FIRST GLOBAL DISTRICT ENERGY CLIMATE AWARDS

REDUCING CO_2 EMISSIONS AND INCREASING ENERGY EFFICIENCY IN OUR CITIES WITH DISTRICT ENERGY SYSTEMS

APPLICATION FILE FOR THE GLOBAL DISTRICT ENERGY CLIMATE AWARDS 2009 ORGANIZED BY THE INTERNATIONAL ENERGY AGENCY

By

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CLIMESPACE
GDF SUEZ

APPLICATION FILE FOR THE 2009 GLOBAL DISTRICT ENERGY CLIMATE AWARDS ORGANIZED BY THE INTERNATIONAL ENERGY AGENCY

The energy and environmental impacts of the cooling systems of the chilled water production plants in the district chilled water network in Paris

Executive summary

Under the framework of the public service concession concluded with the City of Paris, since 1991 Climespace has been developing the Parisian chilled water district network.

This chilled water network, which is the largest one in Europe, has seventy kilometres of district network, two hundred and ninety megaWatts of injected cooling power, and four hundred and seventy-five buildings. Every year, the connection rate for new customers is twenty megaWatts of additional cooling power.

In addition to the environmental and energy advantages offered by the district chilled water network compared with independent installations, district chilled water production plants centralize the consumption of resources (electricity, atmospheric discharges, water) required for cooling. The Climespace chilled water production system has thus become the largest electricity consumer in Paris (over one hundred and thirty gigaWatt hours a year).

In the late 1990s, Climespace undertook changes to its cooling production schema in order to reduce both electricity consumption and the environmental impact. These changes were based on a change from the cooling units' cooling method (initially involving wet cooling towers) to use of a cooling method using water from the Seine River. The construction effort required for new sites on the banks of the Seine, the construction of chilled water transport structural networks, and basic modifications to the running of the equipment, enabled a spectacular improvement of energy performance from 2002 to 2009:

ELECTRICITY CONSUMPTION SAVING 112 GWH

Equivalent to a CO_2 emissions saving of 56,153 tonnes

TAP DRINKING WATER CONSUMPTION SAVING 3,000,000 M^3

The Paris Community is the first beneficiary of these dramatic improvements.

CONTENTS

1. Presentation of Climespace

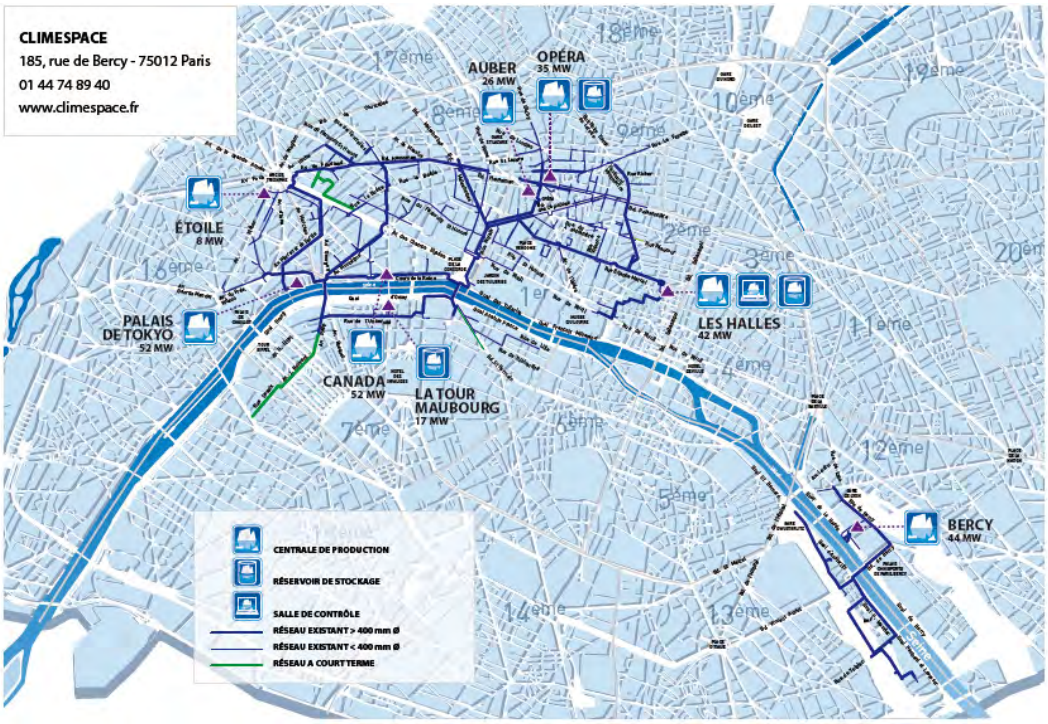
1.1 The history of Climespace

Since 1978, Climespace has produced and distributed cooling energy via the Paris district chilled water network in order to respond to the air conditioning needs of Parisian buildings (department stores, museums, offices, hotels).

The public service concession concluded by the City of Paris in 1991 enabled the district chilled water network to undertake major development involving an additional twenty megaWatts of cooling power connected per year.

Climespace is a subsidiary of the GDF Suez Group, and frequently intervenes as a skills centre in support of the Group's projects in the field of district cooling networks.

1.2 Description of Climespace's resources



The Paris district chilled water network is developing at a rate of approximately 20MW worth of new customers per year.
In 2009 the district network consisted of :

- 475 customers connected, or the equivalent of 5 million m² of office space
- 7 chilled water production plants, for a total cooling power of 290MW

  4 production plants cooled by air cooling towers

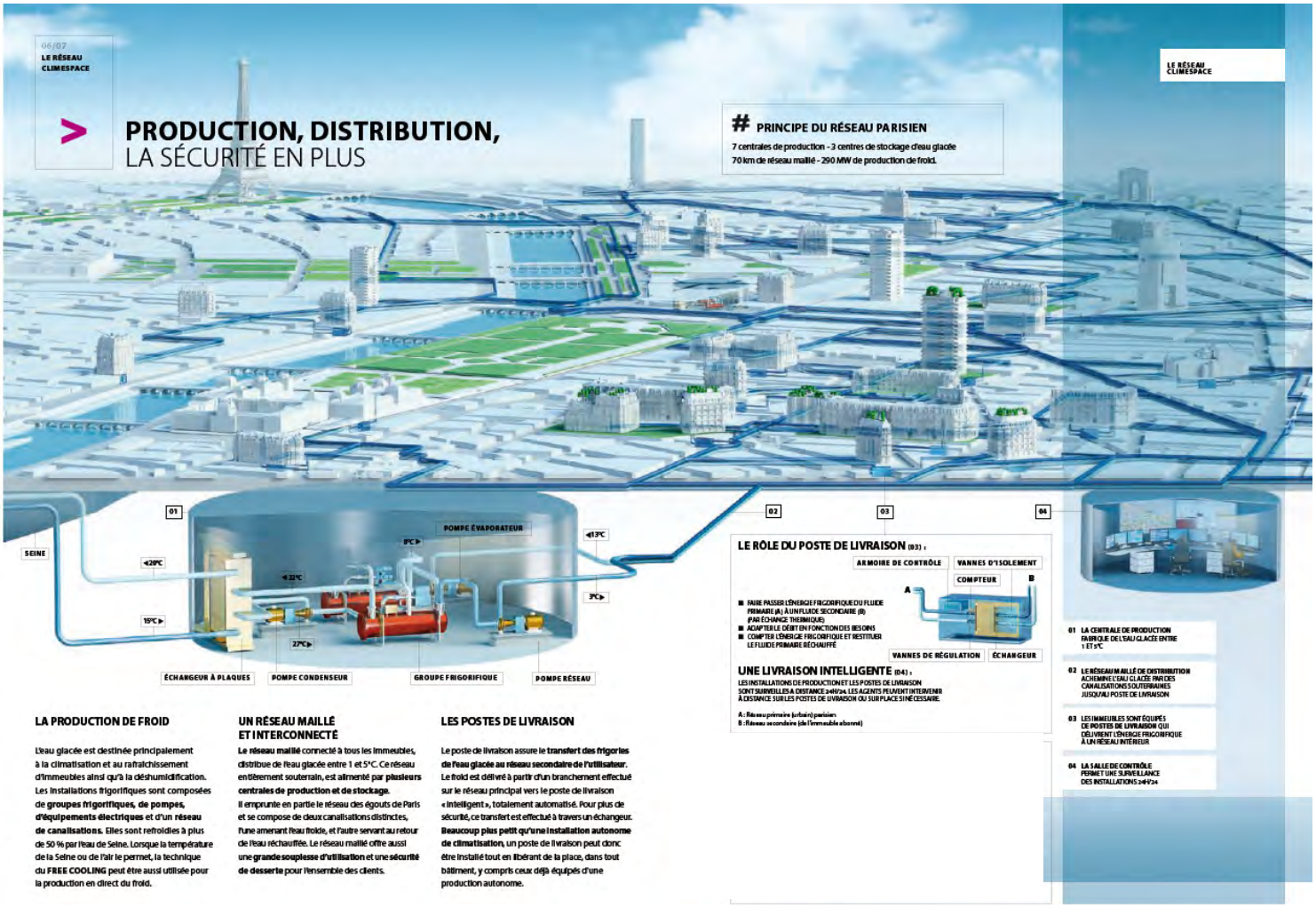
  3 production plants cooled by the Seine

• 3 cold storage units with a capacity of 140 MWh (2 ice storage units, 1 chilled water storage unit)

• 70 km of district transport network, amounting to 140 km of tubes running along sewers or technical galleries, and buried pipes

• 1 central control unit for equipment, that runs using 68,000 pieces of information fed back from sensors.

1.3 Description of the operating principle for a district cooling network



1.4 About the importance of the cooling of the district chilled water production plants

The chilled water production plants discharge the cooling power produced as well as the electric power required for the operation of the cooling units. The power levels to be dissipated are substantial (~300 MW) and the cooling method has a major influence on the production plants' power consumption. This consumption difference mainly relates to the cooling temperature; a

low cooling temperature enables a reduction in the energy consumption of the chilled water production units, which operate using compressed steam.

Because heating needs are very low in summer, recovery of the heat discharged in summer by the chilled water production plants is inappropriate in Paris.
The heat discharged by the cooling units is therefore waste which must be discharged whilst reducing the overall environmental impact (particularly the power consumption required for operating the cooling units), local heating, and the public health impact.

In light of the major size of the installations, which are located in a dense urban environment, two cooling methods are currently used for the production plants:

AIR COOLING TOWERS

This principle is based on evaporating the cooling water by spraying water in a counter-flow to the ambient air. Part of this water evaporates when it comes into contact with the air, thus ensuring cooling of the rest of the water, which is then sent back to cool the cooling units. The volume of evaporated water is compensated for using top-up water. Continuous chemical treatment enables corrosion and the development of bacteria to be tightly controlled. The temperature of the cooling water is between 16 and 39°C.

RIVER WATER

This principle is based on cooling the cooling units by using river water from the Seine. Some of the water from the Seine is sluiced off, heated, and is then fully integrated back into the waterway, without any chemicals being added. The cooling water temperature is between 1°C and 28°C, and the increase in the waterway's overall temperature is only a few tenths of a degree.

One of the major stakes for Climespace during the 1990s was therefore to build chilled water production plants in the vicinity of the Seine in order to benefit from this virtuous cooling source.

First of all, three production plants cooled using water from the Seine (Bercy in 1994, Canada in 2003, and Tokyo in 2007) gradually enabled additional cooling to be produced for new customers, as well as, and most importantly, the transfer of the remaining cooling production which hitherto had been carried out by tower production plants. The production plants using water from the Seine, which offer better energy performance, thus became the production base, and the tower production plants, which have a lower energy performance, are now committed during peak periods. The transformation of the structure of the cooling production array was integrated into a complete change in the company's development orientations, particularly in terms of the execution of the chilled water transport networks required, and the commercial development of customers in the proximity of the new production plants.

WITH THE HINDSIGHT OF 7 YEARS' EXPERIENCE, THE BALANCE SHEET FOR THIS TRANSFORMATION RELATING TO THE COOLING METHOD USING THE SEINE OFFERS MAJOR REVELATIONS IN TERMS OF THE ENERGY CONSUMPTION AND CO_2 SAVINGS ACCOMPLISHED:

POWER CONSUMPTION SAVING	112 GWH
EQUIVALENT TO A CO_2 EMISSIONS SAVING OF	56,153 TONNES
SAVING IN DRINKING WATER CONSUMPTION	3,000,000 M^3

Details of these favourable effects are provided in the following section, outlining the transition and the continuity of the improvement of energy performance.

2. Development of the cooling network management strategy

Since 2002, Climespace has been mobilizing major human and financial resources in order to transfer its production capacity, which initially consisted of production plants cooled using wet towers, to chilled water production plants using sites cooled with water from the Seine.

2.1 Gradual migration of production capacity to sites cooled using water from the Seine

The energy share of sites cooled using water from the Seine went from **8%** in 2002 to **83%** in 2009. Over the same period, the cooling energy volume produced increased from 315 to 460 GWh_c.

Figure 1 illustrates these ongoing developments since 2002.

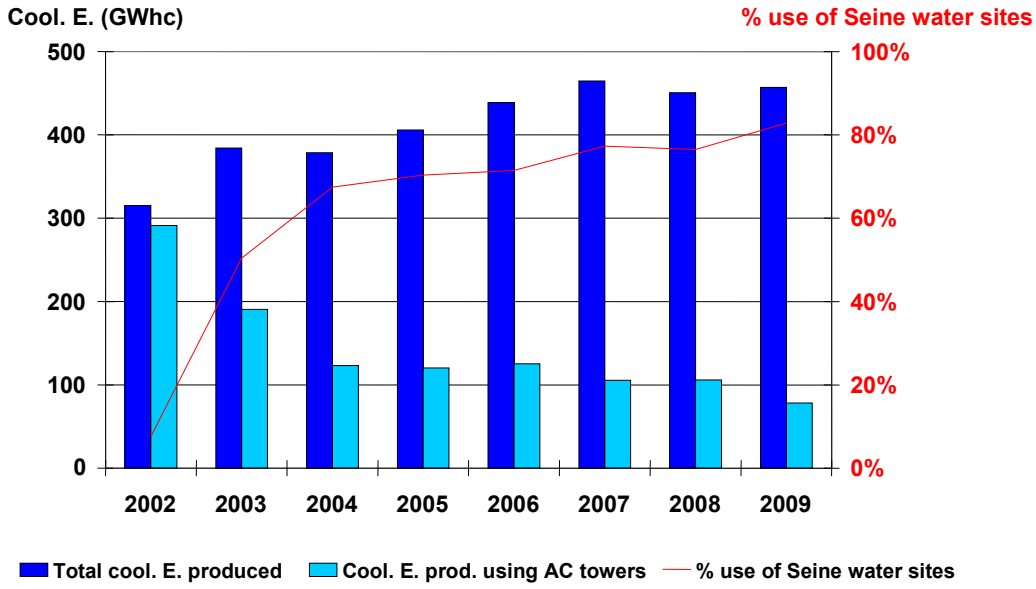


Figure 1 – Development of cooling energy production produced by both types of production plants
Comparison between the annual total cooling energy produced by all of Climespace's production plants (in dark blue) and the cooling energy produced by production sites cooled using air cooling towers (in light blue) – illustration in red of the percent share for sites cooled using water from the Seine in Climespace's annual cooling energy production (red curve).

Abbreviation:
AC towers *Air Cooling towers*

The gradual shift from production capacity cooled using air cooling towers to sites cooled using water from the Seine resulted in a different breakdown for the various types of electrical energy consumption.

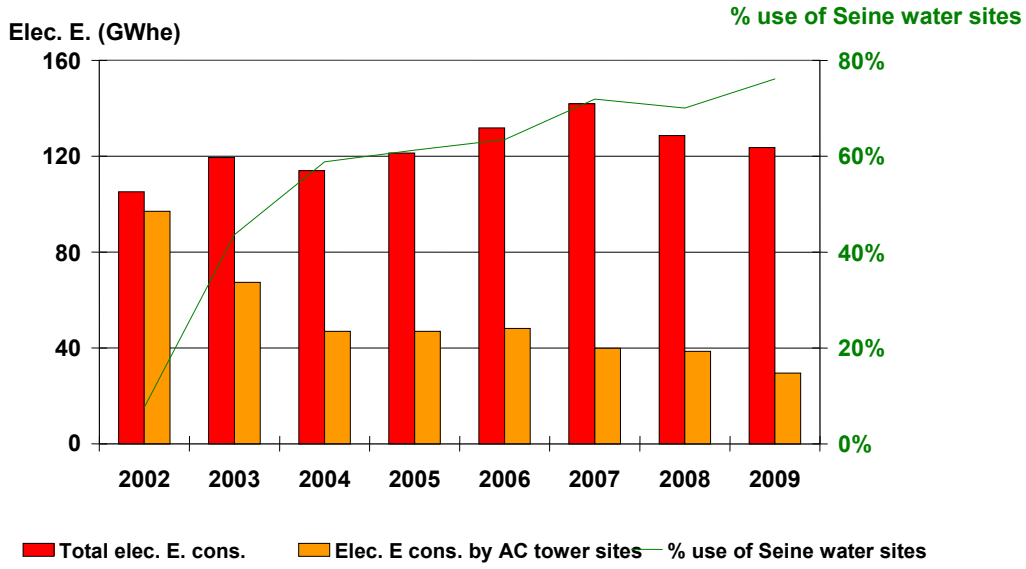


Figure 2 – Development of the electrical energy consumed by both types of production plants
Comparison between the annual total electrical energy consumed by all of Climespace's production plants (in red) and the electrical energy consumed by production sites cooled using air cooling towers (in orange) – illustration in green of the percentage of electrical energy consumed by sites cooled using water from the Seine as part of Climespace's annual overall energy consumption (green curve).

Abbreviation:
AC towers *Air cooling towers*

The migration of Climespace's energy production volumes from sites using air cooling towers to sites cooled using water from the Seine involved the implementation of the following resources:

- 55 million Euros' worth of investments for the construction of 104 MW_c of production capacity cooled using water from the Seine;
- 13 million Euros' worth of investments for the extension of the network to sites cooled using water from the Seine;
- Commercial development of new customers in the proximity of the new chilled water transport network;
- Implementation of a management strategy adapted by using sites cooled with water from the Seine as the production base.

2.2 Environmental gains achieved

There are various types of environmental benefits from using sites cooled with water from the Seine.

The primary environmental benefits are analyzed and detailed in this document:

- Reduction in electricity consumption levels and a reduction in associated CO_2 emissions;
- Reduction in tap drinking water consumption and a reduction in the chemicals associated with this.

The other major environmental benefits are, in particular, quantitative:

- Elimination of the public health risk relating to legionnaire's disease
- A reduction in water consumption
- A reduction in water discharged into sewers
- Elimination of the plume of steam resulting from water vapour condensation
- Architectural improvement of the roofs of production plants
- A reduction in the noise pollution caused by the towers' fan units

2.2.1 Reduction in electricity consumption

Evaluating the decrease in the electricity consumption relating to the commissioning of sites cooled using water from the Seine was carried out via a comparative study of the annual values measured by Climespace in relation to a production capacity development scenario which would have given priority to the construction of sites cooled using air cooling towers.

The following production capacities involving cooling with water from the Seine were commissioned:

- 52 MW_c at the Canada site in 2003
- 52 MW_c at the Tokyo site in 2007

2.2.1.1 Reference scenario

The specific consumption ratio relates to the electrical energy required to produce one kiloWatt hour of cooling. This is the reference energy performance indicator which is considered. Figure 3 illustrates the development of a specific annual consumption ratio for Climespace's production plants from 2002 to 2009.

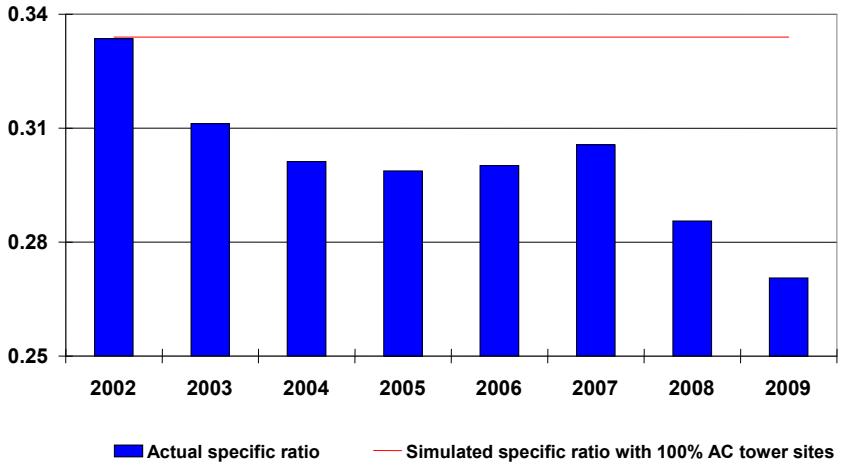


Figure 3 – Development of the annual specific consumption ratio for Climespace's production plants from 2002 until today (blue) – specific ratio for the year 2002 used as the baseline for a development strategy involving sites cooled using air cooling towers (in red)

The specific ratio for 2002, which is in red in Figure 3, is defined as the reference value for the simulation of Climespace's production plants' performance in the case of the development scenario defined above.

These specific electrical consumption ratios integrate the consumption of chilled water production units and their related auxiliaries, as well as the consumption of cooling distribution pumps across the district chilled water network. The sizeable effect of distribution energy losses (thermal and pumping losses) relating to the remoteness of customers in relation to the production sites is therefore integrated into the specific consumption ratio.
2007 was characterized by the start-up of the Tokyo production plant, the adjustment of which, along with the major importance of the pumping losses from the district network, provide an explanation for the lower performance that year. 2008 showed a catching up in terms of energy performance characteristics.

2.2.1.2 Results

Figure 4 describes the results obtained by comparing the development of actual electricity consumption since 2002 with simulated consumption. The decrease in the electricity consumption levels due to the use of sites cooled with water from the Seine increases along with a decrease in the commitment rate for sites with air cooling towers.

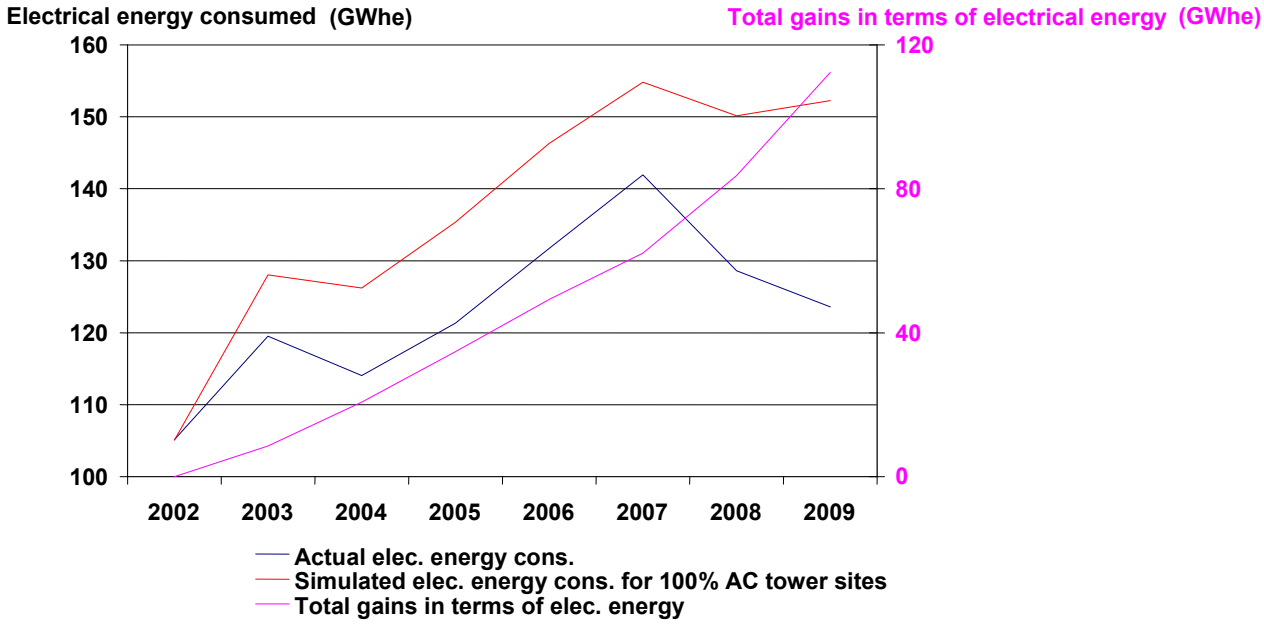


Figure 4 – Comparison between the development of actual electricity consumption (in blue) and consumption assumed by the development scenario involving 100% sites with air cooling towers (in red) – related reduction of the electrical energy consumed in GWh (in pink)

The total electrical savings relating to the placement in operation of sites cooled using water from the Seine is **112GWh$_e$** over 7 years.

2.2.2 Reduction of indirect CO_2 emissions

Electricity consumption causes indirect impacts on the environment. There are various types of discharges relating to electricity production:

- Air pollution due to the emission of CO_2, SO_2, NOx, radioactive waste, thermal discharges, and the visual pollution caused by plumes of steam
- Water pollution due to thermal and chemical discharges

In this document, only the CO_2 aspects are evaluated.

2.2.2.1 Reference scenario

The CO_2 cost for the electricity consumed by Climespace is assessed in accordance with the memorandum dated 8 October 2007 completed by the ADEME and the RTE, entitled "CO_2 content of the electric kWh: comparative advantage of the marginal content and the content according to usage, based on history in France and the 27-member European Union".

The value adopted in this document is the (27-member) European marginal CO_2 content relating to electricity consumption for refrigeration use (§4): **500g/kWh$_e$**

2.2.2.2 Results

Figure 5 describes the results obtained by comparing the development of CO_2 emissions relating to actual electricity consumption levels and the consumption levels established in section 2.2.1.2.

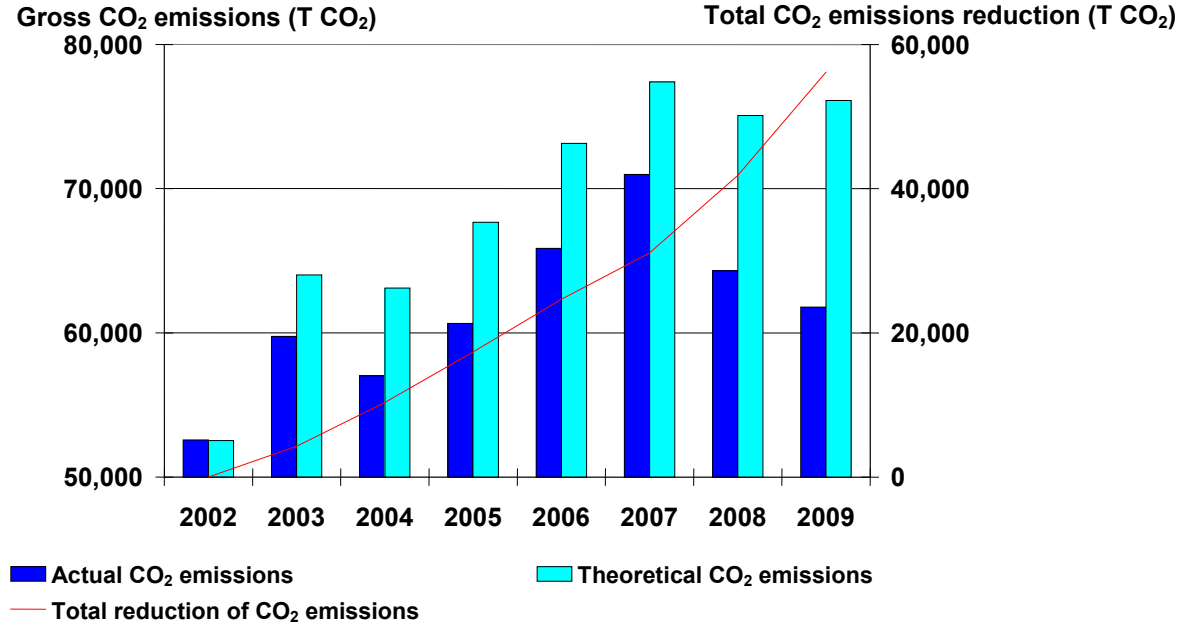


Figure 5 – CO_2 emissions avoided
Comparison between actual CO_2 emissions development (in dark blue) and emissions assumed by the development scenario involving 100% sites with air cooling towers (in light blue) – Total for the CO_2 emissions avoided (in red)

The total reduction in CO_2 emissions relating to the technological choice of cooling using water from the Seine is evaluated as being 56,153 tonnes of CO_2 over 7 years.

2.2.3 Reduction in tap drinking water consumption

By their very nature, chilled water production installations using air cooling towers entail major water consumption levels. In order to optimally manage the public health risks relating to using this type of apparatus, the water used always comes from the drinking water network. The consumption of drinking water involves environmental impacts:

- Due to the increasing scarcity of drinking water resources;
- Due to the consumption of electricity and resources relating to pressurizing the distribution network;
- Due to the oversizing of wastewater collection networks and treatment plants.

2.2.3.1 Reference scenario

Under the framework of a development scenario 100% oriented towards sites cooled by air cooling towers, drinking water consumption levels are simulated using the water consumption ratio recorded in 2002. This ratio is expressed in m^3 of drinking water consumed per MWh_c produced.
The value adopted was $1.68 m^3/MWh_c$.

2.2.3.2 Results

Figure 6 describes the results obtained by comparing the development of actual drinking water consumption levels with the estimated consumption levels for an array of production plants that mainly consists of sites cooled using air cooling towers.

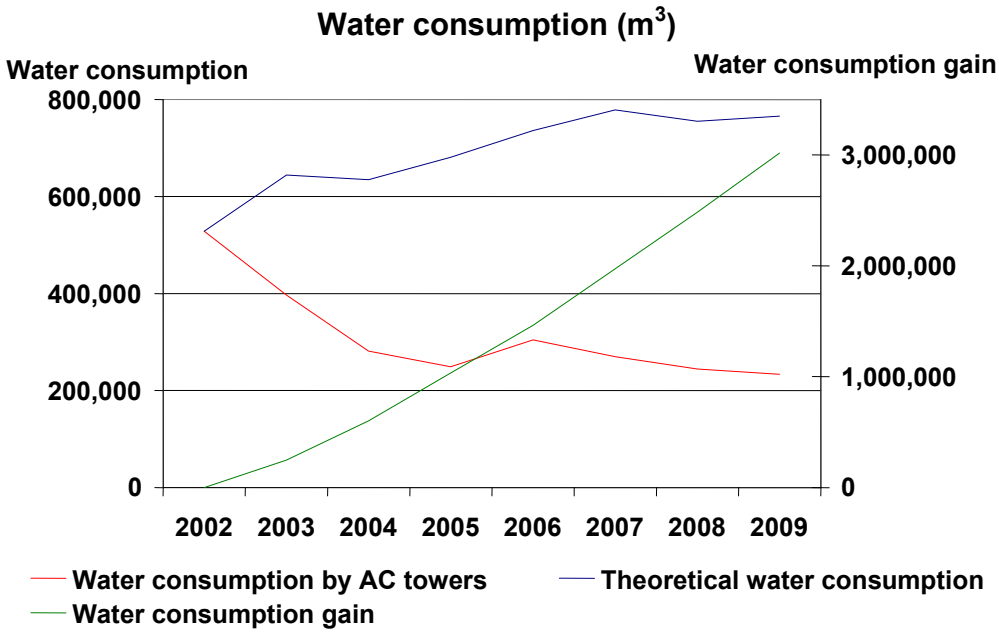


Figure 6 – Drinking water consumption saving
Comparison of developments in drinking water consumption levels (in red) with consumption levels estimated by the development scenario involving 100% sites with air cooling towers (in blue) – total for the water volumes saved since 2002 (in green)

The volume of drinking water saved by the placement into operation of sites cooled with water from the Seine is 3,000,000 m^3 over the 7 years in question.

2.3 Other contributions to reducing the environmental impact

2.3.1 Use of renewable cooling from the Seine

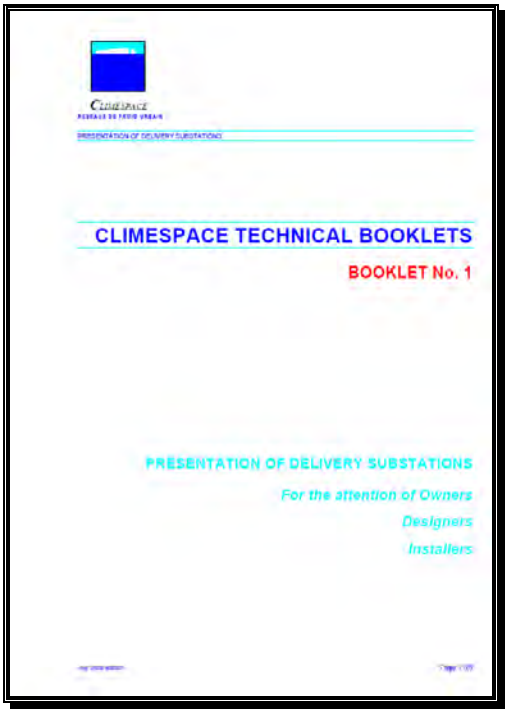
Direct use of renewable cooling available when the Seine's water temperature is lower than 8°C enables a major reduction in the operation of the cooling units and, consequently, a reduction in the electrical energy consumed in winter (from November to March). During the winter of 2008/2009, the electrical energy thus saved for the Tokyo and Bercy sites was 2.8 GWh.
Although this renewable energy volume is proportionally moderate compared to the customers' annual cooling needs. There is a major environmental impact because the peak electrical consumption occurs in winter, at a time when the peak electrical production method is highly polluting (coal/fuel oil/gas).

2.3.2 Advice for customers

Climespace advises its customers, particularly regarding the design and operational phases for cooling installations in buildings. Technical guides have been published for supporting and assisting customers:

Booklet No. 1 -

Presentation of the delivery substation

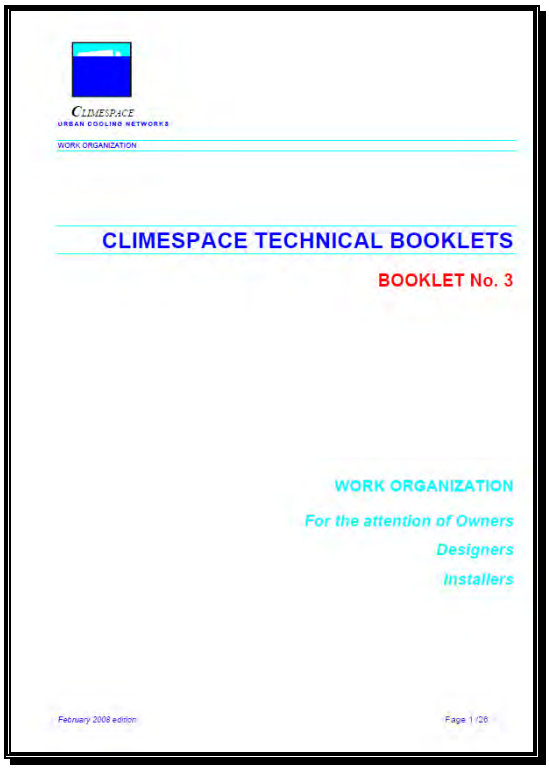


Booklet No. 2 –

Design principles for installations, for the attention of project owners, designers, installers

Booklet No. 3 –

Work organization



Booklet No. 4 –

Installation principles for fan coil units


CLIMESPACE
RESEAUX DE FROID URBAIN
PRINCIPES D'INSTALLATION DE VENTILO-CONVECTEURS
CAHIERS TECHNIQUES CLIMESPACE
CAHIER N° 4
PRINCIPES D'INSTALLATION DE VENTILO - CONVECTEURS
A l'attention des Maîtres d'ouvrage
Des concepteurs
Des installateurs
Edition de mars 2008
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Booklet No. 5 –

Installation principles for high-speed water temperature transmitters


CLIMESPACE
RESEAUX DE FROID URBAIN
PRINCIPES D'INSTALLATION D'EMETTEURS A REGIME ELEVE DE TEMPERATURE D'EAU
CAHIERS TECHNIQUES CLIMESPACE
CAHIER N° 5
PRINCIPES D'INSTALLATION D'EMETTEURS A REGIME ELEVE DE TEMPERATURE D'EAU
A l'attention des Maîtres d'ouvrage
Des concepteurs
Des installateurs
Edition de mars 2008
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Booklet No. 6 –

Examples of Climespace mixed/independent production installations


CLIMESPACE
URBAN REFRIGERATION NETWORKS
INSTALLATION EXAMPLES OF MIXED CLIMESPACE / INDEPENDENT PRODUCTION
CLIMESPACE TECHNICAL NOTES
NOTE No. 62
INSTALLATION EXAMPLES OF MIXED CLIMESPACE / INDEPENDENT PRODUCTION
For the attention of project owners
Designers
Installers
Edition of march 2008
Page 1 /13

Booklet No. 7 –

Energy savings


CLIMESPACE
RESEAUX DE FROID URBAIN
PRINCIPES DE CONCEPTION D'INSTALLATIONS
CAHIERS TECHNIQUES CLIMESPACE
CAHIER N° 7
ECONOMIES D'ENERGIE
A l'attention des Maîtres d'ouvrage
Des concepteurs
Des installateurs
Edition de mars 2008
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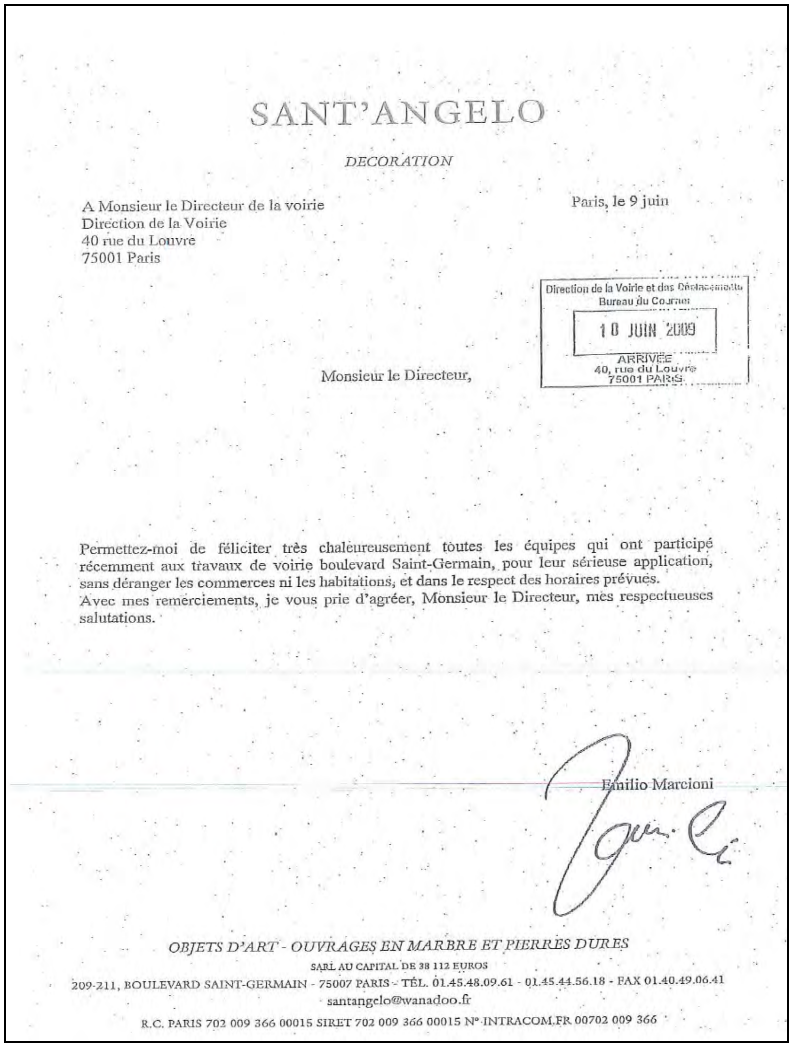
2.3.3 Satisfaction of customers and local residents

Connection of the Ministry of Ecology, Energy, Sustainable Development and the Sea

For Climespace, connecting a building belonging to the Ministry of Ecology is a source of satisfaction with regard to recognition of the environmental advantages provided by our energy solution.

Letter of congratulations from a local resident when major work on the network was being carried out



SANT'ANGELO

DECORATION

A Monsieur le Directeur de la voirie
Direction de la Voirie
40 rue du Louvre
75001 Paris

Paris, le 9 juin

Direction de la Voirie et des Déplacements
Bureau du Courrier
10 JUIN 2009
ARRIVÉE
40, rue du Louvre
75001 PARIS

Monsieur le Directeur,

Permettez-moi de féliciter très chaleureusement toutes les équipes qui ont participé récemment aux travaux de voirie boulevard Saint-Germain, pour leur sérieuse application, sans déranger les commerces ni les habitations, et dans le respect des horaires prévues.
Avec mes remerciements, je vous prie d'agréer, Monsieur le Directeur, mes respectueuses salutations.

Emilio Marcioni

OBJETS D'ART - OUVRAGES EN MARBRE ET PIERRES DURES
SARL AU CAPITAL DE 38 112 EUROS
209-211, BOULEVARD SAINT-GERMAIN - 75007 PARIS - TÉL. 01.45.48.09.61 - 01.45.44.56.18 - FAX 01.40.49.06.41
santangelo@wanadoo.fr
R.C. PARIS 702 009 366 00015 SIRET 702 009 366 00015 N° INTRACOM.FR 00702 009 366

Customers interview

Le meilleur au monde ! ...

CLIENT

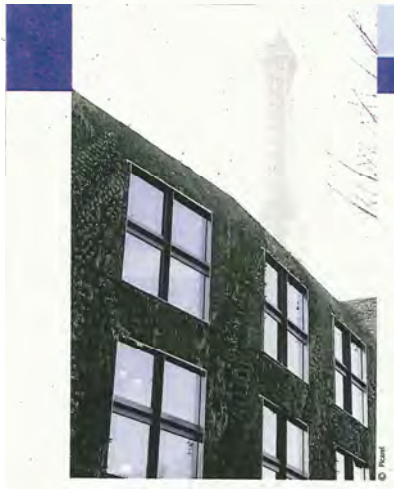
GEORGES V : LE PALACE DES PALACES

Meilleur Hôtel du Monde 2004 pour l'Institutional Investor's et le ZAGAT Survey 2004, Meilleur Hôtel en ville du Monde pour la 4ème année consécutive pour l'Andrew Harper's Hideaway Report 2004, Meilleur Hôtel Européen pour Highlife British Airways. Ce ne sont là que quelques uns des titres prestigieux que collectionne « le Four Seasons George V. »

Son restaurant a 3 étoiles au Michelin Guide 2004 et son Spa vient d'être classé Meilleur Spa d'hôtel en Europe par le Travel & Leisure 2004 ! Le célèbrissime palace parisien appartient au neveu du roi Fahd d'Arabie Saoudite, le Prince Al Walid Ben Talal, investisseur avisé, cinquième fortune mondiale selon le magazine américain Forbes et considéré comme l'un des hommes les plus influents au monde.
M. Martial Ménéghini, directeur technique du palace, souligne que c'est notamment grâce à ses partenaires que cet établissement maintient son rang exceptionnel dans l'hôtellerie de luxe mondiale... Et parmi eux, Climespace.
« Je suis arrivé à ce poste en 1999, poursuit M. Martial Ménéghini, alors que le George V venait de subir deux années de travaux de rénovation. La décision d'opter pour le réseau de froid de Climespace avait donc été prise antérieurement, mais je ne peux que me féliciter de cette option. Cette entreprise est très réactive, ce qui est essentiel à la gestion d'un tel établissement ».

Les 245 chambres, dont 61 suites, du George V, sont climatisées grâce à des ventilo-convecteurs, ainsi que les aires de circulation et les bureaux du personnel. Les salons et lieux publics bénéficient de centrales thermostatiques de traitement d'air, tout comme les trois cuisines.
Le local dédié à Climespace ne prend que 45 m² (au deuxième sous-sol) des 38 000 m² du palace,et ce, pour délivrer 1,6 MW de froid : « Cette discrétion est à tous égards un avantage certain », note M. Ménéghini. Climespace et le luxe font bon ménage...

Climatisation à tous les étages.



CLIENT

Le Musée des Arts premiers

Il a fallu dix ans de réflexion et de travaux pour que s'ouvre, quai Branly, le Musée des Arts premiers, dont le fonds compte déjà quelque 300 000 œuvres.

Un écrin contemporain

L'ensemble, signé par l'architecte français Jean Nouvel (Institut du monde arabe, Fondation Cartier pour l'art contemporain), comprend quatre bâtiments (40 600 m2), dont certains décors ont été réalisés par des artistes aborigènes, venus spécialement d'Australie à Paris pour exercer leur art dont l'origine se perd dans la nuit des temps. Un mur végétal recouvre la partie administrative du musée.
Doté d'un restaurant avec terrasse, d'un théâtre, d'une médiathèque, de salles de cours et de 18 000 m2 de jardin, cet espace de « reconnaissance de la diversité culturelle » s'affirme, a l'orée du 21 ème siècle, comme l'un des hauts lieux de la culture mondiale.

Un somptueux voyage

Dix mille instruments de musique, des sculptures et masques d'Afrique, des

peaux de bison peintes d'Amérique du Nord, des impressions malgaches sur textiles, des statuettes précolombiennes et bien d'autres trésors du passé s'exposent aux côtés de créations plus contemporaines, dans des espaces ouverts et lumineux.
Ce musée apparait comme un écrin de choix où des œuvres trop longtemps ignorées, voire méprisées, trouvent enfin la place qu'elles méritent.
Ce « patrimoine de l'humanité » présenté quai Branly est aussi précieux que fragile. Il faut beaucoup de savoir-faire et d'infinies précautions pour le conserver.
C'est notamment le rôle de Climespace qui assure la climatisation de cet ensemble architectural exceptionnel.

Confort et préservation

Le poste de livraison, d'une puissance de 3 600kW, a été mis à disposition en mars 2005.
La mise en exploitation a eu lieu courant 2006, avec un régime de température secondaire de 7 à 15°C.
Trois échangeurs unitaires de 1200 kW fonctionnant en cascade assurent les besoins de l'ensemble du musée.

© Ratel

Entretien avec M. Jean-Yves Chazal, société Hermès

CLIMESPACE INFO : HERMES est une entreprise réputée dans le monde. Pouvez-vous vous présenter en quelques mots?
Jean-Yves CHAZAL : J'occupe depuis 13 ans le poste de Directeur des Services Généraux chez HERMES. L'un des aspects de mon activité est d'apporter à nos collaborateurs et à nos clients le plus grand confort possible et de bonnes conditions de travail. Pour cela, il faut, pour les uns, des bureaux et locaux aménagés, des liaisons téléphoniques et informatiques. Pour les autres, un accueil ainsi qu'une bonne sécurité. Chacun doit pouvoir bénéficier du chauffage l'hiver et de la climatisation l'été. Chez HERMES, employés et clients sont traités de la même manière.

C : L'immeuble HERMES est situé au 24, rue du Faubourg Saint Honoré, dans le 8e arrondissement. Ses besoins en froid sont-ils très spécifiques?
J.Y. C. : L'une des spécificités des magasins en règle générale et de luxe en particulier est l'importance de l'éclairage. Cela engendre des apports thermiques qu'il faut équilibrer en été et qui nous amène à climatiser même en hiver. Notre rayon « bijouterie », par exemple, utilise la climatisation pratiquement toute l'année. Notre objectif est donc d'avoir une qualité d'atmosphère et une homogénéité de température qui soient optimales, aussi bien dans les ateliers que dans les boutiques.

C : Vous avez décidé de remplacer la production de froid existante par un raccordement au réseau CLIMESPACE. Quelles ont été les raisons de ce choix?
J.Y. C. : Après 25 ans de service, la réfection de nos installations s'imposait, de même qu'un accroissement de puissance. Notre groupe frigorifique fonctionnait plutôt bien et une remise en état complète nous aurait coûté moins cher que la solution CLIMESPACE. Cependant, la perspective de renouer avec les nombreuses contraintes qu'engendre une production autonome - c'est à dire des évaporateurs sur les toitures, du bruit, des tringlages réguliers des canalisations, bref une maintenance très importante - nous a fait pencher pour CLIMESPACE.

De plus, je sais qu'à la production, chez vous, il y a un homme responsable, ancien sous-marinier comme moi, qui nous assure un service de grande qualité. Cet élément a aussi été décisif dans ma prise de décision.

C : L'été se termine. Avez-vous été satisfait du service apporté par CLIMESPACE durant cette période?
J.Y. C. : Oui, vraiment, je suis très satisfait. Cela change la vie. Il n'y a pas eu une seule coupure dans la distribution d'eau glacée.

C : Quels sont les avantages que vous apporte le réseau CLIMESPACE?
J.Y. C. : Souplesse, silence, environnement, esthétique, économie de main-d'œuvre, récupération de locaux. Le moindre m2 est bon à prendre et est le bienvenu. On a pû transformer les anciens locaux techniques en réserves pour le magasin et des bureaux s'installeront prochainement à la place des tours des évaporateurs.
De plus, n'ayant plus le souci de la production, on a pû se concentrer d'avantage sur la distribution pour la rendre plus performante. Interviewez des vendeurs dans le magasin, ils vous diront que c'est très bien! Cet été, ils revenaient plus tôt après le déjeuner pour se mettre au frais!

C : Après un an de climatisation par réseau, avez-vous découvert d'autres avantages ou bien des inconvénients que vous n'aviez pas envisagés?
J.Y. C. : Non. Tout avait été vu au cours d'une étude conjointe avec CLIMESPACE, longue et très sérieuse. On savait qu'on obtiendrait du confort et que cela nous coûterait un peu d'argent. On a même été surpris par les avantages.

C : Quels sont les points importants que vous attendez d'un service comme le nôtre?
J.Y. C. : Régularité de la fourniture, stabilité des températures et possibilité d'augmenter la puissance à tout moment.

2.3.4 Comparisons with independent installations

The operational energy performance characteristics of independent chilled water production installations are often different from the performance characteristics initially expected. The absence of an energy breakdown and operational analysis assessment conceals problems that independent installations have with excessive consumption levels, and the difference in relation to theoretical performance characteristics.
Climespace initiated a performance measuring campaign for independent installations in order to quantify the actual annual average performance difference.
The publication issued at the EEMODS conference in September 2009 (appended) presents a major reduction in the energy performance of independent installations with instrumentation.

2.3.5 Participation in drawing up technical guides and standards

Climespace participates in various professional working groups for drawing up standards (EN 253 pre-insulated pipe/ENxxx the design of air cooling towers) and technical guides:

• The various water cooling processes in industrial and tertiary sector installations (CETIAT (Air Flow and Thermal Industries Technical Centre)/ Ministry of Ecology and Sustainable Development)

• Performance indicators for heating and cooling networks – The Delegated Management Institute and the Association of the Mayors of France

• Guide to good practices in the field of managing cooling systems (Ministry of Ecology, Energy, Sustainable Development and the Sea)

• Technical assessment missions for the Ministry of the Environment concerning mastering the risk of legionnaire's disease (technical opinion, 26 expert assessments of files, regulatory changes)

• Guide on "Treatments for managing the risk of the proliferation of legionella in cooling installations" in 2006.

• National training guide: February 2005.
Completion of a training guide as a help tool for disseminating knowledge (as it stood at the time it was written) about the theme of legionella and cooling circuits.

2.3.6 Participation in professional associations

Climespace's professional commitment to professional bodies is made via the following organizations:

European Federation of HVAC Associations

Federation of Energy and Environmental Services, grouping together 6 professional associations

Association for exchanges between network managers (heating and cooling networks), local bodies, public organizations, industrials, equipment manufacturers, architectural and urban planning consultancies, and users' associations

International Institute of Refrigeration

International Association for District Heating, District Cooling and Combined Heat and Power

A French association bringing together industrials that use high-power water coolers that enable the equivalent of twenty-five million square metres of office space to be cooled.

CEREG

GDF SUEZ

GdF Suez Chilled Water Network Operators Club

2.4 Prospects for increasing energy savings and preserving the environment

The approach undertaken for reducing primary energy consumption is oriented towards the following complementary orientations:

NEW PRODUCTION PLANT COOLED BY THE SEINE

In order to respond to the increase in demand for connections to the district chilled water network, Climespace is seeking a new site near the Seine so that it can establish a production plant. This production plant will be equipped with installations enabling free-cooling in winter and, if there is sufficient volume available, a high-capacity cool water storage unit. A study concerning the environmental impact of the heat on the Seine is currently being carried out Paris-wide in order to limit disruption to the aquatic environment.

RENEWABLE UNDERGROUND COOL WATER STORAGE

Studies will be carried out in order to study the opportunities for storing renewable cool water from the Seine during winter in underground aquifers. This cool water would be drawn on in summer for cooling production plants.

COMBINED HEATING/COOLING PRODUCTION

Opportunities for executing small combined heating/cooling production plants using heat pump installations are being studied. For a long time, the major additional cost in terms of production and the district heating network posed an obstacle to the development of this type of installation. Consequently, making this type of installation financially profitable greatly depends on the cost of primary energy sources and on financial assistance from public bodies.

USE OF BY-PRODUCT HEAT IN SUMMER – STEAM FROM HOUSEHOLD WASTE INCINERATION PLANTS

The Parisian heating network is basically supplied by steam produced by household waste incineration plants. During summer, the excess steam is not used by the heating network. Recovering this heat for the purpose of chilled water production by means of absorption units would enable this by-product waste to be reused. However, the required increase in the cooling power and the low cooling temperature for absorption units limits the creation of this type of production plant.

NB:

All the annual results are given for consecutive years running from September to August.

List of abbreviations

ADEME	Environmental and Energy Control Agency
RTE	French national electricity transmission grid
AC towers	Air cooling towers

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- The Autonomous Port of Paris
- The Ministry of Culture
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