



TURN-KEY ENERGY-SAVING PACKAGES



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Next are presented 18 Turn-key energy saving packages.
Under each package title there could be one or more examples.
Each example is presented on a separate column.

Some examples contain specific tools or additional documentation.
These are provided through download links.

#1 Engagement for an e-mobility future

Transport & mobility, e-mobility in urban areas

References/sources

Project name: EMOBILITY WORKS – Integration of e-mobility in European municipalities and businesses, IEE project (duration 03/2014 – 08/2016). Implementing city: Schladming in Styria, one of Austria's main touristic regions in the Alps, with both intense summer and winter tourism

Who needs to act?

Touristic municipalities need to be aware of the latest trends and future developments in order to remain an attractive destination for customers (tourists) on the one hand and to stay a progressive and forward-thinking place for living for the inhabitants. E-mobility is therefore a development, major touristic destinations must not miss.

Local stakeholders thus need to enforce e-mobility in their close sphere of action to make a difference on local level. This accounts for municipal stakeholders as well as for businesses; the tourist industry needs to realize that establishing e-mobility in their near surroundings provides multiple benefits, not only for the inhabitants, but also for their customers.

Who is affected?

The integration of e-mobility positively influences everyone (inhabitants, tourists, employees, etc.) in a municipality or city and improves the quality of life for all inhabitants.

Solution

The solution regarding how to best integrate e-mobility in the municipality in the long term was the establishment of a so-called „e-mobility action plan“. In this plan, all e-mobility related measures and activities for the next years have been defined by a group of local stakeholders and decision makers.

Investment

Level of investment low to medium. Types of investment: e-vehicles, charging infrastructure, awareness – raising activities, further e-mobility related measures.

Return of investment

Not known.

Other resources to be used

Staff costs

Available tools

Operating e-mobility action plan with results; supporting tools for the setting up of the plan:

Schladming Municipality e-mobility action plan

(http://www.grazer-ea.at/cms/upload/e-mobility%20works/e-aktionsplan_schladming_150917.pdf)

All supporting technical tools were developed within the Emobility Works project

(www.emobilityworks.com/at). These comprise: Status quo analyses, fact sheets, life cycle cost calculator,

infrastructure check, template for e-mobility action plan, stakeholder landscape, workshops, dissemination material (videos, brochures, etc.)

Until 2030, Schladming wants to achieve the following goals:

- 30 % of the municipal fleet are electric vehicles
- Reduction of operating costs of the municipal fleet through increasing use of e-vehicles by 20 %
- 15 new charging stations within the next 3 – 5 years
- Use of 100 % renewable energy at the public charging station
- Intense integration of e-mobility in touristic activities
- Tourists will have the opportunity to hire e-vehicles in the whole region

As the e-mobility action plan came into force in 2016 in Schladming, there has been no evaluation on the results so far.

Main steps of implementation

An e-mobility action plan is being set-up along the following procedure:

1. Ensuring the commitment of local stakeholders and main decision makers
2. Stakeholder involvement (via workshops, etc.)
3. Status quo analysis
4. Definition of vision, goals and measures
5. Implementation of the action plan measures

After the implementation of the action plan, an evaluation is also recommended to see whether the implemented measures have triggered the expected results.

Expected results

- Significant number of electric vehicles in the municipal fleet
- Reduction of operating costs of the municipal fleet through increasing use of e-vehicles
- Significant number of new charging stations
- Use of renewable energy produced at local level
- Integration of e-mobility in touristic activities and in other fields of services
- Reduction of air and noise pollution

Contribution to SEAP & indicators

SEAP: increased production of RES, reduction of GHGs, primary energy savings;

How to integrate in SEAP?

Introducing of the measures for acquisition of e-vehicles using local produced green electricity could represent strong actions common to SEAPs

Contribution to SUMP & indicators

Reduction of CO2 and other GHGs, noise reduction.

How to integrate in SUMP?

E-mobility related actions could represent strong measures in a SUMP

Lessons learned

E-mobility works particularly well, if the respective municipality/city has some kind of intrinsic motivation to increase the quality of life for inhabitants, tourists, etc. It is also essential that the main local stakeholders (car distributors, public transportation, touristic agencies, etc.) consider e-mobility as a strong asset. Furthermore, a close cooperation between a municipality and an energy supplier alleviates the integration of e-mobility and particularly the reliable supply with green energy.

Contacts & links

www.emobilityworks.com www.alea.ro

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#2 Electric car sharing

PUBLIC SECTOR, TRANSPORT & MOBILITY, Efficient and clean transport

References/sources

References are provided regarding 3 electric car-sharing schemes:

1. Share'n go
2. E-Vai
3. E car-sharing in the city of Padua

Who needs to act?

As for all car-sharing schemes, these can be created and run by private operators and/or by public agencies (e.g. public transport companies, mobility agencies, utilities) with an agreement with city councils.

Who is affected?

The service can be offered to all city users (resident population + visitors). Additionally, large organizations (e.g. enterprises, hospitals and other public institutions with significant mobility flows) may get special agreements to replace their fleets to a lesser or greater extent.

Solution

When compared to traditional car-sharing schemes, electric car-sharing responds to mobility needs - typically in urban environments - adding the zero (local) emissions element to the advantages provided by other car-sharing solutions.

Operational schemes can be station-based (point to point) or free-floating (whereby vehicles can be picked up and returned anywhere within the operational area, to be preferred in an urban environment).

Among the most relevant management issues, is the vehicle retrieval system, particularly for free floating schemes, for vehicles left in more peripheral areas to be made available in sectors of the operational area where demand is normally higher.

Because of the fuelling system, there is a need for charging stations (slow/fast charging) and dedicated parking spaces. This is normally the object of negotiations with municipality and/or utilities. Local regulations are a major lever for the success of the operation. Free access to traffic limited areas in city centres is a major plus. The scheme works well in an intermodality frame. Besides e-cars, the scheme may apply also to e-scooters and e-vans.

Investment

Overall investment to launch the scheme is quite high.

Investments for the purchase of vehicles and running costs (incl. maintenance, insurance, etc.) can be born entirely by the private investor, directly or indirectly by public institutions or it can be shared.

The charging & parking infrastructure is normally the object of negotiations.

Public authorities can/should have an exemplary role and may get beneficial rates under certain conditions (e.g. fleet sharing). For instance, the city council may grant access to restricted areas and support the installation of charging infrastructure under beneficial conditions

Return of investment

Return on the investment in the mid-term.

Reduction in infrastructure and vehicles' costs as the technology matures is going to have significant impact in coming years.

Other resources to be used

[CIVITAS Insight 05 - Car sharing: New forms of vehicle use and ownership](#)

[CIVITAS Insight 13 - E-mobility: From strategy to legislation](#)

[CIVITAS Insight 19 - E-mobility: Make it happen through SUMPs!](#)

Available tools

OPERATING SCHEMES, CONDITIONS OF USE, KEY SUCCESS FACTORS

Share'N Go offers a zero-impact, free-floating electric car-sharing service, priced to be widely accessible and aimed at providing a sustainable solution to urban mobility needs in metropolitan areas. Share'N Go uses 100% electric, high-performance, 2-seater micro-cars produced by Xindayang (Geely Motor group), with over 100 Km autonomy and cutting-edge equipment. They can be accessed using a smartphone or a Share'ngo Card. In November 2016, the service is available in Milan, Rome, Florence. Share'ngo counts upon a net of more than 200 charging points and has more than 45.000 clients in Italy - 35.000 in Milan only. 34% of clients are women.

HOW IT WORKS

Registering: anyone over 18 with a valid driving licence can register online, providing their tax identification code and a credit card's details. Registration costs €10 and includes a Share'ngo Card and the first half hour.

Costs: the standard fare is € 0.28 per minute when driving and € 0.10 per minute when the car is parked. It is possible to have a personalized fare based on individual mobility needs and habits and/or buy special packages to pay as little as € 0,10 per minute and € 6 per hour. **The average fare is € 0.21 per minute.**

Additional advantages: unlimited mileage per trip; free use for women from 1 to 6 in the morning.

Finding a car where and when you need it: to book a car, a registered user can use the Share'N Go's App for iOS and Android or login onto the website. A map will show all available cars and their autonomy. Booking is free of charge and lasts 30 minutes.

Driving a minicar: to start driving, all the user needs is a click on his/her smartphone or swiping a Share'N Go card to open the car door, enter his/her PIN and turn the key.

Returning the car: the user can temporarily stop over and park the car to continue using it later or end the trip. In both cases he/she will need to press a 'P' (parking) button in the dashboard, select the appropriate option, leave the car and let it do the rest (there is no need to lock the doors, close the windows, pull the hand brake, etc. since the car will do this automatically). The user will not need to recharge the car.

Where you can go: in each city, an area ('operational area') is defined where users can end the trip. This includes free access to 'Area C' in Milan (limited traffic area with a congestion charge) and limited traffic areas in Rome and Florence. The cars can leave the operational areas but cannot be used on the motorways, in pedestrian areas and in bus and taxi lanes. Users can end the trip free of charge in pay and display car parks and in parking areas reserved to residents in city centres, however they cannot be parked in taxi ranks, loading bays, bus stops and parking spaces for disabled people.

KEY SUCCESS FACTORS:

- A mature market in metropolitan areas with an appropriate population size and density;
- Awareness of necessarily high initial investment with a slow-growth scenario;
- Own purpose-developed IT system for user-vehicle and vehicle control interactions;
- Optimal cooperation conditions with Milan City Council:
- Interest in developing framework conditions fostering sustainable mobility solutions, favouring those with the lowest local impacts;
- Significant network of charging stations developed and owned by the council and operated by local utility available for use by car-sharing operator;
- Reward for very low impact service: electric car-sharing operator does not pay the standard fee per vehicle envisaged for traditional car-sharing – currently around € 1.200/year.

E-Vai offers a station-based, mostly electric car sharing service with unique features: it operates at a regional (and not urban) level, it is integrated with the regional railway service and available in the main regional airports. 90% of vehicles are electric and there are over 80 'Evai points' (pick-up and release stations) in Lombardy. The fleet counts upon over 100 low-impact vehicles, each carrying 4/5 people. Electric vehicles include the following types and models: Renault Zoe, Citroen CZero, Mitsubishi i-Miev, Peugeot iOn, Panda berlina, Panda Van, Fiorino. Vehicles with endothermic engines include the following types and models: Fiat Panda Twin air, Citroen C3, Fiat Cinquecento, Fiat Panda.

HOW IT WORKS

Registration and costs: anyone over 18 with a valid driving licence and a passport or an identity card can register online or at some of the E-Vai points. Registration is free. Fees for electric vehicles are €5/hour and €60/day all inclusive. Fees for vehicles with endothermic engines are €2,40/hour and €28,80/day+ €0,48/Km. There are two user profiles:

- Gold: no initial fee per rental; minimum prepayment €50; payment methods: credit card, bank transfer, debit card, cash;
- Silver: €5 initial fee per rental; minimum prepayment €0; payment methods: credit card;
- Cars can be released at any station within the same city at no additional cost. They can be released at any station in lombardy with an extra €10 charge for stations outside the pick-up city boundaries, with the exception of drop-offs carried out in some suburban areas around milan where no additional fee or reductions apply.

Advantages: E-Vai offers a wide range of vehicles to be used at any time, including for short periods (as little as an hour). The whole transaction takes place online and vehicles are opened with an SMS. E-Vai stations are located in strategic locations throughout the region, particularly at train stations to allow low-impact inter-modality. There is no registration fee and the client only pays for the actual use of the vehicle. In many cities E-Vai vehicles are allowed to run on bus lanes, access traffic limited areas and park free of

charge in pay and display car parks and dedicated parking areas (for buses, taxis, etc.). A shared vehicle replaces on average 6 private cars, reducing congestion and occupation of parking spaces. E-Vai only uses low-impact vehicles contributing to reduce environmental impacts.

KEY SUCCESS FACTORS:

- Involvement of big institutional players (railway service operators, utilities, local authorities) in the realization of the scheme;
- Well distributed network of charging stations in strategic locations;
- Targeted communication in a market ready for take-up of e-mobility, particularly in medium-sized cities, facilitated by sharing and pooling schemes;
- User-friendly service and customer assistance.

Car sharing Padua

The City of Padua has been offering a station-based car sharing service since 2013 and is part of the ICS (Iniziativa Car Sharing) network supported by the Ministry of the Environment. The service is managed by APS Holding, in-house utility managing car parks for the city and, among others, a 1MWp PV plant for the production of electricity. The fleet - overall counting 18 vehicles, including Fiat 500 and 500L with bi-fuel gasoline and methane engines - has recently been increased, adding 5 electric cars (Renault Zoe). At present, there are 6 charging stations available. The Council supports the service allowing circulation of shared vehicles in limited traffic areas and on bus lanes.

Main steps of implementation

Typically, the city council decides to have a car-sharing scheme developed (and for example launches a public call). The entity providing the service develops a scheme and benefits from advantages provided by the council (free access to limited traffic areas, free parking, possibility to use bus lanes, etc.)

Expected results

Short and mid-term:

Reduced number of private cars in urban areas both coming from outside and owned by residents.
Reduced environmental and noise pollution.
Increased possibility for citizens, businesses and institutions to purchase/lease e-vehicles.

Mid and long term:

reduced need for parking spaces (land re-appropriation).

Contribution to SEAP & indicators

CO₂ reduction.

How to integrate in SEAP?

Can be included in a SEAP as an Action to reduce CO₂ emissions.

Contribution to SUMP & indicators

Pollutants reduction (NO_x, SO_x, CO, etc.);
enhanced intermodality; reduced number of vehicles in urban areas; improved sustainable accessibility to city centres.

How to integrate in SUMP?

Dedicated measure responding to several objectives measured with the corresponding set of indicators.

Lessons learned

The service needs to be easy to use and flexible to guarantee good **customing**.

Contacts & links

Share'N Go: <http://site.sharengo.it/>

E-Vai: <https://www.e-vai.com/>

E car-sharing in the city of Padua: <http://www.carsharingpadova.it/>

#3 Cargo bikes & low-impact vans for innovative urban logistics

Public Sector, Transport & mobility urban logistics, smart cities

References/sources

References are provided regarding 3 schemes:

UBM

TRICLO'

Padova Cityporto

Examples are reported about schemes developed in Graz and Valencia

Who needs to act?

Private operators, with an agreement with city council.

Who is affected?

Private and public organizations; citizens.

Solution

Operating schemes typically revolve around some sort of 'city port' (break-in-bulk point) where cargo is broken (transferred from one mode to another).

Due to context conditions and/or regulations cargo bikes and low-impact vans (electric, methane fuelled) may prove more effective and cost-efficient.

Investment

Medium to high depending on the schemes and its scope. they include infrastructure (logistic platform, charging stations, etc.) and vehicles.

Return of investment

The scheme may need subsidies, especially to start. It may lead to the creation of new enterprises (often in the form of delivery cooperatives). On some occasions, private operators (couriers) are getting equipped to cover the service where context conditions make it worthwhile. The level of investments varies (cargo bikes and e-vans and related infrastructure having rather different cost scales).

Return times and rate depend on the scheme

Other resources to be used

[CIVITAS Insight 03 - Cleaner, safer and more efficient freight transport in cities](#)

[CIVITAS Insight 06 - Access regulations to facilitate cleaner and better transport](#)

Policy Advice Note 05 - Logistics and freight distribution

Available tools

OPERATING SCHEMES AND CONDITIONS OF USE

Several European cities have launched cargo bike services. Below some examples are reported to illustrate different approaches and solutions.

UBM URBAN BIKE MESSENGERS

UBM offers quality and environment-friendly bike delivery service with standard or cargo bikes for loads up to 100 kg.

Services: express courier (up to 5 Kg in water-proof bags on standard bikes); express courier cargo (from 5 to 100 Kg on cargo bikes); food delivery (7 days a week for food take away); store to store; store to customer

Types of deliveries: standard (4 hours from calling), fast (90 minutes from calling), urgent (45 minutes from calling) and direct (30 minutes from calling)

TRICLO'

TRICLO' offers fast, safe and environment-friendly city logistics solutions for deliveries in city centres and limited traffic areas with a fleet of standard bikes and electric pedal assisted cargo bikes complemented by hybrid, electric and methane vans for larger loads.

TRICLO' offers its clients (large scale retailers, shops, e-commerce, professionals and private customers) express courier and express courier cargo services. Launched in 2011, TRICLO' operates in several cities in the Veneto Region (Padua, Verona, Vicenza, Venezia, Treviso) and has established good relations with local authorities, which, they say, should provide good framework conditions (a city port platform accessible by trucks outside the city centre and easily operable by low-impact vehicles and a net of charging stations in the city centre for electric vehicles) to support this type of services.

PADOVA CITYPORTO

Padova Cityporto is an environment friendly city logistics scheme established in 2004 that uses low-impact delivery vehicles (methane engines) realized by Interporto Padova (Padua's logistics operator) and aiming to rationalize city logistics, foster sustainable transport and inter-modality, reduce traffic.

The role of local public institutions: Padova Cityporto is the result of a framework agreement involving the City Council, the Province, the Chamber of Commerce, Aps (local in-house utility), Padova Interporto.

How it works: operators (mainly couriers) deliver their freight to the Interporto Padova logistic platform and from here low-impact vehicles deliver goods in the city centre ('last mile city logistics'). The involvement of the local authority with policies addressing sustainable city logistics is essential for effective implementation and vehicles are allowed to use bus lanes and have free access to limited traffic areas 24/7.

CARGO BIKES CONQUER GRAZ (AUSTRIA)!

The cargo bikes do not produce noise, exhaust emissions or parking problems.



Practical, sporty and environmentally friendly. | *Source: City of Graz - Foto Fischer*

Since 2011, the environmental department of the City of Graz has been subsidizing the purchase of about 70 bikes with up to 1,000 euros per bike.

In the past, the car was mostly used for the transport of goods or goods were frequently delivered by foot. Nowadays the uses of the cargo bikes have increased significantly. Depending on the load-wheel type, up to 150 kg can be carried. In an average the users transport about 35 kilograms per trip.

Achieved savings: 63,000 km distance covered by bike instead of by car annually. Reduction of CO₂ and NO_x emissions (by about 8 t CO₂, about 28 kg NO_x).

New models for energy efficiency in urban freight transport in Valencia



SMILE micro distribution platform in Valencia. | *Source: REA Kvarner*

Within the MED project "SMILE" City of Valencia was also exploring new sustainable and efficient distribution models, and trialling a new, innovative delivery system, which was operating from October 2014 to January 2015. Two electrically assisted tricycles were delivering parcels within the historical city centre. In this area, the urban distribution of goods is the most complicated link of the transport chain given the complexity of the maze-like streets, one-way system, limited access and passing rights in pedestrian streets and the saturation of cargo loading and unloading in designated areas. In this context, tricycles had offered an agile, silent, flexible and green alternative to traditional delivery vans.

The pilot scheme was also supported by the use of a micro-distribution platform that managed the interchange of goods. How it works? Logistics operators deliver goods and parcels first thing during the morning to this platform and Vanapedal - the company managing the last-mile delivery handles their transfer to the tricycles for delivery to their final destinations. The logistics operators participating to this pilot were: ASM, DHL, SEUR and TNT. They were trialling this service free of charge.

The micro distribution platform was located in the parking of the North Train Station thanks to the collaboration of SABA (the licensee of this parking lot) and ADIF. This location, at the edge of the access belt of the historical centre of Valencia, reduced the number of vehicles that enter the city centre, thereby reducing traffic in this area whilst minimising negative environmental effects such as noise and pollution resulting from urban freight distribution.

The trial period enabled the assessment of the technical and economic viability of this distribution model as well as the quantification of the related environmental benefits.

Video presentation of the Valencia pilot:

<https://www.youtube.com/watch?v=gh0Moutfxr0>

Research article: *Designing New Models for Energy Efficiency in Urban Freight Transport for Smart Cities and its Application to the Spanish Case* (Authors: C. Navarro, M. Roca-Riu, S. Furió, M. Estrada, 2016.) URL: <http://www.sciencedirect.com/science/article/pii/S2352146516000697>

Main steps of implementation

Depending on individual context conditions, these may vary significantly. In general terms, effective public-private cooperation revolves around the creation of infrastructure (city port, recharging stations) often regarded as depending on public investment, whereas private companies are called to organize services.

Expected results

Reduced number of trucks on the roads: Reduced congestion in peri-urban areas. Reduced environmental and noise pollution. Reduced need for loading bays (land re-appropriation).

Contribution to SEAP & indicators

CO₂ reduction.

How to integrate in SEAP?

Can be included in a SEAP as an Action to reduce CO₂ emissions.

Contribution to SUMP & indicators

Pollutants reduction (NO_x, SO_x, CO, etc.); enhanced intermodality; reduced number of vehicles in urban areas; improved sustainable accessibility to city centres; spur to the development of sustainable mobility.

How to integrate in SUMP?

Dedicated measure responding to several objectives measured with the corresponding set of indicators.

Lessons learned

The involvement of public institutions is essential to foster sustainable city logistics policies and invest in the infrastructure (city ports, charging stations, etc.) to create framework conditions for private ventures.

Contacts & links

UBM: <http://www.urbanbm.it/>

TRICLO': <http://www.triclo.it/>

Padova Cityporto: <http://www.interportopd.it/cityporto/>

City of Graz: www.umwelt.graz.at/cms/beitrag/10175977/4851236

Fundación Valenciaport: <http://www.fundacion.valenciaport.com/>

#4 Electric public transport

Public transport

References/sources

Wiener Linien Electric Bus Lines

Wiener Linien, Vienna's city owned transport company www.wienerlinien.at

Who needs to act?

City's public transportation operator(s) with municipalities.

Who is affected?

Greener public transportation being a solution to the city's energy, and environmental challenges affects each citizen helping to bring a better quality of life for them. Ultimately all individuals, families, communities, benefits from a cleaner public transportation system.

Solution

Creation of a zero-emission zone in the historic center with low emissions in the wider center by converting bus lines for operation of electric vehicles. Acquisition of purely electric buses and substituting the existing conventionally fuelled ones to run on the dedicated zero-emission lines. Cities faced with difficulty to have new power lines installed for the charging of the buses can use the existing electric power line networks such as of trams or trolley buses solution that might involve the development of new technology.

Investment

Overall investment is very medium to high. The main costs are related to the acquisition of electric buses (€400,000 each); instalment of the charging points along the lines, at each end station (€90,000 each) and at the bus depot (€320,000); development of new technology to allow existing power lines to be used for recharging of buses along the lines. Additional costs: training of bus drivers, organization of campaigns for passengers to be aware of their use of greener transport technologies.

Return of investment

According to calculations of the Technical University of Graz, "ElectriCitybusse" reduces emissions of CO₂ by 5.3t, of NO by 1.7t and of NO₂ by 0.06t per year compared to the liquid gas buses which had been used before.

Increase of energy efficiency in public transportation in the historic city center.

Other resources to be used

Existing power line network for trams, trolley buses; innovative technologies for charging of the buses.

Available tools

Wiener Linien Electric Bus Lines - the first 12 fully-electric midibus fleet in service to operate in the historic city centre, on two bus service routes in Vienna as from autumn 2012. Vienna, in its efforts to reduce emissions and create a cleaner and quieter environment in the historical city centre, introduced electric

buses into the public transportation system, using the city's old tram charging infrastructure to power these buses.

Striving to be the leading city in green transportation of 2012, Vienna elaborated an e-mobility strategy having as aim to reduce personal motorised transport to less than 20% in 2025. The initiative for purchasing electric buses came from Wiener Linien, Vienna's public transport operator, a subsidiary of Wiener Stadtwerke Holding AG, with ownership held by the City of Vienna. The city decided to create a zero-emission zone in the historic centre with low emissions in the wider centre. Viennese buses, powered by LPG, have been gradually being substituted by other more efficient low emissions buses.

As the two bus lines that crossed the zero-emissions zone in the historic centre, zero-emission electric buses needed to be purchased in order to operate on them.

As planning and building permits for new power lines or charging stations in the historic environment were difficult to obtain, Vienna decided to use the existing network of overhead tram power lines to recharge the electric buses which, however, required the development of new technology.

An extensive market research and testing phase followed so as to find the most appropriate buses that meet with the required technological characteristics, the given conditions and circumstances in the city and the transport habits of the citizens as well. After the identification of the best solution on the market an open tender followed for electric buses. Two out of the four companies which took part in the test phase participated at the tender which was awarded to the consortium of Siemens/Rampini

Main steps of implementation

1. Adopting of e-mobility measures as pilot measures within the existing sustainable urban mobility strategy
2. Creation of zero emission lines (lines on which only zero emission electric buses are allowed)
3. Setting up the necessary charging infrastructure: identification of innovative technology to use the existing power networks (of trams, trolley buses)
4. Extensive market research and contacting phase with electric bus providers to identify the best available solutions for the city's conditions
5. Testing phase with the identified potential technological solutions
6. Tendering for the purchase of electric buses
7. Awareness raising activities among citizens
8. Training on how to drive the electric buses provided for all bus drivers
9. Contract monitoring and management of the implemented solution in order to demonstrate the expected results

Expected results

Reduction of energy consumption.

Reduction of CO2 emissions due to energy savings.

The reduction of CO2 emissions if the energy is sourced from green alternative sources.

Other impacts: noise level and particulate matter reduction.

Contribution to SEAP & indicators

CO2 emission and energy consumption reduction.

Increase in the use of energy produced from renewable sources.

How to integrate in SEAP?

It can be included in a SEAP as an Action to reduce CO2 emissions.

Contribution to SUMP & indicators

Reduction of air pollutants;

Reduction of noise within the city

How to integrate in SUMP?

As dedicated measure responding to several objectives (reduction of energy consumption, reduction of GES and other pollutants).

Lessons learned

The operating costs of the electric buses offset some expenses (lower price for the energy needed for public transportation, maintenance for electric buses costs about one third compared with diesel buses).

Quick charging can be done during the time passengers get on and get off the bus. With this recharging technique, it is possible to install a smaller battery system leaving more space to passengers, increased useful load and also batteries last longer because they are always being fully recharged.

The environmental and social impacts caused by the battery production should also be considered. Therefore, the city has begun to investigate how batteries could be reprocessed and reused, instead of being disposed of.

Contacts & links

<http://www.eltis.org/discover/case-studies/cleaner-city-electric-buses-vienna-austria>

<http://ec.europa.eu/environment/europeangreencapital/vienna-electric-buses/>

<http://www.eltis.org/discover/news/first-its-kind-electric-buses-charge-existing-infrastructure-vienna-austria-0>

#5 ICT applications for efficient and integrated transport solutions

Transport and mobility/ Efficient and integrated transport solutions - Optimization of the urban transport system

References/sources

References are provided regarding 3 showcases:

Multimodal advice to travellers, Sofia, Bulgaria (MODUM project)

Sharing information platform, Murcia, Spain

Journey planning through ICT assistance, Manchester, UK

Who needs to act?

The municipality is the initiator of any measures/or actions which refer to mobility management, while the concrete interventions can be implemented by private operators (mobility agencies, transport companies, utilities) upon agreement with the city council.

Who is affected?

The actions are to serve the all users incl. citizens, transport companies, stakeholders, tourists, local community.

Solution

The action tackles a set of actions and measures aimed to optimize the urban transport systems in the big cities through application of integrated soft measures and investment activities. Based on the assumption that the big cities suffer from the heavy traffic and transport dependencies, the present solutions are based on combination of innovative and advanced applications using ICT technologies, infrastructure development and campaigning measures. ICT technologies incorporate establishment of intelligent online transport system, installation of GPS modules to track the bus lines and regulate the transport. Infrastructure development regards reorganization of urban transport through construction of BRT corridor, bicycle paths, update of public transport fleet. Campaigning measures include organization of information and dissemination activities targeted to the residents and guests of the city.

Investment

The level of investment is considered as high as it has to be realized in several phases, interrelated with one another starting with feasibility studies, planning and programming and going forward to real construction and reconstruction activities and supplementary measures. Costs are related with infrastructure development, human resource development, and research and innovation activities for ICT application, information and awareness raising campaigns.

Return of investment

Return of investment is mid-term. The use of alternative transport modes will continue to be actively promoted and utilized and the mobile applications will be continuously developed and incorporated in the mobility schemes.

Assumptions state an investment return up to 20%.

Other resources to be used

Additional resources can be allocated for support and collaboration with the local stakeholders, transport companies and providers, energy companies, development agents, etc.

Available tools

Operating processes:

MULTIMODAL ADVICE TO TRAVELERS

The city of Sofia has been appointed for a trial study aimed to reduce the carbon emission and duration of journeys in the urban centre. The reason for selection was that the traffic density is very high and to include corridors where multimodal trips (public transport services, park& ride, cycle lanes, etc.) were possible.

The idea was multimodal advice to travellers to be offered. Test users (volunteers) had to register online using smartphone running Android 4.2. or higher and had to commute within the trial study area. Three types of scenarios have been enacted by the test users: A. driving in a congested city. B. car users switching to other modes of transport. C. use of multimodal transport. The specific performance indicators that were measured across these scenarios included reductions in carbon emissions, commuting duration, uncertainty of journey time, and overall congestion as well as a change in modal split. To ensure that the travel data gathered were comparable, the participants were required to predefine their route origin and destination upon registration. Entry of their commute was completed through selection of an origin and arrival location within a map interface. Input of time spent on modes of transport was also captured to ascertain participants' typical commute from which changes in behaviour were measured.

In order to be able to measure the indicators mentioned above, the trials were conducted across two phases: The first phase, a control period, required participants to complete 5 journeys as per their typical commuting behaviour with no advice from the system. The second phase saw participants complete at least 20 journeys, where they received advice from the system and followed this advice by choosing either the fastest or greenest route to their destination.

The general aim of the pilot test was to reduce the carbon emissions and duration of journeys in urban centres, through providing real time multimodal advice to travellers.

Key success factors:

The main results from the practice showed that it was feasible for a city to provide such an app, thereby directly tying into the needs of daily commuters who wish to more efficiently organise their personal mobility. It was also a huge bonus for such systems which provide routing advice referring the fact that transport information can be seamlessly integrated within the application framework.

SHARING INFORMATION PLATFORM, MURCIA, SPAIN

The government of Murcia has developed an interactive methodology for identification and determination of cycling routes across the city of Murcia to serve the citizens and guests of the city. For the purpose ICT application has been developed for the available transport network including public transport means,

roads, cycle lanes, etc. A preliminary research has been accomplished to identify the needs and incentives for the proper transport management and satisfying the users demand.

It is online tool enabling the potential user to find the most appropriate route via transport mode while crossing the city. Thus, the objective to achieve a better time, cost and resource efficiency is to be ensured. Each potential user can benefit of better planning travel behavior and achieving efficiency of journeys. A specific methodology for designing the cycle lane network using ICT and geolocation has been elaborated and integrated. Additional measures for parking areas have been modified to boost intermodality.

Everyone who wants to plan his travel and/or stay in the city may visit the official website (www.mutrans.es) and organize his trip in the most efficient way.



JOURNEY PLANNING THROUGH ICT ASSISTANCE, MANCHESTER, UK



As a metropolitan county in the North-West England Greater Manchester has developed a travel choices programmes which serves the various preferences of the travellers. It is an online platform providing a number of travel choices by application of interactive ICT tools.

The mobile “real time” travel information service is for users on the primary school run. In fact, it is an application that enables the visualization of a walking school bus (WSB) by predicting and tracking the pre-determined safe route of the pupils. Users can see where the WSB is located at any particular point in time or should be in immediate future.

It is the Station Travel Planning (STP) programme which enables the access to rail stations and tramp stops across Greater Manchester with a focus on encouraging cycling to cycle ride and stations. The user the better plan his/her travel options by visualization of the most sustainable ways.

The Travel Planning Toolkit provides specific package of measures to encourage commuters to use travel choices available. By utilization of ICT application, the frequently travelling users can determine the most efficient and cost saving travel by less time consuming.

Advantages:

The travel choices programmes offer five progressive acquisitions for the users:

1. Sustainable access – network of cycle routes is established across Greater Manchester
2. Travel Choices – wide range of travel choices for commuters, businesses and jobseekers is provided
3. Smarter Technology – real time travel by web or mobile and smart ticketing system is enabled
4. Enabling community transport – demand responsive transport for connecting people is ensured
5. Commuter Cycle Project – toolkit of measures including cycle training, secure cycle parking facilities, cycle infrastructure improvements are offered

The municipality takes decision how to organize and manage the transport system and the city council votes. The service is provided by a specialized entity following the technical specifications.

In general, this kind of action is based on preliminary findings, feasibility studies and concrete measurements of transport indicators among which are: number of travel choices made with private and/or public vehicles, travel behaviors and number of users, etc. An action plan is needed to be developed with specific design and allocation of measures. Consolidation activities with the relevant authorities at every step of the action implementation (as for issue permission, administrative procedures, etc.) should be enacted

Main steps of implementation

1. Planning and Programming based on feasibility study - Project design. 2. Project start-up. 3. Consolidation of the relevant authorities at all steps of implementation (issue permissions, administrative procedures, etc.) cooperation between the relevant departments within the municipality.

Expected results

Short and mid term

- Achieve modal shift from car travel to sustainable transport modes
- Reduced number of private cars in the urban areas
- Increased use of public transport
- Improved customer satisfaction with end to end journeys as a result of the station travel plan

Mid and long term

- Improved local infrastructure to use transport efficiently and sustainable transport means, efficient mobility, etc.
- Better quality of life of local citizens – low carbon performance, sustainable applications.
- Increased level of perception and appreciation of integrated transport measures
- Increased local economy through utilization of the innovations.

Contribution to SEAP & indicators

Reduce traffic burden in urban areas.

Reduce CO2 emissions.

Increase of energy efficiency, environmental indicators and quality of citizens life.

How to integrate in SEAP?

To set as a measure including qualitative and quantitative indicators.

Contribution to SUMP & indicators

Reduce traffic burden in urban areas.

Reduce CO2 emissions.

Increase of energy efficiency, environmental indicators and quality of citizens life.

How to integrate in SUMP?

To set as a measure with concrete actions for definite period of time. Allocate specific qualitative and quantitative indicators.

Lessons learned

Close communication and cooperation with the local citizens is a very important tool for better development of a planning process, setting specific indicators and reaching definite results. The regular feedback could serve as a key point to re-formulate ideas, change if anything goes wrong or planning better resources and actions.

One of the success factors for involving citizens and all interested parties in the process of creation and introduction of innovative ICT tools is the establishment of local working groups. Representatives of all stakeholders are invited and proactively participate in decision making process and adoption of innovative transport solutions.

Another very important side of the implementation of ICT in transport is the involvement of volunteers and/or universities and their students in the feasibility study phase of the ICT apps introduction. The R&D universities' centers could serve as valuable hubs both for creation of innovative ICT tools and for their testing and initial introduction among young people.

Amongst the beneficial ICT approaches is detected to be the Internet and social networks communication. This is the way for fast and fruitful cooperation with the target groups and the potential beneficiaries.

Last, but not least, the cooperation with central and local authorities and institutions, local business and financing organisations from all economic fields (health, social, transport, business, etc) gives advantage to any ICT campaign and is a guarantee for its success.

Contacts & links

Integrated urban transport Burgas (www.transportburgas.bg), Sofia (www.sofiatraffic.bg), Varna (www.varna.bg)

MODUM project www.modum-project.eu

Web tools, Murcia (<http://www.mutrans.es>)

Journey Planning Tools Greater Manchester (<http://www.tfgm.com>) www.travelplans.org.uk

MOBISec project www.eumobisec.eu

#6 Green car parks

PUBLIC SECTOR, TRANSPORT & MOBILITY

References/sources

Several cities have implemented "Green Car Parks", using a range of technical solutions.

Who needs to act?

Private-Public partnership: a private operator invests in building the Green Car Park and related infrastructure, and returns from the investment by managing it for 10 years. Public partner (Municipality) may provide the space (land or abandoned building), plan urban mobility to maximize the impact of the new Green Car Park and may be one of the main users of the park.

Who is affected?

All city users (resident population + visitors); enterprises and public institutions may get special agreements.

Solution

Municipality identifies an abandoned building or an existing parking lot - not too far from the center - that can be converted in a Green Car Park. Private partner builds a multi-storey car park, covered with photovoltaic roof (to produce green energy) and surrounded by a small green area (building facades covered with plants for shading and reducing heat island effect and enhanced water drainage. Several electric vehicle recharging stations are installed in the park. Municipality adapts mobility, traffic and public transport to support a "Park-and-Ride" scheme, car-sharing and bike-sharing. All data on cost, energy production and consumption are available as open data to anyone, so the idea can be easily improved and replicated.

Investment

Overall investment to build the car park and launch the services is quite high. Investments for the parking and infrastructure can be born entirely by the private investor, by public institutions or it can be shared. Public authorities should be one of the first and main users of the park and car sharing services, in order to ensure a reliable revenue to the private investor from the beginning.

Return of investment

Return on the investment in the mid-term. Reduction in infrastructure and vehicles' costs as the technology matures is going to have significant impact in coming years.

Other resources to be used

EU-, local- and national Funds dedicated to RES projects are key to success. Specifically, the project development stage of a Green Car Park may be funded by ELENA – European Local ENergy Assistance, a joint initiative of the European Investment bank and the European Commission, that helps local authorities to prepare energy efficiency or renewable energy projects.

A Green Car Park should be integrated into existing networks of charging stations (such as www.ev-charging.com , <https://my.newmotion.com> or www.tesla.com/supercharger).

Available tools

The potential electricity production of a solar roof on top of the Green Car Park should be estimated using a reliable tool, taking into account location, solar radiation available, photovoltaic technology and local shading produced by surrounding buildings or other obstacles. An example of such tool is "PVgis photovoltaic calculator for Europe", produced by JRC and available online at the following address: [PVGIS for Europe](#)

Main steps of implementation

1. Identify and involve stakeholders in a participated process to assess needs and barriers
2. Feasibility study: identify an appropriate area, check mobility plans, electric infrastructure,
3. Project development: technical, financial and legal
4. Call for tender to select a private investor
5. Executive project and construction of the Green Car Park (including parking, electric vehicle charging facilities and solar electricity generation)
6. Adaptation of mobility, traffic and public transport plans to support a "Park-and-Ride" scheme, car-sharing and bike-sharing
7. Green car park is operational

Expected results

Short and mid-term: Reduced number of private cars in central urban areas. Increased use of public transport. Increased used of electric cars and bikes. Reduced environmental and noise pollution. reduced temperatures and improved water management around the parking lot.

Mid and long term: conversion to 100% electric, installing charging stations for each parking place.

Contribution to SEAP & indicators

CO2 reduction. Work in progress

How to integrate in SEAP?

Can be included in a SEAP as an Action to reduce CO2 emissions.

Contribution to SUMP & indicators

Pollutants reduction (NOx, SOx, CO, etc.); enhanced intermodality; reduced number of vehicles in urban areas; improved sustainable accessibility to city centres.

How to integrate in SUMP?

Dedicated measure responding to several objectives measured with the corresponding set of indicators.

Lessons learned

Stakeholder involvement in a preliminary phase is a key to success, in order to assess needs and barriers to all aspects of the project, as well as to prevent conflicts in the design phase and maximize the number of future users of the car park. Stakeholders should include all citizens and associations involved in SEAP and SUMP, professionals (engineers and architects) and companies interested in the project development or construction and the DSO (Distribution System Operator, managing the local electric infrastructure).

Project development must be carefully planned and managed, including appropriate expertise (and external support) to tackle all technical, financial and legal issues.

Contacts & links

ELENA – European Local ENergy Assistance www.eib.org/attachments/thematic/elena_en.pdf

#7 Energy and mobility databases

Public sector, energy databases

References/sources

References represent DATA4ACTION project monitoring systems

Who needs to act?

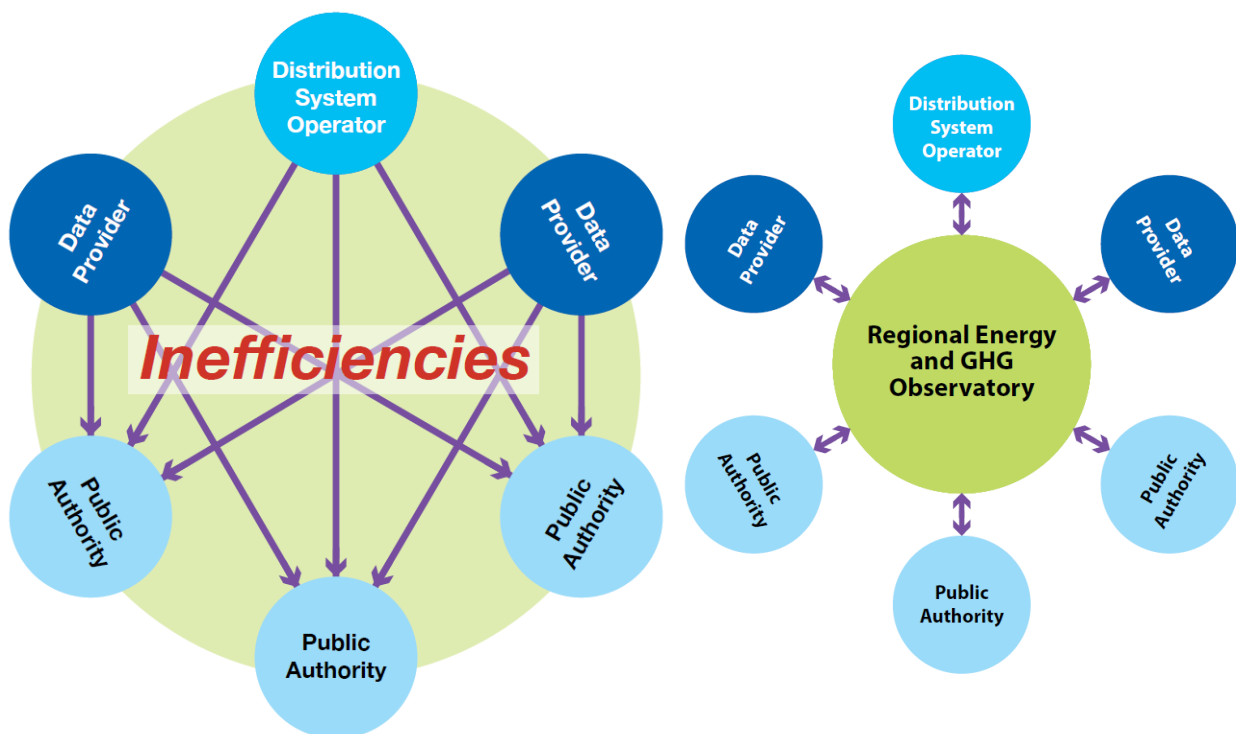
Energy observatory, municipalities, Energy Data Providers, energy facilitators

Who is affected?

Municipalities, energy distributors and providers, individual consumers, buildings' owners

Solution

A major challenge in climate change mitigation is the timely access to robust energy data that can underpin local and regional sustainable energy policies and plans. The challenge demands a collaborative solution.



A collaborative partnership approach underpins successful sustainable energy planning. Effective data sharing involves practical collaborations between Public Authorities, Energy Planning Facilitators and Energy Data Providers.

A practical solution to this challenge is to setup of a "one stop shop energy data center" to enhance data sharing and increase energy data reliability at local and regional level. Having as solid base collaboration agreements among energy providers and LAs, the energy observatory has already proven to be an efficient

tool for energy data sharing and monitoring and has become an essential tool for CoM signatories in elaborating SEAPs.

Developing win-win collaborative partnerships between Public Authorities and data providers, such as Energy Utility Companies (including Distribution System Operators, and Transmission System Operators) will facilitate energy data sharing and the preparation of sustainable energy plans. There are different types of collaboration models that public authorities and energy planning facilitators may employ, as described in the subsequent section.

For the concrete implementation of such data centre, a management body is required. The actual observatory operation will be to collect data from local authorities themselves in an organised manner and from the energy data providers. This could be a semi-automated process with variation according to LAs size and resources. The implementation of this can be scaled up by developing this process using special on-line platforms for data collection, visualisation, correction, adaptation and specific outputs.

The operation model will generally consist many data inputs, several outputs (including Baseline Emission Inventories (BEI) for LAs, Monitoring Emission Inventories (MEI), customised energy analysis at local and regional level) and the involvement of specialised staff in handling the database, applying corrections to data and understanding the reasons for the consumption variations that could appear over time in one or in a group of territories.

Investment

Investment level of setting up an "one stop shop energy data centre" are medium to high. Type of costs: software, databases, security, ensuring data confidentiality, staff costs. Sources that can be of support are EU programmes or national/regional funds.

Return of investment

Agreements for data exchange between local authorities, energy data providers, energy suppliers and energy database established at local & regional level.

Other resources to be used

Specialized data sharing software/databases; GIS integration.

Available tools

Operating practices:

ANERGO (The first Regional Energy Observatory in Romania) the core of the "one stop shop energy data center" concept launched in the framework of DATA4ACTION project is an efficient instrument for energy data monitoring on regional level, an online platform which:

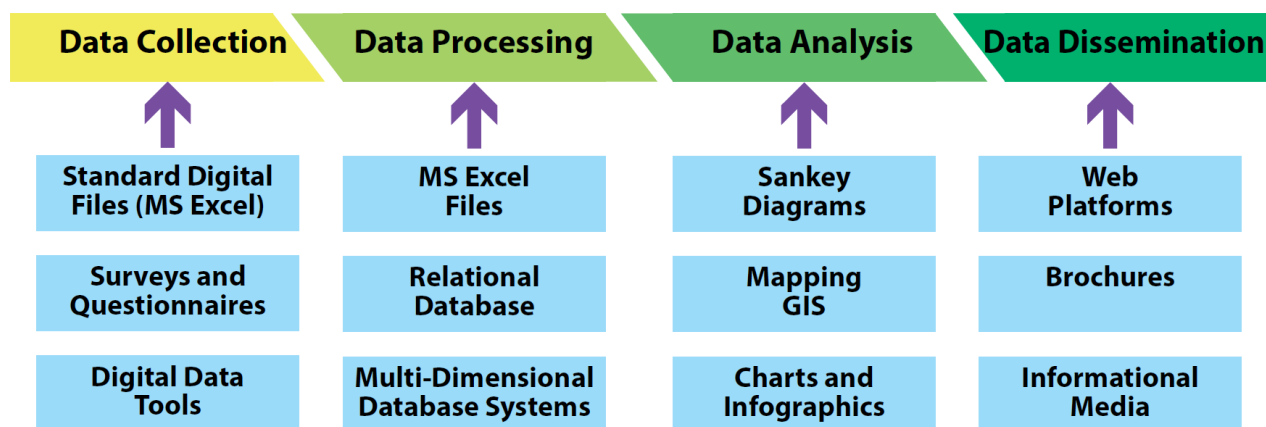
- Processes the raw energy data from local authorities and energy data providers, adapting it for energy consumption and CO2 emissions inventories for their SEAPs
- Applies corrections and generates energy-specific indicators after integrating multiple types of consumption data
- Provides online tools for individual users to monitor their consumptions

Available instruments related to the functioning of ANERGO: agreement templates with municipalities/energy data providers (free, no copyrights), software tools (paid, full copyrights).

Main steps of implementation

Typically, the main steps are as follows:

- Formal establishment of the observatory structure
- Setting up of a steering committee and the initial goals
- Initialization of templates for agreements with the involved parties
- Development of database characteristics/tables/data formats
- Development of tools to output data according to the demands and reports output



It is crucial to make continuous efforts to expand the collaborations with other types of energy providers, utility companies and other municipalities in order to have more accurate view on energy data in the region.

Expected results

Energy observatories contribute directly to: enhanced data quality and consistency for local authorities Sustainable Energy Action Plans; development of regional trends and statistic on current and future energy demands; RES integration at local and regional level; the reduction of CO₂ and GHG emissions.

Contribution to SEAP & indicators

Energy Observatories provide data for SEAPs output to match the demands per sectors of interest. These outputs include BEIs, MEIs, energy and emissions indicators and custom reports.

How to integrate in SEAP?

Using output instruments or methodology, energy data to match SEAP can be extracted from Observatory's energy database in the form of a BEI a MEI or a custom energy or emissions report.

Contribution to SUMP & indicators

Transportation is integral part of emissions monitoring and one of the largest pollutant. Energy database can be used to output specific SUMP indicators.

How to integrate in SUMP?

Establishing agreements with data providers in transport can provide the data required to output consistent SUMP indicators, reports and trends. The Observatory can collect data regarding number and

type of vehicles in a territory and can track the evolution of the associated consumption and emissions due to private & commercial transport.

Lessons learned

The "one stop shop energy data centre" is highly dependent on good collaboration with energy data providers to start building a good energy database. The collection of energy data (municipal sector) required by SEAPS and SUMPS is a highly demanding process that needs local authorities' active involvement. Responsible staff from local authorities must be motivated to engage in working with the "one stop shop energy data centre" and provide feedback. Energy data centre must provide enough flexibility regarding what data is shared and be of low costs in terms of money and time for municipalities to be perceived the energy data centre as a feasible partner.

Contacts & links

<http://data4action.eu>

<https://anergo.alea.ro>

#8 Public lighting and smart city infrastructure

Public lighting

References/sources

Several cities have implemented similar projects. Some pilot Models from different countries:

- SOLAR STREET LIGHTING IN BALCHIK MUNICIPALITY, BULGARIA
- SMARTCITY MALAGA
- A SMALL, YET VERY INOVATIVE MODEL OF ESCO CONTACT IN ITALY: MONTECHIARUGOLO

Who needs to act?

The public authority is the initiator, while the action can be implemented under a Private-Public partnership, typically a ESCO scheme: a private operator invests in the "smart light" infrastructure, and returns from the investment by managing it for a number of years (maintenance + electricity).

Who is affected?

Citizens, transport companies, transport providers, communities.

Solution

Deep renovation of old street lighting, to build an integrated platform for energy, data and smart services.

New high efficiency lights (LED) with advanced dimming functions to adapt to actual traffic and minimize consumption. Upgraded electric infrastructure to support e-vehicles: several e-vehicle charging station installed at street lighting poles. IT infrastructure to provide public WiFi access points and support IoT (thousands of sensors connected to street lighting poles, vehicles and wearables).

Example: Balchik Municipality joined CoM and committed to go beyond the 20/20/20 targets. According to the municipal SEAP 20% of emissions come from street lights. In order for appropriate measures to be undertaken a photovoltaic street lighting construction on the Dambata coastal promenade was performed. It is a pilot project including installation of new street lighting system of PV-LED 68 street light poles with LED lamps. Each lamp has a power of 20 W, the total installed power is 1360 W. Photovoltaic charging station consists of 18 pieces polycrystalline photovoltaic panels with a power of 240 Wp. The total installed capacity is 4,32 kWp. The warranty period of photovoltaic panels is 25 years of LED lamps - 35,000 hours.

Example: SmartCity Malaga has made since its inception in 2009, the testbed for the introduction of Smart Grid technologies in the networks of medium and low voltage, in order to respond to these challenges and improve efficiency, safety, quality and sustainability of the electricity system. It is a living laboratory built on the actual distribution network that has developed and implemented features and much higher than the usual technologies.

Investment

The investment on public lighting and smart city infrastructure is generally high.

In Malaga, the investment has been promoted and financed by the CDTI and Endesa.

The pilot installation in Balchik required a small investment of 50,000 EUR. Type of costs:

1. human resources.
2. ICT applications: equipment, measurement and monitoring devices, PV modules, specific software.
3. Costs for measurement and monitoring.
4. Costs for campaigning and dissemination activities.

May be financed under the ELENA-BEI scheme.

Return of investment

Return on the investment on improved energy efficiency of public lighting is generally 5-7 years, depending on the efficiency of the old system.

Investments on Smart services for mobility management should be paid by public authorities.

Other resources to be used

Existing public lighting and ICT infrastructure should be included in the project.

Available tools

There are several tools to support the adoption of efficient street lighting and smart city infrastructures, provided by private companies or non-profit organizations.

The most relevant tool is the “SEAD Street Lighting Tool”, a free, easy-to-use calculator that helps municipal officials make more informed procurement choices and alleviate some of the complexity involved in purchasing new street lighting products. “SEAD Street Lighting Tool” is provided by SEAD Initiative (the Super-efficient Equipment and Appliance Deployment Initiative), a voluntary collaboration among governments working to promote the manufacture, purchase, and use of energy-efficient appliances, lighting, and equipment worldwide. SEAD is an initiative under the [Clean Energy Ministerial \(CEM\)](#) and a task of the [International Partnership for Energy Efficiency Cooperation \(IPEEC\)](#), promoted by 17 Governments worldwide, including the European Commission – Directorate-General for Energy.

More information at: <http://www.superefficient.org>

Main steps of implementation

1. Set-up a multidisciplinary team, applying SIMPLA methodology
2. Collect data on public lighting and ICT infrastructure, mobility and energy use
3. define the main goals of the investment
4. define the business model and funding (ESCO, ELENA BEI,)
5. tender for public-private partnership (approx. 1 year)
6. investment (approx. 1 year)
7. new public lighting and smart city infrastructure at work - maintenance, monitoring and verification of savings and operation costs.

Expected results

Improved lighting, reduced energy consumption for lighting.
Smart mobility services and reduced congestion

Improved availability of WiFi connections and smart services.

Increased number of e-vehicle charging stations and consequently more electric vehicles on the road.

Example: the pilot installation in Balchik Municipality resulted in annual savings of 23 MWh of electricity and 47,3 t emissions CO₂.

Example: in Malaga, the project resulted in an improved electricity distribution network, integration of e-vehicles with "It Smart Plugs" and gaining experience on existing equipment and innovative functionalities not yet on the market.

Contribution to SEAP & indicators

Reduce CO₂ emissions, reducing energy. Increase use of renewable sources. Increase of energy and cost efficiency.

How to integrate in SEAP?

Can be included in a SEAP as an Action to reduce CO₂ emissions.

Contribution to SUMP & indicators

Pollutants reduction (NO_x, SO_x, CO, etc.); enhanced intermodality; reduced number of vehicles in urban areas; improved sustainable accessibility to city centres.

How to integrate in SUMP?

The action fully corresponds with the SEAP goals and can be set as a measure.

Lessons learned

Application of energy measures using renewable source will significantly contribute to achieving the targets for energy and climate as set by the municipality. Such measures have strong replicability in other cities, regions, etc. as it explores local facilities and integrates local stakeholders.

Contacts & links

http://www.bsecluster.org/en/partner_projects_s1.php

http://www.endesa.com/es/saladeprensa/noticias/Documents/Smartcity%20Malaga_ESP.pdf

<http://greencities.malaga.eu/>

<http://www.superefficient.org>

#9 Promoting energy savings at school and other public buildings

PUBLIC and RESIDENTIAL SECTOR/ Users and consumers empowerment to reduce energy consumption

References/sources

EURONET 50/50 and EURONET 50/50 MAX projects

<http://www.euronet50-50max.eu/en/>

<http://euronet50-50max.eu/en/about-euronet-50-50-max/project-results-and-success-stories>

Who needs to act?

The local authority which pays the energy bills (municipality, region...) signs an agreement with the school/other public building on how to implement the 9-step 50/50 methodology and share the savings

Who is affected?

The parties concerned are the municipality, the local energy manager and the building users, that in case of schools are pupils, teachers, the school management team, caretakers, cleaning staff, parent associations, etc.

Solution

The methodology implemented in the public building increases energy awareness of the building users and actively involves them in energy-saving actions. Achieved financial savings are shared equally between the building users and the local authority which covers the energy bills. Thus local authority benefit of a reduction in the energy bills and the building users' efforts are rewarded (50% of saved money is for financing the building's users own activities).

With 50/50, everyone wins: Users of public buildings are encouraged to save energy and to earn money to put towards their own activities or to invest in improving their facilities; public authorities are able to reduce their energy expenses, and the general public win by reducing atmospheric CO₂ emissions.

Investment

Level of investment is very low (~300€/school), therefore such expenses may be incurred interchangeably by both school or municipality according to the agreement signed between parties. Measuring instruments: Electricity meter monitoring, digital thermometer, luxometer, energy meter socket (Only the investment costs are included. The staff costs are excluded. It is assumed that affected people as teachers and local energy managers implement the project).

The investments for the prizes of the schools are paid by the energy savings achieved and the above mentioned initial investments will be probably refunded by the share of the local authority savings making this action a real win/win solution.

In the case to be implemented in other type of building, monitoring system/grid analyzer investment may be higher (~1500-2000 €)

Return of investment

Investments are returned through energy savings; thus, the return of investments is dependent of total energy consumption. Based on our experience, average saving rate is at least 10% of energy consumption. The return period ranges from 3-12 months for an annual electricity expenditure of EUR 20.000.

Other resources to be used

In order to a correct implementation of the 50/50 methodology, guidelines for the different types of building as well as other educational materials and agreement models have been developed and can be downloaded for free at the project website: <http://euronet50-50max.eu/es/50-50-library>

Available tools

An Energy saving calculation tool has been developed to help assess savings achieved. It's non-copyrighted and free of charge.

<http://www.euronet50-50max.eu/en/energy-savings-calculation-tool>

Educational materials on energy savings at schools are available also on:

IUSES project <http://www.iuses.eu/>

Carbon detectives project <http://www.carbondetectiveseurope.org/>

Main steps of implementation

A successful 50/50 Project at a school requires will and drive both from the side of the school and from the side of the administration that is paying the energy bills. At the school one or two teachers should be the “engines” of the project. These teachers should have the support of the director of the school.

THE NINE BASIC STEPS FOR A SUCCESSFUL 50/50 PROJECT:

The first two steps of the proposed methodology are preparatory. The steps 3-9 are carried out by the students, which are supported by the teacher using the material given in this e-pack:

1. **Establish an Energy Team:** The energy team consists of one school class, one or two teachers interested in the project and the school caretaker.
2. **The Insider Energy Tour:** The insider energy tour is done by the school director, the teachers involved in the project, the school caretaker and a representative of the administration paying the energy bills of the school to assess the situation in the school building.
3. Theoretical Kick-off in the energy team
4. **Energy Tour:** The students get to know the way of the energy into and out of their school.
5. **Making an energy survey at school:** Students make an instant and long-time temperature profile and a survey of the use of electricity.
6. **Evaluate the results:** Make Solution Proposals
7. They work out proposals to improve the energy performance of their school – and thus ways to avoid CO₂-emissions.

Tell the School target public: The students work out ways to reach the target persons of the behaviour oriented proposals at the school.

8. **Communicate measures that need small investment:** Proposal that are small investment-related measures that can save a lot of energy and can thus make the 50/50-project even more effective.
9. **Use and communicate the money the school gets for its efforts:** When project receives its reward – the 50% of the money saved-, the success is communicated at the school and the money is spent.

All docs to apply this methodology can be downloaded in many European languages at:

<http://euronet50-50max.eu/en/50-50-library/methodological-guidelines-how-to-implement-the-50-50-methodology>

Expected results

Minimum energy savings achieved in each building involved reach 8%.

Financial savings resulting from the implementation of energy efficiency measures are equally shared between buildings' users and local authorities covering their energy bills: 50% of the savings are returned to building's users through a financial pay-out and 50% are the net saving of the local authority

Communities of educational and non-educational buildings change their energy behaviour influencing their families and friends to do the same!

Contribution to SEAP & indicators

It contributes as "Other measures in buildings" as set out in [the "Guidebook on How to develop a SEAP 1.3", edited by the Covenant of Mayors:](#)

POSSIBLE INDICATORS TO MONITOR THE IMPLEMENTATION: Total energy consumption of Municipal buildings and equipment/facilities as described in pages. 49 and 69 of the ["Guidebook on How to develop a SEAP"](#) edited by the Covenant of Mayors.

How to integrate in SEAP?

You can find an example of factsheet on how to integrate it in the SEAP at the link:

<http://www.diba.cat/documents/471041/0/Euronet+PAES+english.pdf/b68aa9b2-2d92-43d9-a4c0-1e69de02c78e>

Contribution to SUMP & indicators

It contributes to SUMP in all measures involving Energy use and carbon emissions reduction in the city, as well as fostering synergic measures such as pedestrian routes to school, bike lanes for students and teachers, etc.

How to integrate in SUMP?

SUMPs include measures targeting improving quality of air and carbon emissions reductions, as well as promoting more sustainable means of transport to and from urban tertiary facilities such as schools. The Euronet 50/50 idea fits in that area of SUMP.

Lessons learned

Euronet 50/50 max has managed to involve many people in energy savings in public buildings which has generated huge savings. 500 schools of 13 European countries means a great network that during the

development of the project learnt a lot about what climate change is and about how they can save energy in their public facilities. And all of us have been learned that:

- **With enthusiasm of teachers, students, managers and users of the building, Euronet 50/50 max goes on!**

The 50/50 methodology is a powerful tool to raise awareness on energy use and save energy in public buildings. Euronet 50/50 max enhances the possibilities of public buildings to save energy with just changing behaviours and increases their knowledge and motivation on climate change action. Finding enthusiastic people who want to lead the project, and making sure they have the necessary support the project goes on. Especially when kicking off the initiative a large promotional campaign is to planned to actively involved schools, including the organization of several workshops to present it to the school managers.

- **Co-responsibility is a key factor to achieve energy savings.**

Public buildings need much more motivation and support than schools. In non-school public buildings, it's necessary to adapt the methodology according with the objectives and interests of workers and users of the buildings. When we are working with adults sometimes it's more difficult to maintain the motivation than with young students. But when the organizers of the 50/50 projects can get that, the potential of public facilities to achieve good results is enormous. It's necessary to have the support, commitment and involvement of local politicians is the starting point for any energy-management project.

- **Economic incentive has been just incentive, not the main goal!**
- **Difficulties to arrive (influence) on regional and national level strategies**

Strategic roll- out has proven to be difficult to conducts, due to several reasons. Depending on the specific situations in each country or on the kind of each partner, these problems occurred on local, regional and/or national level. Partners as NGOs or universities has more difficulties to reach the targets, they don't have direct channels and methods to influence strategies. But for public authorities, it was supposed to be easier.

It's very important ensuring wide **dissemination** of the 50/50 benefits on the **national and regional level** to motivate more public authorities to implement 50/50 concept in their buildings.

Contacts & links

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<http://euronet50-50max.eu/en/about-euronet-50-50-max/what-is-the-euronet-50-50-max-about>

<https://www.facebook.com/EURONETMAX>

#10 District heating including industrial waste heat recovery

District heating

References/sources

UNEP: District heating energy; Unlocking the potential of energy efficiency and renewable energy.

Who needs to act?

Local governments are uniquely positioned to advance district energy systems in their various capacities: as planners and regulators, as facilitators of finance, as role models and advocates, and as large consumers of energy and providers of infrastructure and services.

When local governments do not have regulatory powers in the energy sector, nor a stake in a local utility, nor the resources to undertake feasibility studies, they can incorporate energy supply or efficiency requirements into planning and land-use policies.

Integrated energy planning and mapping supported by a designated coordination unit or a public-private partnership, is best practice to identify synergies and opportunities for cost-effective district energy systems, and to apply tailored policies or financial incentives.

Who is affected?

Optimising district energy systems ensures efficient resource use. Realisation of the diverse benefits requires working with the end users. Cities pursuing district energy have benefited from identifying synergies with other utilities (water, waste management, transport) and incorporating these synergies into a mutually beneficial business case.

Solution

Many cities are aiming to integrate publicly or privately-owned waste heat through heat tariffs that reflect the cost of connection and the backup system to guarantee supply. This is similar to the development of feed-in tariffs for renewable power.

Integrating energy into urban planning leads to the most efficient use of energy and to the optimization of local resources by encouraging mixed-use zoning and compact land use – two of the most important planning tools for encouraging district energy and reducing carbon emissions.

“Wholly public business model”: The public sector, in its role as local authority or public utility, has full ownership of the system, which allows it to have complete control of the project.

Investment

“Hybrid public and private” business models have a rate of return that will attract the private sector. In several cities, the public sector is still willing to invest in the project and retain some control. These business models can include:

- a public and private joint venture where investment is provided by both parties that are creating a district energy company, or where the public and private sector finance different assets in the district energy system (e.g., production of heat/cooling versus transmission and distribution);
- a concession contract where the public sector is involved in the design and development of a project, which is then developed, financed and operated by the private sector, and the city usually has the option to buy back the project in the future; and
- a community-owned not-for-profit or cooperative business model where a municipality can establish a district energy system as a mutual, community-owned not-for-profit enterprise or as a cooperative. In this model, the local authority takes on a lot of risk initially in development and if it underwrites any finance to the project.

“Private business models” are pursued where there is a high rate of return for the private sector, and require limited public-sector support

Return of investment

The return of investment depends on the project specific conditions. However, a business plan has to be developed. The business plan for a district energy system is very project-specific. It needs to ensure that all of the players involved – including investors, owners, operators, utilities/suppliers, end-consumers and municipalities – can achieve financial returns, in addition to any wider economic benefits that they seek.

Other resources to be used

- Land use planning
- Legal requirements
- National and local utilities which are providing heating and cooling
- Energy vision and targets of the local authority
- Building codes

Taxes and tariff regulations

Available tools

Industrial waste heat recovery systems are very complex and they need to be adopted to the company specific conditions, as well as the connection to the district heating system. Therefore, no standard tool can be provided. We suggest to involve in the planning phase an engineering office.

Main steps of implementation

1. Assess existing energy and climate policy objectives, strategies and targets, and identify catalysts
2. Strengthen or develop the institutional multi-stakeholder coordination framework
3. Integrate district energy into national and/or local energy strategy and planning
4. Map local energy demand and evaluate local energy resources (including waste heat sources, renewable energy sources)
5. Determine relevant policy design considerations
6. Carry out project pre-feasibility and viability
7. Develop business plan

8. Analyse procurement options
9. Facilitate finance

Set measurable, reportable and verifiable project indicators

Expected results

- Greenhouse gas emissions reduction: Rapid, deep and cost-effective emissions reductions, due to fuel switching and to decreases in primary energy consumption of 30–50 per cent (e.g., the district cooling network in Paris uses 50 percent less primary energy).
- Air quality improvements: Reduced indoor and outdoor air pollution and their associated health impacts, through reduced fossil fuel consumption.
- Energy efficiency improvement: Operational efficiency gains of up to 90 per cent through use of district energy infrastructure to link the heat and electricity sectors (e.g., Helsinki's CHP plants often operate at 93 per cent primary energy efficiency).
- Use of local and renewable resources: Harnessing of local energy sources, including from waste streams, reject heat, natural water bodies and renewable energy. Piloting of new technologies, such as thermal storage, to integrate variable renewables.
- Resilience and energy access: Reduced import dependency and fossil fuel price volatility. Management of electricity demand and reduced risk of brownouts.
- Green economy: Cost savings from avoided or deferred investment in generation infrastructure and peak power capacity. Wealth creation through reduced fossil fuel bills and generation of local tax revenue. Employment from jobs created in system design, construction, equipment manufacturing, operation and maintenance.

Contribution to SEAP & indicators

Reduction of greenhouse gas emissions

Increase of the use of renewable sources

How to integrate in SEAP?

Can be included in a SEAP/SECAP as an action to reduce CO₂ emissions.

Contribution to SUMP & indicators

no contribution to the SUMP indicators

How to integrate in SUMP?

The construction of the district heating can have a temporary negative impact on urban traffic, this should be considered for mitigation actions in the SUMP.

District heating pipes can have the side effect of warm ups bikes lanes and smelt snow as it has been tested in the Netherlands. Probably it doesn't make sense to have district heating specifically built for this purpose but when it is already planned this side effect could be taken into account in SUMP.

Lessons learned

Modern district energy systems supply heating and cooling services using technologies and approaches such as combined heat and power (CHP), thermal storage, industrial waste heat, heat pumps and decentralized energy. District energy creates synergies between the production and supply of heat, cooling, domestic hot water and electricity and can be integrated with municipal systems such as power, sanitation, sewage treatment, transport and

waste.

Contacts & links

UNEP: District heating energy; Unlocking the potential of energy efficiency and renewable energy. In this paper, more than twenty case studies are included and the lessons learned from 45 champion cities of district energy use summarised.

Link for download: <http://www.unep.org/energy/districtenergyincities>

#11 Intelligent energy monitoring and management of buildings

Public sector / Efficient Energy Management in public buildings by application of EMS systems

References/sources

References are provided regarding 2 showcases:

1. Energy management in public buildings in Burgas municipality
2. Monitoring of energy performance in public buildings in Primorje-Gorski Kotar

Who needs to act?

The process of energy management and monitoring in public buildings is responsibility of the local and regional governments as the main actors and owners of the buildings. Outsourcing company.

Who is affected?

The primary beneficiaries of the measure are the buildings' owners and users, represented by the public authorities, institutions, etc. while the secondary recipients are the visitors and citizens using the services provided in those buildings.

Solution

The energy efficient measures used for retrofitting of the building itself, replacement of windows, fuel switch, etc. do not often effect the practical decrease of energy demand. Researches have shown that the building users' personal behaviors and patterns keep a significant impact on the energy performance. Therefore, the energy management and monitoring is a direct response to the matter.

Energy management and monitoring provides a very detailed and accurate database with real figures for the actual energy consumption in each building. By utilization of energy monitoring system (EMS) the real energy performance identification and energy losses estimation in the respective premises would be enabled. The EMS provides detailed and complete information needed for energy audits and at the same time it decreases the costs and terms for the measures implementation at higher quality and accuracy of estimations, assessments and recommendations. It allows better control of energy flows in the buildings, and adequate thermal comfort and rates for building lighting can be provided with minimum use of resources.

It is very important the main energy consumers in the building to be determined and differentiated. For example, in the kindergarten the main consumers are: inside light, outside light, kitchen equipment, office supply consumers (computers, PV systems, television, DVD players, etc.), special equipment (sterilizer machine), boiler, inside heating system. In some cases, inside heating systems have to be subdivided according to specific purpose of the building use (e.g. sub divisions: by floors, by premises, by location, east and west part, etc.). Measurement devices have to be installed on each of the identified consumers to measure electricity, gas, oil, etc. Each measurement device has to be designed on the basis of each specific

case taking into account the available consumers, heating of the building, resources, etc. and to be able to send data to the main control system. All data have to be collected in a main data center. The special software analyzes the data received and if there are some deviations from the standard the software has to give a signal to the operator. Outside and inside temperature is necessary to be measured as well. All measurable data are compared with standard or statistical data. The measurement timing is at least at every 15 minutes.

The benefits such EMS installations provide are the following:

- i. in case of unnecessary energy consumption, the system detects and gives signal to the operator. There are possibilities for the manager to regulate the system manually or some consumers to be switched off automatically.
- ii. a very precise determination of the necessary energy efficiency measures.
- iii. measurement of the saved energy from every concrete retrofitting measure. For example, the EMS is adjusted so as the lights to operate only during the nights, but for some reasons during the day the lights are switched on. In this case the system detects that and there two options: it will automatically switch off, or the EMS will give a signal to the operator. Or during a very hot winter day, the system detects very hot radiators, again on time the system understands that and reduces the heaters. In these cases, the advantages are related with a reaction on time, or the manager understands immediately the unnecessary consumption and stops the process. When there is a sufficient statistical data it can be analyzed and opportunities for increasing the energy efficiency can be found through benchmarking. Example: we are aware of best examples which report energy consumption of 2 kWh/sq.m for LED lighting. However, our showcase reported 3 kWh/sq.m. So, if we switch the bulbs we will report saving of 1 kWh/sq.m. Thanks to these data we can estimate the necessary investment as profitable. In case of implementation we can measure real results.

This system has proven to be very efficient both in terms of energy management and energy planning by the local authority

Investment

The overall investment is estimated to medium high depending on the building stock and energy performance of the respective buildings.

The investments are related with ICT facilities and applications which include equipment, measurement and monitoring devices and specific software.

Costs for measurement and monitoring should be foreseen the main of which are for human resources and education of experts to work with the application.

Purchasing equipment and facilities can be done by the authority own sources and/or using external funding.

The practical application of energy monitoring can be made either as internal action where an expert is assigned and trained to work with it or as it can be an outsourced activity for the municipality.

Return of investment

Return of investment is estimated to mid- term reflecting mainly in reduction of energy consumption in the buildings. Accordingly, it leads to improvement of the energy performance of the building itself.

Other resources to be used

It is necessary to build up or acquire the energy management system software if such is not already available. Additional ICT applications can be installed as part of the EMS for data processing which will enable forecasts and target setting for implementing actions in mid-term and long-term period.

Local and regional funding (own sources) can be used as well.

Available tools

Operating practices

ENERGY MANAGEMENT IN PUBLIC BUILDINGS IN BURGAS MUNICIPALITY

The process:

An innovative model has been applied for upgrading the conventional energy efficiency measures in public buildings.

Initially feasibility study for building inventory has been made for the energy performance in public buildings. Based on the outcomes 3 pilot buildings (two kindergartens and a secondary school) have been selected on the following criteria: (i) building functionality; (ii) hours of active exploitation of the building; (iii) type of the installed energy consuming systems and facilities (heating, cooling, domestic hot water, ventilation, etc.). Consequently, three prototypes (design and specification of system hardware and software, sensors, devices, modifications to existing equipment and combinations of hard/firmware) of energy monitoring systems were developed and installed in the buildings. Trainings have been organized for building managers how to supervise the controllers and manage the systems. Thus, efficient control of energy buildings' energy performance has been ensured. Series of campaigns have been organized to inform the residents about the new investments as well as to raise the awareness of the building performance.

Indicative amount of investment: It was estimated that 10,000 EUR per building were allocated, which included: 1. human resources, 2. ICT facilities and applications: equipment, measurement and monitoring devices, specific software, 3. Costs for measurement and monitoring, 4. Costs for campaigning and informative actions.

Return of investment: The estimated period of investment return is set to 4 years. The investment reported energy savings up to 30% per annum depending on the type and purpose of building operation (number of hour of active use).

MONITORING OF ENERGY PERFORMANCE IN PUBLIC BUILDINGS IN PRIMORJE-GORSKI KOTAR

The process:

REA Kvarner monitors energy consumption and energy savings in public buildings owned by the regional authority. It is part of the national project Systematic Energy Management, being a regional coordinator.

Regional administration and some local administrations have been motivated to introduce separate internal management systems and monitor the consumption of buildings in their ownership. The National Energy Management Information System (ISGE) is developed and established as the basic tool for collecting, analysing and reporting on energy and water consumption in the facilities owned by cities and countries. ISGE is a computer program that serves as an essential tool for support Systematic Energy Management. Data on electricity consumption, energy for heating and water should be continually and regularly uploaded for all buildings to ensure the effective monitoring and management of the energy flow. In addition to regular monitoring of energy and water consumption in the building, ISGE can register

possible failures in the building, such as for example the release of water from the pipes. As an example, consider building schools, to be used from Monday to Friday. Consumption is recorded on Friday and Monday, and if the recorded water consumption in the period of the weekend, it means that there is water leakage at certain places.

In the case of Primorje-Gorski Kotar, REA Kvarner was appointed to monitor energy consumption and energy savings in public buildings owned by the regional authority and is part of the national project Systematic Energy Management. It currently monitors the energy consumption in 323 buildings. Buildings that are analyzed are divided into labels depending on their purpose. Division of etiquette is as follows: elementary schools, secondary schools, health centers, hospitals, administrative buildings, pharmacies, museums, sports halls, retirement homes, dormitories, public buildings. The categorization of buildings in the label enables a better comparison of buildings that have a similar regime of using. In this way, within each category can allocate those objects which are the largest consumers. Compares the specific energy consumption (kWh/m²) building within a particular label, which together with data on the energy class of the building makes it a good indicator of those buildings for which it is necessary to apply some of energy efficiency measures.

Recently the municipal administrators appointed to monitor consumption in buildings no longer enter bills in ISGE. In order to improve the accuracy of the entered data, the obligation of entering monthly bills into the system now passes to the energy suppliers. People in charge of it still need to control the data, use consumption data for a more rational use of energy and, if necessary, enter weekly readings, but herewith their job is made considerably easier.

Indicative amount of investment: It is estimated that by monitoring, energy consumption of regional buildings is reduced on average by 5%.

Return of investment: Approx. 15kEUR / year (annual gross salary of an officer in charge of Systematic Energy Management)

Key success factors:

- Active commitment of the local and regional authority and taken decision for the undertaken measure
- Effective collaboration between the building managers and company providing the physical installations
- Constant flow of data processing, input of accurate data needed for the measurement and monitoring
- Regular information to the local communities for efficient energy savings, progress of efficiency and cost savings

Main steps of implementation

It is the local and regional government decision to implement energy monitoring in public buildings. The national legislation in the countries states the opportunities and ways how these activities can be realized, the key actors involved and the available financing schemes.

Expected results

Short and mid-term

- Reduction in energy consumption due to better monitoring, problem detecting and resolution.

- Reduced fuel consumption, electricity and water lose.
- Reduced costs for heating and cooling.
- Mid and long-term
- Increased energy efficiency in the buildings up to 30% per annum.
- Improved energy performance of the public buildings.
- Improved quality and period of stay in the buildings.
- Better planning and investments.

Contribution to SEAP & indicators

Reducing CO2 emissions, decrease energy demand.

Cost efficiency.

Energy savings in the buildings.

Awareness raising.

How to integrate in SEAP?

Can be included in a SEAP as a measure, applicable in Buildings sector, and Public lightning.

Contribution to SUMP & indicators

The action does not directly contribute to SUMP yet its results can lead to behavioural changes reflecting the transport indicators as well.

How to integrate in SUMP?

Development and installation of EMS system for electric fuel stations to monitor and supervise the energy performance.

Organisation of information campaign for alternative transport use as to reduce the green house emission complementary to the raising awareness campaign for energy performance of buildings.

Lessons learned

In order for efficient energy performance in buildings to be achieved it is vital a proper monitoring system to be established with the active involvement of competent professional collaborating the local and regional authorities.

Contacts & links

<http://www.boraem.org/projects6.php>

www.reakvarner.hr

#12 Renting public roofs for PV installation

Public sector

References/sources

Installation of photovoltaic (PV) systems on a public building - examples from the Primorje Gorski Kotar County (HR)

Who needs to act?

Local and regional governments

Who is affected?

Buildings' owners and users

Solution

The idea behind this initiative was to utilise the potential of both the solar energy and public buildings for the installation of photovoltaic solar systems for electricity production. Solar PV systems are increasingly being specified for installation on e.g. schools and other public buildings. The installation of solar PV panels to a school or public building provides a visible statement, an inspiration to others, reliable energy generation, and an effective way to address CO2 targets. What's more:

- Solar PV systems generate free electricity with no carbon emissions
- Every unit of PV generated electricity qualifies for payments under the feed in tariff
- They are practicable for most buildings and result in no loss of usable building space
- Solar PV systems have no moving parts and require little maintenance
- Solar PV systems are reliable, have a predictable performance and an expected life of over 40 years
- It will save several tonnes of CO2 every year

The investments in PV installations on Primorje Gorski Kotar's public buildings were part of a wider REA Kvarner's initiative – a programme called "Public Flat Roof Market" that was intended to uptake all necessary administrative steps that would lead to setting up photovoltaic installations (10kW and 30kW) on the roofs of public buildings in the county, on a principle that the building owner or manager rents its roof to potential investors to set the PV installations. For doing that, the rented roof's owner receives a compensation in the amount of 5-8% of the revenue generated by the investor by selling the electricity produced, which is regulated by a separate contract.

Investment

Approx. 400kEUR;

In the case of projects implemented in the Primorje Gorski Kotar, seventy five percent of the investment has been financed by the Croatian Bank for Reconstruction and Development (HBOR) while the rest has been financed by a regular commercial credit.

Return of investment

8 years

Other resources to be used

EU-, local- and national Funds dedicated to RES projects;

In Croatia: Environmental Fund loans, HBOR loans, commercial credit lines specially developed to finance environmental friendly investments

Available tools

Main project design needs to be developed and all permits acquired in accordance with the national energy law. In the case of Croatia, it means also setting up agreements between HROTE-Croatian Energy Market Operator, and buildings' owners.

Main steps of implementation

1. Elaboration of a conceptual design for PV system
2. Elaboration of a main design
3. Acquiring the status of eligible electricity producer
4. Setting up a contract with the public roof owner (if the investor is not the public building owner)
5. Procurement of equipment (with reference to national public procurement regulations)
6. PV system construction
7. Putting the system into operation
8. Electricity generation

Expected results

Financial (generates revenue for the investor), environmental (free energy from sun, non-polluting energy reduces emissions, has no direct impact on the environment) and social benefits (green jobs creation, increased knowledge and awareness).

Contribution to SEAP & indicators

Leads to energy savings in buildings; increases electricity production by renewable sources; placed on public buildings serves also for educational and awareness-raising purposes.

How to integrate in SEAP?

Can be included in a SEAP as a measure, tackling the residential, commercial and public sector.

Contribution to SUMP & indicators

Not applicable

How to integrate in SUMP?

As a next step, PV systems could be connected to charging stations for electrical vehicles, thus generating energy not only for building's, but also other purposes.

Lessons learned

Solar PV panels can be fitted to almost any building or structure and be mounted on the roof or the ground. However, the feasibility of such projects depends on the available local/regional/national incentives for renewable energy generation.

Contacts & links

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#13 Crowd funding

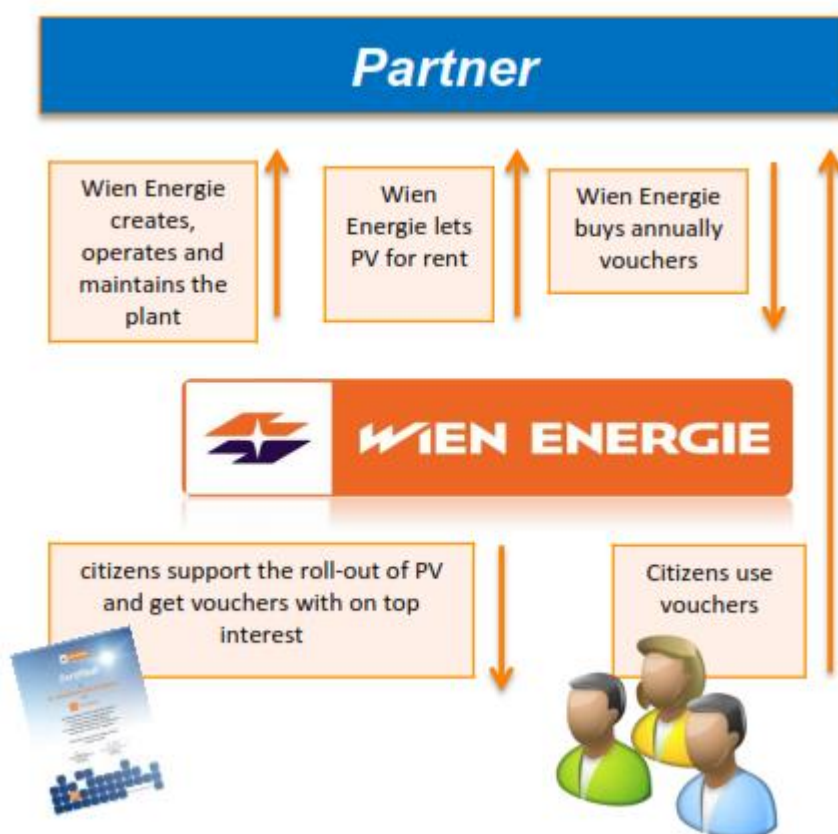
Innovative financing instrument

References/sources

Project: Citizens' Solar Power Plants: solar energy for everyone

Who needs to act?

Example: Citizens' Solar Power Plant: Voucher-based



Who is affected?

It depends on the project; therefore, examples can be given only: all citizens can support the project, energy supplier, enterprises, etc.

Solution

Crowdfunding is a method of raising capital through the collective effort of friends, family, customers, and individual investors. This approach taps into the collective efforts of a large pool of individuals—primarily online via social media and crowdfunding platforms—and leverages their networks for greater reach and exposure

There are three general categories crowdfunding can fall under: Equity, Donation, and Debt.

Equity-based crowdfunding is asking a crowd to donate to your business or project in exchange for equity.

Donation-based crowdfunding is asking a crowd to donate to your project in exchange for tangible, non-monetary rewards such as an ecard, t-shirt, pre-released CD, or the finished product.

Debt-based crowdfunding is asking a crowd to donate to your business or business project in exchange for financial return and/or interest at a future date.

Investment



Example

By investing in community-funded solar power plants, Viennese citizens have the opportunity to participate in the development of renewable energies. Citizens' Solar Power Plants mark the beginning of the dawn of a solar energy future for Vienna, and show the city's clear commitment to developing solar energy.

Image: Citizen's solar power station Donaustadt

The City of Vienna strongly supports photovoltaic energy production, which started into a new boom last year already.

On 4 May 2012, the first citizen solar power plant opened on the site of the Donaustadt power plant in the north of Vienna, with 2.100 photovoltaic modules and an output of 500 kilowatt peak (kWp). The energy is fed into the Vienna power grid and provides solar power for approximately 200 local households.

All solar panels of the first two Citizens' Solar Power Plants (in **Leopoldau** and Donaustadt) were sold out within a single week. Now two more plants have been completed in the districts of Simmering and Liesing. Compared to conventional electricity production, harnessing the sun as an energy source saves around 800 tons of CO₂ per year. The new Citizens' Solar Power Plant in Simmering generates green electricity with over 2.000 panels covering a total area of approximately 3.200 m².

Wien Energie, the city-owned energy provider of the Austrian capital Vienna, has set a target of increasing the share of renewable energy in total electricity production to 50 per cent by 2030. Green energy is produced close to consumers to minimise transmission losses and reduce dependency on electricity imports. This is the first time a participation model of this kind has been implemented in an urban area, and it has proven economical even without subsidising feed-in tariffs.

Return of investment

Shares in the Vienna Citizens' Solar Power Plants can be acquired by any private individual living in Austria. The regional power supply company Wien Energie is in charge of building the turnkey photovoltaic systems

and operating them. Citizens can buy whole or half panels at a price of EUR 950 or EUR 475 respectively. Wien Energie rents the panels from the individual purchasers, who then receive an annual profit of 3,1 per cent on their investment. The annual “rent” is paid directly to their accounts once a year. Once the service life of the plant ends after approximately 25 years, Wien Energie repurchases the panels, and the amount originally invested is returned to the citizens.

Other resources to be used

Country specific legal requirements must be taken into account.

Summary is in: Review of Crowdfunding Regulation Market Developments for RES project financing in the EU “Unleashing published the potential of Crowdfunding for Financing Renewable Energy Projects”, by: Osborne Clarke, Tanja Aschenbeck-Florange, Alexander Dlouhy, in December 2015

Available tools

Crowdfunding platforms in Austria:

- www.1000x1000.at
- www.evercrowd.com
- www.fundraizer.at
- www.homerocket.com
- www.regionalfunding.at
- www.rendity.com
- www.respekt.net

Reward based Crowdfunding-platforms

- www.indiegogo.com
- www.kickstarter.com
- www.startnext.com
- www.wemakeit.com

Main steps of implementation

- **Pick your project:** A crowdfunding project needs to be specific. It must have a clear outcome and be time-limited.
- **Write your budget:** Your crowdfunding campaign needs a target so it's important you're clear about how much money you need and where it is going to go. Remember to include in your budget the commission you'll need to pay to the crowdfunding site and any costs incurred by honouring the rewards.
- **Prepare your pitch:** The most successful crowdfunding campaigns are the ones accompanied by a video explaining what the project is, what you want the money for and what the difference will be when you're successful.
- **Pick your platform:** A dedicated crowdfunding platform will take the pain out of managing financial contributions but there are already a lot to choose from.

- **Plan your social media campaign:** Putting your campaign onto a crowdfunding platform is only the first step. To help people find it and build a movement of support you need to make the most of your online presence.
- **Keep in touch:** It's important that you keep people updated about the progress of the campaign.

Expected results

Benefits of the crowdfunding models:

- Economical possibility to make solar energy useable in urban areas
- Completely riskless for citizens – carefree!
- Overcome legal and directive barriers of in rent living citizens
- Promotes ecological awareness of Viennese citizens and climate protection (get in touch with energy production)
- Supports quality of live in the hometown
- Enhancement of energy-independence
- Citizens create the energy revolution in hometown
- Local value added based on local partners and local energy production
- Formation of opinion benefits supports general PV roll-out

Contribution to SEAP & indicators

It depends on the implemented measure

How to integrate in SEAP?

Financing of measures

Contribution to SUMP & indicators

It depends on the implemented measure

How to integrate in SUMP?

Financing of measures

Lessons learned

Challenges:

- Financial Market Authority (securities prospectus requirement, banking practice law)
- Suitable Location had to be found within a few weeks (project partner quit): structural analysis, connection with the grid, power transformer, shadowing, ownership structure, etc.
- Regulatory approvals: many municipal authorities involved (electricity department, monument conservation, fire department, environment protection, department of building regulation, labor inspector, etc.)
- Time schedule (politics, call for bids, etc.)

Contacts & links

Further information

<https://smartcity.wien.gv.at/site/en/projekte/menschen-gesellschaft/buergerinnen-solarkraftwerk/>

<http://www.umweltgemeinde.at/badener-sonnenkraft-mein-sonniger-beitrag-zum-klimaschutz>

The **Austrian financial market authority** is very carefully informing citizens about potential risks of this model:

<https://www.fma.gv.at/fma-themenfokusse/informationen-zu-buergerbeteiligungsmodellen/>

How to set up a crowdfunding project: This link provides a checklist on how to set a crowdfunding project including all main steps which have been taken for a successful project implementation:

<http://www.fundingcentre.com.au/help/setting-up>

#14 Energy sustainable communities or Energy Saving Awards

Residential sector

References/sources

Energy Neighbourhoods 2 project

Who needs to act?

Municipalities, citizens, NGOs with interests in energy and environment, retailers

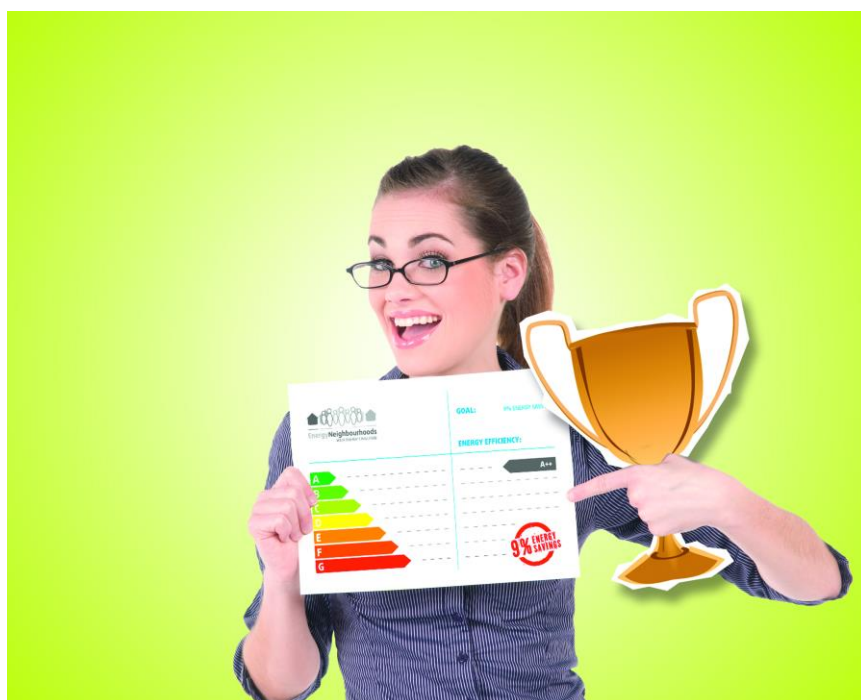
Who is affected?

Main: citizens; Secondary: municipalities.

Solution

Energy saving in households under the form of a competition set up by municipalities among citizens grouped in "neighbourhoods" on different levels, combined with measures such as training for households for efficient energy consumption, consumption monitoring and local climate campaigns.

The energy saving is achieved without significant investments, simply by behavioral change in a way that it does not compromise living standards. Moreover, by doing so everyone involved can reduce their carbon emissions and contribute to the overall goal of reducing CO2 emissions set in sustainable development related documents of the municipalities.



Investment

Low to medium investment level. Types of costs: organizational costs for training events, climate campaigns, staff costs, incentives for "energy masters" - energy experts that motivate citizens in saving energy, awards for winner communities. Sources: local budget, sponsorship.

Return of investment

Energy savings in each "neighborhood". Increased level of engagement of citizens in reducing energy consumption through a change of consumer behavior.

Other resources to be used

Carbon footprint calculators; weather data; website hosting; the online tool (savings calculator).

Available tools

Online tool for measuring the energy and CO2 saving; Toolkits for energy masters and citizens containing: handbook, small scale energy audit, energy meters reading chart, energy saving tips; climate campaign materials including information papers on CO2 challenges.

Main steps of implementation

1. Municipality decision makers start a challenge at city level in which they invite the citizens to save as much energy as they can only by changing their behavior as energy consumers without engaging in major investments. The underlining idea is that participants should not see a reduction in their comfort levels, just a reduction in their energy consumption through a "smart" use of energy.

2. Setting up the "neighborhoods" including the appointment of the Energy Master (EM). The EM should be an enthusiastic individual who plays the role of a coordinator and motivator of the group who is supported by the municipality by offering specific training on how to help the group in making its energy saving.

An important part of this step is to gather data on each participant's previous consumption.

3. The Energy Master training - an important step as the person who takes on the role of EM does not necessarily have to be an expert on energy issues. It is advisable to be part of a group.

4. Public launch of the competition: The public launch involves several events in order to motivate even more the participants and to raise awareness among non-participating citizens. The event should be of high visibility in order to reach out to local retailers and involve them in supporting participants in achieving high energy savings.

5. The development of the competition (the energy saving period): During a set timeframe (it is advisable to have at least 6 months of energy saving period including winter season) the participants monitor their energy meters weekly, receive trainings/advice from the EM, put in practice new ideas on how to be more efficient consumers. Moreover, to boost their energy savings and reduce their carbon footprint, the so-called "climate challenge campaigns" can be held whose main purpose is to further develop a better understanding and raise awareness in what energy and environmental protection topics are concerned (possible topics: energy label of household appliances, recycling, consumption of local products and services, energy efficiency in transport).

6. Final dissemination event where the recorded savings and winners are announced and prizes are awarded by municipality representatives.



Example of successful implementation of the bet in Romania:

Alba Iulia Municipality, with a strong commitment toward a sustainable development as a Covenant of Mayors signatory started the bet with its citizens having a strong promoter the Mayor himself who knew the importance of the citizens involvement and positive response to his vision of a greener and lower carbon emissions city. The Alba Iulia approach proved to be a very successful one as a total of 5 groups (neighbourhoods) entered in the competition out of the 17 participating at national level. The stating kick-off event whose main goal was to present the competition and attract participants proved to be crucial as the citizens felt that the municipality is really reaching out and actively involve them in achieving the goals. The groups were formed among colleagues from different institutions in the city who took on the role of promoting energy saving in their institutions. The approach proved to be successful as at the workplace people have lots of opportunities to exchange ideas on regular basis replicating the energy saving methods towards other colleagues as well. A total of 34 participating households took part in an extensive awareness raising campaign and they were given technical advice on how to reduce energy consumption only by behavioural change. The municipality appointed a technical expert who monitored energy consumption and saving together with each group's energy expert, offering specialised tailored advice to each participating household.

There were held a number of events throughout the campaign the social factor playing a major role in the success of the competition: a training event for the energy masters; four Co2 challenge meeting with the participants whose goal were to go beyond and find new attractive ways of reducing Co2 footprint, local events for award ceremonies, a final award ceremony and other promoting events involving media such as interviews.

The constant contact with municipality representatives who acted as motivator and partner in the competition brought together people and ensured a proactive and motivated approach by each participant.

Expected results

- Significant measurable reduction of energy consumption in private households; up to 25% energy savings without significant investments in energy efficiency works in households.
- Measurable reduction of CO2 emissions related to energy consumptions in private households,
- Raised awareness of citizens on carbon footprint, energy efficient products, efficient transport and climate protection policies

Contribution to SEAP & indicators

SEAP: reduction of GHGs, primary energy savings;

How to integrate in SEAP?

Elaboration of climate challenge campaigns to change behavior as energy consumer in residential buildings.

Contribution to SUMP & indicators

Reduction of CO2 emissions, and GHGs.

How to integrate in SUMP?

Organization of climate challenge campaigns related to the use of public transportation and non-conventional ways of transport instead of private motorized transportation

Lessons learned

- Lack of accurate information about energy efficiency, CO2 emissions, efficient transport and other climate-related aspects among citizens can be relatively easily overcome thanks to the fact that citizens are eager to learn about these issues. Raising awareness must be tackled individually but comprehensive raising - awareness campaigns targeting the general public are also crucial so as to reach out to non-participants as well.
- The success of the campaign is highly dependent on the enthusiasm and motivation of the Energy Masters which ensures dynamism and motivates participants.
- The social aspect of the project is also a key factor for success. Getting together with friends, neighbours or colleagues to share experiences really helps people to engage and stick with their energy saving practices.
- Citizens are motivated to continue changing their energy consumer behavior after realizing that small changes in behavior can contribute to significant home energy savings.
- Social media proved to be a very good channel to connect people in achieving a common goal

Contacts & links

<http://ec.europa.eu/energy/intelligent/projects/en/projects/en2>

#15 Social media app for participatory process

Transport and mobility/ Social Media to boost participatory processes.

References/sources

References are provided in two different approaches:

<http://eparticipation.eu/>

<http://www.ecas.org/wp-content/uploads/2015/06/ECAS-Publication-online-version.pdf>

Who needs to act?

Municipalities, citizens, SMEs and civil society (associations, NGOs, etc.) Who is affected?

Solution

A kit of measures including on-line tools, Apps and social media initiatives is designed, developed and implemented so as to boost the quality and quantity of participation from citizens and organizations in Mobility and Energy savings Plans promoted by the Municipality. Deployment of a Social Media App protocol, designed to boost citizenship participation in SUMP and SEAP/SECAV processes, including on-line surveys, presentation of results, videos and discussion of previous experiences in other municipalities. Only existing resources are to be used, and no dedicated App has to be designed.

Investment

Range of investment: from 2,000 to 5,000 EUR. Type of costs: human resources, equipment, app license fee, software, costs for promotion.

Return of investment

The investment return is measured in significant increases of social participation along the SUMP/SEAP processes.

Other resources to be used

- Available specifically oriented apps:
 - General
 - Specific participatory apps
- Smartphones (owned by users)
- GPS devices (owned by users)

Available tools

1. General apps:
 - Facebook: How to create a poll on Facebook: <https://www.facebook.com/simple.polls/>

- Twitter: How to create a poll on Twitter: <https://blog.twitter.com/2015/introducing-twitter-polls>
 - LinkedIn: How to create a group: <https://www.linkedin.com/help/linkedin/answer/6/creating-a-group?lang=en>
2. Specific participatory apps:
- GPS tracker: Search for 'Route tracker Apps' in internet and Playstore. There is a wide range of options from free Apps to Licensed ones, offering different features and applications.
 - Specifically designed for the process: The cost of designing and developing a specific App depends on the desired features and scope. Some Apps already designed to be used by cities in previous projects can be consulted and used (<https://smartcitizen.me/>).

Main steps of implementation

Once the general plan for SUMP/SEAP implementation has been drafted, we design the protocol for participation:

1- MAIN ELEMENTS:

- Information/data:
 - What do we need to know?
 - What do we want to communicate and share?
- Stakeholders:
 - Identification
 - Characterization
- Deadlines, resources, other

2- PARTICIPATORY PROCESS PROTOCOL:

- Link every type of stakeholder (ST) to the specific pack of information (Info) and data required and/or delivered (STx~Infox).
- Link the previous groupings to the most suitable communication format (CT) and tool (STx~Infox~CTx)
- Draft a diagram of all communication actions of the process stating every group and scheduling each stage of the process

3- SOCIAL MEDIA USE FOR THE PARTICIPATORY PROCESS

Prior to define the Social Media use, we must understand that every communication tool has a specific and optimal use for delivering information to citizens and encouraging participation:

- *Common guidelines for all them will be:*
 - The language used in the communication with citizens will always be clear and understandable and will be adapted to different target groups.
 - Information will be accessible attending to any special needs of the audience (subtitled videos, audio files...)
 - Coordinate actions on social media with traditional formats, in order to reach a wider audience, especially those not engaged in social media, so they can enter the debate through ordinary channels (contacting municipality's help desks, mail, ...)

- When approaching general public through social media, it will be important not only to inform about the process and its stages but also to entertain and educate the users.
- Attractive design and visual content, competitions, events calendar and posts that start a dialogue, will help to boost the participation.
- *Social Media optimal use*
 - **Municipality Web Portal/link devoted to the specific topic.** Most effective tool for gathering all information related to SUMP/SEAP development and present the channels that will enable citizens to participate in the process.
 - *Best for: linking and keeping updated all participation activities with information about the process in the official site.*
 - **LinkedIn:** Optimal tool to create a group of technical experts and professionals in the field to provide suggestions, ideas and opinions through the participatory process. It can also be used as a consultation hub for the municipality, and as a previous step to the wider public participation in social media (Twitter and Facebook). Users participating in this group will also benefit for an active involvement in municipality issues in their profile account that could be certified by the municipality for their curriculum vitae, if their participation meets the requirements set for that purpose. *Best for: Involving trained professionals and qualified audience participation.*
 - **Twitter:** Optimal tool to:
 - Engage several influencers and trendsetting users on sharing the information about the process and encouraging citizens to participate in other media polls or discussions (like celebrities endorsement to the participatory process).
 - Recommend sites and experts profiles to follow for those interested in the specific and other related topics.
 - Host simple polls through “likes” and retweets.
 - Promote other tools used by the municipality in the participatory process.

Best for: Persuading the audience to participate through influent users and link other communication activities.
 - **Facebook:** Most active way to make a public and open call for citizens to express their opinions and suggest ideas all along the process. The language used in this tool shall be informal and aimed at engaging general public. It presents opportunities for massive dissemination being particularly useful for sharing polls and questionnaires, collecting opinions and rising discussions. Posts that start a dialogue by questions or a “fill in the blanks” increase significantly the participation of users. Tip: the topic of discussion may sometimes be lost or tangled with public opinion about other issues. The manager of the Facebook profile will have to redirect the conversation to the matter in discussion. However, the management activity on Facebook, should also be flexible with negative comments, and let users interact about the issue. *Best for: Engaging the community as a whole and encouraging massive participation.*
 - This information combined with socioeconomic data will allow the characterization of different types of users.
 - Specific apps adapted for citizen participation: Whether specifically designed or adapting an existing one by the municipality: some municipalities opt for creating their own app, so that it includes the features selected by the municipality. Since it may require a larger

budget, the option of adapting an existing App or using one which already fits to the Municipality needs is recommended.

Expected results

- Large and fruitful citizen participation and engagement in the process
- Useful and segmented information about activities
- Enhanced credibility
- Community acceptance of future actions

Contribution to SEAP & indicators

- Direct mean to gather information related to consumers, citizen use of resources and opinions regarding energy use, Climate Change and sustainability.
- Indirect mean to promote awareness, inform citizens and raise acceptance of future actions which could have been conflicting.

How to integrate in SEAP?

The whole measure scheme is applicable to any public open process, so it can be directly applied to a SEAP/SECAV process.

Contribution to SUMP & indicators

- Direct mean to gather information related to mobility, citizen use transportation habits, and opinions regarding urban mobility, urban wellbeing and sustainability.
- Indirect mean to promote awareness, inform citizens and raise acceptance of future actions which could have been conflicting.

How to integrate in SUMP?

The whole measure scheme is applicable to any public open process, so it can be directly applied to a SUMP process

Lessons learned

It is hard to determine concrete lessons learned for this type of initiatives since they respond to very specific cases and environments which may be very different from others. However, a few relevant points which are frequently observed are the following ones:

- The level of participation at citizen level increases dramatically.
- It is a very good system to bring in unexpected issues and needs.
- Continuous feedback and monitoring are essential actions which must be integral part of the initiative.
- Proper and extensive communication are crucial, especially concerning security and confidentiality.

Contacts & links

Links to available tools:

- Smart Citizen: <https://smartcitizen.me/>

- icitizen: <https://icitizen.com/>
- Smart City App Hack: <http://smartcityapphack.com/>

ELTIS guidelines for the management of participation processes:

<http://www.eltis.org/resources/tools/sump-participation-kit>

#16 Public support in citizens everyday decision making

PUBLIC SECTOR, TRANSPORT & MOBILITY

References/sources

References are provided regarding the following similar project

- FIESTA (energy help desk and energy audits in families)
- Information and consultancy centre for energy efficiency within Dobrich municipality

Who needs to act?

Municipalities, citizens and civil society (associations, NGOs, etc.)

Who is affected?

The service can be offered to all citizens

Solution

Citizens need clear, accurate and reliable information to improve their everyday decisions on sustainable mobility and energy. The Municipality can organize a “help desk”, “info point”, a “laboratory” or a similar service, providing citizens with the information they need.

A "Sustainable Energy and Mobility Help Desk" (or “info point”) is an office open to all citizens, to provide free information, advice and consultancy on energy saving, renewables, public transport, sustainable transport and mobility.

A “sustainable energy & mobility laboratory” has a pro-active approach, organizing activities for raising the awareness on energy savings, sustainable transport and mobility solutions, responsible behaviour targeted to the local consumers. Such events may include communication campaigns (printed material, radio, press) workshops, conferences, home visits, energy audits, lessons in schools...

This could be combined also with an online travel planner that can help citizens in planning their trip using public transport or even suggesting multimodal trip. The travel planner can consider also present traffic situation (on the basis of sensors and/or data gathered by mobile devices), travel planner can also forecast critical situations as works on main roads, large events etc. A good example of such tool is the one developed by the city of Antwerp in Belgium.

This will contribute to increase the level of perception of the importance and changing behaviour towards efficient energy performance and transport and mobility exploration.

Investment

The level of investment is set to low as it involves only limited equipment and human resources; furthermore, the cost depends on the smooth cooperation between all key actors.

The “help desk”, “info point” or “laboratory” can be established as municipality supervised unit (as the Dobrich case) or constituted external body (part or within an NGO, agency, etc.).

The basic setup of a “help desk” or “info point” requires only a small office and staff (1 person employed full time)

The cost of a “laboratory” depends on the type and number of awareness raising events organized along the year.

For example, in FIESTA project the Help Desk is active for 3 years, and employs an energy consultant for the whole period (with an average effort is 10 man months per year). The budget does not include the cost of an office, since the Help Desk is hosted by the “public information office”. The cost of printed materials is around 300€ per year.

Sources: costs allocated in the annual municipal budget and/or outsourcing, external/ funding and subsidies.

The cost for developing a travel planner could be quite high, requiring the involvement of an experienced software house, the setting up of a cooperation protocol with all key actors (public transport operators, parking operators etc.) and a system of real time traffic data collection based on a system of sensors and/or an agreement with big data owners.

Return of investment

Investment results:

1. Short term: increasing the awareness of local citizens and enabling them to efficiently implement energy measures and move in a more sustainable way. Moreover spreading in advance information on critical traffic situation will lead people to take alternative solutions with a mitigating effect
2. Medium and long term: Changing behaviour of residents towards energy saving measures and sustainable transport solutions.

A quantitative analysis of “Return on investment” of this project is difficult to estimate, as it depends considerably on the number of people served (therefore on the opening times of the help desk, the communication campaign...).

For a quantitative estimate of the impact is required, a careful feedback /recall activity must be included.

An easily manageable impact indicator is the number of citizens / families that got involved with the help desk. Based on the experience of FIESTA project it is reasonable to assume that 150 to 200 families per year can be involved in customized services (e.g. home energy audit) while more families per year can be involved in general communication and information activities.

Other resources to be used

Human resources employed in this project are key to success. The person in charge of the “Energy and Mobility Help Desk” / “Infopoint” / “Laboratory” should have appropriate technical skills AND excellent communication skills. A training course may be required. The “Energy and Mobility Help Desk” / “Infopoint”

/ “Laboratory” requires an office easily accessible to public, preferably within a well-known office (e.g. information office, public library...). A communication campaign is essential to maximize impact.

Use of available financial opportunities to expand or specify delivery of services upon particular requests using experts and specialists.

Available tools

Publications and information material on sustainable energy and mobility should be freely available at the “Energy and Mobility Help Desk” / “Infopoint” / “Laboratory” Information leaflets, toolkits and guidelines with concrete advice and solutions for efficient performance and utilization (For example the FIESTA guide for families, information on local public transport, information on e-mobility...) are generally available in electronic format.

Main steps of implementation

1. Negotiation of proper place (to be located at easily reached and recognized area);
2. Set up of equipment and facilities;
3. Appointment of human resources
4. Training for the employee on sustainable mobility, sustainable energy and communication
5. Organize the help desk and collect relevant information material
6. Information campaign through communication channels, peer meetings, dissemination.
7. “Energy and Mobility Help Desk” / “Infopoint” / “Laboratory” / “Travel planner” open to public
8. Collect feedback and Lessons Learned for the following year

Expected results

- (1) Well informed citizens can make better choices in sustainable mobility and sustainable energy.
- (2) Municipality receives feedback and suggestions on the needs to improve services and local infrastructure

Contribution to SEAP & indicators

Better choices in sustainable mobility and sustainable energy lead to a reduction of CO2 emissions.

How to integrate in SEAP?

The Energy and Mobility Help Desk can be included in a SEAP as an Action to reduce CO2 emissions. The Energy and Mobility Help Desk can also be used as a contact point to facilitate participation in the initial analysis of a SEAP/SECAP.

Contribution to SUMP & indicators

Better choices in sustainable mobility and sustainable energy lead to a reduction of several pollutants (NOx, SOx, CO, etc.) and to enhanced intermodality; reduced number of vehicles in urban areas; improved sustainable accessibility to city centres, mitigation of critical events impact on traffic.

How to integrate in SUMP?

The Energy and Mobility Help Desk can be included in a SUMP as one of the actions.

Lessons learned

Close communication and cooperation with the local citizens is a very important tool for better development of a planning process, setting specific indicators and reaching definite results. Cooperation with the social care department of the municipality proved to work extremely well in the implementation of the help desk in Logrono (Spain). Also, cooperation with NGOs can be useful for reaching a wider public. The regular feedback could serve as a key point to re-formulate ideas, change if anything goes wrong or planning a better resources and actions.

Contacts & links

EU project FIESTA (www.fiesta-audit.eu) developed this model in the energy sector

#17 Active and autonomous mobility for students

Public and residential sector

References/sources

- Agenda 21 Escolar Vitoria-Gasteiz
- PUMAS project (www.pumasproject.eu) in Venice
- The Traffic Snake Game (www.trafficsnakegame.eu) in Bulgaria

Who needs to act?

- City council (Environmental Department, Urban Planning Department, Air Quality Department, Mobility and Transport Planning Department, Educational Politics Department or similar)
- Regional Environment Agency
- Teachers representative of the Schools
- Parents representative of the Schools
- Local Municipality Police
- Traffic body
- Public transport
- External experts
- NGOs
- Students

Who is affected?

Students, teachers and parents, drivers

Solution

The participating schools in the School Agenda 21 of Vitoria-Gasteiz and PUMAS project (City of Venice) and Traffic Snake Game are working on the promotion of active and autonomous mobility in commuting to schools with the aim of reducing the environmental impact of car use, improved public health, encouraging sustainable transport solutions, intervening in the public space, in the collective perception of the relationship between the city and childhood and education of children to build their capacity to discover the immediate environment and to remove obstacles that limit children's autonomy.

Investment

For the Vitoria-Gasteiz case the 50% could be financed by the city council, up to 2000 euros per participant school. Cost could include: Organization of courses, lectures and workshops in relation to promoting active

and autonomous mobility in commuting to school. Performing works or works directly associated with the promotion of the pedestrian or cyclist mobility. Example: creation or expansion of safe bicycle parking. Communication campaigns directly associated with promoting active and autonomous mobility in commuting to school. Purchasing bicycles for the transfer to staff to develop their work in the workplace that holds the requesting entity of the grant.

The Traffic Snake Game has started in Belgium as a small project and has evolved into a European wide campaign with more than 2,000 schools involved in a network in 18 countries across Europe and abroad. 20 national contact points and 46 local actors support the implementation of the game in their countries. The investment is considered as low highlighting the importance of the human resources availability and at the foremost the personal attitude and willingness.

Return of investment

The investment return is measured in significant improvement of environment protection, health, children autonomy, traffic decongestion and CO2 emissions savings, as well as changing transport behaviour and high level of positive social participation and impact along the SUMP/SEAP processes.

Other resources to be used

Schools' own funding, parents' association, etc.

For the Traffic Snake game: sponsorships by the school boards, funding from the municipality and other relevant authorities.

Available tools

Common:

- Stakeholders meetings.
- Participatory activities in the schools with parents' involvement.
- Participatory analysis and stakeholders' involvement (cognitive questionnaires, double interviews, etc.)
- Participatory planning

Victoria-Gasteiz, as results:

- Week of the active and autonomous mobility for children.
- Pedibus.
- Mobility card to register the mobility actions per child.
- Safe mobility course/Bicycle maintenance course.
- Vial signs.

Venice, as results:

- Energy Performance Certificate, it is related to the most virtuous means of transport to get to school: by bike and by foot.



Source: Venice SUMP pilot project developed in the framework of Pumas project - "Scuola in Classe A" NOTE: project is receiving support from the National Operative Programme for Metropolitan Cities"

- **TOOL BOX** containing and describing all the activities able to carry on the plan in all schools of the City
 - NEW SCHOOL MOBILITY OFFICE
 - AGREEMENT between Schools and Administration
 - New RULES and EFFECTIVE MEASURES to be inserted in the City Urban Traffic and Mobility Plan
- Traffic Snake Game, as results:

- Two weeks mobility campaign, organized preferably within the EU Mobility week
- Toolbox with materials for the campaign - manual for teachers, letters for parents, set of materials to be used by the children, stickers and gadgets as rewards for participants

Main steps of implementation

Preparation:

- Current situation analysis
- Stakeholder involvement
- Develop scenarios

Goal setting:

- Develop a common vision
- Develop smart targets

Plan elaboration

- Budget
- Elaboration
- Approval

Implementing

- Monitoring

specifically for PUMAS project at Venice:

Starting point: “We want to improve mobility and quality of life for our citizens!”

1. Determine your potential for a successful SUMP
 - 1.1. Commit to overall sustainable mobility principles
 - 1.2. Assess impact of regional/national framework
 - 1.3. Conduct self-assessment
 - 1.4. Review availability of resources
 - 1.5. Define basic timeline
 - 1.6. Identify key actors and stakeholders
2. Define the development process and scope of plan
 - 2.1. Look beyond your own boundaries and responsibilities
 - 2.2. Strive for policy coordination and an integrated planning approach
 - 2.3. Plan stakeholder and citizen involvement
 - 2.4. Agree on workplan and management arrangements
3. Analyse the mobility situation and develop scenarios
 - 3.1. Prepare an analysis of problems and opportunities
 - 3.2. Develop scenarios
4. Develop a common vision
 - 4.1. Develop a common vision of mobility and beyond
 - 4.2. Actively inform the public
5. Set priorities and measurable targets
 - 5.1. Identify the priorities for mobility
 - 5.2. Develop SMART targets
6. Develop effective packages of measures
 - 6.1. Identify the most effective measures
 - 6.2. Learn from others' experience
 - 6.3. Consider best value for money
 - 6.4. Use synergies and create integrated packages of measures
7. Agree on clear responsibilities and allocate funding
 - 7.1. Assign responsibilities and resources
 - 7.2. Prepare an action and budget plan
8. Build monitoring and assessment into the plan
 - 8.1. Arrange for monitoring and evaluation
9. Adopt Sustainable Urban Mobility Plan
10. Ensure proper management and communication

- 10.1 Manage plan implementation
- 10.2 Inform and engage the citizens
- 10.3 Check progress towards achieving the objectives
- 11. Learn the lessons
 - 11.1 Update current plan regularly
 - 11.2 Review achievements- understand success and failure
 - 11.3 Identify new challenges for next SUMP generation

Expected results

- Improving road safety in local home-school trip,
- reducing traffic congestion during the rush hours,
- improving public health and safety,
- promoting new forms of sustainable accessibility and traffic urban planning,
- reducing pollution,
- increasing the use of bicycle among scholars and rest,
- promotion use of sustainable means of transport - public transport, bike use, car sharing, "walking buses" to and from school
- decreasing in carbon emissions.

Contribution to SEAP & indicators

- Direct mean to gather information related to consumers, citizen use of resources and opinions regarding energy use in transport.
- Indirect mean to promote awareness, inform citizens and raise acceptance of future actions which could have been conflicting.

How to integrate in SEAP?

The whole measure scheme is applicable to any public open process, so it can be directly applied to a SEAP/SECAP process.

Contribution to SUMP & indicators

- Direct mean to gather information related to mobility, citizen use transportation habits, and opinions regarding urban mobility, urban wellbeing and sustainability.
- Indirect mean to promote awareness, inform citizens and raise acceptance of future actions which could have been conflicting.

How to integrate in SUMP?

It can be integrated easily as the steps followed can be similar to the ones when planning the City SUMP.

Lessons learned

The main obstacle that in the opinion of parents makes it difficult for their children and daughters to go to school walking is the long distance to get there by active way (by foot, bicycle or scooter) and traffic-related impacts for pedestrian crossings, bicycle paths, etc., which put under risk children. In this sense measures

reducing this risk and giving more autonomy to children should be achieved, mainly by means of partnerships of children, parents and school representatives.

Therefore, the impulse of projects/measures such as "school road", "pedibus or bicibus" could have a strong impact on the choice of active modes of transport and on the increase of the autonomy of children in the trips to school with the positive impacts of reducing CO2 emissions and health improvement.

In children words they have learnt under these initiatives:

“Improves our health, as we move and do not spend so much time sitting
Makes us more responsible and less dependent on the elderly
We are more fun the way to the school
There is less air and noise pollution
And we got a safer city for everyone”

As from the Traffic Snake Game: local partnerships with strong student participation can make a significant change towards more sustainable transport and less pollution.

Contacts & links

http://www.vitoria-gasteiz.org/we001/was/we001Action.do?aplicacion=wb021&tabla=contenido&idioma=es&uid=u1d852908_149ea85daae_7f0e

<http://www.bump-mobility.eu/media/43232/10-del-piccolo.pdf>

<http://www.pumasproject.eu/>

<http://www.trafficsnakegame.eu/>

<http://urbanpromo.it/2016-en/progetti/operative-program-metropolitna-cities-2014-2020> - *the National Operative Programme for Metropolitan Cities*

#18 Biomass district heating

Public sector

References/sources

North-west Croatia Regional Energy Agency (Regionalna energetska agencija Sjeverozapadne Hrvatske): www.regea.org

Who needs to act?

Local and regional governments

Who is affected?

The municipality of Pokupsko has been the key driving force to implement this project, recognized all the benefits and actively participated in the project implementation including education and promotion activities, providing feedback and expressing interest in future projects. REGEA has provided expert support and coordinated the project on behalf of the municipality. The final beneficiaries of all projects and activities in Pokupsko are in all cases its inhabitants – the local people. With the construction of the communal biomass heating plant the inhabitants have the opportunity to additionally increase their quality of life – instead of chopping wood into logs and taking care of lighting the old wood furnace, heat is now available by simply pressing a button. The price of heat is cheaper than fossil fuel options while the regulation system enables each customer to define the desired comfort levels but also monitor the consumed heat on a constant basis. One of the main customers of the new biomass heating plant is the Elementary school in Pokupsko – which is, not surprisingly, very focused on environment protection and eco topics. Through a wide range of activities, the Eco-group pupils in Pokupsko are instilled with a sense of nature preservation and environment protection. Apart from providing cheaper and environment friendly heating, an additional benefit of the new biomass heating plant is that it creates new economic activity in the area – local forest owners can supply the plant with their own biomass and either receive heat for a lower cost or directly get paid for the delivery. Creating new business opportunities and new jobs is seen by the municipality as a key issue in reversing the negative population trends which Pokupsko is facing in the last two decades.

The biomass heating plant has a strong positive social component as well and can serve as an example of social responsibility: one part of the revenues from the selling of heat is used as a scholarship for poor and needy children living in Pokupsko.

Solution

Pokupsko District Heating System is a new system, opened in the late 2015, which presents the first biomass powered district heating system in Croatia. It is located in the municipality of Pokupsko, in the southern part of Zagreb County which is a home to 2,224 inhabitants (2011 census). The heat capacity of the biomass boiler is 1 MW, which will supply around 30 consumers in the first stage of the project. The equipment for heating plant has delivered the company Herz, one of the world's largest manufacturer of equipment for energy recovery from biomass. The biomass plant in Pokupsko is equipped with a multi-cyclone, where the dust from the waste gas can reduce to approximately 200 mg / Nm³. Almost 70% of the

area of the Municipality of Pokupsko is covered with forests, many of them private, and this is one of the main reasons why the biomass heating plant has been established right here. The establishment of a biomass trade and logistic centre is in progress in Pokupsko which will provide a big support to the utilisation of local wood for heating. This is a direct result of an EU funded project (BioRES project within the Horizon2020 programme) in which Pokupsko Municipality participates through the North-West Croatia Regional Energy Agency. The final result is that currently more than 75% of energy needs in Pokupsko are satisfied through local resources, with the plans to reach 100% within next five years.

Investment

The project was financed by a mix of available financing sources. The total investment amounted to EUR 800,000, financed by means of EU-, local- and national Funds dedicated to RES projects. The project is considered a greenfield investment. The beneficiary / owner of the project is Pokupsko municipality.

Return of investment

Not applicable, because the whole investment has been 100 % financed by the IPARD Pre-accession programme.

Other resources to be used

EU-, local- and national Funds dedicated to RES projects

Available tools

Main project design developed and all building permits acquired in accordance with the national law.

Main steps of implementation

The project was developed by Croatian company Enerkon, while the consulting services were provided by North-West Croatia Regional Energy Agency. The preparation process for this project was lengthy – it took 6 years to prepare all the paperwork, and only 6 months to build the production facility and district heating infrastructure. Currently, 15 consumers are connected to the district heating grid. The production facility also contains a heat storage in the form of a 24 m³ steel tank. The production facility was completely funded by the EU IPARD-programme under measure 301 "Improvement and Development of Rural Infrastructure", while the district heating infrastructure was funded by municipality and regional funds. All the public buildings in the municipality have been connected to this system and a number of local businesses have shown interest in connecting to the system.

Expected results

It is expected that within the next 5 years, more than 60 consumers will be connected to the system. The production facility uses forest biomass, which also opens new jobs since the municipality has a lot of privately owned forests whose owners can deliver biomass for utilization.

Contribution to SEAP & indicators

Increase of renewable resources

How to integrate in SEAP?

Can be included in a SEAP as a measure, tackling the residential and commercial sector.

Contribution to SUMP & indicators

District heating cannot be included in the sump indicators

How to integrate in SUMP?

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Lessons learned

The main problem in developing DH systems using biomass as fuel or another RES in Croatia is that the project developer has to invest also in the heat distribution network.

Contacts & links

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