Global District Energy Climate Awards

Copenhagen – 3 November 2009

District Heating Network – Dunkirk, France

Concession grantor:
The Dunkirk intercommunity district heating council (SICURD), which serves the cities of Dunkirk and Saint-Pol-sur-Mer, France.

Concession holder:
Energie Grand Littoral (EGL), a Dalkia France subsidiary

Contact:
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Executive Summary

Dunkirk is an industrial port located in northern France. The city's district heating network, built in 1985, currently delivers nearly 140,000 MWh a year to 105 customers through an approximately 40-km distribution network that covers a large portion of the Dunkirk urban community.

The heating network was originally designed to recover byproduct energy from the local ArcelorMittal steel works. As a result, it has turned in a unique environmental performance, with recovered energy accounting for 60% of its total output. The recovered energy has a neutral impact in terms of CO_2, NOx, SOx and other emissions.

Following the addition of three cogeneration units and the April 2008 commissioning of a second byproduct heat capture unit at the ArcelorMittal plant, the percentage of recovered energy in the network has risen to 90%, 70% of which is pollution-free industrial byproduct energy.

With its unique environmental and cost performance, the Dunkirk heating network is clearly an essential component of the region's environmental policy. In this way, the network has enabled the community to maintain and enhance the region's reputation as a leading industrial area.

Leveraging these strengths, the network is continuing to broaden and deepen its presence, while adapting to the needs of both users (simplified pricing, individual invoicing) and local authorities (enhanced environmental performance, participation in the city's development).

PROJECT DESCRIPTION

France's largest North Sea port, Dunkirk is both a local and regional administrative centre. With 210,000 inhabitants, of whom nearly 30% are under 20, the Dunkirk urban community is Europe's leading energy hub.

As a recipient of a European "Sustainable Cities" award, Dunkirk is committed to aligning its industrial development and environmental management policies both today and tomorrow.

History of the district heating network

Following the oil crises of 1973 and 1979, the cities of Dunkirk and Saint Pol sur Mer needed to find an alternative to fossil fuels. Together, they decided to build a heating network that would be supplied primarily by recovered byproduct heat from a local industrial process. Construction of the heating network began in early May 1985.

A capture hood to recover heat at the Usinor (now ArcelorMittal) steel works was brought on stream in early 1986. By 1990, the heating network was already supplying 120 substations.

Following a nationwide request for proposals, the Dunkirk intercommunity district heating council (SICURD), which manages the heating network, chose Compagnie Générale de Chauffe (since renamed Dalkia) as the concession holder to build and operate the network. The first service concession arrangement was signed on 24 April 1985 for an initial period of 24 years.

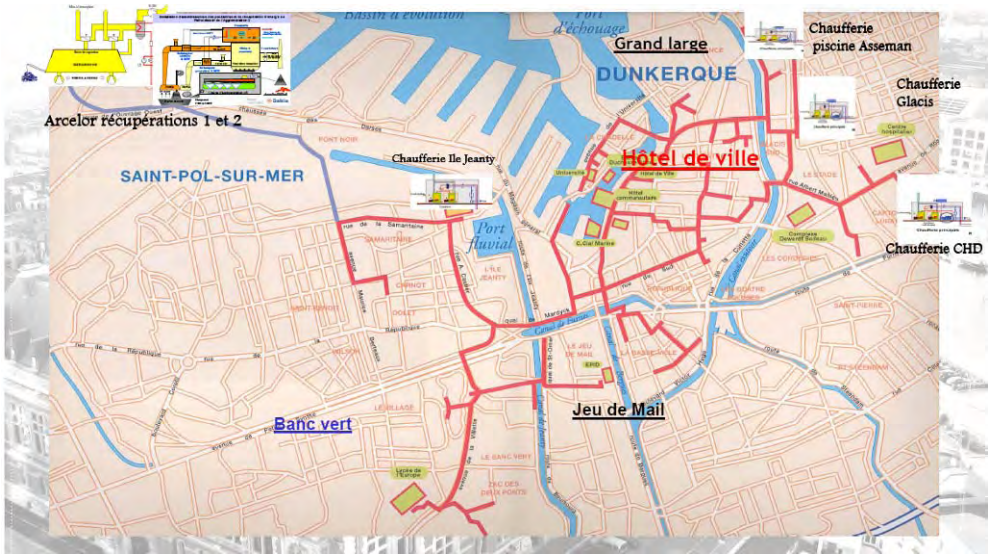
In January 1992, an amendment to the arrangement extended the contract through 30 June 2024, enabling the initial project costs to be amortised over a longer period.

In 2001, a new amendment transferred the service concession arrangement to Energie Grand Littoral (EGL), a wholly-owned Dalkia subsidiary. Changes in the arrangement led to upgrades in the production facilities and the distribution network, in particular to recover heat produced by the ArcelorMittal plant.

Network facts and figures:

- 1985: construction began
- 2nd largest network in the Nord-Pas-de-Calais region
- 100 MW of installed capacity
- 40 km of pipelines
- 170 substations
- 105 customers
- 137,698 MWh sold in 2008
- 60% of energy produced comes from carbon-neutral recovered energy

The Dunkirk heating network



Technical description of the heating network

The Dunkirk network's main source of heat is recovered heat from the No. 2 and No. 3 sinter strands at the ArcelorMittal plant, with the remainder coming from heating plants located at various points along the network.

Heat recovery at the ArcelorMittal plant

Built in 1963, the ArcelorMittal steel works is specialised in the production of flat carbon steel. France's largest steel mill, it accounts for approximately 1.5% of the country's total energy consumption.

The heat recovered by Dalkia comes from air that is heated when it flows through the sinter coming off the cooling bed of the sinter strand that fuels the blast furnace.

The principle of hot air capture is simple. A large hood placed over the cooling bed draws hot air through an exchanger where it heats water that is then distributed via the network.

In 1986, when the heating network was first built, the cooling bed of the No. 3 sinter strand was fitted with a capture hood that recovered 20 MW of heat. Since then, heat capture has been the main source of energy for the Dunkirk heating network. In April 2008, a hood was installed on the cooling bed of the No. 2 sinter strand, which increased heating capacity by 8 MW.

Additional production resources

The network includes a number of auxiliary/standby boilers to supplement—and in come cases replace—heat recovered at the ArcelorMittal plant. These include:

- A 13 MW gas/domestic fuel oil heating plant at the Dunkirk hospital, backed by a 4 MWe cogeneration unit.
- An 8 MW gas/domestic fuel oil heating plant in the Glacis neighbourhood, backed by a 4 MWe cogeneration unit.
- A 2 MW gas heating plant at the Paul Asseman swimming pool, backed by a 1 MWe cogeneration unit.
- A 36 MW heavy fuel oil heating plant at Ile Jeanty.
- A number of auxiliary/standby gas/domestic fuel oil heating plants (6 MW).

The cogeneration units operate during the winter—from 1 November to 31 March—in accordance with sales contracts with France's EDF electricity utility.

Production facility construction dates

Heat recovery at ArcelorMittal:

- Heat capture unit on the No. 3 sinter strand: 1986 (Hood renovated in 2008)
- Heat capture unit on the No. 2 sinter strand: 2008

Heating plants:

- Hospital gas heating plant: 1986 (Boilers replaced in 1995)
- Glacis gas heating plant: 2004 (Heating plant completely rebuilt to replace the old Glacis heavy fuel oil heating plant)
- Paul Asseman swimming pool gas heating plant: 1995
- Ile Jeanty heavy fuel oil heating plant: 1986
- Other standby heating plants: between 1986 and 1990

Heat distribution

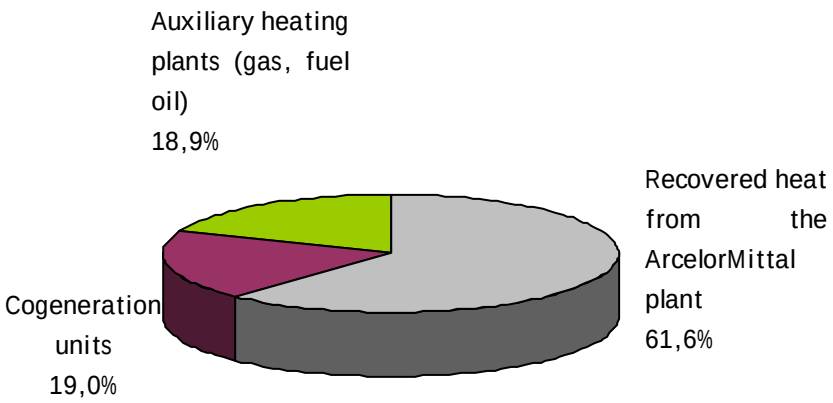
Heat distribution is carried out entirely by a system of pre-insulated buried pipes. Initially, the heat recovery unit and the main Ile Jeanty heating plant were connected with Stecta-type pipes (water pipes made of welded steel tubes) and the rest of the network was made of Pont à Mousson cast iron. Because these materials wore down quickly and new, more durable processes had been invented, the concession holder replaced the entire network with pre-insulated Wannipipe-type pipelines. The Wannipipe system uses pipes and fittings that are pre-insulated in the factory and assembled on the worksite. The components are made of black steel tube insulated with injected rigid polyurethane foam and protected by a polyethylene coating. Replacement began in the early 1990s and was completed in 2003. Today, network losses represent 10.4% of annual heat output.

The heating network's energy mix

Network production in 2008: 162,632 MWh (137,698 MWh sold), of which:

- Recovered heat from the No. 2 and No. 3 sinter strands: 100,143 MWh (61.6%)
- Cogeneration units: 31,569 MWh (19.5%)
- Other auxiliary heating plants: 30,920 MWh (18.9%)

Dunkirk heating network's energy mix



In 2008, the Dunkirk heating network's coefficient came to 0**.104 kg CO_2/KWh** (following the method devised by the national district heating and air-conditioning council (SNCU), which is a member of the French federation for energy and environmental management services (FG3E)).

CONTINUOUS IMPROVEMENTS IN THE HEATING NETWORK'S PERFORMANCE

With an energy recovery rate of nearly 90% (70% byproduct energy from the ArcelorMittal sinter strands and 20% from three cogeneration units) and an optimised billing system, the Dunkirk network offers a unique environmental and cost performance and is clearly an essential component of the city's environmental policy.

Continuous improvement of the network

Designed and built to recover industrial energy, the Dunkirk heating network is constantly evolving to become even more energy efficient and environmentally friendly.

The network was conceived in the early 1980s as a cost-effective, green response to soaring oil prices. While very costly at the time, the initial investment was expected to be offset by the lower, stable cost of the recovered energy compared with high fossil-fuel prices. Although the average price of energy more than doubled between 1980 and 1985, the sudden collapse of oil prices in early 1986—just when the new installations were being brought on stream—was a severe blow to the network's financial stability.

Despite this unfavourable environment, the concession holder continued to invest in developing and upgrading the network. By year-end 2000, total investment in the network amounted to €37 million, including approximately €9.6 million in renovation work.

- 1990-2003: distribution network replaced by a thermal-efficient, pre-insulated, buried pipeline, resulting in a gradual, significant decrease in network losses.
- 1993: Start-up of two cogeneration units at the Dunkirk hospital (4 MWe) and the Paul Asseman swimming pool (2 MWe).
- 1995: Start-up of new high-performance gas boilers in the heating plants at the Dunkirk hospital and the Paul Asseman swimming pool.
- 2004: Construction of a new, 9 MW gas/domestic fuel oil heating plant equipped with a 4 MWe cogeneration unit in the Glacis neighbourhood.

- 2007: renovation of the cogeneration units at the Dunkirk hospital and Paul Asseman swimming pool with the installation of new, more efficient motors.
- 2008: Start-up of a second 8 MW heat recovery installation on the ArcelorMittal No. 2 sinter strand.
- 2008: Renovation of the heat capture hood on the ArcelorMittal No. 3 sinter strand.

Environmental performance

The heat recovered from the cooling bed of the ArcelorMittal sinter strands is entirely byproduct energy. This means it is an inevitable part of the production process that would be entirely dispersed and lost without the capture system.

With enhanced energy recovery capacity, the network's forecast energy performance is as follows:

	MWh ex-heating plant	%
Energy recovery (ArcelorMittal)	111,000	68.1
Cogeneration	31,500	19.3
Domestic fuel oil	4,000	2.5
Heavy fuel oil	7,500	4.6
Gas	9,000	5.5

Recovery of industrial heat enables annual savings of:

26,000 tonnes of CO_2 compared with a gas-fired solution

ISO 14001 certification of the system

The installations were ISO 14001-certified in 2007, reflecting the heating network's commitment to continuously improving its environmental performance.


Annexe
Appendix

Annexe N° 12

1994/3127h

ENERGIE GRAND-LITTORAL

Société adhérente au Système de Management de la Qualité DALKIA NORD
Company complying with the requirements of DALKIA NORD's Quality Management System

Rue de l'Aiback – ZI de Petite Synthe
FR-59640 Dunkerque

pour les activités suivantes :
for the following activities :

VENTE ET REALISATION DE PRESTATIONS EN :

- GESTION ET MAINTENANCE D'INSTALLATIONS DE : CHAUFFAGE, FROID, CONDITIONNEMENT D'AIR, RESEAUX DE CHALEUR, TRAITEMENT DES EAUX, TELEACTIVITES, PRODUCTION D'ELECTRICITE, UTILITES INDUSTRIELLES ET MULTITECHNIQUES.
- PRODUCTION ET DISTRIBUTION D'ENERGIE : CHALEUR, FROID, ELECTRICITE.
- UTILITES INDUSTRIELLES : CHALEUR, FROID, AIR COMPRIME.
- ORGANISATION, GESTION DE PRESTATIONS DE "FACILITIES MANAGEMENT" ET REALISATION SOUS EXECUTION PROPRE DE TOUT OU PARTIE DES PRESTATIONS TECHNIQUES ASSOCIEES.
- TELEDISTRIBUTION PAR RESEAUX NUMERIQUES ET ANALOGIQUES.

Système de management évalué et jugé conforme aux exigences requises par :
Management system assessed and found to meet the requirements of :

ISO 9001 : 2008

F. MEAUX

afnor

Annexe
Appendix

Annexe N° 68

certificat n° / certificate number :

2009/35031

ENERGIE GRAND LITTORAL
Captation de chaleur de SOLLAC : AGGLO 3

pour les activités suivantes :
for the following activities :

PRODUCTION DE CHALEUR.

Liste complémentaire des sites entrant dans le périmètre de la certification :
Complementary list of locations within the certification scope :

1, rue du Comte Jean FR-59381 DUNKERQUE

Système de management évalué et jugé conforme aux exigences requises par :
Management system assessed and found to meet the requirements of :

ISO 14001 : 2004 – OHSAS 18001 : 2007

F. MEAUX

afnor

Installation of the second heat recovery unit: an unqualified success

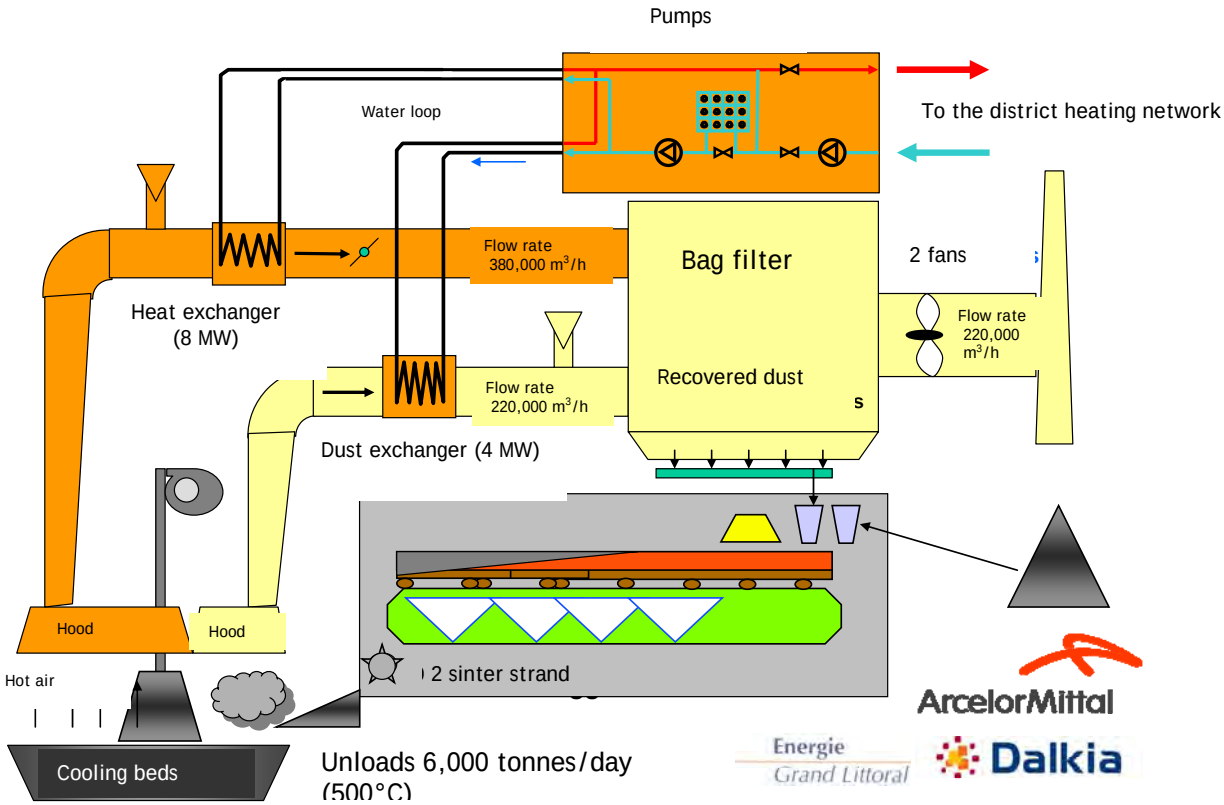
In 2001, amendment No. 5 to the original arrangement called for increased use of heat produced by the ArcelorMittal plant. As a result, Dalkia and ArcelorMittal began working together in October 2002 to develop a process that would improve and increase heat recovery at the plant.

The project to build a second heat recovery unit on the No. 2 sinter strand was carried out jointly by Dalkia and ArcelorMittal, under the supervision of the concession grantor (primarily the City of Dunkirk) with the goal of enhancing environmental performance and service to network users.

Technical description:

- Two capture hoods cover half of the cooling bed's open surface.
- The first, known as the dust hood, is located over the area where the sinter is unloaded into the cooling bed. This area contains 90% of the captured dust, but represents only 12.5% of the unit's rated capacity (or 1 MW).
-
- The second, known as the heat hood, covers 75% of the surface under the hoods. It accounts for 88% of the unit's rated capacity (or 7 MW) and has a much lower dust intake.
- A heat exchanger is located on each intake pipe and is connected to the heating network.
- A bag filter has the capacity to capture at least 1.7 tonnes of dust annually, reducing the site's total dust emissions by 10%.
- Two fans direct the exhaust into a 45-metre smokestack, with an exhaust concentration of 10 mg/Nm3.

Heat recovery and dust capture system at the No. 2 sinter strand cooling bed



Contribution to sustainable development

Cost efficiency

- Creates value while protecting the environment.
- Makes the heating network more cost competitive.

Social responsibility

- Reduces users' costs.
- Strengthens and extends the partnership between Dalkia (EGL), ArcelorMittal and the City of Dunkirk.

Environmental performance

- Replaces 2,500 tonnes of heavy fuel oil with a pollution-free energy source.
- 7,900 tonnes of CO_2 emissions avoided, 2,400 toe recovered
- Nearly 90% of the energy used in the network is recovered energy (two recovery units at ArcelorMittal and three cogeneration plants).

A benchmark facility in Europe.

FUTURE UPGRADES TO THE DUNKIRK HEATING NETWORK

The outlook for developing the network has brightened significantly thanks to its cost and environmental performance. As a result, the City of Dunkirk and Dalkia are considering expanding the network by around 20% by 2012.

The "Grand Large" project is a good example of this strategy.

The Grand Large eco-neighbourhood

The Grand Large project, located on the Neptune site of the former Normed shipyards, kicks off the second stage of an initiative launched in the early 1990s to reclaim abandoned industrial/harbour land, as part of a large-scale urban renewal programme. The Dunkirk urban community decided to develop an attractive, relatively densely populated neighbourhood (around 1,000 housing units) offering a quantitative and qualitative alternative to suburban living.

Compliant with "Quartier 21" standards

The "Quartier 21" label is designed to encourage an integrated approach to sustainable development among local communities and their partners. With this in mind, the Dunkirk urban community has taken all environmental, economic and social aspects into account in this new neighbourhood.

A number of environmentally friendly solutions are under consideration for the buildings, including:

- Individualised district heating combined with solar heating.
- Natural ventilation.
- Enhanced insulation, using materials with a low grey energy content.

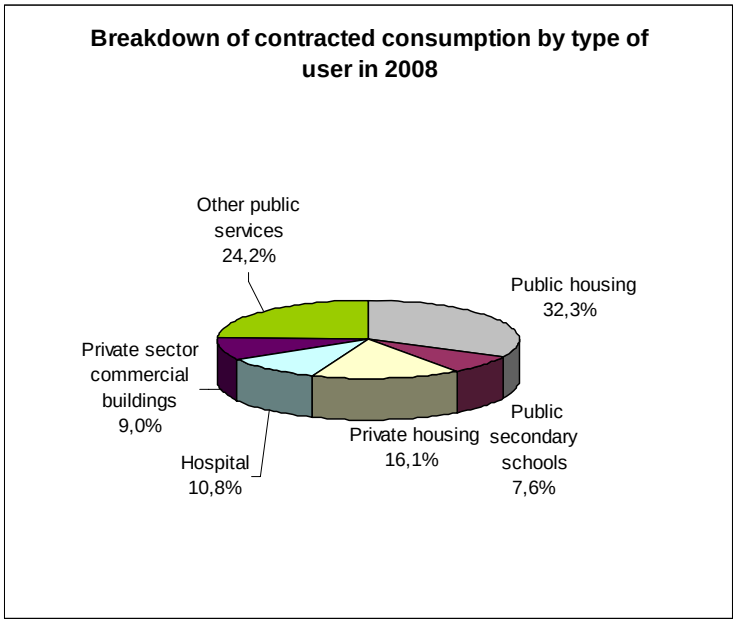
Role of the heating network

To cover this high environmental quality (HQE) neighbourhood's energy needs, the private developers and public lessors naturally turned to district heating. At the same, they also wanted to individualise the costs.

The network therefore had to offer the right technical solutions and an appropriate pricing system to meet the Grand Large project's specific requirements. On the technical level, a specific module will be used to distribute heat to each housing unit so that consumption can be measured on an individual basis. As for pricing, a set fee has been added to the monthly rate to reflect the additional costs involved in maintaining the module, metering and invoicing.

THE HEATING NETWORK AND ITS USERS

Users



Relations with clients and users

Advisory board

Each year, the heating network concession holder reports on the service provided during a meeting of the local public services advisory board. The concession holder presents the network's technical, contractual and financial developments to a representative group of users, along with the financial statements of the operating company (EGL). The meeting also provides an opportunity to obtain direct feedback on user satisfaction.

At present, users give the network's environmental performance and reliability very high marks, but still find that there is room for improvement in user information.

Concerning rates, the changes introduced in 2001 through amendment No. 5 have simplified the structure considerably and provided a clear view of the network's cost performance.

Even so, the concession holder compares the cost of the heating network to an all-gas alternative each year to assess the network's rate positioning as accurately as possible, since rates continue to be the main concern among users as a whole.

Report to the concession grantor

In accordance with the provisions of the concession contract, the concession holder provides a technical and financial report to the community each year. The report covers the network's technical, cost and environmental performance and discusses the quality of service provided to users, any complaints received (along with the corrective and preventive action taken), and the commercial strategy pursued during the year.

Communication

Brochures on the heating network have been published by:

- Concession holder EGL ("Imaginez votre ville sans cheminée…")

- The local community ("Le réseau de chaleur: la chaleur tranquille")

The Dunkirk heating network is also profiled among Dalkia France's flagship projects at www.dalkia.fr.

Marketing initiatives

EGL has taken a number of measures to keep up with changes in user attitudes and motivations, including:

- Simplifying the rate structure

Users' bills now break down into just two parts: a set fee based on contracted consumption and a variable fee based on the actual meter reading (and calculated on the energy cost).

In an innovative move, the Dunkirk network's rate structure integrates a fixed amount in the energy cost to reflect the fact that the cost of recovered energy is not tied to the cost of fossil fuels.

- Adapting rates

In response to requests for individualised service from certain lessors and private promoters, the network now offers individualised supply for housing units.

The resulting technical, contractual and financial provisions are outlined in amendment No. 7 to the concession arrangement, which should be ratified by the end of 2009.

- Enhancing environmental performance

To be effective, a heating network must achieve environmental excellence with high performance and/or innovative facilities.

This has been the case from the beginning in Dunkirk, with a network based on the ground-breaking concept of recovering byproduct heat from an industrial process.

Three cogeneration units were added in 2004 and a second heat recovery unit came on stream in 2008 as part of an ambitious, tailored development strategy that has proven to be a major strength.

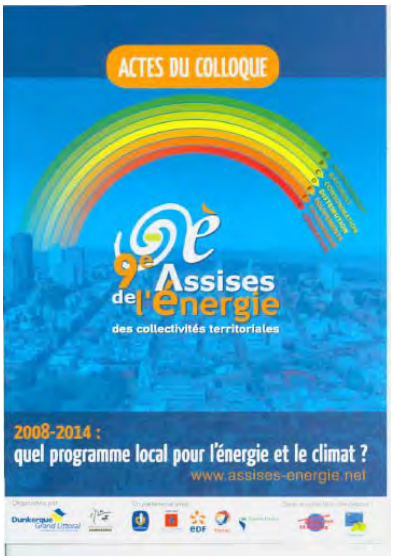
NETWORK'S IMPACT ON THE DUNKIRK REGION

EGL participates in many professional organisations through Dalkia, among them ATMO Nord Pas-de-Calais, which is involved in monitoring, measuring, reporting and preventing air pollution.

Publicity surrounding the heating network has a positive impact on the community and on the region's image. Communication primarily focuses on:

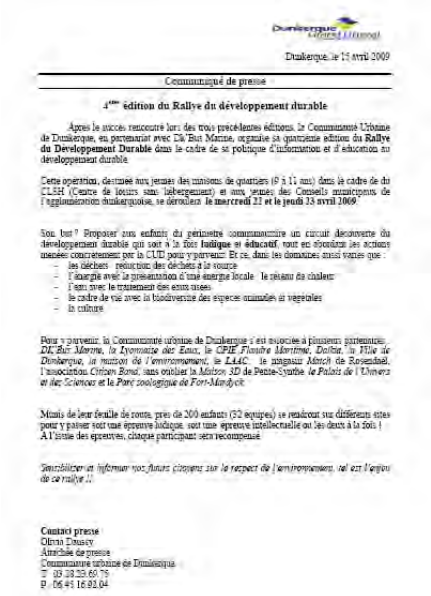
- Articles for in-house and informational magazines published by Veolia, ArcelorMittal, the City of Dunkirk and the Dunkirk Urban Community.

- Articles in the local daily newspaper (La Voix du Nord).
- TV news reports (France 2, France 3 Nord Pas de Calais).
- Site tours during special events, such as the energy forum organised every four years in Dunkirk (2004 and 2008).



- Tours for students from regional technical schools, Dunkirk city schools and the Mayors of France association.

- An Environmental Rally organised for primary school students by the Dunkirk Urban Community over the past four years. EGL presents the heating network during a Rally stage devoted to energy.



Dunkerque Grand Littoral

Dunkerque, le 14 avril 2009

Communiqué de presse

4ème édition du Rallye du développement durable

Après le succès rencontré lors des trois précédentes éditions, la Communauté Urbaine de Dunkerque, en partenariat avec Dk'Bat Marine, organise sa quatrième édition du **Rallye du Développement Durable** dans le cadre de sa politique d'information et d'éducation au développement durable.

Cette opération, destinée aux jeunes des missions de quartiers (9 à 11 ans) dans le cadre du CLSH (Centre de loisirs sans hébergement) et aux jeunes des Conseils municipaux de l'agglomération dunkerquoise, se déroulera **le mercredi 23 et le jeudi 24 avril 2009**.

Son but ? Proposer aux enfants du périmètre communautaire un circuit découverte du développement durable qui soit à la fois **ludique** et **éducatif**, tout en répondant aux actions menées concrètement par la CUD pour y parvenir. Et ce, dans les domaines aussi variés que :

- les déchets : réduction des déchets à la source
- l'énergie avec la présentation d'une énergie locale : le réseau de chaleur
- l'eau, avec le traitement des eaux usées
- le cadre de vie avec la biodiversité des espèces animales et végétales
- la culture

Pour y parvenir, la Communauté urbaine de Dunkerque s'est associée à plusieurs partenaires, *Dk'Bat Marine, la Lyonnaise des Eaux*, le *CPIE Flandre Maritime*, *Dalkia*, *la Ville de Dunkerque*, *la maison de l'environnement*, le *LAAC*, le zoogaze *Marck* de Rosendaël, l'association *Citizen Bond*, sans oublier la *Maison 3D* de Petite-Synthe, *le Palais de l'Univers et des Sciences* et le *Parc zoologique de Fort-Mardyck*.

Munis de leur feuille de route, pas de 200 enfants (32 équipes) se rendront sur différents sites pour y passer soit une épreuve ludique, soit une épreuve intellectuelle ou les deux à la fois ! A l'issue des épreuves, chaque participant sera récompensé.

Sensibiliser et informer vos futurs citoyens sur le respect de l'environnement, tel est l'enjeu de ce rallye !!

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