that can be taken to reduce the carbon footprint and eventually lead to behavioral change by example. The partners have sought for resource-efficient and sustainable practices that can be transferred directly or modified before use in the new setting.

The best practices are arranged according to the indicators of the Northern Periphery and Arctic Programme:

- » Renewable energy services and solutions for public infrastructures and housing, *for example retrofits of heating systems and production of electricity*
- » Products developed utilizing by-products from economic activities, *for example use of saw dust, short rotation coppice and waste as energy*
- » Smart energy management solutions, *for example intelligent control systems of lighting, heating, networks of energy actors, community initiatives*

All of the best practices show either reduction of energy consumption or reduction of CO<sub>2</sub> emissions. Energy consumption can be reduced by using more energy efficient equipment and improving air tightness of buildings whereas reduction of emissions are most commonly a result of such activities. CO<sub>2</sub> emissions are also reduced by shifting from using fossil fuels to using renewable energy.

The best practices are not only straight forward actions in reducing the energy consumption or CO<sub>2</sub> emissions but also related to the community, its inhabitants and economic situation. Some best practices are looking out for the wellbeing of inhabitants in the lower income classes and by executing energy efficiency measures, the households can improve their quality of life. The communities benefit from the activities through saving costs of heating public properties and upkeep of infrastructure (for example street lighting). The savings eventually benefit the community in the form of lower maintenance cost and through that, possibly lower taxes. Using local renewable energy sources improves the economic situation of the area when the cost of energy stays in the region instead of flowing nationwide or across borders.

<b>BEST PRACTICE</b>	<b>INDICATOR</b> <b>(1) Renewable energy services and solutions for public infrastructures and housing</b> <b>(2) Products developed utilizing by-products from economic activities</b> <b>(3) Smart energy management solutions</b>	<b>Service/ Product/ Other</b>	<b>CO2 reduction in best practice case</b>	<b>MWh saving in best practice case</b>	<b>Applicable to Private/ Industry/ Public</b>
Solar City	1	o			Pu to Pr
Energy efficient wooden apartment building	1	p,o			Pr, Pu
Ground source heat pumps	1	o			Pu to Pr
Thermal imaging of buildings	1	s			Pr, I, Pu
Heat recovery from wastewater	1	p		58 %	Pr, I, Pu
Energy efficiency of external illumination	1	p		216 MWh/ year	Pu
Street lighting retrofit with LED	1	p		50 %	Pu
Replacement of public lighting with LED	1	p		45 %	Pu
Photovoltaic installation in Alley Theatre	1	p		17 MWh/ year	Pr, I, Pu
Retrofit office with integrated intelligent lighting system	1	p		44 %	Pr, I, Pu
CHP Unit at Leisure Centre	1	p	124 tonnes/ year		Pr, I, Pu
Snow cooling	2	s,p			Pu, I
ANSWER	2	o			Pr, I, Pu
Solution for small scale forestry harvesting	2	o			Pr, I, Pu
COMFIT (Community feed-in tariff)	3	o			
Property assessed clean energy (PACE) program	3	o			Pu to Pr
Municipal climate change action plans	3	o			Pu
Onsite energy managers	3	s			I to Pu
Efficiency Nova Scotia	3	o			
HomeWarming	3	s			Pu to Pr
HINKU - Forum for carbon neutral municipalities	3	o			Pu
Energy efficiency service	3	s			Pr, I, Pu
Renewable energy group	3	o			Pr, I, Pu
ISO 50001 Energy management system implementation	3	o		5-15%	Pu, I
Leitrim Green schools initiative	3	o			Pu
Mohill better energy communities project	3	o	20 tonnes/ year	690 MWh/year	
HEATBOSS heating control system	3	s, p		72 MWh/ year	
Sustainable council in Västernorrland	3	o			Pu

### **3. CASE STUDIES:**

**Renewable energy services  
and solutions for public  
infrastructures and housing**



# Solar City

- » **PROJECT PARTNER:**  
Ecology Action Centre, Canada
- » **NAME OF THE ENERGY PRACTICE:**  
Solar City
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Nova Scotia, Canada

## Short description of the function, product or service

The Solar City Programme allows the property owners in the municipality to finance their solar energy projects through their property. The charge is placed on the property rather than the individual, which is similar to a Local Improvement Charge (LIC).

Initially, this program was offered as a pilot program from 2013 to 2015 for residential homeowners to install 1 to 2 solar thermal panels that would preheat hot water for their domestic hot water supply. The pilot was a huge success – 388 homes, across all demographics, installed their own solar thermal system.

After the success of the pilot program, the municipality expanded the program. In addition to solar thermal panels, the program now includes financing for solar photovoltaic pan-

els, and solar hot air panels. It is now available to all property owners that are a not-for-profit business entity in the municipality, including non-profits and co-operatives.

The solar system is paid back over a ten-year loan and is similar to a Local Improvement Charge, which means it is paid through a separate annual bill from their property tax bill. The interest rate is fixed at 4.75%. The annual repayment to the municipality varies in the new program since Solar City is supporting various system sizes dependent on the solar technology and its application. Generally, the repayments could be less than the cost savings offered by the solar panels. This financing covers the cost of administering the program and leads to the cash flow remaining neutral to municipality.

## Innovativeness or relevance of the practice

- » The municipality acts as combined contracting agent, advisor, and financing solution which offers a simple process which is very attractive to residents.
- » Low risk to municipality and cost neutral to operate.
- » Financing the solar system through the property doesn't impact the individual's credit rating or debt to income ratio and remains with the property regardless of the property owner.
- » 60% of the solar systems in the pilot installed data monitoring devices. All solar systems going forward must install data monitoring devices to receive financing.
- » The solar systems installed in the pilot annually replaces an estimated: 50,000 litres of oil; 750 MWh, and 700 tonnes GHGs.
- » The number of installations in Halifax through the Solar City pilot program exceeded the total number of solar thermal panels installed across Canada during 2013 and 2014.

## Further information

[Solar city website](#)





# Energy efficient wooden apartment building

- » **PROJECT PARTNER:**  
Karelia University of Applied Sciences, Finland
- » **NAME OF THE ENERGY PRACTICE:**  
Energy efficient wooden apartment building
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
North Karelia, Finland



## Short description of the function, product or service

Joensuun Pihapetäjä apartment building is currently the most energy efficient wooden apartment building in Finland. The energy class of the building is B (99 kWh/m<sup>2</sup>/year). The six-story building has a basement made of concrete and five floors made out of CLT (Cross Laminated Timber). Joensuun Pihapetäjä consists of 40 flats and total living area is 1730 m<sup>2</sup>. The energy efficiency is gained by new innovative HVAC-technologies as well as with structural solutions. The building is owned by a private owned foundation called Karjalaisen Kulttuurin Edistämissäätiö KKES, who is renting the apartments for the citizens.



## Innovativeness or relevance of the practice

The energy efficiency is gained by new innovative HVAC-technologies as well as with structural solutions. HVAC-technologies include for example, a hybrid heat exchanger. The heat exchanger system recovers heat from the black and grey waters to heat up the hot water. The system has a 50% efficiency rate. The building has 100 m<sup>2</sup> solar plant installed on the roof with 15.9 kWp performance. The panels have a theoretical potential for 13 MWh annual production of electricity. Every apartment has its own ventilation unit with heat recovery up to 80% efficiency.

Structural solutions include innovative solutions, for example semi-warm staircases which significantly saves energy needed for heating. Air tightness was measured from eight apartments with the variation between 0.6-1.0. Thus the theoretical envelope air-tightness (q<sub>50</sub>) of the building is 1.0.

## Further information

[Joensuun Pihapetäjä website \(in Finnish\)](#)



# Ground source heat pumps

- » **PROJECT PARTNER:**  
Umhvørvisstovan, Faroe Islands
- » **NAME OF THE ENERGY PRACTICE:**  
Ground source heat pumps
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Faroe Islands

## Short description of the function, product or service

Heat pumps are energy efficient as they use a small amount of electric energy to transfer a larger amount of heat from the environment into the house. Heat pumps replace oil burners and thus the required heating energy is produced with electricity, mainly from renewable sources, instead of fossil fuel. Approximately one fourth of the needed heating energy comes from electricity. The rest of the heat is extracted from heat present in the surrounding environment, which can be the air, the ground or the water.

Heat pumps are a rather new technology in the Faroe Islands. However, more than 1000 systems have been installed in the past 10 years. Around 200 of these 1000 systems are based on ground source heat. The system requires a 200m deep hole to be drilled into the underground rock. Heat is extracted from this hole to heat the house or building using a heat pump. The system is more expensive than other heat pumps systems, but it has higher energy efficiency and better longevity. Three companies have been licensed for ground source heat-pump installation: Pf Maria Poulsen, Pf Svend Krosstein and Pf Demich.

## Innovativeness or relevance of the practice

The official policy in the Faroe Islands is to reduce the dependency on imported oil. An obvious possibility on this track is to replace oil burners used for space heating by heat pumps. Therefore installations of heat pumps are encouraged. The government has agreed that home owners that install heat pump systems are entitled to recover the VAT of the purchase.

# Thermal imaging of buildings

- » **PROJECT PARTNER:**  
Umhvørvisstovan, Faroe Islands
- » **NAME OF THE ENERGY PRACTICE:**  
Thermal imaging of buildings
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Faroe Islands

## Short description of the function, product or service

In the Faroe Islands, a local company called Hitamyndir (Heatpictures) has a service that can reveal the airtightness of a building and identify where cold air may penetrate into the warmer inside of the building.

The service uses blower door test equipment in combination with thermal imaging infrared cameras. Using a powerful fan in the door, the air is pulled out of the building creating under pressure inside the room or building. This forces cold air from the higher pressure outside to flow through all holes, cracks and openings and this is clearly seen on the thermal image. Measures can be taken to make the building more energy efficient by reducing the exchange of warm inside air and cold outside air.

## Innovativeness or relevance of the practice

The airtightness of a building is important to make it:

- » more energy efficient by reducing energy consumption due to air leakage
- » more comfortable by avoiding drafts caused by cold air leaking in from the outside
- » avoiding moisture condensation problems
- » easier to control mechanical ventilation to provide acceptable indoor air quality

# Heat recovery from wastewater

- » **PROJECT PARTNER:**  
Umhvørvisstovan, Faroe Islands
- » **NAME OF THE ENERGY PRACTICE:**  
Heat recovery from wastewater
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Faroe Islands

## Short description of the function, product or service

In the Faroe Islands, a local company called Defined Energy focuses on recovery of energy from wastewater. Warm water from showers passes through a heat exchanger, which feeds the recovered heat into the boiler.

The cold domestic water flows through the coils, and the hot wastewater flows on top of the coils in the opposite direction of the domestic water, causing it to heat up. Wastewater flows from the top, down through the trays to the bottom tray and then further down the drain. The domestic water enters the bottom tray and runs up through the trays to the top tray, after which it is fed into the building. As the hot wastewater migrates down through the trays, it gets colder, because the energy is (taken out and) used for the cold domestic water, which gets warmer for each tray it enters.

The system can be used both in private houses and in public buildings. One example is the swimming hall in Tórshavn. With 165,000 visitors every year, the swimming pool in Torshavn is the largest on the Faroe Islands. In 2013, the annual energy consumption for heating the shower water was 327 MWh. By installing four DE-5 heat exchangers from Defined Energy, this was reduced by 58% to 139 MWh per year.

Every year, 3000 TWh is used in Europe for heating water, which is then flushed out as wastewater. This leads to 600 million tonnes of CO<sub>2</sub> emissions. Defined Energy's goal is to reduce CO<sub>2</sub> emissions by creating innovative solutions that secure a better use of energy and at the same time reduce energy expenses.

# Energy efficiency of external illumination

- » **PROJECT PARTNER:**  
Association of Local Authorities in Västernorrland, Sweden
- » **NAME OF THE ENERGY PRACTICE:**  
Energy efficiency of external illumination
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Västernorrland, Sweden

## Short description of the function, product or service

Solatum Hus & Hem AB implemented in 2012 a basic inventory of all exterior lights, including municipal owned and managed properties. Information on the type of light sources and effects and assess the status of the light fittings were reported in the inventory.

On this basis, Solatum Hus & Hem AB planned for replacing all outside lighting with modern LED lighting fixtures, with the aim of lower operating costs and an opportunity to phase out all light sources with mercury. Only a few conventional fixtures have remained. The light sources of these have been changed to low-energy lights.

After carrying out the planning and procurement, the first phase was initiated in summer 2013. Since then, further three stages have followed, from 2014 to 2016. The last of which will be completed in spring 2017.



After this, the replacements of exterior lighting is completed.

## Innovativeness or relevance of the practice

The shared assumed power reduction is 95,637 kW and the reduced energy consumption is 216 MWh after completion of phases in 2013-2015. The indicators have not yet been calculated for 2017 activities. The results of this project are good. The new lighting

resulted in improved illumination with increased security for residents and operators, reduced maintenance, lower operating costs, lower power consumption and phasing out of mercury.

## Further information

Magnus Nordenmark  
Energymanager  
0620-68 28 51

# Street lighting retrofit with LED

- » **PROJECT PARTNER:**  
Donegal County Council, Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
Street lighting retrofit with LED
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
County Donegal, Ireland

## Short description of the function, product or service

Donegal County Council identified existing street lighting which was high maintenance and a large energy user, and these have now been retrofitted to LED street lighting.

The LED fittings are controlled via a photocell, which brings on the LED lighting at a slightly darker time of the day, due to the instant light from the LED fittings vs the Old SON fittings that take time to warm up before they reach max light output.

The Natural White light gives off a different light source vs the SON Orange lighting and this adds to the energy saving as the LED does not need to be as intense as the SON fittings. S/P ratio (the scotopic lumens to photonic lumens ratio) gives the human eye a different perception on light. Natural white light from an LED gives a better colour rendering light source, thus adding value to installing an LED Lantern.

During 2017 over 1,000 street lights have been changed to LEDs, at circa 60 locations



across the county (with more still to be done on some national routes). In total, the Council now has circa 1,400 LED lights, out of a total inventory of over 16,800. Energy savings of up to 50% or more, depending on the type of lamp being replaced, are being achieved. Also, as the number of LED lights grows, maintenance costs should reduce, as they have considerably longer life expectancy than traditional SOX/SON lamps.

## Innovativeness or relevance of the practice

Dimming patterns of the LED add extra energy savings on the project due to the time of night when the area may have little to no traffic or people.

### Further information

- Road and urban lights
- Photocontrol sensors
- Dimming of LED street lights

# Replacement of public lighting with LED

- » **PROJECT PARTNER:**  
Leitrim County Council, Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
Replacement of public lighting with LED
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
County Leitrim, Ireland

## Short description of the function, product or service

The public lighting improvements involved replacing existing lanterns with energy efficient LED lanterns. The lanterns were replaced in 2015 (Mohill) and 2016 (on the N4 route in Carrick on Shannon). Lights on N16 in Manorhamilton and on Dromod Rooskey bypass are planned to be replaced in 2017. The aim is to reach a 45% reduction in energy use.

## Innovativeness or relevance of the practice

Such replacement is still at a relatively early phase in Ireland and it is having a significant impact on energy reduction costs of the Local Authority.

### Further information

[Sustainable Energy Authority of Ireland](#)



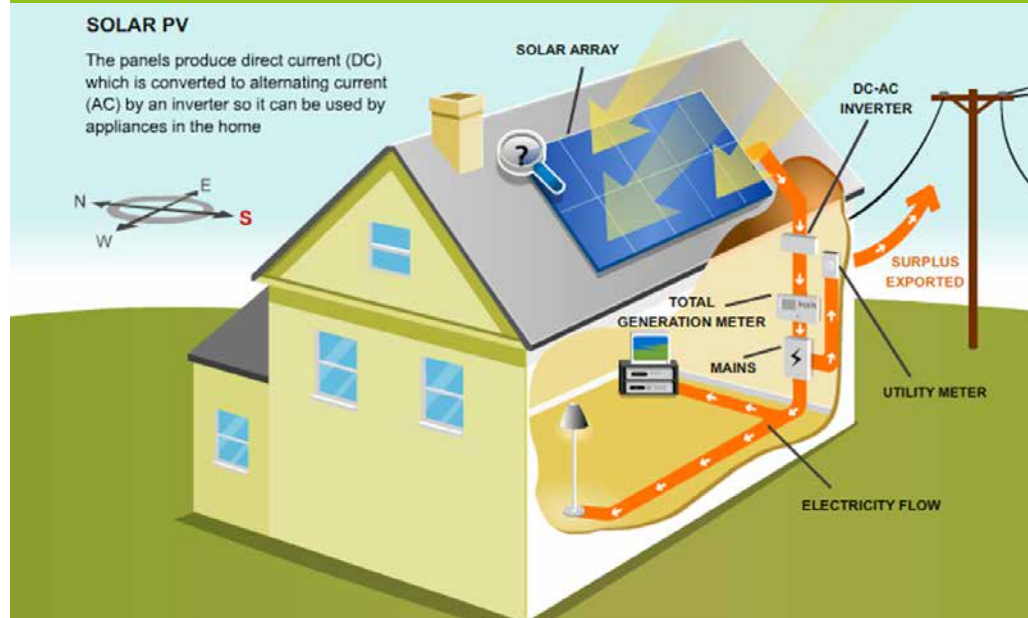
Before



After

# Photovoltaic installation in Alley Theatre

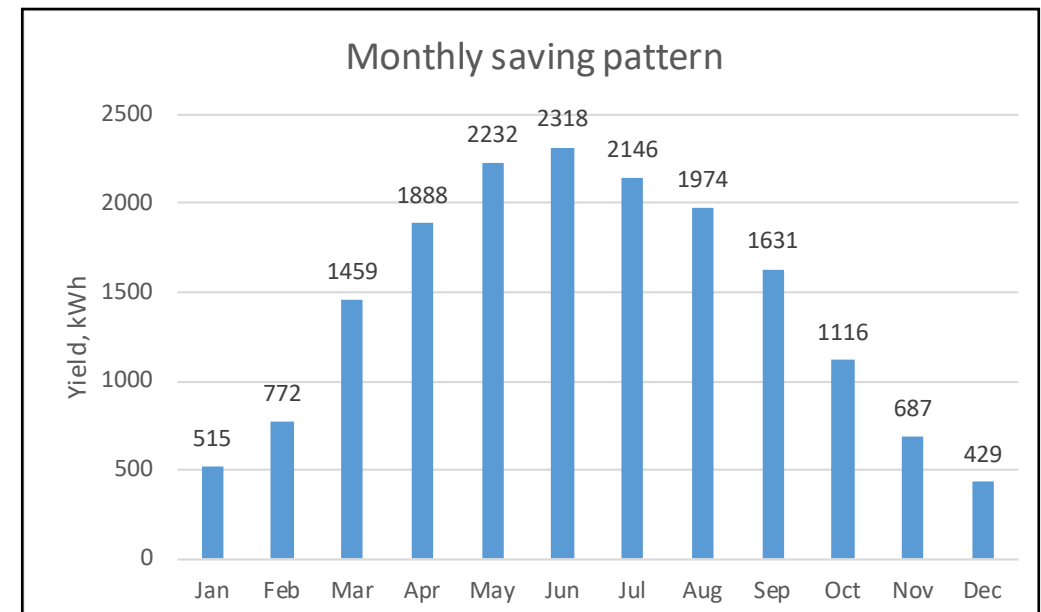
- » **PROJECT PARTNER:**  
Derry City and Strabane District Council, Northern Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
Photovoltaic installation in Alley Theatre
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
County Londonderry, Northern Ireland



## Short description of the function, product or service

Installation of a 20 kW photovoltaic electric generation system on the roof of the Theatre Complex. The system converts the radiation from the sun into useful electrical energy which is consumed by the normal day to day

operations in the building. The amount of energy generated varies depending on the cloud cover and the time of year, with winter having shorter days.



## Innovativeness or relevance of the practice

Installing photovoltaic panels on Council building is a relatively new concept as a combination of better efficiency and generous government incentives have significantly reduced the payback period for the initial capital investment. The higher efficiency PV panels generating more electricity increases the environmental benefits.

## Further information

[Basics of solar panels](#)

	%	Yield, kWh	Saving, GBP
Jan	3.0	515.04	57.12
Feb	4.5	772.04	85.68
Mar	8.5	1459.28	161.83
Apr	11	1888.48	209.43
May	13	2231.84	247.51
Jun	13.5	2317.68	257.03
Jul	12.5	2146.00	237.99
Aug	11.5	1974.32	218.95
Sep	9.5	1630.96	180.87
Oct	6.5	1115.92	123.72
Nov	4.0	686.72	76.16
Dec	2.5	429.20	47.6
	100,00	17,167	1,904



# Retrofit office with integrated intelligent lighting system

- » **PROJECT PARTNER:**  
Derry City and Strabane District Council, Northern Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
Retrofit office with integrated intelligent lighting system
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
County Londonderry, Northern Ireland



Carbon dioxide emissions arising from the test installation. The table shows only the estimated efficiency savings, which amount to 14 MWh/year (44%), saving GBP 1,933/year and reducing carbon dioxide emissions by 7.60 tonnes/year. If these figures are scaled up from the test area to the building as a whole (all spaces except the basement, amounting to 4,469 m<sup>2</sup> of floorspace) the savings become 131 MWh/year, saving £18,302 annually and reducing carbon dioxide emissions by 71.96 tonnes/year.

Previous tests of the Redwood system suggested that control savings arising from fine-grained daylight and occupancy sensing, and from policy-driven dimming and switch off, should save 50% of the remaining lighting energy, i.e. approximately 9 MWh/year, worth GBP 1,247/year and reduce emissions by a further 4.90 tonnes/year across the whole building. Thus total estimated lighting energy savings are of the order of 72%, as summarised in Table 5.1. Additional savings were expected because fine-grained temperature and humidity data from the Redwood system was to be fed to the Building Energy Management System (BEMS) in order to im-

## Short description of the function, product or service

The Redwood system was installed on one floor of one wing of the building, with an area of 472 m<sup>2</sup> lit by 116 light fittings. An almost identical area directly below served as a control space – both areas are monitored. Energy savings were expected from two sources: from the improved efficiency of the lamps, and from improved control of both lighting and HVAC.

Table 1 summarises the originally estimated savings in energy use and reduction in car-

TABLE 1	Existing lighting	New lighting
Lamp wattage (kW)	0,072	0,044
Average ballast circuit efficiency (%)	84	93
Power consumed by one lamp (kW)	0,08352	0,04708
Number of lamps in test area	116	116
Lumens delivered	4200	4290
Downward light output ratio	0,6	0,84
Relative effective light output (lumens)	2520	3604
Lumens per Watt	30,17	76,54
Power consumption of lamps (kW/hr)	9,69	5,46
Operation (hours/day)	12	12
Power consumption of lamps (kWh/day)	116,28	65,52
Total power consumption (kWh/yr) [272 days]	31 628	17 821
Electricity cost (£/yr @ 14p/kWh)	£4,428	£2,495
Carbon dioxide emissions (tonne/yr @ 0.55 kg/kWh)	17,4	9,8



prove control of the HVAC installation, but this feature was not realized.

Thus it was estimated that overall energy use, electricity cost and carbon dioxide emissions savings of at least 75% were achievable in the Derry City Council building if the Redwood system were installed throughout, as summarised in Table 2.

## Innovativeness or relevance of the practice

This lighting system uses a CAT cable system to provide data connection with the control engine and for electrical power. The intelligence of the system ensures the control engine “learns” the occupancy patterns in each office and reacts to personal preferences. The benefits are:

- » Daylight harvesting
- » Automatic dimming
- » Remote book/time lights in specific area
- » Follow Me functions in corridors
- » Demand management
- » Lower energy consumption
- » Customer comfort/satisfaction

## Further information

[Intelligent LED-lighting Redwood Systems](#)

TABLE 2	Existing lights energy use kWh/yr	New lights energy use kWh/yr	Saving kWh/yr	Saving %
Single wing with LED lights	31 628	17 821	13 807	44 %
Scale up installation to whole building	299 461	168 733	130 728	44 %
Single wing with energy saving controls	31 628	8 911	22 717	72 %
Scale up full installation to whole building	299 461	84 367	215 094	72 %

# Combined heat & power (CHP) unit at Leisure Centre

- » **PROJECT PARTNER:**  
Derry City and Strabane District Council, Northern Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
Combined heat & power (CHP) unit at Leisure Centre
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Derry City and County Londonderry, Northern Ireland

## Short description of the function, product or service

The Leisure Centre is a building with a traditional construction, built in the late 1970s with a total floor area of 2542 m<sup>2</sup>. The facilities available at the Leisure Centre include a swimming pool, spa, sauna, gym, changing facilities and office accommodation.

A single Combined Heat and Power (CHP) unit powered by natural gas, 4-stroke engine which is coupled to a synchronous generator rated at 400v/3ph/50Hz, with the following specification:

- » Gas engine
- » Synchronous generator
- » Heat recovery system
- » Electrical output of 123 KWe
- » Heat output of 196 KWth
- » Total fuel input (gross) of 395 KWg

The system operates from 8.00 to 20.00 each day. The generated electricity is used in the building and the associated heat generated (the by-product of the combustion process) is part of the pool water, domestic water and comfort heating systems. The building closes

at 20.00 each night and has reduced electrical and heating requirements. Therefore it is not economic to run the CHP unit at night.

The centre has an annual electrical consumption of 690 MWh and an annual gas consumption of 2,748 MWh which is used to heat the pool water, domestic hot water and comfort heating systems.

## Innovativeness or relevance of the practice

As the CHP unit is a gas fired unit, operation of the unit increased the annual gas consumption to 3,608 MWh, but reduced the site imported electricity consumption by 527 MWh. As natural gas is a less polluting fuel than the energy mix to generate grid electricity, the net benefit is an annual carbon emission saving of 124 tonnes CO<sub>2</sub> and a financial saving of GBP 42,000.

## Further information

[CHP basics](#)

## 4. CASE STUDIES:

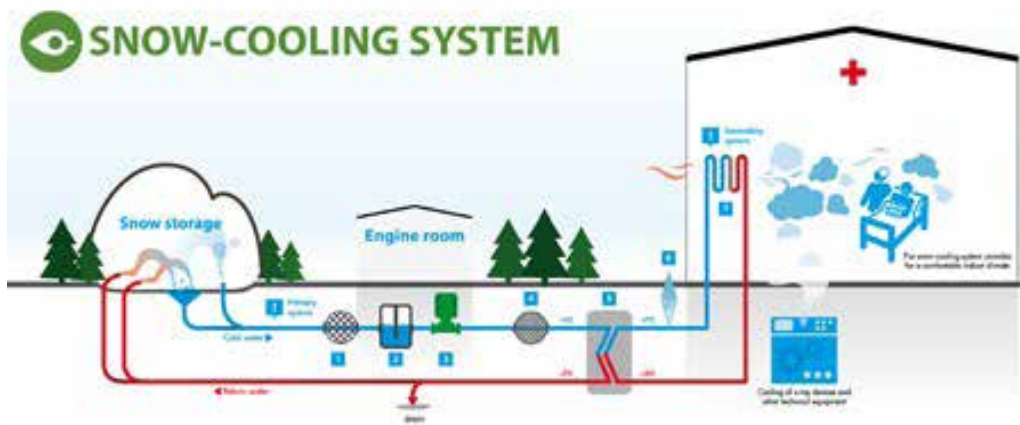
**Products developed utilizing  
by-products from economic  
activities**





# Snow cooling

- » **PROJECT PARTNER:**  
Association of Local Authorities in Västernorrland, Sweden
- » **NAME OF THE ENERGY PRACTICE:**  
Snow cooling
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Västernorrland, Sweden



## Short description of the function, product or service

Snow cooling is county councils most acknowledged energy efficiency project to date. In Sundsvall they have developed and operate a large scale snow cooling plant used for cooling the County Hospital. The plant, which has been in use since 2000, is the first of its kind in the world.

The County Hospital in Sundsvall is a massive structure that covers about 190 000 m<sup>2</sup> and – naturally – requires a heavy duty cooling system in order to maintain a comfortable

indoor climate as well as keeping a variety of technical equipment from overheating.

Prior to the year 2000, a conventional cooling appliance was used for this purpose. However, the county council of Västernorrland has since the turn of the millennium committed to a more environment-friendly and energy-saving alternative in making use of a natural resource that is easily available in the north of Sweden, namely snow.

Before the snow cooling system was built

there was already a snow deposit situated west of the hospital – mainly used by the Sundsvall municipality to dump snow that had been cleared from streets in the region. This undisturbed place proved to be the ideal spot for building the new cooling facility, since there would be no negative impact on the surrounding area and it was already a natural place for. All in all the snow cooling facility consists of three main parts; the snow storage, a pumping station and a heat exchanger. Snow that has melted is being pumped through the heat exchanger where the water cools the technical equipment as well as the ventilation air which passes through the hospital.

The facility is equipped with a 23 feet (7 meters) deep bowl-shaped basin that is being filled with snow during the winter months. The snow-pool is made out of waterproof asphalt which provides insulation against any unwanted heating from below. During the spring and summer months the snow deposit is covered with a layer of wooden chips in order to prevent the snow from melting due to increased outdoor temperature. During win-

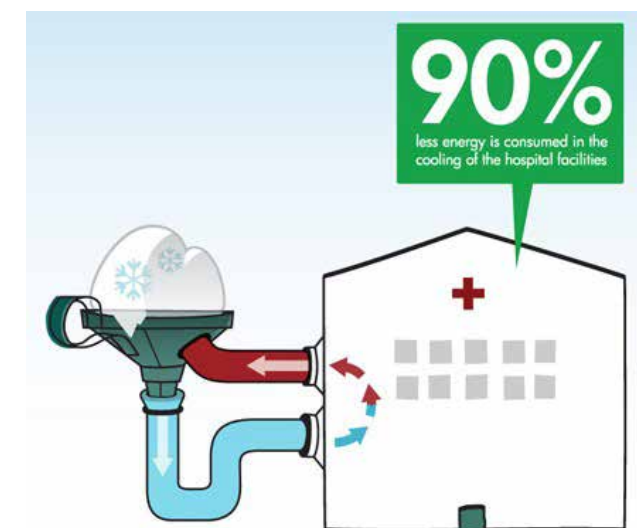
ters with less snowfall, a set of snow-cannons can be used to secure that there is enough snow in the pool. However, using snow-cannons is still a more energy efficient solution than using a conventional cooling system.

Through this process, the water reaches a higher temperature – on the way back it is therefore used to melt more snow. This also eliminates the risk of shortage in cooled water since everything returns to the snow deposit where it melts just enough amount of snow that is required depending on the outside temperature

In other words; on hot days when much cooling is needed, the system gives a higher output due to more water being pumped and therefore more snow being melt, whereas it on colder days pumps a lesser amount and thus melting a lesser amount of snow.

## Further information

Jan Lindberg  
Energy controller  
jan.lindberg@lvn.se



# ANSWER – Agricultural need for sustainable willow effluent recycling

- » **PROJECT PARTNER:**  
Donegal County Council, Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
ANSWER - Agricultural need for sustainable willow effluent recycling
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
County Donegal, Ireland

## Short description of the function, product or service

The primary objective was to develop the use of Short Rotation Coppice (SRC) willow for the bioremediation of a range of effluents. The effluents include municipal wastewater, landfill leachate and industrial effluents. The added value on top of effluent bioremediation is having willow which can be harvested, chipped and dried as fuel for biomass boilers resulting in a carbon neutral renewable energy source.

Donegal County Council (DCC) installed a 12ha effluent irrigated willow plantation at Bridgend (a sustainable upgrade to the Bridgend Waste Water Treatment Plant.

DCC also installed lysimeters (test sites) at Ballinacarrick Landfill site to trial bioremediation of leachate and established the unique combination of willow bioremediation and Integrated Constructed Wetland to treat leachate at the Churchtown landfill site. The landfill site is not open anymore.

## Innovativeness or relevance of the practice

Bioremediation is the use of living organisms to break down or remove toxins and other harmful substances from soil and water. Plants, in this case short rotation coppice (SRC) willow can also be used to manage large volumes of potentially damaging wastewater

streams coming from inefficient Wastewater Treatment Works (WWTWs), certain industries (especially the food processing industry) and the leachate from landfill sites.

There are hundreds of small treatment works dealing with effluent in small rural settlements. Often they only serve a small number of people equivalents and would be uneconomic to upgrade. It is therefore essential to develop cost effective, environmentally friendly, sustainable approaches to wastewater management appropriate to rural communities.

The use of fast growing woody plants for the bioremediation of wastewater is a potentially useful approach to this problem of managing wastewater streams and effluents. In addition the willow can be harvested, chipped and dried as fuel for biomass boilers resulting in a carbon neutral renewable energy source.

## Further information

[Bioremediation projects](#)

[Answer report](#)



# Solution for small scale forestry harvesting on sites with poor access

- » **PROJECT PARTNER:**  
Leitrim County Council, Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
Solution for small scale forestry harvesting on sites with poor access
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
County Leitrim, Ireland

## Short description of the function, product or service

Renewable Energy Group members identified that a significant amount of small forestry plantations in Leitrim were not being thinned. This was due to poor access to the sites and the inability to harvest them using traditional heavy machinery. The full supply chain (forest owner, forestry co-op, haulier and end users) are represented in the group and they identified a more labour intensive but lighter harvesting method, which is currently being piloted as an enterprise in Leitrim. Timber demand by 2020 is predicted to increase by 1.7 million m<sup>3</sup> (nationally). The total net realisable volume set to increase from: 3.44 million m<sup>3</sup> in 2011 to 6.95 million m<sup>3</sup> in 2028

The challenges are:

- » Small fragmented forest areas
- » Lack of small scale machinery available (investment needed)
- » Lack of available skilled workforce
- » Intentions of forest owners unknown

- » Continuity of work for a forest based workforce dedicated to small scale harvesting in the region

Solution/Best Practice Achieved through coming together of full supply chain resulting in:

- » Appropriate machinery identified
- » Support and mentoring from group
- » Enterprise Agency Feasibility
- » New Business Established
- » Ensuring thinnings of forestry
- » Job creation
- » Increase in supply

## Innovativeness or relevance of the practice

The project is innovative in that it allows access to thinning which otherwise would not be completed and also will result in a more economical end harvesting. The solution was identified by the coming together of the full supply chain who know the business best. It is easily transferable to other areas.

## 5. CASE STUDIES:

Smart energy management solutions



# COMFIT

## Community feed-in tariff

- » **PROJECT PARTNER:**  
Ecology Action Centre, Canada
- » **NAME OF THE ENERGY PRACTICE:**  
COMFIT (Community feed-in tariff)
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Nova Scotia, Canada

### Short description of the function, product or service

The Nova Scotia Community Feed-in Tariff (COMFIT) program was designed to encourage community-based, local renewable energy projects by guaranteeing a rate per kilowatt-hour for the energy the project feeds into the province's distribution electrical grid. Through COMFIT, community groups, non-profit entities, universities, municipalities and first nation groups were able to supply renewable electricity directly to the local distribution grid in their community.

COMFIT has been successful in broadening Nova Scotia's base of renewable electricity ownership and supporting community investment in electricity projects. It increased the renewable energy on Nova Scotia's electrical grid by 5% (about 120 MW). COMFIT comprised of just over 20% of the renewable electricity generated in Nova Scotia in 2016. Although community-led renewable energy is more common in Europe, the COMFIT program was the first of its kind in North America, and contributed significantly to the overall acceptance of renewable energy development in Nova Scotia.

### Innovativeness or relevance of the practice

The COMFIT program has exceeded expectations both in clean energy output and in contributing to the economic development of Nova Scotian communities. The program encourages increased community support for wind power development, in particular, by enabling communities to own their own wind energy project. It also helps stimulate economic growth in communities by providing a steady source of income from electricity generation, and increased local contractor utilization. Through this program, First Nations communities in Nova Scotia will be generating more electricity than their communities use.



# PACE program

- » **PROJECT PARTNER:**  
Ecology Action Centre, Canada
- » **NAME OF THE ENERGY PRACTICE:**  
Property assessed clean energy (PACE) program
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
5 municipalities in Nova Scotia, Canada: Town of Bridgewater, Municipality of District of Digby, Halifax Regional Municipality, Municipality of the District Lunenburg, Municipality of the District of Shelburne



### Short description of the function, product or service

The PACE program enables private property owners to invest into Energy Efficient Upgrades or Renewable Energy for their property. The energy efficiency upgrades can include, for example, insulation, energy efficient windows and energy efficient doors and high efficiency heat pumps while the renewable energy upgrades can include, for example, solar panels.

A Home Energy Assessment will be done for the household and the eligible upgrades are dependent on the assessment. The financing comes from the Local Improvement Fund of the regional taxing authority (normally a municipality). The payback can be distributed over a ten year period with low lending rates. A Property Assessed Clean Energy Improvement Tax will be added to the property owner's Property Tax Bill.

### Innovativeness or relevance of the practice

The PACE program enables property owners to overcome the first barrier which is the initial capital investment necessary for Energy Efficiency Upgrades or Renewable Energy installation. Many homeowners are hesitant to invest in energy efficiency or renewable energy because they might end ownership of the property before the payback period is finished. PACE allows the payment plan to be carried onto on the future owners of the property.

### Further information

- [Halifax PACE Program](#)
- [Bridgewater PACE Program](#)
- [Digby PACE program](#)
- [Lunenburg PACE program](#)
- [Shelburne PACE program](#)
- [PACE research for EU](#)

# Municipal climate change action plans

- » **PROJECT PARTNER:**  
Ecology Action Centre, Canada
- » **NAME OF THE ENERGY PRACTICE:**  
Municipal climate change action plans
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Nova Scotia, Canada

## Short description of the function, product or service

The Municipal Climate Change Action Plans (MCCAP) are an amendment to the Integrated Community Sustainability Plans (ICSP). The ICSP's were developed by all of Nova Scotia's 54 municipalities. They were a reporting requirement of the Municipal Funding Agreement (MFA) between the province and municipalities. This agreement allows the transfer of Federal Gas Tax funds to municipalities for environmentally sustainable infrastructure projects.

The Municipal Climate Change Action Plans have two parts: adaptation and mitigation. The adaptation aspect involved identifying the impacts of climate change on the municipality, then the affected locations, facilities and infrastructure. Then, based on social, economic, and environmental consideration, the municipality identified priorities for action. Regarding climate change mitigation, the municipalities were asked to collect energy and emissions information, then complete an inventory with this data, and with this information set goals and identify mitigation actions.

## Innovativeness or relevance of the practice

This is a model to ensure that municipalities have a plan to adapt to the changing energy landscape and climate. The MCCAPs have highlighted the role that addressing climate change plays in municipal and regional economic development. Since the submission of the MCCAPs, municipalities have been in-

tegrating their priorities for adaptation into municipal policies and operations. In addition, MCCAPs are informing how municipal assets are managed. The MCCAPs have generated an internal dialog within the municipalities, in which climate and weather factor into local decision-making..

Canada - Nova Scotia  
Infrastructure  
Secretariat

Secrétariat du Programme  
d'Infrastructures  
Canada - Nouvelle Écosse

Canada

NOVA SCOTIA  
NOUVELLE-ÉCOSSE

## Municipal Climate Change Action Plan Guidebook

Canada-Nova Scotia Agreement on the Transfer of Federal Gas Tax Funds

# Onsite energy managers

- » **PROJECT PARTNER:**  
Ecology Action Centre, Canada
- » **NAME OF THE ENERGY PRACTICE:**  
Onsite energy managers
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Nova Scotia, Canada



## Short description of the function, product or service

Onsite Energy Management is an embedded energy specialist program run by Efficiency Nova Scotia. Through this program an organization, like a university, school or municipality can hire a full-time employee to focus on reducing their energy consumption. An embedded energy specialist will:

- » focus their complete attention on energy management activities
- » build a business case for energy efficiency projects
- » help the organization develop and execute an energy management plan
- » help the organization identify funding and obtain incentives and rebates for energy saving projects
- » track, measure and verify energy saving results
- » benchmark the organization's energy use and savings against similar organizations



That's when the benefits really begin. Improved energy efficiency makes your organization:

- » Less expensive to operate
- » More comfortable to work in
- » More environmentally friendly
- » More competitive

The programme has specialists in different fields, for example, health care, education and manufacturing.

## Innovativeness or relevance of the practice

This has allowed for some major institutions in Nova Scotia to find significant energy savings through a reliable energy efficiency expert. Cape Breton Regional Municipality has worked with David Brushett, an Onsite Energy Manager for nearly three years. Since his work began, David has helped the municipality cut its energy use by 15%.

## Further information

[Video of Capital Health, where they have been working with an embedded energy specialist](#)

[Video of Dalhousie University, where they have been working with an embedded energy specialist](#)

[Efficiency Nova Scotia's website](#)



# Efficiency Nova Scotia

- » **PROJECT PARTNER:**  
Ecology Action Centre, Canada
- » **NAME OF THE ENERGY PRACTICE:**  
Efficiency Nova Scotia
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Nova Scotia, Canada



## Short description of the function, product or service

Efficiency Nova Scotia is Canada's first energy efficiency utility. Efficiency Nova Scotia is a non-profit organization with a mandate of reducing energy consumption in Nova Scotia. Working with more than 200 local partners, they have helped over 278,000 program par-

ticipants complete energy efficiency projects, saving Nova Scotian's CAD 150 million in 2016 alone and preventing the release of 700,000 tonnes of GHG emissions annually.

Efficiency Nova Scotia's work is funded by revenues from supplying electricity efficien-

cy and conservation activities to Nova Scotia Power. This helps the utility meet Nova Scotia's electricity needs. The cost of these services is included in electricity rates. Additional funding from the Province of Nova Scotia supports non-electric efficiency programs for low-income homeowners, renters, non-profits and First Nation communities. No-charge energy assessment and upgrades to energy efficiency are available for qualifying low-income homeowners at no charge.

Efficiency Nova Scotia is operated as a franchise by EfficiencyOne, an independent non-profit organization. Regulatory oversight is provided by the provincial regulatory body, the Nova Scotia Utility and Review Board.

Efficiency Nova Scotia has created an Efficiency Trade Network for those involved in the Efficiency Trade Industry in Nova Scotia. This is a go-to resource for people looking for contracts, connecting home and business owners, to help them implement energy saving projects.

Efficiency Nova Scotia also hosts the Bright Business Conference and Awards, a one-day event to encourage networking amongst the efficiency industry and to recognize excellence within the industry.

## Innovativeness or relevance of the practice

Energy efficiency is essential to preventing catastrophic climate change. Efficiency Nova Scotia has changed the culture around energy efficiency in Nova Scotia. Now, efficiency must be thought of as an alternative fuel. In Nova Scotia, this model has been more successful at reducing electricity consumption than a government or utility run program. This model has also fostered a growing energy efficiency industry in Nova Scotia, creating over 1,000 full time jobs throughout the province.

## Further information

[Efficiency as a Fuel \[video\]](#)

[Efficiency Nova Scotia's webpage](#)

[Efficiency Nova Scotia's Youtube Channel](#)

[Efficiency Nova Scotia's Bright Business Awards](#)

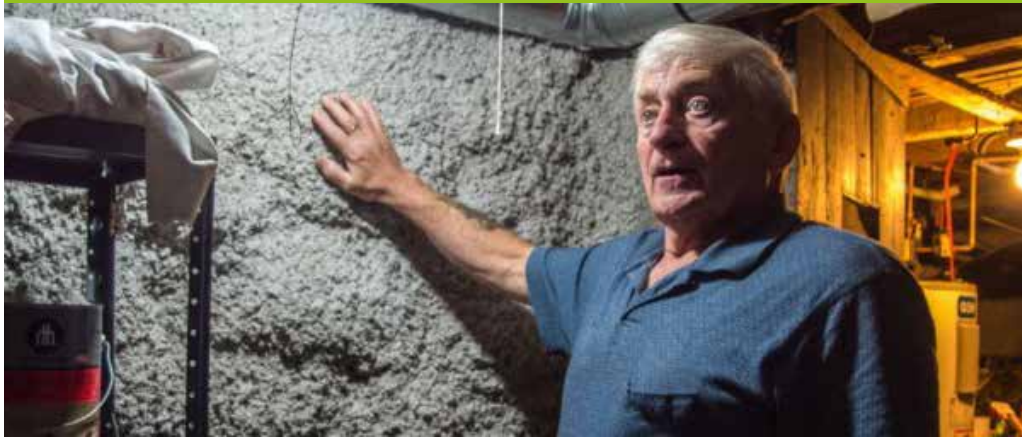
[Efficiency Nova Scotia's Bright Business Conference](#)





# HomeWarming

- » **PROJECT PARTNER:**  
Ecology Action Centre, Canada
- » **NAME OF THE ENERGY PRACTICE:**  
HomeWarming
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Nova Scotia, Canada



## Short description of the function, product or service

HomeWarming is a program that provides energy-saving home upgrades to income-qualified homeowners at no cost. All residents, regardless of income, deserve to be comfortable in their homes. Despite this, too many struggle to keep warm and pay the bills. HomeWarming helps Nova Scotians save money on heating bills, feel more comfortable year-round, and could even reduce their carbon footprint. It's a rare win-win-win.

Clean Foundation and Efficiency Nova Scotia are working together to offer low-

income homeowners free energy efficiency improvements that can help them feel more comfortable while reducing heating and power bills. These upgrades are provided at no cost to qualifying homeowners thanks to the generous support of Nova Scotia Power and the Government of Nova Scotia. The improvements are based on free of charge energy assessments.

Clean works on the electrically heated homes while Efficiency Nova Scotia looks after homes heated with other means.



A typical house can lose up to 80 percent of its heat through the walls, floors and roof. Upgrades like improving insulation and draft-proofing can help keep a home warmer in the winter and cooler in the summer. And since heating and cooling makes up around 60 percent of energy costs, reducing these bills can make other household expenses more manageable.

Interested homeowners can speak confidentially with a Service Advisor before their assessment.

## Innovativeness or relevance of the practice

This program capitalizes on the benefits of energy efficiency that are financial and social. Far too many people live in energy poverty-struggling to pay their bills. This program enables a conversation about energy affordability – rather than lowering energy rates, lowering the kWh used can truly reduce the cost of energy. Further, a more energy effi-

cient home is a more comfortable home. This program also has some in depth data to better understand the paybacks of energy retrofits.

## Further information

[Example of HomeWarming](#)  
[HomeWarming website](#)



# HINKU

- » **PROJECT PARTNER:**  
**Karelia University of Applied Sciences, Finland**
- » **NAME OF THE ENERGY PRACTICE:**  
**HINKU – Forum for carbon neutral municipalities**
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
**Several municipalities in Finland**

## Short description of the function, product or service

HINKU project, Forum for Carbon Neutral Municipalities, covers many municipalities in Finland. For example, North Karelia, Joensuu municipality.

The HINKU project brings municipalities, businesses and citizens together to create solutions that reduce greenhouse gas emissions. Every municipality that participates in this project are committed to an 80 % emission reduction target by 2030 compared to 2007. The municipalities must meet with certain requirements in order to participate in the project.

HINKU collates best practices about climate friendly solutions and shares the information to all who are interested. Collating is done in the HINKU municipalities, other municipalities and even outside Finland. Information is shared through so-called HINKU forum and map.

## Innovativeness or relevance of the practice

HINKU forum is an online platform where municipalities can have support in emission reduction activities. It is also a place for net-

working and see what kind of solutions are working. HINKU map is where anyone can mark their own climate friendly solution (best practice) to show it for everyone else. For example, if you have solar panels in your home, you can add it to the HINKU map and share the experiences with others. It can be any application or service that is climate friendly and usually there are technical specifications along with investment costs and experiences mentioned.

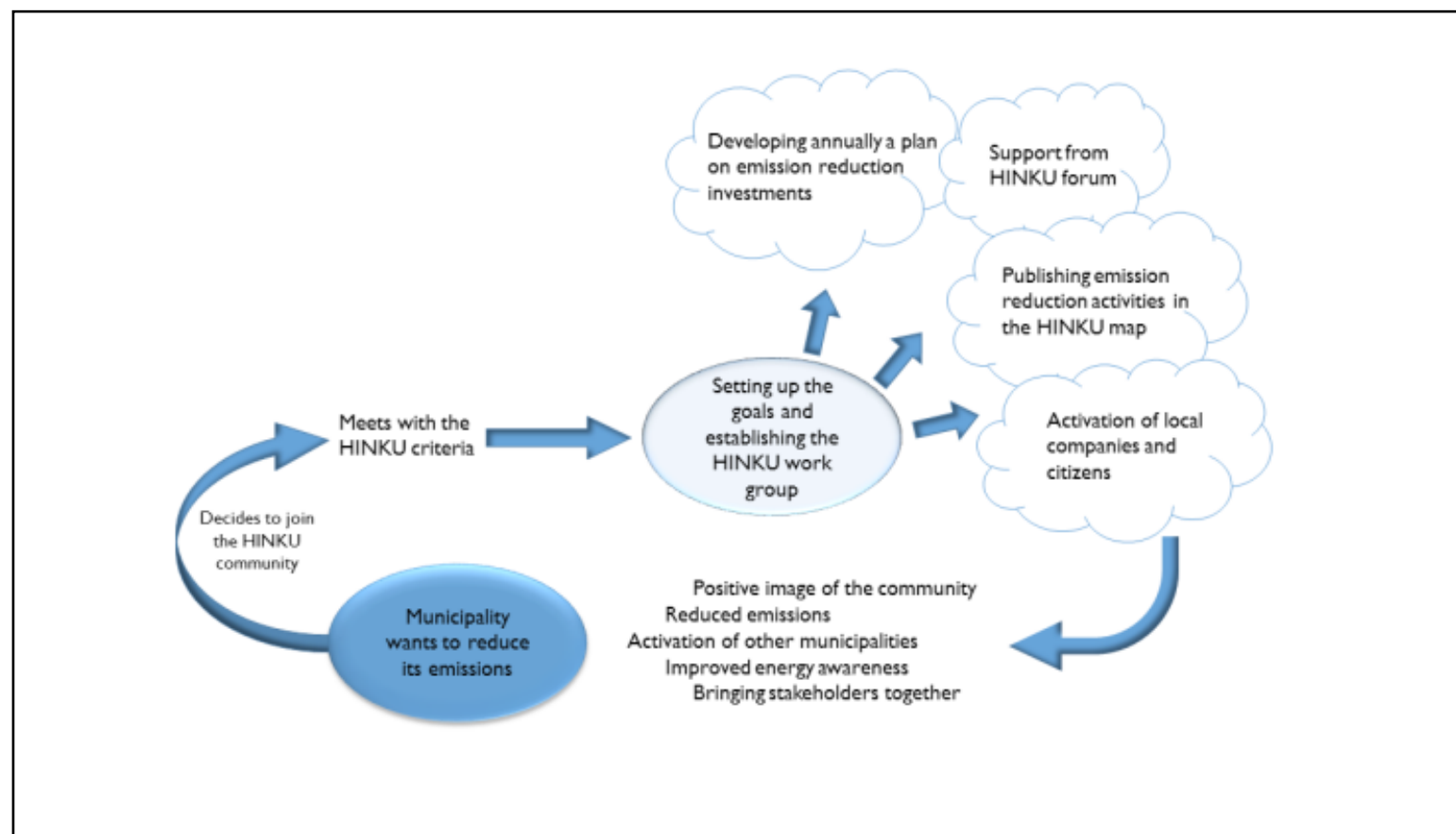
Every month the HINKU project gives a “climate friendly solution of the month” –reward and it can be given to a municipality, local company or to local citizen. The rewarded

stakeholder gets a diploma and positive publicity.

The HINKU project's outputs, HINKU forum and map, offers great support for municipalities that want to reduce their GHG emissions and it is a good example on how to encourage the implementation of renewable energies and energy efficiency methods.

## Further information

[Basic project information in English](#)



# Energy efficiency service

- » **PROJECT PARTNER:**  
Umhvørvisstovan, Faroe Islands
- » **NAME OF THE ENERGY PRACTICE:**  
Energy efficiency service
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Faroe Islands

## Short description of the function, product or service

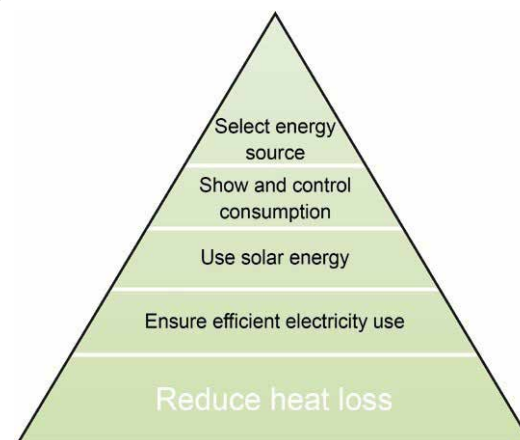
There are around 18,000 households in the Faroe Islands. The government has a goal to reduce energy consumption and transform 50% of the heating of houses from oil to renewable energy heating (mainly by electric heat pumps) within 10 years. Existing houses as well as new houses need to be more energy efficient.

A local company, Spf Byggitrygd (building security), has a service where they analyze a house or building with the aim to identify, calculate and describe actions to save on the heating costs. At the same time maintenance routines are identified that will create maximum future value for the house owner. The company owner is a former carpenter and later educated as a building physicist specializing in moisture and insulation.

The philosophy of the company builds on the Kyoto pyramid principles, which has following priorities:

- » Reduce heat loss
- » Ensure efficient electricity use
- » Use solar energy
- » Show and control consumption
- » Select energy source

The Kyoto pyramid is part of the Kyoto Protocol that was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. There are currently 192 parties to the Protocol.



# ISO 50001 Energy management system implementation

- » **PROJECT PARTNER:**  
Donegal County Council, Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
ISO 50001 Energy management system implementation
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
County Donegal, Ireland

## Short description of the function, product or service

In 2015 Donegal County Council embarked on a process of designing and implementing an Energy management System which would achieve ISO 50001 accreditation.

An Energy Policy was adopted by Senior Management of the council. An Energy Review was carried out to provide an understanding of where energy was used in the organisation, what drives its consumption and what can be done in order to improve its performance. This allowed the Council to identify the types of energy being used and the identification of Significant Energy Users. Energy Performance Indicators were developed to allow for monitoring and tracking performance, an Opportunities Register was compiled to allow for the development of detailed Action Plan. The Action Plan identified significant Energy Reduction projects in Organisational/People/Technical areas which now inform the organisation as it strives to continuously improve on Energy Performance Reduction.

Accreditation was achieved and granted by Certification Europe, an independent certifying body. Implementation of the energy management system, heightened awareness and the better management of energy consumption in the council's office facilities delivered a 5% reduction in energy consumption in year 1. Further savings will be realised by the implementation of identified energy reduction projects with a further 10% reduction in energy consumption expected in year 2.

## Innovativeness or relevance of the practice

Donegal County Council is only the second Local Authority in Ireland and among the first in Europe to have developed and implemented an Energy management System which has achieved ISO 50001 accreditation.



# Renewable energy group

- » **PROJECT PARTNER:**  
Leitrim County Council, Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
Renewable energy group
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
County Leitrim, Ireland

## Short description of the function, product or service

Leitrim County Council (LCC) has prepared a 6 year economic plan as part of a broader Local Economic and Community Plan. Due to the importance of renewable energy as a sector for economic development to the Council, LCC decided to devote a separate section within the plan to the sector and also to establish a Renewable Energy Business Group. The group is comprised of businesses working in the renewable energy sector and agencies that support such businesses.

The Group is chaired by the Chief Executive of the County Council and they meet on average four times a year. The Group looks at national policy developments and identifies how these can be maximised in the local area. They also work on areas where there is a need for more research or obstacles to be overcome.

This group will be the stakeholder group now also for SECURE as they bring together a lot of expertise.

## Innovativeness or relevance of the practice

Leitrim County Council is the only council in this region of Ireland and possibly in Ireland that has such a group with the range of expertise and knowledge available to it.



# Leitrim Green schools initiative

- » **PROJECT PARTNER:**  
Leitrim County Council, Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
Leitrim Green schools initiative
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
County Leitrim, Ireland

## Short description of the function, product or service

All Primary and Post Primary Schools in Leitrim are registered on the Green Schools Programme. Green Schools is about whole-school action for the environment, with the main focus in the initial phase being on litter and waste. Research has shown that active green schools have reduced waste production by over 50%.

Schools follow a seven step programme in order to receive their Green Flag, which is in effect an environmental management system for their school. Leitrim County Council supports all participating Green Schools by providing them with clean up materials and information, where required. The Council's Environmental Awareness Section liaises with schools on an on-going basis, gives talks to students and assists them in getting the Green Schools programme started.

The themes covered by the Green School are:

- » Litter & Waste Management
- » Energy Awareness
- » Water
- » Travel
- » Biodiversity
- » Global Citizenship (Litter & Waste)
- » Global Citizenship (Energy)

## Innovativeness or relevance of the practice

The scheme was developed in Ireland and in Leitrim, the Local Authority aim to ensure that all schools participate.

## Further information

[Notice nature campaign](#)

[Sustainable Energy Authority of Ireland](#)

[Met Éireann's Primary School Resources](#)

# Mohill better energy communities project

- » **PROJECT PARTNER:**  
Leitrim County Council, Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
Mohill better energy communities project
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
County Leitrim, Ireland



- » Knocklongford – energy upgrades to 26 homes
- » Cappagh – 16 homes (+ 4 private homes)
- » Mohill Public Library – insulation, heating and lighting upgrade
- » Mohill Fire Station – insulation, heating and lighting upgrade
- » Hyde Terrace – insulation, storage heating and lighting upgrade

## Short description of the function, product or service

The project involved working with the local community in a town called Mohill in County Leitrim. Mohill has a population of approximately 1,000 people. The Local Authority owns and runs a local library there as well as being responsible for public housing in the town. The Local Authority and Local Enterprise Office applied together for a package of supports from the Sustainable Energy Authority of Ireland (SEAI). Their aim was to increase the energy efficiency of housing and public buildings. The package included works to:

Energy upgrade works to homes included the installation of cavity wall insulation, attic insulation, oil boiler replacement with condensing boilers, and new front door to homes in some cases.

The works to Mohill library and Fire station included an internal lighting upgrade to LED lighting, cavity wall/external wall insulation upgrade and also oil boiler replacements to a more efficient condensing boilers. Heating control upgrades were also installed.

At Hyde Terrace the works included a lighting upgrade, attic insulation, ventilation upgrade.

Works also included replacement of the existing storage heaters with more energy efficient storage heaters.

## Innovativeness or relevance of the practice

The project is part of a programme of works rolled out in a number of local authorities in Ireland with funding from SEAI. Leitrim has done works in Mohill, Carrick on Shannon and Manorhamilton. Works in Mohill (including replacement of 50 public lights with LED lanterns were done in line with LCC Climate Change Plan).

It is estimated that a total of 690 MWh will be saved annually from the energy upgrade works in Mohill. This is equivalent to an annual saving of 20 tonnes of CO<sub>2</sub>.

## Further information

[Sustainable Energy Authority of Ireland](#)



# HEATBOSS heating control system

- » **PROJECT PARTNER:**  
Derry City and Strabane District Council, Northern Ireland
- » **NAME OF THE ENERGY PRACTICE:**  
Installation of 'Heatboss' heating control system into Brooke Park Leisure Centre
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
County Londonderry, Northern Ireland

## Short description of the function, product or service

Heatboss has been specifically designed to improve the heating efficiency within existing buildings by ensuring that the heating is only used when and where it is needed, and only to the temperatures that suit each room and that these target temperatures are accurately maintained.

Heatboss comprises hardware (including the hub, the boiler controller, the wireless radiator valves, the wireless wall thermostats and the wireless signal repeaters) and software (that controls the hardware, the wireless communications that allow users to access their heating controls online, from anywhere).

## Innovativeness or relevance of the practice

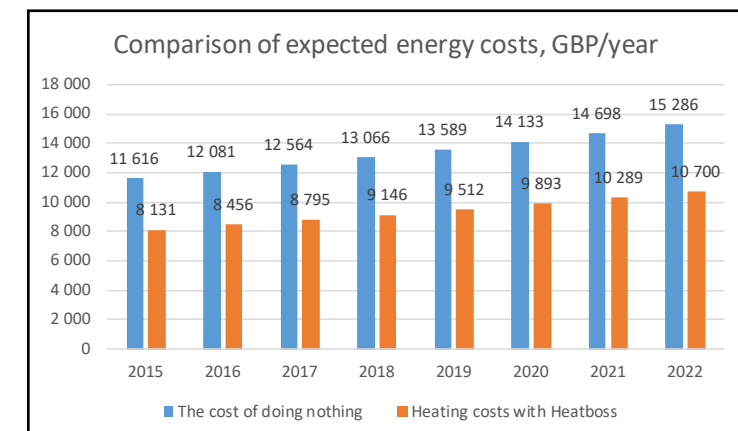
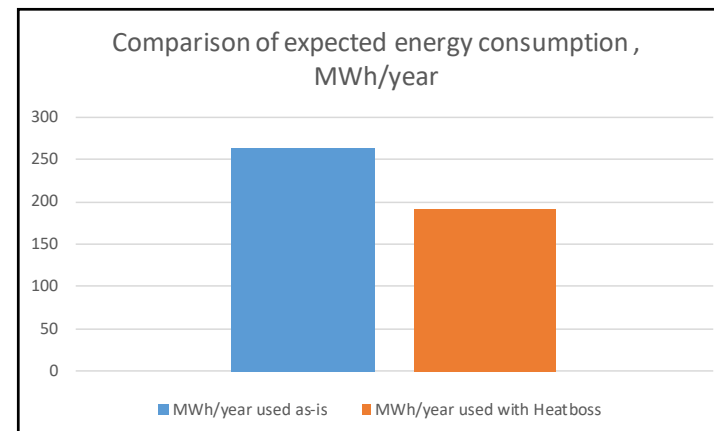
Heatboss helps avoid wasting heating fuel in three key ways:

- » The heat is only on when and where required, instead of heating the whole

building. The system can have motion detection built in or have the heating run off programmed heating times;

- » The valves on each radiator close off as soon as the room's temperature is within 0.5°C of its target temperature and maintains this temperature; and
- » As the heatboss controlled radiators close off quicker, the hot water within the heating system goes directly to where it is required and so the boiler then turns off earlier.

Device	Details
Hub	 Holds all the details about the rooms' on/off times and target temperatures, communicates wirelessly to all other devices and enables remote access to the heating from any web-enabled device
Boiler Controller	 Turns the boiler off when the each room's heat requirement is satisfied and back on again when the room's temperature dips below their target
Wireless Valve	 Controls the radiators within each room based on the room's target temperature (which is communicated to it from the wireless stat via the hub)
Wireless Stat	 Monitors the ambient room temperature, relative humidity levels and motion and communicates this data to the hub. It also allows the user to amend the current target temperature or boost the heating.
Wireless Repeater	 Repeats the wireless signal around the building to ensure complete coverage. The number of these in each building depends on the layout and number of concrete walls.



# Sustainable council in Västernorrland

- » **PROJECT PARTNER:**  
Association of Local Authorities in Västernorrland
- » **NAME OF THE ENERGY PRACTICE:**  
Sustainable council in Västernorrland
- » **REGION WHERE THE PRACTICE IS ACTIVE:**  
Västernorrland, Sweden



change through various learning processes in the form of seminars, workshops and an active exchange within the county and with other actors in Sweden. The focus is in the immediate period focused on carbon offset, sustainable procurement and public climate days to highlight climate measures within and outside the county. The network will have at least four meetings per year, featuring invited lecturers who have expertise in the different areas of specialization.

## Short description of the function, product or service

Municipalities in Västernorrland have collaborated in several regional projects to create a more sustainable county. All municipalities were early members of the Swedish eco-municipalities. In the latest project, "Sustainable Future in Västernorrland", five of the county's municipalities and the county council worked together. Through the framework of the project, a "Sustainable Council in Västernorrland" was formed by two politicians from each municipality and the county council respectively. Now the council wants to increase efforts in the energy and climate

## Innovativeness or relevance of the practice

- » Sustainable leadership is a key factor in a conversion to a fossil-free society.
- » Many of the solutions is better to do at regional level such as transport and energy system.
- » Learning new technologies also goes faster with more experiences.

## Further information

[Association of Local Authorities in Västernorrland](#)

[Instagram](#)



**Ecology  
Action  
Centre**



**umhvõrvistovan**  
environment agency



**Comhairle Contae  
Dhún na nGall**  
Donegal County Council



**Leitrim County Council**  
Comhairle Chontae Liatroma



Derry City & Strabane  
District Council

Comhairle Chathair  
Dhoire & Cheantar  
an tSraitha Báin

Derry Cittie & Strábane  
Destrict Council

