



LG Action

Your LG Action Guide
to local climate and sustainable energy action

PURPOSE OF THIS GUIDE

This compact guide provides information on key issues relevant to local climate and energy action, and aims to stimulate an interest in exploring local sustainable energy options. It addresses community leaders, local elected officials and municipal staff working in all sectors.

The reader can gain a quick overview of the need for local action, get inspired by mini-cases that illustrate different replicable sustainable energy solutions, and become motivated to join other communities engaging in local climate and energy action. The following topics are addressed in the Guide:

- Today's realities
- Responding to challenges
- Context for local action
- The Sustainable Energy Success Cycle
- Case studies

EDITORIAL INFORMATION

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Editing, design and layout of the Guide by the project coordinator, ICLEI – Local Governments for Sustainability.

DISCLAIMER

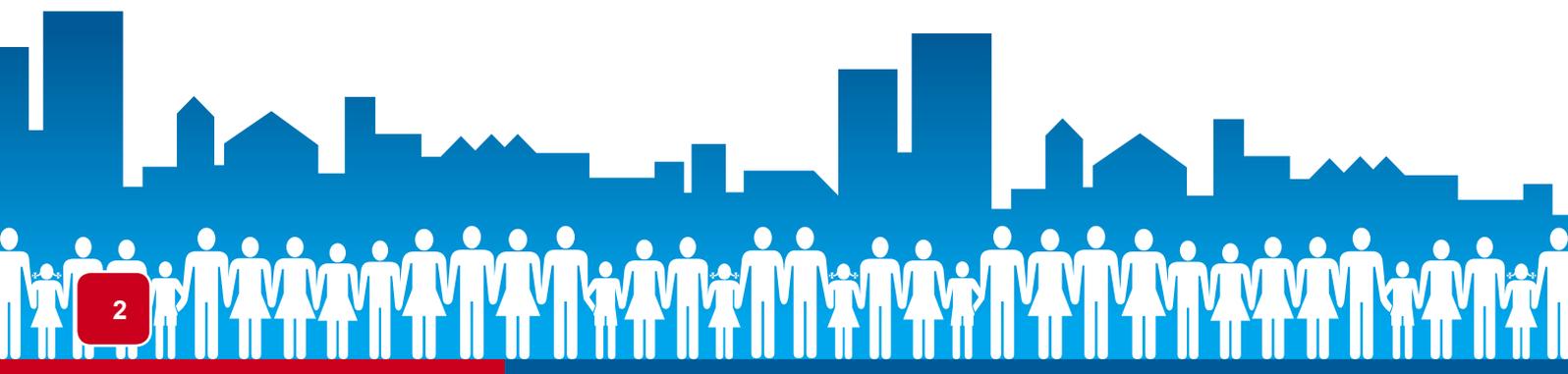
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www.lg-action.eu

PROJECT DESCRIPTION

LG Action is a European networking action that aims to involve Local Governments in the EU27, Croatia, Liechtenstein and Norway, in the European and international energy and climate debate. It provides information and mobilises local governments (LGs) to engage in local climate and energy action. It collects input from LGs with the aim to present European LG Positioning and calling for greater recognition of their essential role in climate protection and sustainable energy roll-out. More details on the project website – www.lg-action.eu



TODAY'S REALITIES

CITIES, THE HUBS OF HUMANITY

Urban areas are important socio-economic centres of humanity - today more than half of the world's population are living in cities and towns. **In Europe around 80 percent of citizens already live in cities and towns.** Here citizens expect great job opportunities, a high quality of life, as well as a good level and a wide range of services to support their daily lives. They need clean drinking water, urban transport options, green spaces for relaxation, stable energy and regular waste removal. All these services they expect, but do not necessarily (want to) think about.

ESSENTIAL ENERGY

People also require energy every day: for space and water heating, for cooking, lighting, using their electronic equipment, and transport. As part of the modern lifestyle we expect energy to be available at the flick of a switch. Yet, is it really so easy? **Things are changing, with energy at the heart of this change.** What exactly does this mean?

DWINDLING FOSSIL FUELS, PROMISING ALTERNATIVES

A large percentage of energy we use today is generated by burning fossil fuels, such as coal, oil and gas, as well as nuclear power using uranium. The raw materials used as fuel are extracted from the earth - and are increasingly being depleted. These finite resources must be replaced by other fuels. Ideally this should be done by switching to more sustainable sources, such as renewable energy (RE) - wind, sun (solar radiation), water (rivers, lakes, waves and tides) and heat from the earth. Where available, these renewable energy sources (RES) are **ideal resources for local generation and local use.** This in turn means improved energy security: by reducing dependency on energy imports, limiting financial 'exports' for energy, potentially even generating an income from selling excess energy.

Now is a good time to start with local climate and energy action!
Fuel prices are rising.
Local energy security is a new priority.



TIME FOR A NEW RENAISSANCE

Production of energy from fossil fuels can definitely not cover the ever-increasing demand, and competition is driving prices upwards. Having reached "Peak Oil" according to many experts, this situation has real consequences for the global economy and a society that has been based on oil for many decades. Now we need to move from oil to 'alternatives'. **Burning oil no longer makes sense** when this resource is rather needed to make essential materials and products (e.g. in the medical and agricultural sectors).

CONNECTING ENERGY AND CLIMATE CHANGE

In addition to its dwindling nature, fossil energy in its current use has a very negative impact on climate change. By burning fossil fuels (also extracting raw material, building power plants, generating and distributing energy through extensive grids), harmful greenhouse gas (GHG) emissions are released. These emissions accelerate the natural process of climate change - this is referred to as the **human impact on climate change.** Climate change is visible in fluctuating climate conditions (shifts from 'normal' temperatures), as well as more intense weather phenomena (floods, droughts, violent storms) and rising sea levels. The human impact on the release of GHGs can be reduced, in communities in particular, by extensively limiting the release of carbon dioxide (CO₂) and methane (CH₄). Methane is a particularly harmful GHG with 21 times the potency of CO₂ in terms of trapping heat in the atmosphere (thereby intensifying global warming). Methane is for example released from waste dumps (landfill), agriculture sites and melting permafrost. We can't do much about the melting, but a lot about the first two by aggressively reducing the release of GHGs, i.e. mitigating our impact on climate change.

RESPONDING TO CHALLENGES

MAJOR GLOBAL CHALLENGES WITH A LOCAL IMPACT

The following issues either directly or indirectly impact on us all today:

- climate change
- energy security / insecurity
- economic stability

People, money, energy and environment - these issues are drawing attention in the modern day and age. All people want to live in a safe environment, have enough money to live on, and have a good quality of life. As the global challenges have a global impact, as well as a local impact, **municipalities need to empower themselves and their communities** by anticipating and responding to change, planning and implementing actions that will benefit current and future generations.

TOWARDS SUSTAINABLE ENERGY

Sustainable energy is a keyword in this response approach. This means combining energy savings and energy efficiency with renewable energy, and thus reducing any long-term negative impact that could result from energy production and use. By reducing energy demand and using clean, sustainable energy sources that release lower or no emissions during energy generation, we mitigate the human impact on climate change. It can also improve resilience against change, e.g. reducing fossil fuel dependency. Sustainable energy addresses an **area with vast growth potential**, considering the need for a major global transition towards sustainable energy solutions over the next decades - and it offers a range of benefits, in particular for local communities.

Defining Sustainable Energy:

“Energy production or consumption of electricity, heating and cooling, which has no or limited impacts – compared to fossil fuels or nuclear energy – on human health, the functioning of local and global ecological systems and the environment. Sustainable energy is the combination of energy savings, energy efficiency measures and technologies, as well as the use of renewable energy sources, such as solar energy (passive and active use, e.g. solar thermal, photovoltaics), wind-, bio-energy, geothermal energy, small hydro power, wave and tidal power, as well as hybrid systems. Its objective is to provide energy security (sufficient, safe, affordable) for the present and future generations.”



ELEMENTS OF ENERGY SECURITY

Local energy security directly implies community security. Three key aspects are important when addressing energy security at the local level, namely:

- availability of energy resources,
- actual impact in terms of finances (real cost) and
- threat-opportunity potential,

require a re-think in terms of the approach taken to energy. This is no longer just a topic for the energy planner. **It is essential to engage the municipal strategy team, the financial department, the security manager and energy end-users** - both on the government operations side and in the whole community. Security of energy supply is a basic need, i.e. having energy. However, one must also ensure that there is **sufficient energy to cover demand**, even in peak times. Who will get the energy if there is high demand? Probably the customer who can pay the most. Thus it is also necessary to ensure that the **cost of energy remains stable and affordable for all**. Ideally this means producing 100% own (local) energy and being 100% independent. It has the added benefits of local job creation (production and maintenance), economic development in the region, potentially even political stability and certainly improved quality of life for citizens.

LOCAL ACTION: CALLING FOR AUDACITY AND TENACITY

CHALLENGES STIMULATE CLEVER SOLUTIONS

With the growing realisation of environmental, financial and security impacts, based on the energy choices made, **alert local decision-makers are busy planning fossil fuel independency, financial stability and sustainable community development.** Those communities that have already made progress in this field are gaining from a myriad of accompanying benefits for the local economy, people and environment.

LOCAL GOVERNMENTS AS KEY ACTORS

More than 100,000 local governments (LGs) in Europe, act as community policy-makers and administrators of almost 500 million inhabitants. **This is an important level of government – closest to citizens, and thus in an excellent position to inform, guide and lead local inhabitants, businesses and industries.** In most cases democratically elected, this is an accountable level of governance that represents its local community. It is a focus for community identity, provides services to meet community needs, facilitates and coordinates local efforts and resources in pursuit of common community goals.

CITIZENS WITH EXPECTATIONS

Citizens and businesses look towards their governments, at all levels, to respond appropriately to issues impacting on them – also the above mentioned global challenges. **They want and need real leadership, clear direction, practical, as well as continuous motivation and support for their own engagement.** Considering expectations of a good quality of life and the need for sustainable development, in particular against the backdrop of the economic crises and financial impact of climate change, the role of local governments is becoming more and more crucial – especially regarding local energy and climate protection!

**LOCAL LEADERSHIP
+ GUIDANCE
+ RESOURCES
+ PEOPLE
= powerful combination
for local climate
and energy action.**



REVISITING LOCAL PRIORITIES

Addressing these above mentioned issues is fast moving to the top of local council agendas. Priorities are shifting, and as energy is relevant to every area, every sector, there is a need for an integrated approach with the transition to **sustainable energy becoming a foundation priority embedded in all other priorities.** Community leaders and municipal staff – people who shape local policy and implement local regulations – have a responsibility to guide and safeguard their community. Considering the local impact of global challenges, there is clearly a tremendous potential for local climate and energy action. Energy planning and action across the community is the start of the transition to a sustainable energy future. **Local governments should set ambitious targets for own government operations and for the whole community.** Some of the most ambitious targets are: CO₂ neutral by 2025 (e.g. Copenhagen), fossil fuel free by 2050 (e.g. Stockholm and Växjö), 100% energy independent (e.g. Güssing), etc.. If these targets are too ambitious for your community, start with something else - but start! **A local government sustainable energy success cycle is shown overleaf to show you how.**

Covenant of Mayors

In Europe developments relevant to local governments and sustainable energy include the Covenant of Mayors (www.eumayors.eu). This is an initiative at European level to develop the capacities of cities, in support of achieving European targets collectively known as the 20-20-20 by 2020. This is to be achieved through, among others 20% of European Union (EU) energy consumption to come from renewable energy sources (RES) and a 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.

F. MONITOR & REPORT

Result: Status report, start cycle again

Monitor results - reduce of emissions, budget and action plan

Evaluate impacts and results against indicators

Identify benchmarks

Document local activities, impacts and lessons learned

Share successes and lessons learned, heighten profile of community (national, Europe, international)

E. IMPLEMENT ACTION

Result: Realisation of Sustainable Energy Action Plan

Develop or improve policy and legislation

Establish information centre - show what LG is doing in the SEAP

Raise public awareness & encourage behaviour change

Involve local stakeholders

Build capacity for local actors

Establishment of external partnerships for cooperative and efficient work

Document activities done

D. PLAN ACTION

Result: Sustainable Energy Action Plan

Conduct a detailed examination of possible activities and instruments:

- existing and required local policy and enforcement;
- required support and enabling frameworks at national and sub-national levels;
- public and private actors/stakeholders and their relevance for planning and implementing action;
- distribution of responsibilities among municipal departments and contracted labor;
- available technologies and measures.

List of priorities for actions and action timeframes

Set up systems and processes

MONITORING
& REPORTING

IMPLEMENTATION

ACTION PLANNING



SUSTAINABLE ENERGY SUCCESS CYCLE

The transition to a sustainable energy future at community level requires planning, implementation and monitoring.

GETTING STARTED

A. GETTING STARTED

Result: Commitment made

Clarify initial motivation for action (e.g. energy security, business development, climate protection, ...)

Decide to engage - present interest to commit to community

Conduct initial awareness raising and establish stakeholder groups to be involved the process

ASSESSMENT

B. SITUATION ASSESSMENT

Result: Local energy audit

Conduct energy assessment / identify local resources

Conduct vulnerability and community resilience assessment - identify threats, vulnerabilities, opportunities

Assess existing frameworks and their impact (supportive / neutral / blocking plans and actions?)

TARGET SETTING

C. SET TARGET(S)

Result: Council decision on RE/EE & CO₂ reduction targets

Examine existing sub-national, national and international targets - impact?

Examine comparable communities (what are their targets? What did they base these on?)

Set own targets with baseline and timeframe references (e.g. 20% CO₂ reduction by 2020, against 1998 baseline)

Define a vision and develop scenarios

Involve stakeholders

Sketch out room for own maneuverability (know municipal range of options, capacities, expertise)

Development of indicator set and means of monitoring

ENERGY AND BUILDINGS

RENOVATING BUILDING TO PASSIVE HOUSE STANDARD

Valga, Estonia

LOCAL CHALLENGES:

A temperate to cold climate (average temperature of 5 degrees Celsius), with old building stock and extensive heating requirements. Need for improved awareness on options to reduce energy demand and have lower energy bills.

LOCAL ACTION:

The Valga Municipality implemented the first passive house building renovation pilot project in Estonia – using effective solar building design and modern technologies to achieve more than 90% energy savings in the Kaseke kindergarten, including a connecting to a district heating system running on biomass

APPROACH AND RESULTS:

The municipality identified the need to renovate a kindergarten building constructed in 1966, which had a poor construction quality, insufficient insulation, and heating systems that could not be regulated. After a public call for tender specifying the requirements to achieve the passive house standard, the kindergarten was successfully renovated. It illustrated that achieving this goal is possible, at the same time creating a comfortable public space and drastically reducing primary energy demand - from 250 kilowatt hour per square meter per year (kWh/m²/p.a) to around 15 to 17 kWh/m²/p.a.



Image: City of Valga



Energy savings and energy efficiency in the built environment

- Energy efficient lighting (e.g. low energy light bulbs or Light Emitting Diodes – LEDs).
- Thermal building insulation of the whole building envelope (windows, doors, roofs, walls).
- Passive solar building design: optimal placement of building elements (building facing optimal way, effective placing of windows and doors), use of natural daylighting & natural ventilation.
- Heat-reflective paints and coatings on roofs or vegetation (green roofs) to lower urban air temperatures and combat the heat island effect.
- Building codes and permitting system, e.g. only allow construction / renovation to low energy building standard.



Space heating in buildings – where do we stand today?

- Existing building stock 200 kWh/m²
- Standard renovation 100 kWh/m²
- New homes 50 kWh/m²
- 3-liter house 30 kWh/m²
- Passive house 15 kWh/m²



Renewable energy and buildings

- Active solar energy: solar thermal systems for hot water, photovoltaics generating electricity.
- Go 'energy plus' and make money: produce more energy than needed and sell the rest.
- District heating or cooling using biomass or geothermal energy.
- Urban and peri-urban wind energy.

COMBINED HEAT AND POWER (CHP) AND WASTE INCINERATION FOR DISTRICT HEATING

The Greater Copenhagen Region, Denmark

LOCAL CHALLENGES:

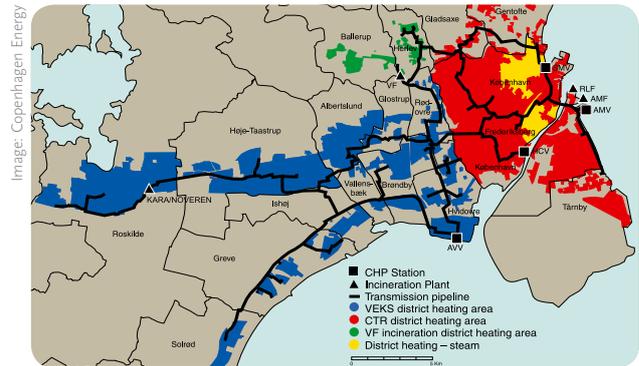
Have to respond to a steady and dense energy demand in combination with pollution reduction and waste management

LOCAL ACTION:

Copenhagen has district heating with 98% of homes connected to a system based on combined heat and power (CHP) plants and waste incineration. It is an integrated part of the remarkable integrated Low Carbon District Heating System in the Greater Copenhagen Region, providing a highly reliable and cost-effective district energy service. This is an effective component of the strategy to become a carbon neutral city by 2025.

APPROACH AND RESULTS:

Five municipalities benefit from the district heating cooperation, with networks interconnected so that excess heat and/or reserve capacity in one area can be utilised by the other. As a result, the district heating system is extremely reliable. The heat networks collect, dispatch and manage heat supply from four CHP stations, four waste incinerators and more than 50 peak-load boiler plants with more than 20 distribution companies in one large pool-operated system, with a total heat production of around 8.3 million Megawatt hours. Copenhagen obtained the 1st Global District Energy Climate Awards in November 2009 in recognition of its advanced approach in cogeneration.



Energy savings and energy efficiency in waste:

- Educate waste producers - people
- Promote separate waste collection and reduce contamination of materials
- Assist waste minimisation, re-use and recycling schemes - provide municipal recycling facilities and recycling collection support
- Implement economic incentives for using a 'pay per user' scheme



Denmark has become a world leader in CHP - why has this worked?

Effective national policy was set in place to ensure that electricity generating stations would recover waste heat, and establishing CHP as the standard for electricity generation. CHP plants can reach 90% energy efficiency, compared to an efficiency of less than 40% for plants that only produce electricity – as “waste” heat is instead used to heat and cool nearby buildings.
www.iea.org/files/CHPbrochure09.pdf



Using renewable energy:

- Methane recovery from landfill and sewage, covert to energy
- Waste-to-energy incineration (solid waste disposal and heat recovery)
- Provide electricity, heating and/or cooling for buildings and district grids

ENERGY AND TRANSPORT

PROMOTING PEDESTRIAN AND BICYCLE HOME-SCHOOL MOBILITY

Reggio Emilia, Italy

LOCAL CHALLENGES:

Reducing GHG emissions and air pollution, improving citizen health.

LOCAL ACTION:

Children are escorted to school by parents or adult volunteers on foot (Pedibus) or bicycle (Bicy[cle]bus) along predetermined, safe paths. They are motivated to change their behaviour through innovative strategies.

APPROACH AND RESULTS:

Started in 2003 as pilot activities by the Municipality of Reggio Emilia within the framework of Local Agenda 21, these continue to date. The approach works like a school bus service, but is a GHG-free means of mobility. The volunteers who help are covered through an insurance offered by the Municipality.

Linked to these projects, municipality the implemented "Collect Green Miles" (Raccogliamo miglia verdi) - a competition that awards sustainable behaviour to stimulate in the decreased use of personal cars and the switch to ecologically sound practices. Information and education workshops on sustainable mobility, road safety and bicycle culture, as well as maintenance are organised for children involved in the projects.



Image: Municipality of Reggio Emilia



Renewable energy in transport

- Biofuels to replace imported, increasingly expensive petrol
- Biogas generated from local waste (e.g. slaughterhouse or forestry waste).
- Green electricity for public tram system



Energy savings and energy efficiency in transport

- Integrated mobility solutions – interconnecting public transport, pedestrian zones and cycling paths.
- No-drive city centre zones.
- Congestion charges.
- Good public transport options and affordable rates.

DRINKING WATER FROM DESALINATED SEA WATER USING RENEWABLE ENERGY

South-East County of Gran Canaria, Spain

LOCAL CHALLENGES:

Plan for an expected decrease in rainfall impacting on availability of drinking water, and respond to negative developments in the economy due to climate change.

LOCAL ACTION:

Develop an integrated system for energy, water and agriculture, addressing climate change mitigation, adaptation, and energy security, as well as stimulating local job creation.



APPROACH AND RESULTS:

- Moving towards achieving maximum energy autonomy by focusing on energy savings and the use of local renewable energy sources.
- 51 MW of wind and 8 MW of solar energy has been installed, generating 150,000 MWh of wind and 14,000 MWh of solar electricity per year.
- Switching to clean energy for water management processes (sewage purification, pumping water, desalination).
- As rainfall patterns are changing, providing a sustainable drinking water supply for citizens and tourists is becoming essential. By desalinating sea water using renewable energy the security of supply is improved.
- The desalination and purification plant uses only 45 MWh/year.
- The plant has a fresh water production capacity of 12 million cubic metres (m³) per year (33,000 m³/day).



Energy savings and energy efficiency in water:

- Educate water users - inhabitants and tourists – water is a valuable resource.
- Fix dripping taps (in most instances just replace the washer).
- Repair or replace leaking pipes.
- Install new low flush/dual flush toilets (4 litre/6 litre flush).
- Re-use and recycle water (e.g. greywater is wastewater generated from domestic activities such as dish washing, laundry and bathing).
- Harvest and use rainwater.
- Install appropriately sized water and hot water systems (not too large, as overcapacity leads to waste) and water meters.



Using renewable energy:

- Pumping water
- Purifying water
- Desalinating water
- Storage of energy using water as 'battery'
- Solar water heaters for hot water – cheap and easy to use technology
- Small and pico hydropower – where there is adequate water flow

BROADER CONTEXT FOR LOCAL ACTION

INTERNATIONAL: KYOTO PROTOCOL AND NEW POST-2012 AGREEMENT

The original 15 EU Member States (EU15) agreed under the Kyoto Protocol to an 8% reduction of total GHG emissions by 2008-2012 (from the base year 1990), while the 12 New Member States which joined the EU in 2004 and 2006 (EU12) have individual reduction targets. A new international agreement is expected to follow the Kyoto Protocol, with more **ambitious targets** to intensify climate protection action. To achieve the new country targets, many different actors need to engage. This includes cities and towns - without the engagement of their communities and citizens, most national governments will not be able to reach their targets.

EUROPEAN ENERGY AND CLIMATE POLICY

There are many relevant European Union (EU) directives and developments aimed at reducing GHGs, improving energy security and stimulating economic development. These are 'translated' into national approaches, which in turn impact on the local level. Among these are for example the Energy Performance in Buildings Directive (EPBD) and the national Renewable Energy Action Plans. These are part of **national framework conditions**, that shape and influence country developments. Framework conditions are required to ensure action is effective and coordinated, and includes important aspects such as financing, human capacity, and the flow of information.

PROJECT COORDINATOR



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The Association of Cities and Regions for Recycling and sustainable Resource management (ACR+)
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The Regional Environmental Center for Central and Eastern Europe (REC)
www.rec.org



Italian Local Agenda 21 Association (CA21L)
www.a21italy.net

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