



Hannover • Nantes
Koszalin • Malmö • Newcastle

Concerto - act2 project

action of cities to mainstream energy 2006
efficient building and renewable 2012
energy systems across Europe



FINAL BROCHURE

Concerto is co-funded by the European Commission



Concerto

Concerto is a European Commission initiative supervised by the Directorate-General for Energy within the European Research Framework Programme (FP6 and FP7). Since its launch in 2005, Concerto has co-funded 58 communities grouped in 22 projects (including act2 with Hannover and Nantes) to develop integrated energy strategies in pilot districts. The total amount of the EU funding for the Concerto initiative is 175 M€.

Three main objectives have been targeted:

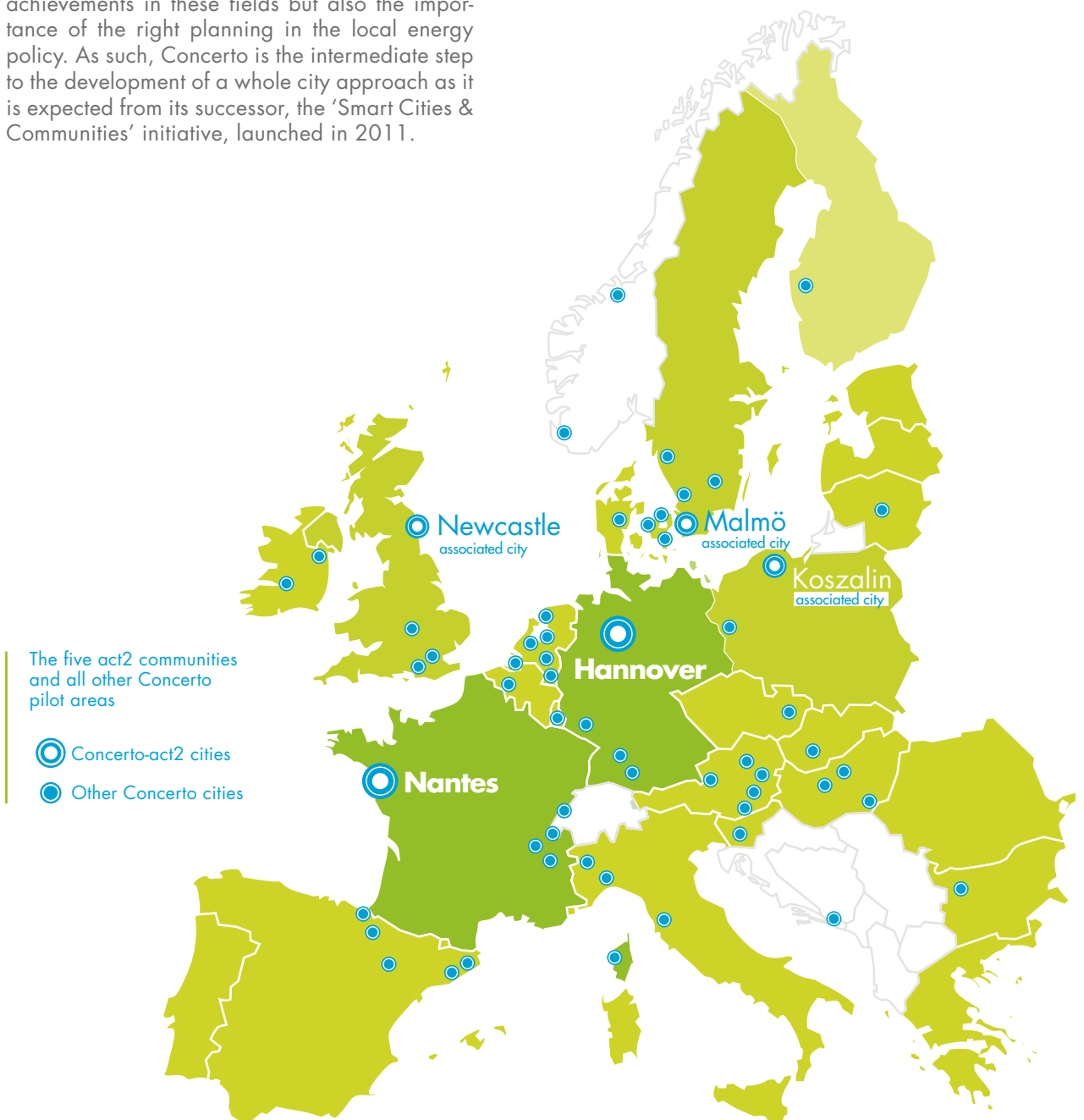
- ▶ energy efficiency in building and renovation projects
- ▶ use of renewable energy sources
- ▶ development of polygeneration (combined generation of heat, power and/or cooling)

Concerto projects have demonstrated ambitious achievements in these fields but also the importance of the right planning in the local energy policy. As such, Concerto is the intermediate step to the development of a whole city approach as it is expected from its successor, the 'Smart Cities & Communities' initiative, launched in 2011.

act2

act2 means **action** of cities **to** mainstream energy efficient building and renewable energy systems across Europe.

act2 reflects the motivation of **Hannover** and **Nantes**, the two demonstration communities, and the three associated cities - **Koszalin**, **Malmö** and **Newcastle** - to implement an energy policy that matches the scale and urgency of current climate-related issues, building on past experiences - especially the development of the Kronsberg district in Hannover ('act two') - and inviting the stakeholders in their areas to espouse the same proactive policies ('act too').



Common view from the City of Hannover and Nantes Métropole

'The Concerto-act2 project is drawing to a close. Ten years have passed since our two communities joined forces to work alongside the European Commission and consider urban renewal from the energy perspective. We can now look back at the achievements we have both made.

In Hannover, numerous refurbishments significantly cut energy costs for inhabitants, while in Nantes Métropole, brand new, efficient buildings have sprung up from brownfield sites in the Ile de Nantes as an alternative to urban sprawl. Our two communities also went all out to develop renewable energy supplies.

The act2 project underlines how we, local communities, can particularly take action alongside stakeholders in the construction industry to dream up low-energy buildings that go above and beyond mandatory regulations.

Nevertheless, our work on the Climate and Energy Plans demonstrated that these efforts must be increased. Hannover and Nantes have begun to explore a variety of avenues including quickening the pace of renovation works, getting our grids smarter and continuing to develop renewable energies.'



Hans Mönninghoff,
Director of Services
and Deputy Chief
Executive of the City
of Hannover



Gilles Retière,
Nantes Métropole's
President



Hannover

ACT2 IN FACTS AND FIGURES

► 14 partners

- 7 in Hannover
- 4 in Nantes
- 3 associated cities (Koszalin, Malmö and Newcastle)

► Total eligible budget: 14.2 M€

► EU co-funding: 5.7 M€

► Project duration: 7 years (2006-2012)

► Demonstration projects: 80 buildings (130,000 m²)

- Hannover: 55 buildings (50,000 m²), refurbishments
- Nantes: 25 buildings (80,000 m²), newly built

► Other activities:

- Energy planning and advice (studies, engineering)
- Quality assurance, evaluation and monitoring of demonstration projects
- Communication and good practices dissemination
- Training professionals
- Collaboration with other European Concerto cities

	Hannover	Nantes Métropole
Population	524,000	590,000
Area	204 km ²	523 km ²
Dwellings	290,000	280,000
Jobs	379,000	304,000
CO ₂ Objective	tCO ₂ e: -40% by 2020 <small>(Basis: 1990)</small>	tCO ₂ e/cap: -30% by 2020 <small>(Basis: 2003)</small>



Ile de Nantes



Hannover

act2 fitted in the **Climate Protection Programme 2020** of the City of Hannover with its integrative approach and contributes to the development of **'Ecological Standards'** for municipal buildings and city owned ground. The ambitions were the energy efficient refurbishment and use of renewable energy systems in seven model districts.

In Ahlem, Hainholz, Herrenhausen, Nordstadt, Limmer, Vahrenwald and Vinnhorst, the three housing associations, **Spar- und Bauverein eG**, **Wohnungsgenossenschaft Herrenhausen eG** and **Gundlach & Co. KG Wohnungsunternehmen**, retrofitted multi-occupancy buildings and connected them to existing district heating system. Partner **Stadtwerke Hannover AG** generated thermal energy from Stöcken heat and power station from wood pellets thus substituting coal. These measures were accompanied by trainings for architects and craftsmen organised by **target GmbH**.

A Wood Energy Centre was erected by **Stadtwerke Hannover AG** to provide Hannover Region with wood fuels. In public buildings like schools the heating system was converted to wood fuel, the buildings energy performance was improved by insulation of the envelope, an open air swimming pool was equipped with solar thermal collectors. These measures were flanked by energy advice, energy saving campaigns and an 'Energy assistant' in the Concerto districts. **proKlima fund** was responsible for the monitoring of measures.



act2 site visit in Hannover, 2010

Focus on some activities led



Training

Hannover local training activities aimed to develop measures for craftsmen to assist the implementation of an advanced energy-efficient standard of retrofitting and to improve skills for retrofitting construction by offer trainings directly on building site with special focus on quality assurance. Short courses for the companies carrying out the work and in-depth block courses were primarily held for planners and architects.



www.klimafreundlicher-wohnen.de

target GmbH, partner of act2, created a website in cooperation with the housing and tenants association. Tenants but also landlords are informed about energy saving, insulation, heating and building technology.



Tenants concern

Acceptance by the residents and their preparedness to change their behaviour patterns are important factors if retrofitting is to meet its energy efficiency targets. Conversely, taking account of tenants' needs and attitudes in advance is important if this acceptance is to be achieved. Special attention must therefore be devoted to tenant liaison in a modernisation project, running through the entire process from planning to end use.



Energy assistant

As part of Concerto, the energy assistant was launched for home owners wanting to make energy-efficiency improvements and it was later adopted by the proKlima fund. During extensive energy-efficiency measures, home owners can use the energy assistant to support them. They receive specific help and information on improving their homes.



Next steps toward zero emission developments already engaged

Taking advantage of its experience gained from the Expo in Kronsberg and act2, the City of Hannover initiated a carbon neutral settlement in the Wettbergen district. The area includes around 330 detached, semi-detached and terraced houses, and a supermarket built to Passive House standard. The houses' good insulation and efficient ventilation systems create a comfortable atmosphere and virtually no energy for heating is required. Power for household electricity and heat is compensated for by renewable energy generation.



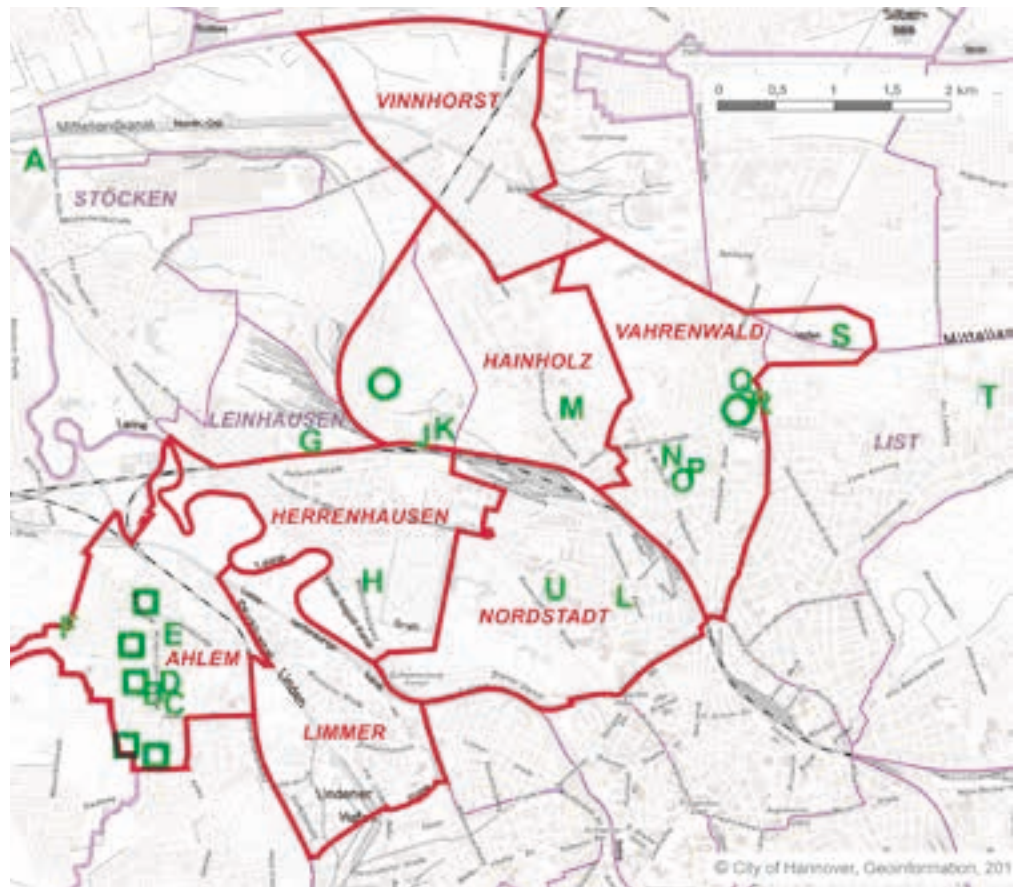
Hannover

Demonstration projects

CONCERTO DISTRICTS IN HANNOVER

- 2,240 ha
- 71,400 inhabitants
- 25,500 employees
(subject to social insurance contribution)
- 40,500 apartments

- A Wood Energy Centre
- B Richard-Lattorf-Strasse
- C Naugarder Weg
- D Landsberger Weg
- E Evangelical Martin-Luther parish
- F Ahlem Cemetery Chapel
- G PV Plant Herrenhausen
- H Hibernation Glashouse
- J School Biology Centre
- K Burgweg Depot
- L Gymnasium Luther School
- M Cultural Centre Hainholz
- N Grahnstrasse
- O Ernst-Eiselen-Strasse
- P Auf dem Hollen
- Q Hirtenweg
- R Linsingenstrasse
- S Lister Bad
- T Brüder-Grimm-School
- U PV Plant refectory university
- Multi-occupancy buildings
- Detached and semi-detached Houses



Wood Energy Centre

This centre of the Stadtwerke Hannover sells wood from the Region to the Region Hannover since 2007. In 2011 over 3,100 tonnes of fire wood, wood pellets and wood chips were sold. An information-centre advises interested customers on heating with wood.



A



D

Landsberger Weg – Ahlem

Retrofitting of four multi-occupancy houses in Hannover-Ahlem with 50,000 m² usable floor area and connection to a centralised wood pellet heating system replacing individual boilers. Property owner : Gundlach & Co. KG Wohnungsunternehmen.

Wood pellet boiler Richard-Lattorf-Strasse - Ahlem

The centralised wood pellet heating system with 150 kW provides energy to four blocks with 72 apartments for space heating and warm water. The heating was installed by Gundlach & Co. KG Wohnungsunternehmen.



B



G

Photovoltaic plant - Herrenhausen

A photovoltaic plant with an output of 75 kWp has been installed on the roof of a storage depot by Stadtwerke Hannover AG. Power generation from this facility has, at 74,000 kWh per year exceeded expectations by 15 per cent.

KEY FIGURES

► Energy efficient refurbishments

- 42 multiple-family dwellings: 22,300 m²
- 10 buildings of private house owners: 3,300 m²
- 3 school buildings: 8,600 m²
- Wood Energy Centre selling split logs and wood chips from the region
- Final energy demand: 62-73 kWh/m² (equivalent to new build standard)

► Renewable Energies:

- District heating from biomass: 561 kW
- Wood fuel heating 1,000 kW
- Photovoltaic installed: 174 kWp
- Solar thermal installed: 1,900 m²

► Monitored results

- Final energy saved 70%
- Primary energy saved 92%
- 3,600 tCO₂/a saved

Burgweg Depot

In the Burgweg Depot a wood pellet-fired boiler since 2007 covers 75 - 85 per cent of the heating requirements. The plant is one of four new wood pellet systems for municipality buildings in Hannover. They save a total of 1,770 MWh fossil energy or 432 t of CO₂ emissions and about 80,000 € energy costs every year



K



S

Lister Bad

In the Lister bad outdoor swimmingpool, a solar absorber with 1,800 m² has enabled the energy used for pool heating to be more than halved. The CO₂ saving is in total 181 t per year.

Cultural Centre Hainholz

Energy efficient modernisation of a listed building (former Alice-Salomon School). Savings of 50 % of the final energy demand for space heating. The CO₂ saving is in total 13 t per year.



M



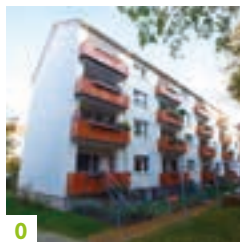
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Brüder-Grimm School

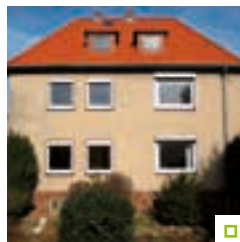
Energy efficient modernisation of a school from the Fifties. Savings of 62% of the final energy demand for space heating plus 86 kWp photovoltaic modules on the roof. The CO₂ saving in total is 107 t per year.

Ernst-Eiselen-Strasse - Vahrenwald

Retrofitting of multi-occupancy houses and connection to district heating from biomass. Modernised by Gundlach & Co. KG Wohnungsunternehmen. Energy efficient modernisation of 3,500 m² useable area in seven multi-occupancy buildings



O



Q

Bergkammstrasse – Ahlem

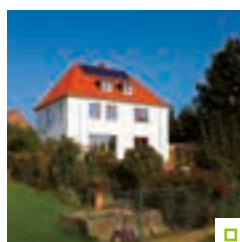
Typical Detached house from the Thirties in Hannover-Ahlem. before retrofitting owned by a private investor. Usable area: 160 m²

Linsingenstrasse - Vahrenwald

Retrofitting of multi-occupancy houses and connection to district heating from biomass for 8,000 m² usable areas. Modernised by Spar- und Bauverein. Transfer station for district heating in Linsingenstrasse



R



Q

Bergkammstrasse – Ahlem

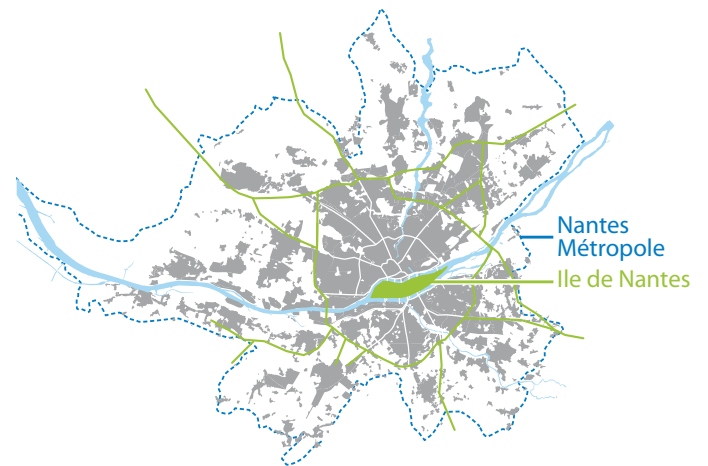
Detached house retrofitted to Kronsberg standard (55 kWh/m².a final energy demand for space heating) with solar thermal collectors and mechanical ventilation with heat recovery after modernisation

Nantes

In Nantes, the act2 project takes the shape of the Climate and Energy policy which is implemented by **NANTES MÉTROPOLE**, the local authority leading the project. It focuses on the integration of energy efficiency and the use of renewable energies in a specific area that best represents the challenges inherent to urban renewal, the **Ile de Nantes**.

To do this, **SAMOA**, the company developing this district of Nantes, outlined a set of heating and energy requirements. Going above and beyond regulatory provisions, SAMOA's requirements apply to constructions built by the various contracting authorities involved (real estate developers, private and public housing companies, equipment management bodies such as the **CITY OF NANTES**). 25 pilot buildings, i.e. over **80,000 m² of housing and office space**, were built, each one harnessing a renewable source of energy.

The act2 project also involves the local authority investigating its whole area and taking up other challenges. This consists in drawing up a road map for renewable energies or accompanying a specific initiative to encourage refurbishments. Both illustrate the **energy-related studies and engineering** which have been supported. Improving the practice of construction professionals was also targeted. The introduction of the thermal regulation in France has resulted in changing construction and worksite approaches. As such, project partners, especially the **ADEME PAYS DE LA LOIRE** Regional Directorate, went about **organising training and feedback sessions** by contacting all of the stakeholders involved (decision-makers, designers, builders and building managers and operators).



THE ILE DE NANTES RENEWAL

- ▶ 340 ha -wide island, 5 km by 1 km
- ▶ 20 year-long project
- ▶ + 8,500 inhabitants from 2008 to 2013
- ▶ Construction potential : 1,000,000 m²
 - equipments : + 150,000 m²
 - activities : + 300,000 m²
 - housing : + 550,000 m² (7,000 dwellings)

More at www.iledenantes.com

Focus on some activities led



Encouraging the thermal renovation of co-ownership buildings

Building refurbishment is a major stake towards the huge amount of savings involved. Nantes Métropole has investigated this issue by creating a team of 6 agents dedicated to identify and help renovation of exist-

ing co-ownership residential blocks. This initiative was backed by act2 project.

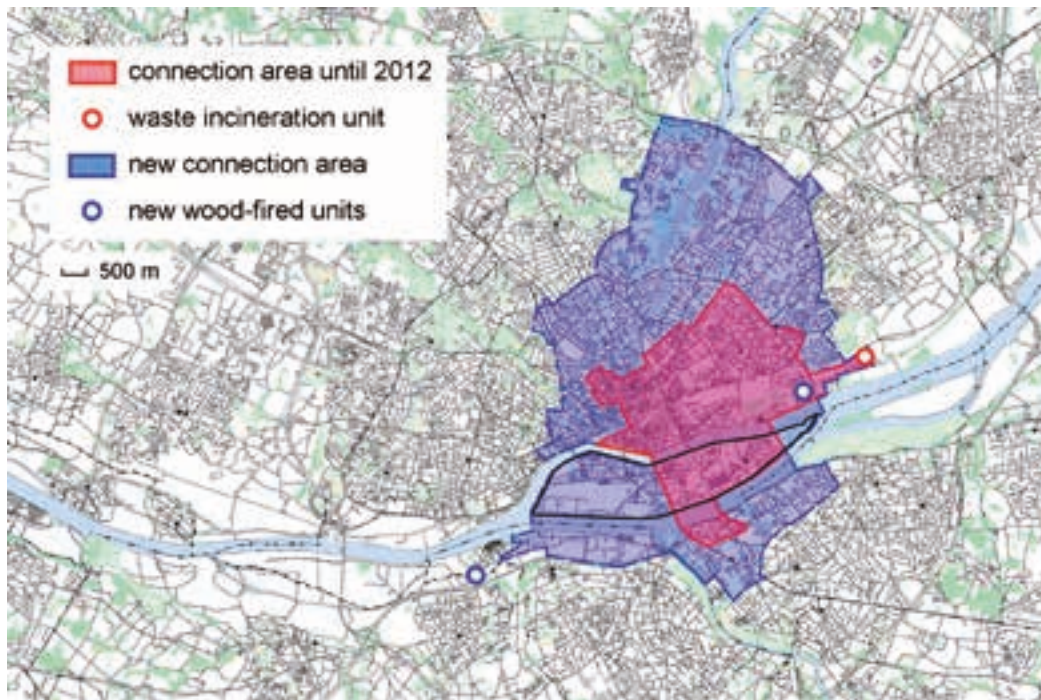
At the end of an experimental phase focusing on 10 residential blocks (picture: the St-Laurent residence), the initiative is looking to provide annual support to some 1,800 flats.



Cit'ergie® : the city of Nantes' commitment is recognised

By assessing its energy policy alongside act2, the City of Nantes got both awarded and committed. The Cit'ergie® label (France's adaptation of the European Energy Awards®) rewards its current work (especially its renovation programme for 800,000 m² of facilities) but sets also its capacity for progress.

The work carried out over the next four years will be assessed to gauge the achievements made.

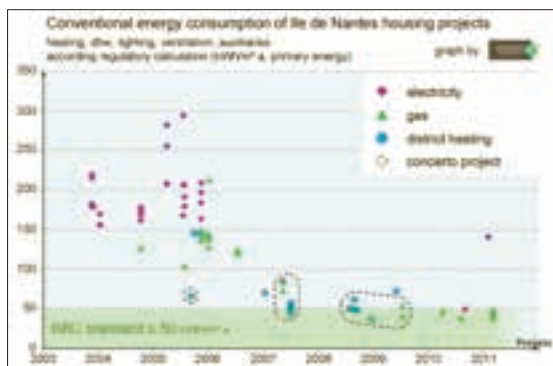


Expanding the Centre-Loire district heating

The Centre-Loire district heating supplies energy to several demonstration buildings in the eastern part of the Ile de Nantes. The act2 project contributed to its expansion.

The developments to be made in the run-up to 2017 include an additional 63 km of pipes, 240 GWh of heat supplied and two new wood-fired heating plants, harnessing an energy mix of which 85% is from renewable sources (waste and wood).

This change clearly reflects Nantes Métropole's bold development policy for district heating and the use of wood as energy. Along with the other networks in the area, an objective of saving 60,000 tonnes of CO₂e per year has been set, i.e. almost 9% of the Climate objective for 2020. Other renewable energy sources will also be used. The dedicated roadmap aims to increase the local annual production of renewable energies by 450 GWh.



Improving energy efficiency on the Ile de Nantes

Developing highly efficient demonstration projects only accounts for a fraction of the work carried out by SAMOA as part of the act2 project. The overarching approach developed in liaison with its energy consultants was implemented across the Ile de Nantes.

It includes specifications that are more stringent than current regulations; energy optimisation for all projects prior to works; overall follow-up of energy performances (see picture); prospective studies for energy-plus block of buildings and increased use of renewable energies.



Helping construction professionals to develop their skills

New regulations and high-performance objectives are changing professional practices. With the act2 project, ADEME Pays de la Loire helped construction professionals to develop their skills by organising worksite-based initiatives and various training sessions, producing an airtightness training kit (see picture) and developing a local partnership bringing together employment and construction professionals as well as training bodies.



Project

Construction year, Developer, Use, Area from Construction Permit (Nb. of dwellings)
 Energy source // Conventional primary energy consumption* (Level of performance**)
See specific fact-sheets to get more information on each project.

Forges Residence

2007, Atlantique Habitations, Housing, 1,810 m² (46 dw.). District Heating // 66 kWh/m².a (Concerto). Social residence for young workers. Interior and exterior insulation on wood cladding.



Living the Quays

2010, Aiguillon Construction, Housing, 5,730 m² (63 dw.). Electricity + Solar Thermal (41 m²), Gas // 79 kWh/m².a (Concerto). 4 rented houses, 27 rented social flats and 32 flats with socially assisted ownership. Aluminium joineries with thermal breaks.

Fonderies Headquarters

2008, LNH & CIL Atlantique, Offices 4,248 m². District Heating // 69 kWh/m².a (Concerto). Offices of the LNH and CIL Atl. housing companies, Double-flow ventilation with heat recovery, regulated with CO₂ sensor and excess ventilation overnight for cooling.



Terrain des Gendarmes

2010-2011, SNI & SAMO, Housing, 5 buildings, 16,393 m² (199 dw.). District Heating // 51 kWh/m².a (Concerto and BBC). Exterior insulation of the 5 buildings. Radiators with thermostat valves, climate control and programming. On-site training sessions organised by ADEME for companies involved in the construction of the Block B.

Beaulieu PV Power Plant

2009, Nantes Métropole, 183 kWp (1,325 m²). Mean annual electric production since 2009: 205 MWh. Visits organised along the year by the local Energy Information Centre to raise awareness on energy issues.



Ile Rouge

2011, ADI, Tertiary, 3,069 m². Aerothermal Heat Pump + PV // 33 kWh/m².a (BBC). Lights with very low luminance and automatic control of the intensity via presence detection sensors.

* according calculation tool validated by the French regulation (space heating, domestic hot water, lighting, ventilation, auxiliaries, cooling, deduction of the electric production from PV)

** 'Concerto' or 'BBC': 'BBC' corresponds to the best level of energy performance set in French 2005 thermal regulation and is above the 'Concerto' standard initially defined in the project

KEY FIGURES

► NEW CONSTRUCTIONS :

- 25 pilot buildings including housing (16), offices (7) and public equipments (2)
- 80,000 m²
- 13 contracting authorities involved

► RENEWABLE ENERGY SYSTEMS COFUNDED:

- District heating (85 % renewable: waste incineration + wood) substations: 1,930 kW
- Photovoltaic: 182 kWp
- Solar thermal: 250 m²
- Aerothermal heat pump: 100 kW
- Wood boiler: 72 kW

► ESTIMATED ANNUAL SAVINGS AFTER DESIGNING THE PROJECTS

- 3.8 GWh (primary energy)
- 790 tCO₂e

Corto

2012, Harmonie Habitat, Housing, 2,798 m² (36 dw.). Gas + Solar Thermal (50 m²) // 39 kWh/m².a (BBC). Exterior insulation with thermal breaks for balconies and roof parapet.



Tripode - Housing

2012, Nexity, 4 blocks, 12,196 m² (138 dw.). District Heating + Solar Thermal // 48 kWh/m².a (Concerto and BBC). Detailed air-tightness tests carried out along the construction.



DT6-Noon

2012, SNI, Housing & Tertiary, 7,205 m² (105 dw. + offices 845 m²). Gas + Solar Thermal. (70 m²) + PV // 39 kWh/m².a (BBC). Gas consumption (heating and DHW from collective gas boilers) is individualised by dedicated meters and management modules.



Tripode - Tertiary

2012, Nexity, 3 blocks, 20,869 m². Aerothermal heat pump // 50 kWh/m².a (BBC). Environmental and energy certificates (provided by independent companies) guarantee the quality of the design and construction.



Prairie au Duc School

2012, Ville de Nantes, School & childhood equipments, 4,222 m². Gas + Solar Thermal (12 m²) // 58 kWh/m².a (BBC). Prototype vegetation-covered roof with a 20-60 cm thick substrate reducing impermeability from 60 % to 25 %.



Wood Centre

2012, ADI, Tertiary, 1,562 m². Wood boiler // 37 kWh/m².a (BBC). Showcase of timber construction, the building notably hosts Atlanbois, the regional association promoting timber.





Associated Cities



1

Koszalin

The City of Koszalin has worked in close partnership with the Municipal Heating Company and pursued the following objectives:

- ▶ research into the heat market in Koszalin and in neighbouring localities
- ▶ strategy development and optimisation for the municipal heat engineering system (including integration of biomass within existing fossil energy-fired boilers)
- ▶ training activities dedicated to various target groups

Participation in the act2 project created the possibility of sharing experiences relating to energy solutions among European cities working under various legal, political and economic conditions. It provided an opportunity to learn of solutions basing on many years of partner cities' experience. The City of Koszalin cooperated closely with the other act2 project participants in a variety of activities promoting environmental friendly solutions.



Malmö stad



2

Malmö

The City of Malmö, as located in southern Sweden, has experienced a considerable growth since the opening of the Oresund fixed link to Copenhagen and Denmark. New construction has increased considerably in recent years. Meanwhile, the City of Malmö has committed to make sustainable development a priority to the highest extent possible.

Its role in the act2 project consisted in following the developments in Hannover and Nantes and draw parallels with local development projects. In addition, the City provided input through the experience gained from the processes in the other partner cities of act2. This covered construction issues, e.g. the use of energy efficiency measures, and the implementation of renewable energy systems in the city.

Based on the act2 project Malmö has developed a 100 % renewable energy concept for the Hyllie area development which will house some 2,000 people by 2016.



3

Newcastle

In Newcastle three sustainable community projects have been accompanied in the planning phase throughout the act2 project duration. The planning phase of the Scotswood Masterplan/Expo and Byker Design Competition has been enriched by the work led in the other act2 partner cities.

Scotswood took a 'total carbon approach' to energy. Energy use was tackled not only in respect of how the buildings and infrastructure are designed, but also how the design can encourage the cooperation of residents and visitors and influence their lifestyle choices towards energy use.

Arising out of the demonstration work reaching 'Passiv Haus' standards in Hannover, Newcastle has undertaken detailed design work for a number of demonstration retrofit properties. Among them, within the Walker Riverside, assessments were led on occupancy strategy issues as well as contractors and skills necessary for high specification insulated building fabric. This has led to one of the first 'Passiv Haus' standard retrofit dwelling in the UK.



4



5



6

- 1- Chimney of the Municipal Heating Company, Koszalin
- 2- Western Harbour district with 100% local renewable energy, Malmö
- 3- Scotswood, Newcastle
- 4- Conference in Koszalin, 2008
- 5- Solar collectors on a sports facility, Malmö
- 6- act2 site visit in Newcastle, 2009



Alongside act2



Climate Alliance Hannover 2020

The City of Hannover is organising an exciting participative process - the Climate Alliance Hannover 2020. Stakeholders from the industrial and service sectors, from the city administration and the utility companies, as well as numerous other institutions and organisations, are working together towards the goal of reducing CO₂ emissions by 40 per cent by the year 2020.



Collaboration with the EC and other Concerto cities

The Concerto forum, held in Brussels on 6-7 December 2010 in presence of the Commissioner for Energy, illustrates the cross-exchange of experience promoted by the Concerto initiative, to which the City of Hannover and Nantes Métropole actively took part. Political representatives of both communities participated to the panel discussion to outline the challenges and lessons learnt from act2 but also to give their visions for the 'Smart Cities & Communities' initiative.



Nantes, European Green Capital 2013

The building sector alone is accountable for over half of energy-related CO₂ emissions. Nantes Métropole has undertaken to cut emissions per capita across the region by 30 % between 2003 and 2020. This bold target is part of its proactive environmental policy, which earned Nantes the 2013 European Green Capital title awarded by the European Commission.



As signatories of the Covenant of Mayors Initiative,

Hannover, Nantes Métropole, Malmö and Newcastle commit to significantly reducing their CO₂ emissions.



All fact sheets are available at www.concerto-act2.eu



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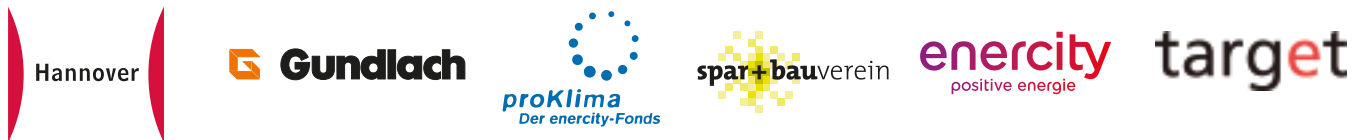
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Get more information on act2 and Concerto at www.concerto-act2.eu and www.concerto.eu

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