MAIRIE DE PARIS

2007

Quel temps fait-on demain ?

PLAN PARISIEN de lutte contre le dérèglement climatique

PARIS CLIMATE PROTECTION PLAN

Plan to combat global warming

2004 - 2020
-25% LESS GREENHOUSE GASES

planclimat.paris.fr

The world loves Paris and Paris loves the world: our City has chosen to become fully committed to combating climate change, a fully-fledged, global challenge that is putting our future and that of our planet at stake.

Our capital, a pioneer with a Local Climate Plan unanimously adopted by elected representatives in Paris on 1st October 2007, has decided to conduct a bold, innovative and cross-cutting initiative that will have bearing on many key areas, such as transport and travel, urban planning and living conditions.

Our Climate Plan is based on the "factor 4" approach which must lead to a 75% cut in greenhouse gases by 2050. We have to set the example with this target. Paris will therefore go beyond European objectives and go to great lengths to reduce its own greenhouse gas emissions by 30% and the emissions generated by local activities by 25% before 2020.

I wanted the Paris Climate Plan to be the result of both a community expression of views and the thorough assessment of economic players, various local institutions and city administration departments. As such, it bears witness to a strong and collective commitment from Paris and its inhabitants.

These experiments conducted on a local level are valuable, represent real progress and provide new models for national and international action. It is in this way that the more environmentally-friendly, and therefore more human, future of our towns will take shape.

Bertrand Delanoë
Mayor of Paris

Climate change and the oil crisis: today we are facing an environmental crisis of unparalleled proportions and we must come up with concrete action to rise to the challenge.

Since 2001, the City of Paris has undertaken measures to reduce our lifestyle's environmental footprint, particularly as concerns transport. Today, it intends to step its action up a gear through this Climate Plan. It now has a far-reaching action plan together with figure-based targets in many fields: transport, housing, town planning, resource and waste management, food.

Rolling out the Climate Plan will require many projects to be conducted at the same time, involving all players in Paris, and innovation. None of this is impossible. The solutions are there and will enable us to cut our environmental footprint, strengthen social justice in favour of the most vulnerable (the first victims of rising energy prices) and boost the economy by making it more resilient in the face of future crises by creating tens of thousands of jobs. There are countless advantages awaiting us – in terms of savings and excess costs prevented.

By implementing the Climate Plan, the municipality is acting for the planet as a whole, but also for Parisians who stand to come out on top of this necessary transition from an environmental, economic and social standpoint. This transformation will make Paris the first post-oil capital of the 21st century.

Denis BAUPIN,
Assistant to the Mayor of Paris, in charge of Sustainable Development and the Environment

THE PARIS CLIMATE PROTECTION PLAN IN BRIEF

To tackle environmental and global warming challenges, the City of Paris unanimously voted a plan to combat greenhouse gas emissions generated by various activities in Paris: the Paris Climate Protection Plan.
This strong commitment is based on a "factor 4" approach and aims to result in 75% less greenhouse gas emissions from its own activities and those in Paris by 2050 compared to 2004.

Its targets for Paris are very ambitious:
- **25% less greenhouse gas emissions in Paris,**
- **25% less energy consumption in Paris,**
- **25% of Paris's energy consumption to come from renewable energy sources.**

By means of comparison, European targets are -20% by 2020.

When it comes to setting an example, the City of Paris is duty-bound to achieve excellent results in the areas under its direct control. Accordingly, it has set the following targets:
- **a 30% reduction in its 2004 emission levels by 2020**
- **a 30% reduction in the energy consumption of municipal services and street lighting**
- **a 30% share of renewable energies in its energy mix.**

EFFECTIVE IMPLEMENTATION RESOURCES

A Parisian Climate Agency will be founded and will be the City's expertise and development platform, with the role of working with all players in Paris and bringing together initiatives. The agency will incorporate the existing *Espaces Info Énergie* (energy information centres) network that the City undertakes to support and promote. The Climate Club created to draw up the Climate Protection Plan will also be developed on a long-term basis.

AN AMBITIOUS ACTION PLAN FOR BUILDINGS

The City has selected the following overall targets:
- maximum primary energy consumption (i.e. for heating, hot water, lighting, ventilation and air conditioning) for new-build operations of 50 kWh per square metre of net floor area per year, thereby exceeding the standards for France's most stringent BBC (*Bâtiment à basse consommation*) label (for low-energy buildings),
- maximum primary energy consumption for major renovations of 80 kWh per sq. m of net floor area per year. This figure lies within the recommendations of the association Effinergie (promoting low-energy buildings), of which the city is a member.

The City intends to set the standard on its own building stock.

To achieve this:
- it will conduct a thermal audit of its 3,000 public facilities within three years;
- it will launch a plan to renovate its building stock, including the thermal renovation of the buildings, the renewal of heating and ventilation equipment, lowering electricity consumption, improving the management of street lighting, increasing the share of renewable energy in consumption. By acting on these levers, the City plans to achieve a 39% cut in its stock's emissions (excluding transport) by 2020;
- it intends to be particularly efficient for its new-build developments.

While stepping up our drive to increase the energy performance of new-build social housing, an extensive renovation plan for existing social housing in Paris will also be launched. The target is a 30% reduction in greenhouse gas emissions by 2020.
The quarter of the housing stock that consumes the most energy is to be dealt with as a priority. This will require a strong partnership between the national government and the Regional Council and several finance sources must be pooled. The City also strives to promote the renovation of the 100,000 buildings in Paris by 2050. This approach, dubbed the 100,000 buildings plan, calls for cooperation between the national government, the Regional Council and innovative financial partnerships to obtain the necessary resources. Its implementation in the next two years will be based on the first lessons learned from an experimental assistance scheme including energy audits and subsidies for work, concerning 300 buildings and approved by the Paris Council alongside the Climate Protection Plan. Lastly, the City of Paris, the Regional Council, the FFB (French building federation) for the Paris Île-de-France Region, CAPEB (the small builders' trade body) for Paris and the inner suburbs, the Fédération parisienne des SCOP du BTP (Parisian federation of cooperative companies in the building and public works sector) and ANAH (the national housing improvement agency) have decided to draw up a partnership agreement to encourage Parisians to carry out specific, effective work to combat climate change.

ENERGY

In addition to the initiatives planned for its building stock and street lighting, the City intends to exercise its full powers as the granting authority for the public distribution of energy in Paris, with regard to the various concession holders, to cut consumption and increase the share of renewable energy.

Four energy sources have been targeted: electricity, gas, district heating and cooling networks.

The City also proposes to create an energy management assistance fund to combat energy insecurity in addition to what is provided as part of the FSL (social housing fund).

URBAN PLANNING

The City of Paris will apply the general objectives of the Climate Protection Plan in all its operations and is already targeting carbon neutrality for its major development operations.

Several operations bear witness to this ambition: Pajol, Clichy-Batignolles, Gare de Rungis, Boucicaut, Claude Bernard, Fréquel-Fontarabie.

The agreement on a 20% bonus on the *Coefficient d'Occupation des Sols* (land-use coefficient) was been incorporated in the Climate Protection Plan as part of the PLU (local urban-planning plan) to construct very energy-efficient housing or buildings with renewable energy production facilities (solar or photovoltaic panels, heat pumps, etc.).

TRAVEL AND TRANSPORT

The Climate Protection Plan includes measures recommended in the Paris Transport Plan that must bring about reductions in the greenhouse gas emissions from Paris traffic in particular.

The City intends to set standards for transport and municipal travel.

By setting up a *Plan de Déplacement de l'Administration Parisienne* (a travel plan for City of Paris staff), it furthers its action undertaken on its fleet of vehicles: reducing the number of vehicles, using more energy-efficient vehicles that consume less fuel and pollute less, using hybrid or electric vehicles.

CONSUMPTION AND WASTE

The City has undertaken a responsible procurement approach that aims to purchase the most "eco-responsible" products, facilities or services (recycled, recyclable, efficient, "clean"), to manage supply stocks and equipment as efficiently as possible (no wastage, making products last) and to advise departments, users and elected representatives on the best "sustainable" practices.

At the same time, the City has developed waste screening at source in all districts. As part of the Climate Protection Plan, it is targeting a 15% reduction in Paris's waste production by 2020.

This target involves changing consumer habits, continuing to develop waste sorting, promoting a culture of re-use, improving professional practices and an improved recovery of waste. SYCTOM, the company in charge of processing waste from Paris and its outskirts, will also develop waste methanisation projects. Lastly, the City of Paris would like to act before the distribution of oil-based plastic bags is banned, set by regulation for 1 January 2010, by drawing up a charter with the relevant professionals.

ECONOMIC ACTIVITIES

The fight against climate change is a significant source of job creation in the building, energy, lighting, refrigeration and property sectors.

In partnership with the economic players and their professional bodies, the City of Paris will foster economic activity and boost job creation concerned by the fight against climate change: a partnership agreement with the building sector, a business centre for companies in the sector with a view to displaying innovative construction and energy management techniques, the creation of a business incubator dedicated to the eco-industries, support for the social and welfare economy related to this issue, etc. The City also proposes to work with tourism, transport, hotel and catering professionals to work towards sustainable tourism (with in particular the idea of a voluntary fund to finance sustainable development projects, aimed at offsetting greenhouse gas emissions related to air travel).

HELPING PARIS TO ADJUST TO CLIMATE CHANGE

In addition to the initiatives planned to cut greenhouse gas emissions, the backbone of the Climate Protection Plan, a strategy to help our society adjust to climate change is necessary. Examples are the heat-wave plan, adapting buildings, planting Paris (i.e. creating green areas, roof and wall gardens and community gardens), the flood prevention plan and carbon offsetting.

AWARENESS-RAISING/ COMMUNICATION PLAN

To bring about deep-rooted changes in habits and develop a genuine shared culture of the energy and eco-citizenship challenges, all the City's communication media will be used internally, geared towards its 46,000 employees, and externally towards Parisians.

PRIZES

The City proposes to draw up a charter of best practices with companies who so desire to limit their greenhouse gas emissions. It will enable users to identify those who are taking a proactive approach to combating climate change.

A Sustainable Development – Corporate Section - prize was created in 2007 for very small and medium-sized companies. It already incorporates criteria regarding the fight against climate change. The City has also decided to create a "Factor 4" prize based exclusively on climate change criteria, aimed at rewarding particularly effective achievements.

THE CITY OF PARIS'S COMMITMENT

In June 2005, the City of Paris decided to draw up its first local climate protection plan. Climate change, a global challenge for civilisation today, requires the introduction of innovative policies. This initiative follows on from transport, town planning, housing and environment policies already implemented by the city administration. Like the Local Town Planning Plan and the Paris Transport Plan, the Paris Climate Protection Plan, will be included in the Local Agenda 21 (a programme setting out each local authority's specific sustainable development initiatives) currently being compiled by the city administration. The City of Paris's initiative - which is, as it should be, exemplary – falls within a broader regional and national policy for cities. To obtain optimum results in greenhouse gas emissions reductions, policy decisions taken by the city administration will need to be aligned with those of the Ile-de-France region, the State and the European Union. Likewise, the city administration should enlist the help of all of the local players to define incentives and coordinating measures: the prefecture, public services, inter-municipal syndicates (SYCTOM, SIAAP), CCIP (the Paris Chamber of Commerce and Industry), Aéroports de Paris (the airport authority for the Paris region), RFF (France's railway infrastructure manager), SNCF (France's national railway company), RATP (the public transport authority for the Paris region), AP-HP (Paris's hospitals authority), businesses, banks and so on.

FROM THE PARISIANS' WHITE PAPER TO THE PARIS CLIMATE PROTECTION PLAN

The city administration's commitment must be seen in context. The scientific community established proof of climate change in 1986. The Rio convention adopted in 1992 stated the need to coordinate efforts on fighting climate change. The Kyoto protocol set France the target of stabilising its emissions between 1990 and 2012. International talks are now under way on a third treaty, which it is thought will be concluded in 2009 and which will set targets for the period through to 2020. In March 2007, the European City administration announced a target 20% reduction in greenhouse gases, which has yet to be divided up among the Member States.

Quite apart from international decisions and national and European policies, local authorities have a key role to play in combating climate change. Through their decisions to construct buildings and transport infrastructures, they contribute to the country's long-term development. They also have a close relationship with the ordinary citizens whose everyday practices (in areas such as heating, food, travel and purchases) are responsible for 50% of the country's emissions.

THE CITY OF PARIS IS WELL AWARE

that no significant progress will be made in combating climate change unless society as a whole is involved. Accordingly, it has engaged institutions, the business community and civil society (citizens living or working in Paris) in an innovative consultative approach, the results of which are set out in a *White Paper.*

This ambitious initiative was made up of different components:

Information campaign

- From June to October 2006, an extensive information campaign was held in the form of a public exhibition in the Bagatelle gardens, entitled *"Énergies mode d'emploi : le Paris du 21e siècle"*. The exhibition, which attracted 100 000 visitors, presented concrete solutions for tackling the climate change challenge.
- In autumn 2006, a section on climate change was added to the City of Paris's web site. Nearly 250 posts have since been received, with ideas on how to fight global warming. They provided direct input for the theme-based consultation workshops. Local community city administrations (*Conseils de quartier*) and associations were also given the opportunity to volunteer contributions online via the City of Paris web site.
- From June 2006 to January 2007, lecture-discussions were held in all the local (*"arrondissement"*) town halls within Paris that so desired. Over a thousand people turned out to suggest and discuss proposals for combating global warming at a local level.

Theme-based consultation workshops as a basis for the White Paper

- In autumn 2006, the city administration ran consultation workshops on eight major areas with a direct impact on climate change, namely buildings, economic activity, passenger transport, goods transport, responsible purchasing, consumption and waste, cooperation, adapting to climate change, and education, awareness raising and training. The workshops were given emission quantification data for each sector, based on the carbon audit (*Bilan Carbone™*) carried out by the city administration in 2006.

There was a regular attendance of 234 people. They included some one hundred volunteer citizens (who had registered either via the City of Paris web site or by calling 3975), as well as key local players and representatives from the Paris City Council (combined city administration for the City of Paris and the wider Paris region), City of Paris services and the business community. In all, the workshops clocked up around a hundred hours of group work, during which participants examined and discussed all the possible means of achieving the target set by the July 2005 Act, namely to reduce France's greenhouse gas emissions by a factor of 4 by 2050. At the closing session on 15 January 2007, participants reported back to the Mayor of Paris on their work. Throughout the consultation process, workshop reports and discussion summaries were posted on the city administration's web site.

- The direct outcome of this broad-based consultation was the drafting and publication of the Parisians' White Paper on Climate: the first step in a process of mustering support to fight climate change. The Parisians' White Paper on Climate sets out a shared vision of the areas for action. The Paris Climate Protection Plan reflects the city administration's commitment in response to this community expression of views. Not all of the proposals have been taken up. Some need further development after additional analysis and consultations with the different local players, and fresh ideas will also have to be found at a later stage.
- A smaller body, known as *Club Climat*, was also set up to enable regular meetings with the various players that have supported the city administration in this process (public institutions, transport organisations, banks, building industry professionals and so on).

In the Climate Protection Plan, the city administration has set out

the initiatives it intends to undertake in its own specific sphere, answering strong demand in the White Paper for the city administration to take an exemplary role.

It also lays down policy guidelines for organising the area it administers and involving local players. The Plan includes ongoing initiatives in the areas of transport, waste and environmental quality, which have already been treated as priorities for reducing greenhouse gas emissions. The Paris Climate Protection Plan is the first stage of a long process, under a common "factor 4" strategy. It is an ambitious, committed document that sets the targets, stakes and conditions for success.

The city administration has committed itself

not only in the areas in which it can intervene directly but also in its role as organiser and leader of the area it administers. The plan accordingly sets out a number of initiatives that will be implemented by other players (business and institutional players, citizens, etc.) but which are essential for achieving the "factor 4" target.



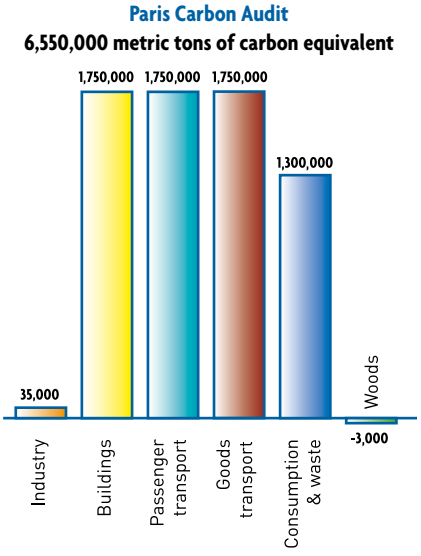
THE CITY OF PARIS'S COMMITMENT

PARIS GREENHOUSE GAS EMISSIONS AUDIT

As preparation for drawing up a climate stabilisation strategy, the City of Paris launched a study in 2004 to calculate the amount of greenhouse gases emitted by its own services and the different players located in the Paris region.
Paris is the first major city to test and pilot the carbon calculator, Bilan CarboneTM, developed by ADEME (the French agency for environment and energy management) to calculate the greenhouse gases emitted by a local authority and the area it administers.

• Carbon footprint, visitors excluded

The audit provided a deeper understanding of the Paris region's environmental impact and helped planners rank and focus ideas for developing the Climate Protection Plan. Setting aside tourism, three sectors are responsible for 80% of the Paris region's carbon footprint: energy consumption in buildings, passenger transport and goods transport.



• Buildings: 1.75 million tCe, or 6.4 million tCO_2e*

Buildings in Paris use close to 35 000 GWh of power a year, equivalent to the annual output of four nuclear power stations. This total embraces the energy consumption of residential, tertiary and commercial premises (for heating, electricity and hot water production). This substantial figure of 6.4 million tCO_2e [1] is due in part to the fact that the buildings in Paris are generally old and poorly insulated, resulting in high energy consumption. The tertiary sector is another big user of energy for heating, lighting and now air conditioning.

• Passenger transport: 1.75 million tCe, or 6.4 million tCO_2e

The transport sector, being heavily oil-dependent, is a high-greenhouse-gas-emitting sector. Transporting Paris's residents, workers and people in transit (including by air) generates 6.4 million tons of CO_2, despite an extremely dense and efficient public transport network (including taxis) that emits only 100 000 tons of carbon (367 000 tCO_2e) for the 3 billion people it transports per year.

• Goods transport: 1.75 million tCe, or 6.4 million tCO_2e

Every year, over 30 million tons of goods enter or leave Paris. Transporting goods that are either used in Paris or transit through its logistics platforms generates over 6.4 million tCO_2e. This estimate includes emissions generated directly from the supply point, which is often a long way away from Paris.
In addition to the above, there are also emissions from other activities.

• Consumption and waste: 1.3 million tCe, or 4.8 million tCO_2e

This item includes emissions resulting from the manufacture or production of all manufactured or food products consumed by Parisians, as well as disposal of the waste they generate.

Unfortunately, for figures in this area to be absolutely accurate, we would need to hold data on the full range of products consumed by Parisians (food, home appliances, furniture, computer and electronic equipment, etc.), along with an audit of the greenhouse gas emissions entailed in producing each of these products. Because such a complete set of figures is not available, this item is probably underestimated. Even without these missing figures, emissions came to 4.8 million tCO_2e.

• Other items: 0.035 million tCe, or 0.13 million tCO_2e

The "industry" item is extremely low. Only one Parisian industry is registered in the Plan National d'Allocation des Quotas de CO_2 (the national CO_2 allowance allocation plan), namely Compagnie Parisienne de Chauffage Urbain (CPCU). This is a steam network operated as a concession from the city administration and which supplies district heating to 400 000 Parisian homes. Its emissions are low because it produces heat by incinerating household waste and at two cogeneration plants, thereby reducing its consumption of fossil energy and increasing the network's efficiency.

Paris's woods also constitute two 3 000 tCe carbon sinks, as plants absorb carbon dioxide out of the atmosphere through photosynthesis. Parks and gardens are deemed to be carbon neutral because the emissions entailed in their upkeep are offset by the emissions absorbed by the plants they contain.

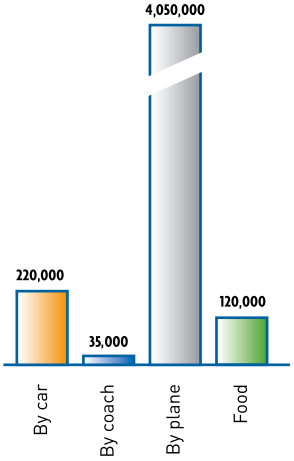
** The standard measurement used by ADEME for calculating carbon footprints is carbon. Greenhouse gas emissions can be expressed in either tons carbon dioxide equivalent (tCO_2e) or tons carbon equivalent (tCe). One mole of CO_2 weighs 44g and one mole of carbon weighs 12g, so to convert carbon equivalents into CO_2 equivalents, we multiply the carbon figure by 44/12.*

The carbon audit of the Paris region takes into account all emissions generated by all activities. Paris, as the capital of France, also attracts large numbers of visitors for business or leisure. Tourism is the capital's foremost business sector.

- **Visitor-generated emissions: 4.4 million tCe, or 16.2 million tCO_2e**

The so-called visitors sector is the highest greenhouse-gas emitter, as a large percentage of visits are made by plane, the means of transport that generates the most greenhouse gas emissions. A trans-Atlantic return trip by plane, for instance, emits roughly as much greenhouse gases as one year's daily use of a car. Once in Paris, over 80% of visitors use public transport for their travel requirements. The greenhouse gas emissions generated by visits by car or coach remain more modest. For want of the relevant data, it was impossible to calculate the share of greenhouse gas emissions attributable to visits by train, but it is very small, given the emission ratio of this type of transport. The purpose of calculating the emissions associated with food was simply to indicate an order of magnitude for the emissions resulting from visitors' food consumption.

Evaluation of visitors
4,425,000 metric tons of carbon equivalent

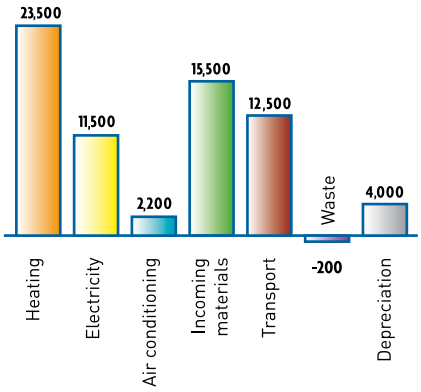


CARBON AUDIT OF THE CITY OF PARIS ADMINISTRATION

A carbon audit was carried out on the services administered by the City of Paris and naturally took into account all municipal buildings, including town halls, administrative buildings, schools, crèches, welfare services, sports facilities, city administration vehicles, parks and gardens, and so on.

A total of 253 000 tCO_2e are emitted annually by municipal services.

Carbon Audit of the City of Paris administration
69,000 metric tons of carbon equivalent



Half of these greenhouse gas emissions stem from building usage, i.e. heating, hot water and electricity. Next come materials and equipment acquired by the city administration (the production and transport of which entailed greenhouse gas emissions), then the city administration's technical and service vehicles. Three other sources of emissions are of lesser importance: emissions resulting from the construction of buildings and facilities (the total is broken down over the duration of usage), building air conditioning (which is increasingly widespread), and waste management.

THE CITY OF PARIS AND THE "FACTOR 4" TARGET

France first committed itself to reducing greenhouse gas emissions in 1992 when it signed the Rio convention. However it was only after the Kyoto Protocol (1997) that the means of actually achieving this goal, sector by sector, were set out in the *Plan National de Lutte contre le Changement Climatique* (PNLCC, the national Climate Protection plan) in February 2000. Successive updates of the Climate Protection plan between 2004 and 2006 incorporated the following major policy directions, designed to enable France to first stabilise its greenhouse gas emissions at their 1990 level through to 2010.

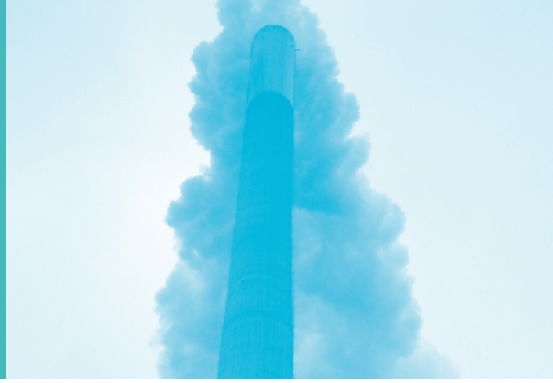
Encouragement for local authorities to implement local climate protection plans.

This was as yet only an incentive measure, with no regulatory force and no prescribed method or scope. This initial pilot phase allowed ADEME and a number of local authorities, including Paris, to develop the carbon auditing methodology. It soon became apparent that local authorities in fact have a central role to play in efforts to combat climate change.

Resumption of a progressive tightening of regulations on greenhouse gas emissions, particularly in the new-build sector

Following the first oil shock in 1973, the government introduced thermal regulations designed to curb energy consumption in new buildings. In 1988, though, falling oil and gas prices and a production overcapacity in electricity prompted the government to put a halt to the gradual progression in requirements. Thermal regulations also saw their credibility undermined by the lack of a State-run control system. The PNLCC set the process in motion again by instituting a new set of

1. In the Paris Climate Plan, greenhouse gas emissions have been calculated in terms of tons carbon dioxide equivalent (tCO_2e). Emission totals therefore include not only emissions of CO_2 but also emissions of the other five greenhouse gases covered by the Kyoto Protocol, i.e. methane, nitrous oxide and three fluorinated gases.



THE CITY OF PARIS'S COMMITMENT

thermal regulations in 2000 and, most importantly, officially stipulating that, from then on, the regulations would be made more stringent every five years. Thermal regulations are now defined in terms of a regular calendar, providing a continuous, planned, foreseeable progression and incorporating regular input from research and consultations with industry players. For the first time in France, the next set of thermal regulations, due for introduction in 2010, will set targets for major renovations of old housing and tertiary buildings. The same type of regular build-up in requirements was used in the European "Euro" emission standards to reduce air pollutant emissions in new vehicles.

2005 THERMAL REGULATIONS

There has been much talk of the RT2005 thermal regulations. These regulations, which were laid down by the Ministry for Public Amenities and Housing in 2005, capped annual primary energy consumption per square metre in new constructions. The new limit concerned heating, hot water production, ventilation, lighting and, if applicable, air conditioning. For the climate zone in which Paris is situated, annual consumption is capped at 130 kWh of primary energy (i.e. energy in its naturally-occurring form: crude oil, gas, etc.).

Analysis and planning on the level of long-term targets required for climate stabilisation

The only way to stabilise the earth's climate will be to ensure that human activities do not release more greenhouse gases into the atmosphere than the ecosystems (primarily oceans, vegetation and soil) are capable of absorbing. This quantity is estimated at around 7 billion tons of carbon dioxide equivalent per year. If we compare this with the fact that the earth's population is currently in excess of 6 billion and expected to level out at 9 billion towards mid-century, the logical conclusion is that the tolerable level will have to be less than one ton of CO_2 emitted per person. At current rates, an African or an Indian generates emissions of 1 tCO_2e per year, while a European generates 10 and a North American close to 20. Scientific debate on the issue has set France an initial target of cutting emissions from 8 tCO_2e per inhabitant to 2 tCO_2e by 2050, i.e. a fourfold reduction. This is the "factor 4" set for 2050 and now laid down in French law (Energy policy programming and orientation act of July 2005). We should be aware, therefore, that the next half-century will mark a profound change in our civilisation.

Attaining these goals is not only vital for the planet but in the economic interest of us all. Sir Nicholas Stern, former chief economist of the World Bank, made a compelling case for this point in a report presented to the British prime minister at the end of 2006. The report showed that investing 1% of GDP today in stabilising emissions can save the 7% to 20% of GDP likely to be lost because of the severe recession caused by climatic disasters.

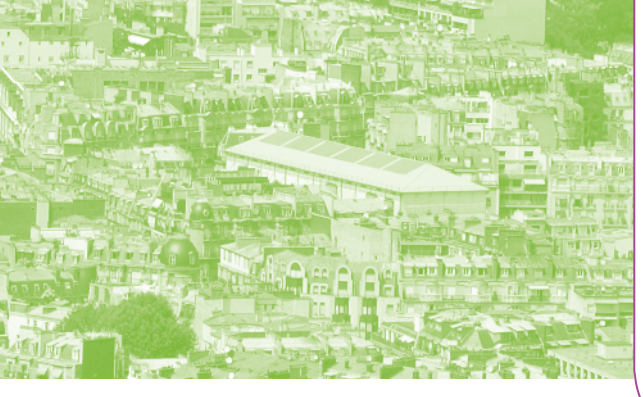
A WORRYING ENERGY CONTEXT

The development of the Paris Climate Protection Plan should be seen in the light of rising energy prices. Oil prices are currently fluctuating between $60 and $75 a barrel. The price of natural gas – widely used for heating in Paris – is indexed on the price of oil. Electricity prices have risen also, mainly because of the end of Europe's production overcapacity and liberalisation of the market.

Strong global demand, especially from emerging countries, should continue to push energy prices up, while the world's oil resources diminish. Oil reserves built up in the subsoil over millions of years will be increasingly sought after. Moreover, the time is coming when the new oil deposits coming into production will no longer be able to offset the depletion of already tapped deposits (a phenomenon known as Hubbert's peak). This tailing off is already evident in North Sea deposits, for example.

The areas worst hit by rising energy prices are heating and transport. It is a context that severely disadvantages low-income families, but which will have to be taken as lasting in the future.

This backdrop of high-priced energy does, however, generate a more virtuous dynamic, in which economic interests and environmental protection coincide. When energy prices are low, short-term economic interests foster negligence, a faster depletion of rare resources and worse environmental damage, thereby running against general, long-term interests and especially protection of the climate.



MAIN OBJECTIVES OF THE PARIS CLIMATE PROTECTION PLAN

The City of Paris has committed itself to a "factor 4" approach with the aim of reducing total emissions in the area it administers and from its own specific activities by 75% of their 2004 level by 2050.

When it comes to setting an example, the City of Paris is duty-bound to achieve excellent results in the areas under its direct control. Accordingly, it has set the following targets:

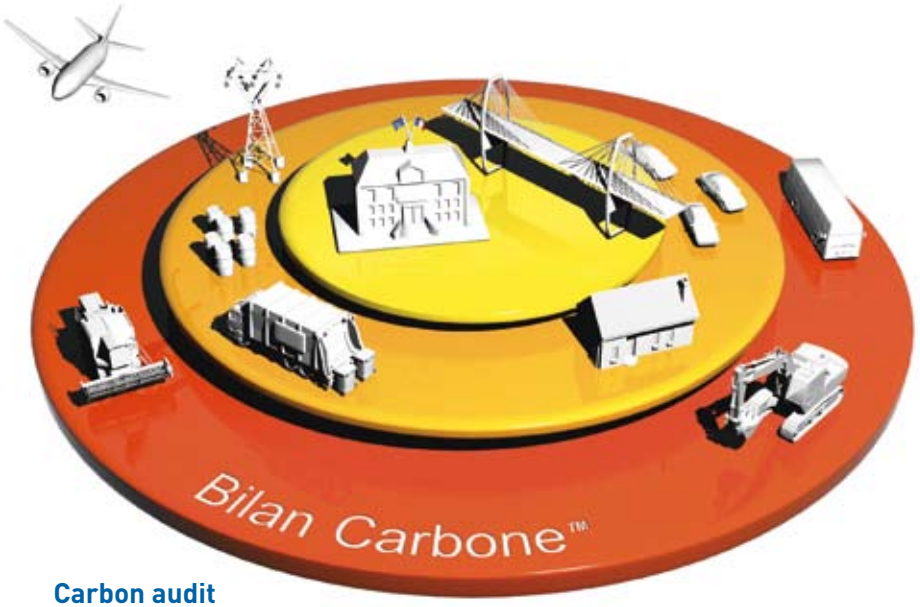
- **a 30% reduction in its 2004 emission levels by 2020.**
- **a 30% reduction in the energy consumption of municipal services and street lighting.**
- **a 30% share of renewable energies in its energy mix.**

For the Paris region as a whole, the Paris Climate Protection Plan intends to surpass the European targets. It is aiming for the following targets by 2020:

- **a 25% reduction in the region's emissions, by comparison with the 2004 levels.**
- **a 25% reduction in the region's energy consumption, by comparison with the 2004 levels.**
- **a 25% share of renewable energies in the region's energy mix.**

The proposed measures will be adapted to suit each sector, taking into account the City of Paris's three levels of responsibility, as set out below:

- **Paris as a model city, for the areas under its direct responsibility**
- **Paris as the organiser and developer of the region it administers, and a driving force to encourage other local players**
- **The essential role of the State and the other institutional levels in ensuring the success of the Paris Climate Protection Plan.**



Carbon audit

BUILDINGS AND PUBLIC AREAS

01

The housing and tertiary built environment is responsible for 27% of greenhouse gas emissions in Paris, mainly through heating. Proven techniques for reducing these emissions exist and should gradually be brought into general use. There is one drawback, though: this is a sector where change is very slow and the life expectancy of a new construction lies between 50 and 100 years, if not longer.

TRANSFORMATION OF THE PARISIAN BUILT

The right policy will therefore be a blend of raising construction quality, renovating the existing built environment, upgrading energy facilities and improving end-user behaviour.

NECESSARY EVOLUTIONS IN REGULATIONS AND JOB SKILLS

- **In addition to supporting research,** government action across the board has consisted primarily in regulating new construction, with increasingly stringent requirements regarding energy efficiency and the use of renewable energies. The improvements made in new constructions were then extended to renovations of the existing building stock.
- **From an economic point of view,** one of the key stakes lies in the initial quality of the construction: the aim is to make a sustainable investment that reduces spending on energy consumption throughout the building's lifetime;
- **The banking sector has a decisive role to play in achieving success.** The tripling of oil and gas prices since 2003 is another reason for acting swiftly;
- **Advances in construction** are only possible if they involve all of the building trades. In other words, they also entail negotiation and training.

The construction industry has the following characteristics:

- **It is a decisive social stake:** low-cost solutions must be found so that higher-quality construction does not become a factor for social discrimination.
- **Building construction, maintenance and management** is a sector in which major groups work alongside small businesses. Care must be taken to ensure that the necessary technical advances do not lead to small businesses being squeezed out of the industry, but go hand-in-hand with skills development.

CARRY OUT CHANGES WHILE CUTTING COSTS

Over-spending on the shift to energy-efficient, low-greenhouse-gas-emitting buildings must be curbed so that it does not become a factor for social discrimination. In practice, there are two sorts of over-spending:

- **First, over-spending on design.** Design costs are high in the learning phase, but decrease as experience is gained.
- **Second, over-spending on the new,** more efficient materials and equipment required. These costs are initially high, pending mass production.

Both forms of over-spending disappear almost entirely once expertise reaches maturity. This aspect makes it even more worthwhile for public authorities to take the bold step of initiating an order, stabilising a new technological offering and making technical knowledge widely available. The additional cost entailed in building a standard home in 2000, compared with 1974, has been estimated at 5%; on the other hand, the average energy consumption for heating a new home has been divided by 2.5. It took five successive sets of thermal regulations to bring about this gradual process.

The right policy will therefore be one that combines support for research and innovation, increasingly high quality standards in building regulations, and their adoption by all of the trades in the chain, from design to construction and from management to maintenance.

Unfortunately, France is clearly trailing behind other countries in this area. The gap, which widened in the 90s, stems from a halt in the improvement measures undertaken by the French government. For want of a satisfactory legal framework, the regional authorities were unable to step in and compensate for the interruption.

In concrete terms, it is important for the City of Paris to be strict in its application of the national thermal regulations and make a determined effort to help reinforce future national regulations by coming down on the side of the innovators and acting as a driving force behind industry professionals in this quality initiative.

THE CITY OF PARIS WILL REVIEW

the Paris Climate Protection Plan every five years and, in view of the latest regulatory context, decide what further measures can be taken, given the specific features of the situation in Paris and the possibilities open to industry professionals.

The compactness of Paris's built environment, the availability of district heating and the ability of a large percentage of users to bear additional short-term investments are certainly very positive points. However the very high land costs – and hence purchase prices – in Paris may nevertheless curb propensity to pay the additional costs entailed in higher construction quality.

TRANSFORMATION OF THE PARISIAN BUILT

SYSTEMATICALLY USE THE TOTAL-COST APPROACH IN PRE-DECISION ANALYSIS AND PLANNING

To facilitate the achievement of these objectives, the City of Paris has decided to adopt the "total cost" method, which factors in all of the long-term running costs when calculating project purchase or investment costs. The costs factored in under the total cost method concern: the investment, payroll expenses and utilities (energy, water, etc.), upkeep and major maintenance, equipment end-of-life costs and waste management costs.

The total cost method implies coordination and exchanges of information between the different departments and with the district ("arrondissement") town halls within Paris, to obtain an overall view of the gains and costs associated with an operation.

The city administration wants to take into account, right from the design phase of a municipal project, both the long-term general benefit and the interest of the public administration according to prudential rules, by factoring in all costs and an estimation of what those costs will be in the future. This sort of method is in keeping with the January 2005 recommendation of the Commissariat Général au Plan (France's strategic analysis and planning body), which recommends taking sustainable development into consideration in public-sector decision-making.

To this end, the city administration will adopt a total-cost-based costing method for the 2008 budget, which will serve as a framework for any new project drawn up either internally by city administration departments or externally by commissioned companies.

It will factor in:

- A lower discount rate than the one currently in use, so as to avoid passing a portion of the expenses on to future generations;
- An adjusted energy price (future price growth rates are to be determined after consultation with experts and regular re-evaluation);
- A value per ton of carbon emitted that takes into account trends in the carbon market.

Later, the city administration will look into how to incorporate additional data that is more difficult to estimate, concerning specific project externalities. The main such externalities to be factored in include damage caused by air pollution, the health repercussions and management of residual waste, and job creations. The city administration will gradually factor in these externalities, on the basis of authoritative reports and expert opinions, after transferring their conclusions to its particular conditions. This additional data could gradually be incorporated into total-cost analyses.

THE CITY ADMINISTRATION'S THREE ACTION AREAS WITH REGARD TO BUILDINGS

City administration policy will consist in adapting the above-mentioned general policy directions to the following action areas:

- The municipality's own building stock;
- The city administration's social housing policy;
- The Parisian building sector as a whole, whether residential or tertiary and whether new or old, by giving it fresh impetus.

OVERALL PROGRESS TARGETS FOR IMPROVING ENERGY EFFICIENCY AND REDUCING GREENHOUSE GAS EMISSIONS

The city administration has set itself the following targets:

- To extend the "factor 4" approach to the entire building sector by 2050.
- To set itself interim targets for 2020 on the way to achieving its "factor 4" targets, in keeping with EU targets and international climate talks (second commitment period in the Kyoto Protocol). This means undertaking exemplary projects for new-build and major renovation operations, using the best techniques available right from day one.
- To cap primary energy consumption (i.e. for heating, hot water, lighting, ventilation and air conditioning) for new-build operations at 50 kWh per square metre of net floor area per year, thereby exceeding the standards for France's BBC (*Bâtiment à basse consommation*) label (for low-energy buildings).
- To cap primary energy consumption for major renovations at 80 kWh per sq. m of net floor area per year. This figure lies within the recommendations of the association Effinergie (promoting low-energy buildings), of which the city is a member.

The only exceptions to the above targets will be where an independent engineering firm has shown that it is technically impossible to attain them.

ENERGY STAR

effinergie

PARIS: SETTING AN EXAMPLE WITH ITS BUILT ENVIRONMENT

Target: a 39% reduction in emissions by 2020.

The City of Paris will undertake a comprehensive plan embracing construction quality, thermal renovation, energy efficiency, the development of renewable energies and green roofs.

A lot is at stake here, as the municipal built environment comprises nearly 3 000 facilities, as well as street lighting and signposting on 1 700 km of streets. Their energy consumption – nearly 850 GWh – is responsible for generating 128 300 tCO_2e of greenhouse gas emissions, making them the leading source of emissions among the city administration services. The municipal building stock (2.5 million sq. m) consists primarily of old buildings dating from before the first set of thermal regulations in 1974.

It will be an arduous task to attain a "factor 4" reduction in greenhouse gas emissions (by comparison with the 2004 emission levels) in the municipal building stock by 2050. To help it reach its ultimate target, the City of Paris is committed to reducing greenhouse gas emissions from its built environment by at least 30% (by comparison with 2004) by 2020.

There are three possible levers for mitigating their impact: reducing consumption levels (through awareness raising, insulation, etc.), improving energy efficiency (of facilities, equipment, etc.) and using renewable energies. It goes without saying that, for sustainable development reasons, electricity consumption will have to be curbed so as to limit the amount of radioactive waste produced.

BY USING ALL THREE OF THESE LEVERS,

the city administration can hope to reduce emissions from its buildings by up to 39% by 2020.

AWARENESS RAISING: THE MOST IMPORTANT MEANS OF REDUCING EMISSIONS

Target: a 5-10% reduction in emissions by 2020 (= 6 000 tCO_2e)

Whether on the scale of the whole of Paris or simply within the City of Paris, awareness raising programmes are the most important means of lowering energy consumption and the emissions resulting from simple, everyday habits. The city administration will run a permanent information campaign, which, according to national figures, could reduce consumption by 5-10%, depending on the purpose for which the energy is used. Displaying building consumption figures, which is now a legal requirement, will help raise awareness and inform people and promote openness, good management and exemplarity.

AN ENERGY AUDIT FOR EACH CITY ADMINISTRATION FACILITY

The amount of energy a facility uses (for heating, ventilation, air conditioning, lighting, and electrical appliances) varies greatly according to the purpose it serves (swimming pool, crèche, offices, school, etc.), the date it was built and its layout (a detached building or part of a block). Beginning in 2008, the City of Paris will carry out an energy audit of all of its facilities to gain a deeper insight into their energy consumption. The operation has been scheduled over three years.

FIRST OF ALL, THE AUDIT WILL SATISFY THE REQUIREMENTS OF THE DECREE OF 19 MARCH 2007,

which obliges every establishment receiving members of the public to display its energy performance at the entrance. Once aware of where energy is being lost, city administration services will be able to budget for the renovations required by 2050 in order to achieve the "factor 4" target, based on their energy, environmental and economic benefit.

PARIS: SETTING AN EXAMPLE WITH ITS BUILT ENVIRONMENT

AN AMBITIOUS PLAN FOR RENOVATING OLD BUILDING STOCK

This plan will extend the duration and scope of the trial schemes conducted since 2001 (energy savings, green roofs, use of renewable energies, etc.), which incorporated measures to mitigate environmental impacts into building renovation specifications.

Thermal renovation of buildings

Target: a 12% reduction in greenhouse gas emissions by 2020 (= 15 000 tCO_2e)

The gradual thermal renovation of the 3 000 public facilities will entail upgrading the building envelope. Insulation should preferably be placed on the outside, but because many buildings are subject to architectural restrictions, this will be difficult to accomplish on the front of buildings. Accordingly, the main focus will be on walls that face inner courtyards, gable walls and roofs.
A working group has been set up to find satisfactory solutions with the government architects in charge of historical monuments.

A FURTHER COMPLICATION

is that the work required to improve energy efficiency very often has to be carried out in occupied buildings or during brief periods of closure during the summer, in order to minimise disruptions to everyday life and public service.

Detailed figures on the potential energy savings will come out of the energy audits launched in 2008. It can reasonably be assumed, though, that these operations will reduce the energy consumption of municipal facilities by at least 100 to 200 kWh/sq. m. If the city administration renovates one-fifth of its housing stock in ten years, this will mean savings of nearly 15 000 tCO_2e and 6 million euros per year on its energy bill in 2020.

Renovation of HVAC equipment

Target: a 17% reduction in greenhouse gas emissions by 2020 (= 21 000 tCO_2e)

The municipal stock of HVAC equipment (heating, ventilation and air conditioning) uses close to 500 GWh per year (2006). Since 1985, for the same-sized stock, the city administration has managed to lower its energy consumption by 45%. This has offset a 35% increase in the HVAC stock due to new services developed for the population of Paris.

- **Replacing old boilers**
  The item with the heaviest energy consumption (and the highest greenhouse gas emissions) in the municipal building stock is HVAC facilities (heaters, radiators, ventilation, air conditioning, etc.). A boiler (gas, steam, fuel oil, etc.) has a lifetime of around 20 to 30 years. Replacing it brings a gain in energy efficiency of at least 15% by comparison with the old boiler's first year in service. By way of illustration, the renovations carried out on old installations in 2006 brought savings of 1.53 GWh/year, equivalent to the energy required to heat 11 crèches.
  Since 2001, the municipality has doubled the amount spent every year on replacing old facilities (from 3 million to 6 million euros). To maintain the level of energy efficiency required to achieve its "factor 4" targets, the city administration will further increase its investments, with a permanent annual budget of 8 million euros from 2009 onwards (7.5 million euros in 2008). Over 11 years, this will enable it to realise a potential saving of 22 GWh (a saving of nearly 5% on the HVAC bill).
- **Ensure high standards of maintenance on HVAC equipment**
  Improving energy efficiency entails day-to-day maintenance and adjustment, carried out by either city administration services or private operators. Since 2002, operators (whether public or private) have had energy efficiency contracts that set a target gain of at least 1% per year. This target was doubled for municipal maintenance officers.
  The installation of new, high-performance HVAC equipment also calls for maintenance officers to acquire the appropriate qualification so that they can bring about these gains in efficiency. The city administration will organise the necessary training to meet these needs. Lastly, users of the most efficient everyday equipment (e.g. office equipment, blinds and awnings, lighting) will be informed of how to maximise energy efficiency: whenever new equipment is installed or repaired, appropriate explanations will be given.

RENOVATING HORTICULTURAL GREENHOUSES

The city administration manages seven sets of horticultural greenhouses, the total energy consumption of which amounts to 19.17 million kWh/year. The tropical greenhouses in Auteuil and the production greenhouses in Rungis are the largest of these and each uses close to 7 million kWh/year. In addition to a programme of insulation and optimisation of the heating systems, the city administration has undertaken to install a wood-burning boiler at the Rungis site, thereby exploiting a renewable energy and saving 1 470 tCO_2e per year.

INNOVATIVE NEW CONSTRUCTIONS

Every year, new municipal facilities are built in Paris to enhance Parisians' quality of life. These facilities, which will still be there in 2050, must be as energy-efficient as possible and generate the lowest possible amount of greenhouse gas emissions to stay on track for the "factor 4" targets.

The consultation entailed in producing the White Paper revealed that Parisians have extremely high expectations for new city administration-built constructions, which they hope will usher in a bright future with their quality of service, efficient use of rare resources, environmental quality and efficient management.

The City of Paris has brought in high-environmental-quality measures for its entire built environment. Alongside its local town planning plan, it has adopted a set of environmental recommendations, which recommend installing effective insulation, choosing very efficient heating installations, connecting buildings to the district heating system and using renewable energies.

The document is a necessity for the city administration and presents recommendations for building permit applicants, to whom it is distributed. It will now be accompanied by fact sheets, helping applicants make their projects more energy-efficient.

All city administration building projects worth over one million euros are carried out in accordance with environmentally-friendly principles, or even the HQE® (high environmental quality) approach. An outside assistant is called in to provide support and guidance for such projects. This aspiration is taken up and expanded in the Climate Protection Plan. The City of Paris undertakes to minimise the environmental impact of its new constructions. For new-build operations, it will recommend a maximum energy consumption level of 50 kWh/m^2/year, thereby exceeding the standards of the BBC label and coming very close to the Swiss "Minergie" and German "PassivHaus" standards. In addition, studies into the use of renewable energies will be systematically carried out for all new-build operations and their conclusions implemented if the site is suitable (insolation, CPCU district heating network nearby, possibility of using geothermal energy, etc.).

An annual target will be defined for the installation of green roofs and included in the budget.

REDUCING ELECTRICITY CONSUMPTION IN BUILDINGS

Target: a 30% reduction in electricity consumption by 2020 (= 4 800 tCO_2e)

Cutting electricity consumption is the third major undertaking the city administration needs to tackle. A number of initiatives aimed at curbing electricity demand have already been conducted in city administration buildings (the Paris city hall and local district town halls). They have shown potential energy savings of 15%, on average. The findings of this operation have now been incorporated into the requirements for electrical renovation. The energy audits mentioned earlier will enable widespread implementation of measures to curb electricity demand in major city administration facilities. At the same time, the city administration will examine ways of tackling more diffuse forms of electricity consumption.

PARIS: SETTING AN EXAMPLE WITH ITS BUILT ENVIRONMENT

Since 2001, the city administration has also been replacing light fittings with high energy consumption (halogen and incandescent bulbs) by bulbs that use less electricity (such as low-energy compact fluorescent bulbs). Note that, for architectural reasons, it is still difficult to replace certain fittings. The optimum solution for the future is LED (light-emitting diode) bulbs, which consume 10 times less than low-energy bulbs and 70 times less than traditional bulbs. They can be used in a wide variety of fittings, including architectural chandeliers. The first systems will be installed in 2009-2010. Studies have shown that, by comparison with the usual identical replacement, the investment in LED bulbs would be offset after five to seven years by the savings made.

THROUGH WIDESPREAD IMPLEMENTATION OF THESE LAST TWO MEASURES – CURBING ELECTRICITY DEMAND AND REPLACING LIGHT BULBS –

the city administration can hope to lower electricity consumption by 30% (compared with 2004) by 2020, which represents a saving of 4 800 tCO_2e.

PUBLIC AREAS

Paris's street lighting

Target: a 30% reduction by 2020 (= 3 400 tCO_2e)

The City of Paris's effective street lighting policy has yielded the following results:

- Latest-generation, high-performance bulbs with an efficiency of over 80 lm/W. When the bulbs are changed, the light fitting is often changed too and the electrical installation brought into compliance;
- The duration of lighting has been reduced by installing photometric sensors that adjust the lighting to the ambient luminosity. Street lighting is currently used for 4 100 hours/year;
- For the same reason, illuminations are switched off at midnight (except during tourist seasons, when they remain lit until one in the morning).

As a result, despite an increase in service quality and a denser network of lights, the energy demand for street lighting has fallen over the last ten years, from over 160 GWh in 1995 to 145 GWh in 2006. Since the beginning of the current term of office, energy savings on street lighting have averted the production of over 1 200 tCO_2e and 120 kg of nuclear waste. Moreover, for the "Paris illumine Paris" operations, the city administration encourages shop-keeper associations to use low-energy lighting installations.

THE POTENTIAL ENERGY SAVINGS

that could be achieved by 2020 by replacing old light fittings and using more energy-efficient technologies stands at 30% of the 2004 emission levels, i.e. around 3 400 tCO_2e.

Street furniture

The City of Paris will launch a technical study into improving energy efficiency and the feasibility of installing photovoltaic cells on street furniture and other permanent fixtures installed on the streets and which use energy.

Renovating and insulating the kiosks and amenities in Paris's parks

Target: a 50% reduction in consumption by 2012

These 491 facilities consume an average of 500 kWh/m^2/year. A design competition will be launched for a "zero-energy" garden kiosk that uses renewable energies. An upgrade programme for existing facilities aims to halve consumption by 2012: a 40% reduction will be achieved through technical upgrades and 10% by changing user behaviour.

- **Public land-use permits**

Public land-use permits will also be subject to an analysis of greenhouse gas emissions, and this criterion will be taken into consideration for granting a permit. Permanent fixtures should be as energy-efficient as possible and strive for zero-emission status within five years.

IN CREASING THE SHARE OF RENEWABLE ENERGIES IN THE ENERGY MIX

Target: a 30% share of renewable energies by 2020

One way of decreasing the carbon footprint is to use renewable energies (solar, geothermal, wind or hydraulic energy) or recovered energies (biomass, waste), which emit practically no greenhouse gases. While little use is made as yet of geothermal or solar energy in municipal facilities, Compagnie parisienne de chauffage urbain (CPCU) already uses recovered and renewable energies to produce over 45% of the heating and hot water it supplies. Moreover, the electricity supplied by EDF is produced using an energy mix that is, on a national average, 14% renewable energies (hydraulic and wind power). Based on these figures, we can estimate that, overall, 15% of the energy used by the municipal building stock is renewable and recovered energies.

THE NEW EU TARGET FOR 2020

set by the European City administration in March 2007 calls for 20% of renewable energy as a European average, all applications combined (heating, electricity and transport). This target will be broken down and redistributed among the Member States over the coming months.

The share of renewable and recovered energies in Paris's energy mix is set to increase in coming years as a result of the following measures:

- Wherever possible, renewable energies will be incorporated into new-build and renovation projects;
- Efforts will be made to save energy and replace carbon-based energies, especially gas, which is still widely used for heating, and also replace fuel oil as a heating fuel, wherever it is still in use;
- Priority will be given to connecting buildings to CPCU's district heating network. Moreover, CPCU's sustainable development plan aims to raise the share of renewable energies in heat generation from 49% to 60% by 2012. This will also allow it to apply a VAT rate of 5.5% on its supplies, instead of 19.6% as at present.

Accordingly, the City of Paris will be able to attain a 30% share of renewable and recovered energy in its energy mix by 2020.

GREEN ELECTRICITY

In order to increase the share of renewable energies in the electricity it purchases for its services' requirements, the City of Paris will specify, for its supplies, a minimum quantity of renewable, low-cost electricity. The sustainable development agreement between the city administration and EDF will have to include this requirement for the years to come. The stipulated share of renewable energy will have to be higher than the level laid down for France by the 2000 EU directive, i.e. 21% in 2010, and therefore be over 30% in 2020.

ZAC Pajol.
Solareo engineering firm.
Image by M. Unzel.

Compagnie Parisienne de Chauffage Urbain in Vitry.

PARIS: SETTING AN EXAMPLE WITH ITS BUILT ENVIRONMENT

THE CITY OF PARIS'S MASTER PLAN FOR RATIONALISING ITS ADMINISTRATIVE FACILITIES (SDIA)

The SDIA is the City of Paris's master plan for rationalising its administrative facilities. More than a mere property project, it is a powerful tool for drawing together the various initiatives taken to modernise city administration services. It is perfectly in keeping with the precepts and guidelines of the Agenda 21, and directly contributes to the goals of the Climate Protection Plan.

The study carried out in connection with the SDIA confirmed the drawbacks of the current situation and prompted a reorganisation of the central services into functional clusters organised around specific areas of responsibility, and each comprised of several departments: public areas, welfare, public amenities and cross-cutting departments. It is planned to install these clusters at six or seven locations: a new site on the *ZAC Paris rive Gauche* (a mixed development zone on Paris's left bank) and the others on the city administration's existing sites, which will undergo a major reorganisation.

Grouping city administration services into geographical sites will not only lower the direct running costs of the buildings (rent, utilities, energy, internal services and routine maintenance) but also the many hidden costs stemming from their dispersion. The master plan will help achieve the Climate Protection Plan's targets by reducing transport requirements and providing modern, energy-efficient buildings. It will also help improve municipal officers' working conditions and the conditions in which the public is received, as well as cutting down on transport requirements for city administration business. Setting up functional clusters will reduce the number of mail shuttles required by around a third. Because it will be possible to pool city administration vehicles, fewer will be needed. The 2004 study showed that running costs for the city administration's administrative building stock would be reduced by 24%. Most importantly, though, grouping central services into functional clusters will make them easier for users to identify and use, as all of the departments responsible for handling a specific question will now be located on the same site.

THE SAVINGS MADE IN THESE DIFFERENT AREAS OF CONSUMPTION

will slash nearly 50 000 tCO_2e off the carbon total for the city administration's own built environment. This works out to a 39% reduction in emissions (transport excluded) from the city administration's built environment by 2020, exceeding the targets set by the European City administration in March 2007.

Current situation

79 clusters on 67 property sites

Geographical distribution of sites

PARIS AS THE ORGANISER OF THE REGION IT ADMINISTERS

Apart from its own built environment, the city administration's action is directed, first and foremost, at the social housing stock for which it is responsible as the local authority for the *département*. The city administration must also act as a driving force with regard to all of the buildings situated in the area it administers.
City administration policy is based on a programme of measures already under way: the Paris City Council had earlier adopted a target in keeping with the 2005 thermal regulations, i.e. 20% for new constructions.

From now on, the target will be 50 kWh/m^2 for new constructions and 80 kWh/m^2 for existing buildings. In order to reach its "factor 4" targets, all sectors combined, the city administration will gradually move towards so-called "positive-energy" buildings. These are buildings for which energy consumption has been reduced to such an extent that the remaining requirements can be supplied by renewable energies, mainly extracted from the building's immediate environment.

The goal in time will be to achieve energy self-sufficiency or even a positive energy balance wherever possible, and aim to make the energy consumption of any new constructions carbon-neutral.

In keeping with the objectives of the climate protection plan, the City of Paris will need to reinforce staffing levels in the departments responsible for analysing the new audit documents required (thermal audit, energy feasibility study, use of renewable energies, etc.) in connection with processing building permit applications.

A COMPREHENSIVE STUDY OF PARIS'S BUILT ENVIRONMENT

APUR (Paris's urban-planning agency) is currently carrying out a comprehensive study of the Parisian housing stock. This is the first such study to be undertaken by a local authority. It will provide a full description of Paris's 96 000 residential buildings, including their date of construction, aspect, building materials, structure, wall thicknesses, solar gains and masking, etc.

Beginning in 2008, the city administration will conduct, in partnership, a thermographic analysis of all buildings, aimed at detecting energy losses, facilitating the renovation of its built environment, informing Parisians, enlisting their involvement and encouraging them to renovate the thermal aspects of their buildings.

The analysis will also provide more detailed information on light pollution so that the city administration can optimise the intensity and orientation of its street lighting.

It will also show up any heat losses that may exist on the district heating network.

SCENARIOS DEVELOPED FROM THE RESULTING DATABASE

will allow planners to target possible operations and the necessary investments, and measure the benefits in terms of energy savings and reductions in greenhouse gas emissions.

SOCIAL HOUSING

New constructions

In 2006, the city administration asked all public housing authorities to apply high-environmental-quality standards in all new-build social housing programmes and as-new renovations, with the aim of attaining a level of energy efficiency 20% higher than that required by the thermal regulations. This has led to the gradual certification of all social housing operations (and in particular Housing & Environment for new residential constructions). Public housing authorities have called in independent HQE compliance consultants so that they can satisfy city administration requirements while at the same time meeting the quantitative targets set for social housing. OPAC (the public development and construction office), for its part, had already developed this expertise internally, in keeping with the principles of sustainable development.

At the same time, the city administration drew up a set of environmental requirements applicable to all social housing operations. These requirements set out the criteria the city administration considers particularly important and specify energy efficiency targets aimed at combating climate change.

Solar panels on the OPAC building Rue de Plantes, 14th district.

PARIS AS THE ORGANISER OF THE REGION IT ADMINISTERS

This set of requirements is part of the city administration's overall sustainable development approach, so also sets objectives for certification of the operations conducted. For new-build operations, the objective to date had been to obtain certification to the Housing & Environment energy-efficiency standards. This is the most demanding environmental-quality certification for new-build operations. The City of Paris is now aiming for a maximum of 50 kWh/m^2/year in primary energy consumption (heating, hot water, lighting and ventilation) for new constructions, except where an independent engineering firm can show that this is technically impossible.

For lighting, social housing operations are required, as far as possible:

- To prefer natural lighting and light colours in the private areas, and if possible in the common areas also;
- To size electrical installations to the purpose served by the area to be lit;
- To separate the electrical control circuits in common areas;
- To make blanket use of energy-saving devices such as timers, presence detectors and dawn-and-dusk light sensors.

New-build projects must include solar-powered domestic hot-water systems that cover at least 30% of requirements, except where insolation is impeded by masking or major architectural constraints.

BY WAY OF ILLUSTRATION,

600 sq. m of photovoltaic cells will shortly be deployed on two new OPAC constructions.

An extensive renovation plan for existing social housing

Target: a 30% reduction in greenhouse gas emissions by 2020 (= 220 000 tCO_2e)

There are nearly 220 000 homes belonging to public housing authorities in Paris. Their average consumption has been estimated at roughly 270 kWh/m^2.

Operations involving the acquisition and major renovation of social housing are already required to obtain certification to built environment Housing & Environment standards, with the aim being to obtain a "B" energy-efficiency rating (50-90 kWh/m^2/year). Housing and Environment certification is sometimes sought for renovation operations. This certification, which usually applies to new-build constructions, is more demanding and often difficult to obtain for an existing building: the building's inherent constraints make it impossible to meet the criteria, and especially the acoustic and thermal criteria. The energy-efficiency level depends on the building's aspect, the initial construction choices, especially with regard to the existence of thermal bridges, and the configuration of the walls. For all renovation operations, the feasibility studies must factor in the installation of renewable-energy-based energy production. Wherever possible, the provisions applicable to new-build operations are applied also to major renovation projects.

For acquisitions where no renovation is required and for renovations of existing social housing stock, a housing stock audit is systematically carried out, based on the requirements of the CERQUAL built environment certification. The purpose of this provision is to give each public housing authority a thermal map of its housing stock for use in any future renovation work to upgrade the energy efficiency of its buildings. Public housing authorities must be able to furnish the standardised EU energy rating before and, if applicable, after the renovation work (energy consumption and greenhouse gas emissions).
So that each social landlord can adopt an effective strategy to lower consumption in its building stock, the city administration will run an audit campaign to identify the most "energy-consuming" buildings and those suitable for external insulation.

The city administration will look into renovation operations entitled to funding under the PALULOS government-subsidised energy-saving scheme, designed to reduce building energy consumption for heating, domestic hot water, lighting, ventilation and auxiliary equipment to 80 kWh/m^2/year.

The gradual renovation of social housing buildings through to 2050 should greatly reduce energy consumption.

THE CITY ADMINISTRATION

has made it a priority to renovate the 25% of social housing stock considered most energy-consuming by 2020, beginning in 2008.

The task in hand calls for the following measures:

- Upgrade building envelopes, using energy-efficient joinery and insulation. External cladding is the most effective insulation but is not always possible, especially on buildings subject to heritage restrictions (this point will be pursued with the government architect in charge of historical monuments). Interior insulation can be an alternative solution where required, though the configuration of the individual flats and the need to move utility networks (electricity, heating, water, etc.) can complicate the task. The city administration will discuss the matter with the ABF (government architects in charge of historical monuments) in order to find suitable solutions that reconcile respect for the built environment and the city administration's environmental goals.
- It will also be necessary to install energy-efficient solutions such as dual-flow ventilation and underfloor heating, which is not also possible in inhabited environments.
- Make heating and hot water installations more efficient, and optimise electricity consumption.
- Provide flats with ventilation and comfortable temperatures in summer without using air conditioning.

These ambitious energy-saving renovations will help protect tenants from energy insecurity and curb their charges.

OPAC is conducting trials of a hydrogen cell on 283 social homes in Paris's 15th district and plans to install 10 000 square metres of solar panels over the next five years. OPAC has also launched renovation work on the Tour Bois Leprêtre housing block in the 17th district. This ambitious renovation entails building extensions onto apartments to form winter gardens, which act as a buffer zone between the apartments and the exterior. This example shows how vast the scope of thermal renovation can be.

SIEMP

(a property development company based on a public-private partnership with the City of Paris) has introduced a sustainable development charter, beginning with six pilot projects set for subsequent widespread application. The operation on the Fréquel block has adopted similar targets to those of new buildings.

Forming partnerships for financing

Investing additional amounts in social housing obviously implies finding a variety of financial aids and sources of financing, in particular:

- a municipal subsidy to be introduced in 2008 will curb increases in rent bills, which, in any event, will be negotiated with the tenants;
- beginning in 2008, landlords will be able to deduct from their land tax on built property 25% of the cost of energy-saving renovations carried out, over a maximum period of five years (Art. 1391 E of the General Tax Code);
- other public financing by the State or the regional authority;
- additional financing that might be provided by the energy-saving certificates or domestic projects set up by the Caisse des Dépôts et Consignations (France's deposit and consignment office) (see Section 5.1.3);
- subsidised loans from the Caisse des Dépôts et Consignations.

The domestic projects consist in the Caisse des Dépôts buying the emission reductions and selling them on the international carbon market, primarily for 2012, when some States will have to compensate for the difference between their actual emission level and the commitments they signed in Kyoto. Whatever could be traded on the emissions market would be deducted from the city administration's financial expenses. This is one of the city administration's priorities for raising finance.

Informing tenants

The growing complexity of future heating, ventilation and air conditioning devices makes it a necessity to run local information campaigns for tenants. To this end, the environmental requirements for social housing operations stipulate that public housing authorities are to give their tenants the necessary information on energy savings, thereby helping them measure the impact of their behaviour on their energy consumption. Tenants must also be informed of the specific technical characteristics of their home and the practices to avoid. SIEMP distributes a welcome booklet containing general instructions for saving energy, as well as information on the particular tenant's home: depending on user behaviour, consumption can up to double.

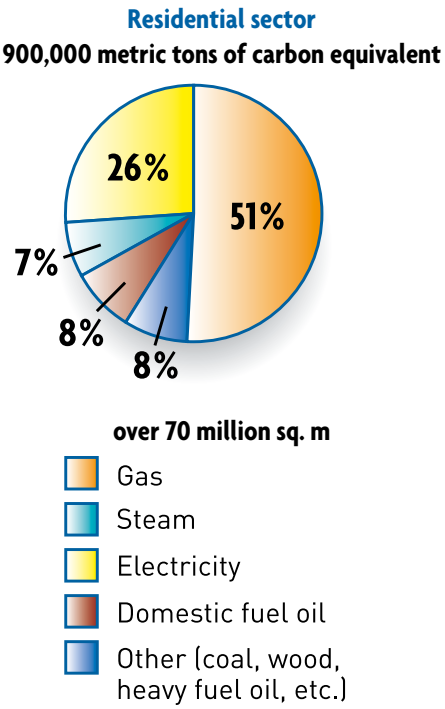
Hydrogen fuel cell 15th district.

Tour Bois Le Prêtre 17th district.

PARIS AS THE ORGANISER OF THE REGION IT ADMINISTERS

A RENOVATION PLAN FOR THE ENTIRE PARISIAN BUILDING STOCK: THE "100 000 BUILDINGS PLAN"

Target: a 30% reduction in greenhouse gas emissions by 2020 (= 1 920 000 tCO_2e)



Paris contains over 1.3 million private homes (both occupied and vacant), spread across 96 000 buildings and 60 million sq. metres, in addition to the capital's 290 000 businesses. Together, they represent a total of nearly 120 million sq. metres, consuming 35 000 GWh of energy per year and emitting 6.4 million tons of CO_2. Over 85% of the building stock was built before 1975 and 48% before 1915.

The specific nature of the Parisian building stock makes it difficult to reach a high level of energy efficiency quickly. Even so, substantial reductions can be made in the energy consumption and greenhouse gas emissions associated with heating, by insulating roofs, courtyard-facing walls and gable walls, replacing window and door frames, changing the type of energy used and replacing old heating appliances.If Paris is to achieve "factor 4" targets by 2050, emissions in this sector will have to be reduced by 30% by 2020. One way to go about this is for the city administration to encourage owners to undertake energy-saving home improvements. To this end, it proposes to introduce a pilot programme in 2007 designed to improve the environmental quality of housing. Based on the programme's conclusions, the city administration, the government, the Île-de-France regional authority, industry professionals and owners will then look at what measures need to be taken to achieve a target 30% reduction in greenhouse gas emissions by 2020 for the private housing stock as a whole.

The necessity of rent control

Against a backdrop of spiralling rental prices and the growing burden they represent for household budgets, it is crucial to ensure that the renovation of buildings and homes does not spark further speculative rises.

While owners can rightfully expect some form of trade-off for their investments, they should bear in mind all of the tax incentives (tax credits, exemptions, etc.) and financial measures (interest subsidies, grants, etc.) brought in by the government to mitigate the true cost of such investments.

It is unacceptable for the savings on charges to benefit only the landlord and for tenants not to receive some financial benefit from the reduction in energy consumption.

The city administration will ask the Observatoire des Loyers (the organisation responsible for monitoring rents) to specifically monitor rental price rises for homes that have undergone renovations.

The government must also shoulder its responsibilities and cap rental prices at the Parisian rent-control levels, as already requested.

A pilot phase: the sustainable housing *Programme d'Intérêt Général* (PIG)

Given the urgency of combating climate change, the City of Paris proposes to initiate a sustainable development approach aimed at improving the thermal (and acoustic) efficiency of homes in the private housing sector. The twofold approach will involve an information and guidance scheme, and additional subsidies

for installing soundproofing or improving energy efficiency.
The aim of the programme is to facilitate the decision to undertake energy-saving improvements. It will be accompanied by an information campaign to inform Parisians about the different types of financial support available. The information and guidance scheme comprises awareness raising and guidance for owners undertaking improvements, along with monitoring and evaluation of the programme. The scheme will be supported by ADEME, while the *Espaces Info-Energie* will guide co-owners through the necessary procedures.
The three-year programme consists in raising the level of financial assistance provided by ANAH (the national housing improvement agency) to owners carrying out work. It is aiming for a minimum of 300 buildings in three years. The pilot scheme and the planned evaluation will lay the groundwork for a comprehensive approach that is both ambitious and operational. Under this general interest project, owners will be able to claim a municipal subsidy of 20% of the cost of work when they carry out work recommended in an audit, in addition to the ANAH subsidies and other existing financial assistance (tax credit, ADEME aids, etc.).

Energy audits

A full energy audit of a building assesses the characteristics of the building's envelope, the heating system, domestic hot water production and the possibility of using renewable energies. The energy efficiency of the envelope is the decisive factor in moderating the building's energy consumption. Renovation work on the envelope, such as exterior insulation, falls within the scope of work on common areas and must be approved by the co-owners' association. This is the preferred approach, wherever possible, because it improves the overall quality of the building more effectively than approach based on individual apartments. In addition to its technical interest, an energy audit has a certain educational value, helping to raise owners' awareness of energy savings. This is why the city administration encourages co-owners' associations to carry out energy audits of their building. Moreover, 70% of the cost of an audit is subsidised by the city administration, the regional authority and ADEME.

A renovation plan for the Parisian building stock: the "100 000 buildings plan"

The city administration has decided to undertake the renovation of 100 000 Parisian buildings by 2050, in an initiative known as the "100 000 buildings plan".

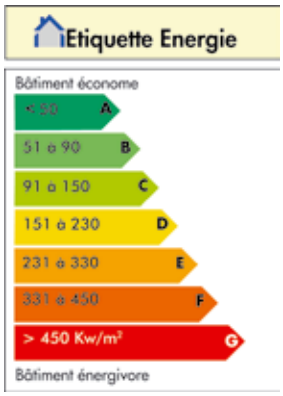
The majority of Parisian buildings are co-owned. Accordingly, work on common areas – where substantial energy savings can be made - must be approved by the co-owners' associations. Too little renovation work has been carried out to date and the city administration's ambitious goal of reducing greenhouse gas emissions by 30% will require measures to inform, encourage and even prescribe work so that co-owners will more readily approve such projects.

To encourage owners to carry out work that will make their homes more energy efficient, the city administration proposes to launch the "100 000 buildings" programme with funding from the State, the Île-de-France regional authority and innovative financial partners. The programme will develop some of the first lessons to come out of implementation of the PIG.

- **A partnership with the banking sector**

  It is important for the city administration to involve the banking sector so that it will provide financing at attractive interest rates and adjust loan repayment charges to the cost effectiveness of the energy-saving work carried out.

  And yet financing is only part of the problem. To make it more attractive for private owners to invest, the city administration will have to provide effective guidance and advisory tools, as well as targeted public grants (State, regional authority, government agencies, City of Paris). Setting up a Parisian climate agency will create an additional incentive.



ADEME
Agence de l'Environnement et de la Maîtrise de l'Energie

INFO→ ÉNERGIE

Agence nationale de l'habitat Anah

PARIS AS THE ORGANISER OF THE REGION IT ADMINISTERS

The City of Paris will initiate talks with the banking networks operating in Paris, as well as with other players directly involved, such as the regional authority, the State (ANAH, ADEME, etc.) and the Paris chamber of commerce and industry, with the aim of facilitating investments in the renovation of old buildings. The city administration may also make a financial contribution as part of an overall financing arrangement. This financial contribution will be subject to income conditions and will involve undertakings to curb rent increases. It may take the form of a subsidy, a guarantee, interest subsidies or a reduction in local taxes.

THE PARTNERSHIP WILL BE FORMED IN 2008

so that the scheme is operational and included in the budget by 2009 at the latest.

PREVENTING ENERGY INSECURITY AND GUARANTEEING ACCESS TO ENERGY

Little has been done to tackle energy insecurity. One reason for this is the cross-cutting nature of the phenomenon, which involves a number of different areas including welfare, housing, health and energy. And yet in France today, over 300 000 families have applied for welfare assistance to pay their energy bills. The City of Paris is naturally confronted with this phenomenon. Energy insecurity is handled primarily by the *commissions départementales "pauvreté-précarité"* (departmental "poverty-insecurity" commissions), which manage the *Fonds Solidarité Énergie* (FSE, energy solidarity funds), now incorporated into the *Fonds Social du Logement* (FSL, social housing fund). The Paris Climate Protection Plan has set out to reduce energy insecurity and help keep low-income earners in their home. Each and every Parisian must be given the means to acquire heating, hot water and electricity.

PARIS SUPPORTS CLAIMS FOR A RIGHT TO ENERGY

and confirms the necessity of ensuring that every Parisian has the means of acquiring heating, hot water and electricity.

Two approaches are used to achieve this:

An extension of the FSL

New FSL regulations voted in by the Paris City Council in September 2006 provide for two sorts of energy support:

- preventive support for underprivileged people struggling to pay their energy bills. This sort of support incorporates the former FSE and can be used even in the absence of an unpaid bill;
- remedial support, introduced in January 2007 and aimed at settling an unpaid energy bill. The CASVP (the City of Paris's social welfare centre) has been given responsibility for managing FSL energy assistance.

In Paris, a total of €2.23 million was paid out of the FSL in 2006 as preventive support for 10 200 households. Remedial support is expected to address over 10 000 households in 2007. Quite apart from the FSL, the municipality of Paris also assists needy families with their energy bills through an optional *Paris Énergie Familles* grant, issued by the 20 local branches of the CASVP. In its capacity as granting authority, the City of Paris also checks that the concession holders charge the correct rates for those in need.

A fund to support energy control

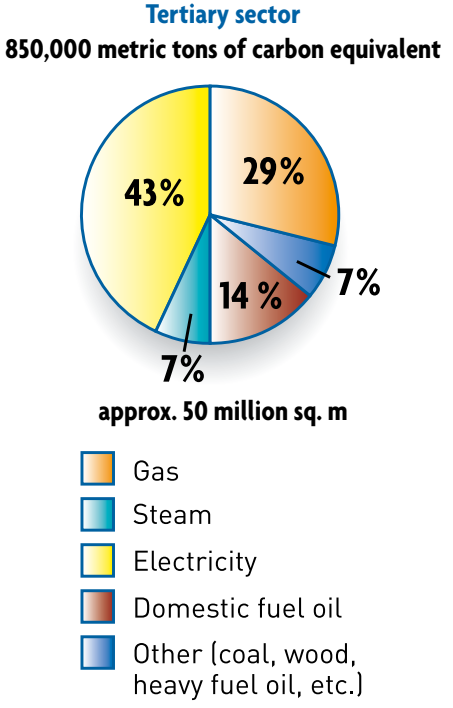
In addition to the existing measures, the City of Paris proposes to set up a fund to support energy-saving work. The aim is to improve the thermal efficiency of homes and home appliances that use energy, with a view to lowering the charges paid while providing an acceptable level of comfort. The fund could call on "mandatory" energy companies and receive additional financial support under the energy-saving certificates scheme. In partnership with job-search associations, the city administration is examining the feasibility of setting up DIY renovation projects designed to boost housing

renovations and at the same time help the occupants return to employment.
Some of the financial assistance allocated to paying bills will be rechannelled into personal grants for investments in energy-saving home improvements.

FOR EITHER OF THE ABOVE TASKS

facilitating access to loans and public funding (subsidies or tax credits) or supporting low-income families – the city administration needs a body to act as interface between households, institutions and industry professionals. This will be the role of the *Agence Parisienne du Climat* (Paris climate agency). The last chapter sets out a proposal for its establishment.

REDUCING EMISSIONS FROM TERTIARY BUILDINGS



In 2004, the tertiary sector led the field for energy consumption in Paris with nearly 17 TWh [2], ahead of the residential sector with 16 TWh. The Parisian tertiary sector represents over 57 million sq. m of heated space, 7% of the national total. It has grown slowly since 1990, increasing by 4.1%, compared with a 25% nationwide increase over the same period. This is mainly due to the increasingly short supply of large areas suitable for development in Paris.

While energy consumption has not changed significantly since 1990 – a 6.7% increase in normal weather conditions – it is still growing faster than the tertiary building stock.

The steepest increase is to be seen in new forms of electricity usage: bear in mind that electricity is the predominant type of energy used in the tertiary sector, all purposes combined (45%). For instance, there has been a 37% increase in electricity consumption for air conditioning since 1990.

Gas and steam are the two main types of energy used for heating, with respectively 32% and 29% shares of the heating market. In the office sub-sector, which represents 38% of Paris's tertiary building stock (as against 21% of the national total), CPCU's steam supplies over one-third of the buildings. While energy consumption for heating has remained almost stable since 1990 (down 0.5%), there has been a shift from fuel oil to gas and, to a lesser extent, steam. The Climate Protection Plan is expected to accentuate this trend. According to the 2004 carbon audit of Paris, energy consumption in the tertiary sector generates 3 120 000 tCO_2e.

A significant part of the Parisian tertiary sector is made up of government administrations and major museums. These administrations are requested to meet the same energy-efficiency standards as the City of Paris, which should significantly improve their emission levels. The Mayor of Paris will approach the government and propose an annual audit of all emissions present in the Paris region to enable regular evaluation of the progress made.

While the city administration does not plan any specific financial assistance for the tertiary sector, it does intend to reward organisations that invest in reducing energy consumption in their buildings. This could take the form of a prize, for example, or a call for "tertiary factor 4" projects, which, by boosting the organisation's image, could act as an incentive and an example. Organisations also have the possibility of buying green electricity.

2. Rapport "Bilan énergétique du bâti parisien 1990-2004" réalisé par le CEREN en 2005 pour la Mairie de Paris - DEVE - SEU.

PARIS AS THE ORGANISER OF THE REGION IT ADMINISTERS

AN AGREEMENT TO ENCOURAGE THE RENOVATION OF PARISIAN BUILDINGS

The City of Paris, FFB (French building federation), the Île-de-France regional authority, CAPEB (the small builders' trade body), ANAH and the Fédération parisienne des SCOP du bâtiment et des travaux publics (Parisian federation of cooperative companies in the building and public works sector) have decided to join forces and sign an agreement to encourage Parisians to carry out specific types of work to combat climate change.

These measures consist in establishing seven stages prior to undertaking work:

- approve the energy-efficiency audit methods applicable in private homes;
- give contractors and tradesmen training in carrying out audits, appropriate work techniques and informing customers;
- inform Parisians of the solutions that entitle them to a loan, subsidy or tax relief;
- inform Parisians of the local services able to guide and assist them through the administrative procedures entailed in applying for subsidies or loans;
- disseminate full information on possible job creations - and the job fields concerned – as a result of growth in this market sector, to industry professionals, job seekers, tradesmen and contractors;
- identify common standards labels to attest to the quality of the audits carried out and the energy-efficiency of the work undertaken;
- draw up a sample list of valid types of work to undertake and valid types of products that individuals can choose to save energy in their private home and attain comfortable summer temperatures in an energy-efficient way.

ROLE OF THE GOVERNMENT

THERMAL REGULATIONS

The government's main task in ensuring an effective reduction in greenhouse gas emissions consists in the series of thermal regulations.

- The next set of thermal regulations, due out in 2010, is expected to introduce regulations for existing buildings – a first in France. In particular, the new regulations will lay down quality requirements for the materials used in renovations or simply for replacing end-of-life items such as heating appliances, roofs, door and window frames, etc.
- Moreover, the targets laid down by successive thermal regulations should be announced further in advance than they are at present. This would facilitate local authorities' initiatives and project owners' design work, and make it easier for businesses to adjust to the new requirements.

ADVANCES IN THE REGULATORY FRAMEWORK

Other measures of a regulatory nature, and hence lying within the government's responsibility, would be key success factors for the Paris Climate Protection Plan:

- Introduce a legally binding requirement for owners to include energy-efficiency upgrades when they carry out work (and especially during work on roofs or building facades);
- Enforce and monitor the obligation to have individual heat and energy metres, so that each household can benefit directly from its energy-saving behaviour;
- Revise the majority rules for buildings held in co-ownership (in particular for cost-effective work and connections to a collective heating system), so that loans can be provided to facilitate investment decisions.

FINANCIAL ASSISTANCE IS ALSO ESSENTIAL

to overcome the obstacles that prevent even cost-effective work from being carried out. We would suggest, for instance, that ANAH introduce a specific form of financial support for co-owners' associations that undertake energy-saving work following an in-depth energy audit (such as the ADEME audit).

LEGISLATIVE POWER FOR REGIONAL AUTHORITIES TO PROMOTE INNOVATION

Yet another decisive measure is legislative in nature. It concerns regional authorities' power to bring in binding legislative provisions in their region to support innovation, even if the said provisions are more demanding than under the national regulatory framework. In concrete terms, this might consist in making it compulsory for buildings to be more energy-efficient than under the national thermal regulations. It might prescribe connection to the district heating network, or the installation of solar collectors. While provisions of this type are possible today in *ZAC* (joint development zones), they are not binding on the rest of the region. It is the absence of this sort of positive law for local authorities that explains the lack of exemplary projects capable of galvanising the players into action. This sort of power needs to be written into urban planning laws and the legislation.

ZAC Pajol.
Solareo engineering firm.
Image by M. Unzel.

DEVELOPING AND DISTRIBUTING ENERGY

02

Exercising the powers of a granting authority in respect of the public distribution of energy.

The City of Paris is the granting authority for the public distribution of energy in the area it administers. Four types of energy are concerned: electricity, gas, district heating and district cooling. Within the framework of concession contracts for public energy distribution, the City of Paris is responsible for fulfilling the public service obligations relating to energy defined by law and set out in the requirements of the contracts. The city administration intends to have an overall view of the different energy distribution networks in the area it administers. Accordingly, in the exercise of its responsibilities as granting authority and in accordance with its urban-planning policy, the City of Paris ensures that the necessary organisation is in place and that there is consistency in the development of the different distribution networks.

ENERGY DISTRIBUTION

The concession holders (EDF, GDF and CPCU) are the city administration's partners, with whom it intends to develop energy-saving projects.

Act No. 2005-781 of 13 July 2005, known in French as the *loi POPE*, defines the directions of France's energy policy. It arises out of a series of recent acts which, since 2000, has been devoted to the electricity and gas market and public service. It set out the main lines of French energy policy for the next few decades. The act opens the way for local authorities to exercise new powers: measures to curb end-users' energy demand, participation in public interest groups aimed at developing energy-saving initiatives and the promotion of renewable energies. The City of Paris therefore intends to exercise its powers in full, in accordance with the framework defined by the law.

It will examine the technical and legal conditions in which it could launch and develop the production and distribution of renewable energies in the Paris region. It will also look into the advantages of setting up either a semi-public company or a local statutory body dedicated to this line of business.

The case of electricity and gas distribution networks

The City of Paris is intent on pursuing several goals:

- check that the concession holders have taken all of the networks' safety measures into account, in particular with regard to adapting to climate change;
- ensure that, within the scope of their power as defined by law, the concession holders contribute to the achievement of public service objectives, namely: *"... air quality and reduction of the greenhouse effect, optimal management and development of national resources, controlled energy demand, competitive business activity and a sound choice of technology for the future, such as rational energy use"*.

An annual inspection of concessions will provide an opportunity to check that these obligations are being met.

It should also be pointed out that EDF officialised its sustainable development initiatives by signing a corporate Agenda 21 in December 2001. In particular, the group undertook to combat climate change through its industrial activities and the advice it gives its customers. The joint operator EDF-Gaz de France Distribution Paris has also held ISO 14 001 certification since the end of 2003. EDF and GDF are therefore among the first European energy groups to embark on this course.

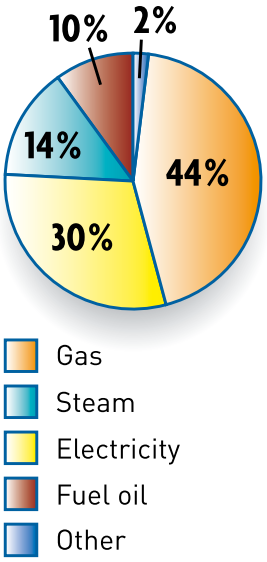
The City of Paris and EDF signed a sustainable development protocol for the period 2003-2006 and initiatives have been conducted in the capital. A new version of the document is being drafted for the period 2007-2010. It will revolve around the following focus areas: energy efficiency, HQE projects, the development of renewable energies, energy-saving certificates, sustainable management and major urban-planning projects, new mobilities and communication policy and partnerships. A similar document is also being drawn up with Gaz de France.

The district heating network

Since 1927, the distribution of heat by steam or hot water in Paris has been contracted out to Compagnie parisienne de chauffage urbain (CPCU), in which the city administration has a 33% holding. In 2000, CPCU adopted an environmental management approach, which resulted in its main production sites being certified to ISO 14 001.

The concession contract has undergone a number of amendments. The latest amendment, in December 2004, made substantial changes to the contract, mainly as regards environmental management, by reinforcing the granting authority's inspection prerogatives and by laying down sustainable development principles for CPCU's development. CPCU is now required to draw up a multi-year programme of environmental initiatives and describe their implementation in an annual report. The contract also stipulates that CPCU undertakes to absorb, first and foremost, all of the steam generated by the incineration of household waste, within the limits of its operating requirements.

Energy consumption by energy type



SUSTAINABLE WASTE MANAGEMENT

CPCU's first multi-year environmental action plan in 2005 aimed for greater control over the environmental risks inherent in its activity (primarily greenhouse gas emissions), as well as improved energy efficiency.

CPCU distributes 4 410 000 MWh in the form of steam, half of which comes from the incineration of the household waste of 4 million inhabitants of the Ile-de-France region (i.e. approximately 1 960 000 tons of waste per year). This energy recovery limits the use of fossil fuels to 300 000 tons oil equivalent per year. A new urban-waste incineration plant, Isséane, is to be commissioned shortly in Issy-les-Moulineaux. Smaller in capacity than the previous plant, it will consolidate heat recovery from waste. CPCU also generates 900 MWh of electricity at its two cogeneration plants in Ivry and Saint-Ouen.

In a broader perspective, changes in the "energy mix" since 1995 (a drop in the use of coal for heat generation) have reduced the carbon content of CPCU's output by 21%, taking it to 307.78 kg/MWh generated. This initiative is also facilitated by the *Engagement National pour le Logement Act* (ENL, national housing commitment) of July 2006, which sets the VAT rate at 5.5% for district heating, providing it uses 60% of renewable or recovered energies.

In its capacity as granting authority, the City of Paris has asked CPCU to attain this 60% rate rapidly and aim for 75% of renewable energies by 2020, mainly by tapping the potential for geothermal energy in Paris.

This will result in lower district heating charges for customers and an increase in the share of renewable energies in Paris's energy audit: two goals that meet the requirements of the POPE act. CPCU intends to reach the figure of 60% of renewable energies (including incineration and recovered energies) used for heat generation by 2012, by building a new production facility. A variety of fuels are planned for this: known as "alternative solid fuels", they include wood waste, the combustible waste obtained from recycling plants or recovered from bulky waste, and geothermal energy, obtained from the heat in the subsoil.

In addition, under the POPE act, CPCU is under an obligation to make energy savings. To achieve this, the concession holder has undertaken a number of measures for the period 2006-2008:

- work on the concession infrastructure, primarily the distribution network, to reduce heat leakage (through improved insulation of the steam and condensation network);
- initiatives aimed at encouraging its customers to save energy (heat demand reduction plan). The annual reduction target is equivalent to the energy requirements of 3 000 homes and a 5 500-ton-per-year reduction in CO_2 emissions.

CPCU is also involved in the CO_2 emissions-trading system set up in 2005. The national CO_2 allowance allocation plan for the period 2008-2012 reduces the allowance allocated to CPCU in the previous period by 31%.

To promote better energy management in buildings connected to the district heating network, the City of Paris has asked CPCU to install individual metres so that customers can more easily monitor and control their individual energy use.

ACCORDING TO A REPORT PUBLISHED BY ADEME IN 2007,

this reduces consumption in collective housing by 20%. Individual metres have been a legal obligation in France since 1974, but without any means of control or enforcement.

The district cooling network

The distribution of cooling energy in Paris has been operated by Climespace on a concession basis since 1991. Chilled water is distributed from five district cooling plants (a sixth plant is under way), connected to the buildings they serve by a network of underground pipes. Wherever possible, the pipes are installed in the sewerage network. This limits the need for earthmoving at street level and minimises the impact of the concession holder's work on the urban environment. This system has numerous

advantages for the community over individual cooling plants, in terms of environmental preservation and energy savings: for the same amount of power delivered, it can replace around 400 stand-alone plants. The quantity of cooling fluids used by a concession-based generation plant is far smaller than that required by an array of stand-alone facilities. Moreover, the coefficient of performance is far higher than for individual plants, so less energy is used.
An amendment to the concession contract is currently under study with a view to adding environmental provisions similar to those inserted in the CPCU contract. Climespace has, moreover, adopted an environmental management approach, implemented in accordance with ISO 14 001 standards.
With global warming already making itself felt, demand for air conditioning is set to intensify. The first strategies to adopt, of course, consist in keeping demand for air conditioning to a minimum by improving the environmental quality of buildings (see previous points), seeking natural ways to cool buildings and installing green roofs. Even so, the City of Paris believes that developing the district cooling network may be an appropriate solution in areas that already contain large numbers of cooling towers at stand-alone plants, which can represent a health hazard.

TOWARDS A GREATER SHARE OF RENEWABLE ENERGIES IN THE REGION'S ENERGY MIX

The renewable energy share in the city administration's own activities has already been discussed in an earlier chapter. But the renewable energy share in the consumption of the Paris region as a whole will need to evolve in the same proportions. Using the same calculation and extrapolation methods, the share of renewable and recovered energies in the consumption of the Paris region is currently estimated at 14%.

We can reasonably assume that, with future national policies encouraging the use of renewable energies and efforts by the city administration to spur the trend, the figure will be close to 25% in 2020.

For the development of geothermal energy in Paris

A detailed study into the potential for developing geothermal energy will be carried out for each development operation. One or even a number of boreholes will be drilled, if necessary, for the purposes of the study.

An estimate of the potential energy output will be made.
Depending on the study's findings, a geothermal energy development plan will be implemented.

Study into the potential for developing solar and wind power in Paris:

In 2008, a detailed study will be carried out into the potential for developing thermal and photovoltaic solar power in Paris. The study will survey the areas suitable for housing solar installations (facades, sunbreakers, gable walls, roofs of buildings, warehouses, facilities, stadiums, etc.) as well as suitable locations for installing wind-power equipment, such as roofs and excess urban right-of-way land. The full range of existing techniques will be considered, including the most innovative ones. On the subject of wind power, the study will be required to determine whether it is possible to install very high wind turbines, occasionally near interchanges on Paris's ring road.
An estimate of the potential energy output will be made.
The study should also address the objective of installing green roofs and weigh up the possible choice between green roofs and solar equipment, as well as the opinion of the *Architectes des Bâtiments de France* (the government architects in charge of historical monuments).

Implementing a solar and wind-power plan

Based on the findings of the study, and as rapidly as possible, a development plan for solar and wind power will be drawn up and implemented. With a view to making solar power widely available and developing wind power, the plan will set annual targets for installations on city administration buildings, buildings under the responsibility of its delegates or private buildings, and in particular on concession infrastructure. This plan will be an update of the Climate Protection plan.

THE PRINCIPLES OF "FACTOR 4" DEVELOPMENT

The outcome in terms of energy efficiency of the facilities, the development of renewable energies and reductions in greenhouse gas emissions are heavily dependent on the type of development chosen. In its urban development projects, the City of Paris will seek to impose standards in keeping with its "factor 4" strategy. The City of Paris will apply the Climate Protection Plan's overall objectives in all of its operations and is already aiming to make its major development operations carbon neutral.

The development zones will have to adopt urban-planning environmental quality and sustainable development approaches. In upstream phases, environmental impact studies will be required to present alternative scenarios so that the most suitable course of action can be chosen.

In keeping with these objectives, the City of Paris will use the following criteria:

- energy efficiency;
- a reduction in the carbon footprint; a carbon audit will be required in addition to the energy audits;
- the development of renewable energies;
- efforts to achieve dense construction and high architectural quality in Paris and densely-built areas (Parisian properties situated outside the centre of Paris) in order to curb urban sprawl and the use of private cars.

The policy measures adopted will be written into the urban-planning documents and in particular the conditions for land transfers. The recommendations will be reviewed throughout implementation of the plan. They may be set down in the form of a "factor 4" charter applicable to the project. Once the zone has been developed, the concession holders, landlords and semi-public companies responsible for its management will be required to furnish energy audits and carbon audits to the city administration every five years.

TOOLS FOR INCORPORATING SUSTAINABLE DEVELOPMENT INTO URBAN DEVELOPMENT PROJECTS

The city administration has grounded its sustainable development and urban development strategy on numerous tools and references, including the Aalborg Charter, the regional biodiversity charter, the *Plan Local d'Urbanisme* (PLU, local urban-planning plan), the *Projet d'Aménagement et de Développement Durable* (development and sustainable development project), and the *Plan des Déplacements de Paris* (Paris transport plan).

Because certain environmental policy measures could not be incorporated into the legal framework of the PLU in 2004, they were collected in a *Cahier de Recommandations Environnementales* (a set of environmental recommendations).

The purpose of this document is to raise awareness and guide players in the development and construction sector, whether public or private, with regard to the city administration's environmental policy. It covers the many environmental aspects of construction and renovation projects, from reducing work site nuisances to managing energy. Once feedback on this widely-distributed document has been analysed, it will be brought up to date and technical and practical fact sheets on insulation, heating, green roofs, etc. will be added to facilitate the practical application of its recommendations. A questionnaire will be used to measure the impact of the recommendations.

What was still lacking, though, was a method that linked up all of these elements for designing and carrying out urban development operations.

The City of Paris accordingly produced a sustainable development guide, intended primarily for municipal officers in charge of managing development operations and project managers in the urban-planning departments. It also addresses a wider audience of all those involved in development (developers, social landlords and so on).

The principle is simple: at each stage, from the initial decision making to the actual construction and through to the final report, stakeholders are given guidance for acting "sustainably" through a comprehensive, cross-cutting approach. In concrete terms, the guide takes the form of a manual. It covers the core development focus areas: organisation, urban setting, environment, social and economic aspect. For each focus area, there is a diagnosis of sustainable development in Paris, together with objectives, instructions and reference texts. A "dashboard" draws together all of the different aspects of the approach; using examples and performance indicators to help users evaluate completed projects. Like any pilot scheme, the guide will evolve over time. The tool is a learning process, a guided road map that helps its users organise consultation, design attractive public areas and choose suitable materials.

Urban-planning programmes that are at least carbon neutral

The latest contracts for joint state-regional projects are subject to the minimum rule of overall carbon neutrality. This means that, when a programme of work is undertaken, other investments have to be made to offset the additional emissions resulting from the new facilities. In this pilot phase, the City of Paris is studying carbon neutrality and looking at how it can be put into practice.

The city administration undertakes to do everything in its power to achieve carbon neutrality in future ZAC mixed development zones, by combining the most advanced insulation and heat-recovery techniques with renewable energy production facilities.

Draft decisions on municipal development operations are to include a technical appendix setting out the measures taken to effectively limit greenhouse gas emissions in the area under development, with a view to achieving a carbon neutral footprint.

The City of Paris will ask ADEME to examine the possibility of carrying out provisional carbon audits on the site of new development operations and providing a method for measuring changes in these projections at appropriate intervals.

A FEW EXAMPLES

> ZAC Gare de Rungis (13th district)

ZAC Gare de Rungis extends over nearly 3.8 hectares of a former railway yard. It is uninhabited and unbuilt, except for two sheds situated on the edge of the small rail belt, now demolished.

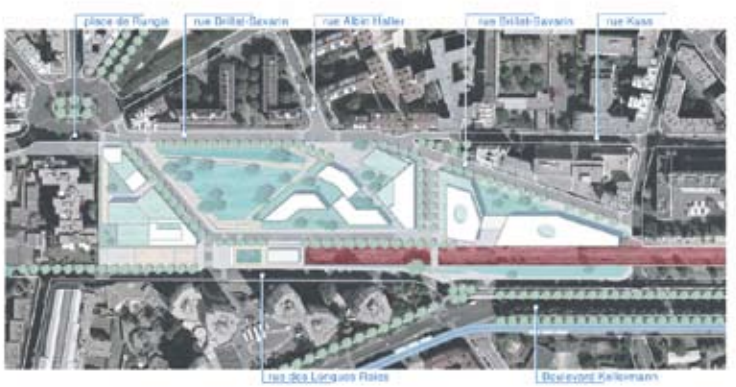
There are plans to build around 300 homes, 19 000 sq. m of offices, street-level shops, a crèche (with accommodation for 60 babies) and a child-minding centre (for 20 children) and an Établissement hébergeant des personnes âgées dépendantes (EHPAD, home for dependent elderly people).

This is the first development operation for which the total energy consumption target is 50% lower than that laid down by the current thermal regulations (RT 2005), which took effect on 1 September 2006. The buildings will have reinforced insulation, use renewable energies and produce electricity from solar energy captured by photovoltaic panels (over 4 000 sq. are planned). The ZAC has been designed to minimise the carbon footprint of not only buildings but also transport. There are no thoroughfares and the emphasis is on "soft" transport and bike parks rather than car parks.

Depending on the aspect and the shape of buildings, they could use:

- solar energy to produce domestic hot water and electricity (photovoltaic panels) wherever there is sufficient insolation;
- passive geothermal energy to pre-heat air in winter and cool it in summer - a technology known in French as *the puits canadien* or *puits provençal.*

Rungis ZAC,
Block plan.
Agence Fortier-Bloch.



THE PRINCIPLES OF "FACTOR 4" DEVELOPMENT

ZAC Boucicaut, Block plan, 2003. Paul Chemetov architect.

> ZAC Boucicaut, (15th district)

ZAC Boucicaut was created to redevelop land belonging to the former Boucicaut hospital. This three-hectare site is still partially occupied by the university activities of the Etablissement Public de l'université Pierre et Marie Curie (a statutory body set up to remove asbestos from the campus).

This operation, which is situated in a very residential sector, will build 8 500 sq. m of community facilities, including an eleven-class school, a crèche with accommodation for 60 babies, a centre for the disabled and the elderly and a hostel for women in a situation of insecurity, as well as an ambitious cultural facility, planned for the second phase. It is also planned to build 350 homes as well as shops and offices, and to convert the green spaces into a public garden.

One of the operation's goals is to maintain the heritage character of most of the buildings while at the same time meeting ambitious energy-saving targets.

Innovative energy-saving products and techniques, such as the use of low-emissivity glazing, will be used to aim for an average consumption of around 65 kWh/m^2/year. The use of solar power (thermal or photovoltaic solar collectors) and the use of passive geothermal energy to heat or cool air (*puits canadien* or *puits provençal*) will greatly reduce the operation's carbon footprint.

Clichy-Batignolles Operation, Block plan. Agence François Grether.

> Clichy-Batignolles operation (17th district)

This major Parisian operation is aimed at linking up the Monceau plain and the Epinettes district, creating a new ten-hectare park to the north-west of Paris, and fostering an urban mix: it includes 3 500 homes, at least half of which will be social housing, as well as businesses, public facilities and heritage development.

On this area of around fifty hectares, still occupied to a large extent by obsolete railway facilities, the City of Paris has set out to create an "exemplary eco-district".

As far as saving energy and reducing greenhouse gas emissions are concerned, this ambition implies trying to balance out CO_2 emissions by using renewable natural energies (solar, geothermal, biomass, etc.) and using energy-saving techniques and products wherever feasible.

To achieve this goal, the operation will need to meet the following requirements:

- The characteristics of the buildings must be such as to allow them to meet or even exceed the thermal efficiency of the RT 2005 thermal regulations less 75%.

  To this end, the architectural design should incorporate the following factors:

  1) a very compact built environment;
  2) a very high level of insulation, especially for glazing;
  3) an almost complete lack of thermal bridges, implying external insulation;
  4) a sufficient thermal mass for incoming solar energy to be stored passively;
  5) a carefully calculated ratio between the surface area of glazing and the surface area of vertical walls, with adjustments depending on the building's aspect: lower to the north, higher between the south-east and the south-south-west;
  6) great attention to shielding openings exposed to summer insolation;
  7) excellent sealing around doors and windows;
  8) dual-flow ventilation, with a very efficient recuperator.

  Early studies show that, under such conditions, net requirements could lie between 18 and 28 kWh/m^2.

- A system of heat generation (for heating and domestic hot water) using at least 85% of renewable energies. Several solutions are under consideration in conjunction with the construction of a renewable heat network:
  – Wood-burning boiler, with the CPCU network as auxiliary system;
  – Heat pumps with borehole into the Albien groundwater reservoir;
  – Direct pumping by deep borehole into the deep groundwater table (the Dogger is situated at a depth of between 1 000 ad 2 000 m), which gives access to a resource at 60°C.

  The total power requirements for the Clichy-Batignolles operation as a whole amount to around 6-8 MW, which may justify building a centralised boiler on a heat network. However further study into the feasibility of this solution will be necessary.

- A system for generating photovoltaic electricity and injecting it into the network. While it may be difficult, if not illusory, to try to offset all of the energy used by home electrical appliances, it is nevertheless possible to set offset targets for the following:
  – Interior lighting;
  – Exterior lighting;
  – Auxiliary heating and domestic hot water systems;
  – All of the general services.
- The use of passive geothermal cooling techniques (*puits canadien* or *puits provençal*);
- The use of pneumatic waste collection.

The district will also house a number of logistics activities that are essential for the city, such as a recycling plant, railway freight, etc. They will be situated to the north of the site and most will be covered (roof or slab). Because they are connected to the SNCF railway network, it will be possible to make this the main means of servicing the site and thereby reduce the carbon footprint of these activities.
Lastly, the entire sector will be equipped with a pneumatic waste-collection system. The suction terminal will be installed in the heart of the railway freight zone, close to the railway facilities for removal of the waste and close to the recycling plant for its processing. This innovative system, by doing away with the rounds of waste collection trucks, is fully in keeping with measures to reduce energy consumption and greenhouse gas emissions.
In conclusion, early study findings show that the goal of carbon neutrality can indeed be achieved by implementing the full set of measures planned for the sector.

> ZAC Pajol (18th district)

The 3.4-hectare ZAC Pajol is an ambitious programme. It aims to promote the district by developing business and employment. It will build community cultural and sports facilities, a youth hostel, a secondary school and host a university institute of technology. It will enhance the living environment by creating a neighbourhood public garden and developing vacant areas. It will also preserve the architectural heritage of the covered market and the freight building, which will be used to receive the public and the new occupants.

At the same time, the largest inner-city photovoltaic plant in France – by today's standards – will be installed on the roof of the covered market.

Its capacity will be equal to over 1% of the total production capacity installed in France today:

- 3 300 sq. m of photovoltaic solar panels will produce 380 MWh/year - almost enough to cover the electricity requirements of the facilities the building houses (youth hostel, library, multimedia centre, business and commercial premises, etc.).
- 200 sq. m of solar panels will produce 50% of the youth hostel's domestic hot water and 90% of its summer requirements (in addition to the energy supplied by CPCU).

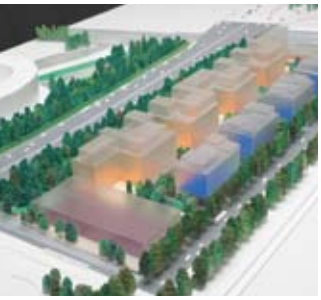
Moreover, 300-500 sq. m of photovoltaic panels could be installed on the roof of the gymnasium. Their production of 30-50 MWh/year - a third of the building's electricity requirements - would reduce the charges.

The secondary school will be equipped with thermal solar panels to pre-heat domestic hot water.

A study will shortly be initiated into the installation of solar panels on the university institute of technology and the business centre.

ZAC Pajol, block plan, 2006. Agence Galiano - Simon,architects coordinating the ZAC.

THE PRINCIPLES OF "FACTOR 4" DEVELOPMENT



ZAC Claude Bernard, Block plan. Agence Dusapin Leclercq urban planner. Agence TER landscape architect.

> ZAC Claude-Bernard (19th district)

Situated in the development sector to the north-east of Paris, the ZAC Claude-Bernard/ Quai de la Charente/canal Saint-Denis will comprise some 330 homes, a crèche and a school. It is also planned to build an EHPAD, 40 000 sq. m of offices and 8 000 sq. m of businesses and shops.

The following requirements have already been laid down in relation to energy:

- Energy consumption is to be reduced to a level that is, on average, at least 20% lower than that specified in the current RT 2005 thermal regulations. Facilities such as the school and the crèche are to achieve even greater energy efficiency: consumption should be 40-50% lower than stipulated in the regulations. They are to strive for energy self-sufficiency;
- All constructions are to use at least 25% of renewable energies.

The operation to build 40 000 sq. m of offices, which was awarded in July 2007, already plans to exceed these targets and achieve energy consumption figures that are 25% lower than in the RT 2005 regulations. The housing operations should aim for the BBC label.

> Fréquel-Fontarabie sector (20th district)

The Fréquel-Fontarabie sector is the last part of the Réunion district to be redeveloped. It is a working class district containing housing that is unfit for habitation, different types of buildings and large vacant areas.

The City of Paris aims to eliminate the insalubrity and build business premises, homes (116 new-build and renovated), a crèche, a *PMI* (maternal and child welfare services) and a green space.

Set at the very centre of an urban block, the buildings will be built or renovated in such a way as to keep their energy consumption to a minimum. The quality of the exterior envelope (external insulation, energy-efficient joinery, super-insulated terraces) combined with the energy-efficiency of the equipment inside will allow them to achieve the following consumption rates for heating:

- less than 65 kWh/m^2/year for renovated buildings;
- less than 15 kWh/m^2/year for new-build constructions (referred to as "passive" buildings by analogy with the German "PassivHaus" label).

Likewise, energy-efficient equipment will curb electricity consumption in the common areas and in apartment kitchens and bathrooms.

Frequel Fontarabie sector. Atelier Pascal Gontier.

> District heating company (GPRU)

The City of Paris launched the GPRU major urban renewal project in 2002 to upgrade eleven working-class districts situated on the outskirts of the capital (around 85 000 inhabitants). These districts will be an area of excellence for reducing both emissions and energy charges.

Building renovation operations will aim for low energy consumption, i.e. 80 kWh/m^2/year for heating, domestic hot water, lighting, ventilation and auxiliary appliances.

AMENDING THE LOCAL URBAN-PLANNING PLAN (PLU)

The following measures for inclusion in the PLU will help achieve the goals of reducing greenhouse gas emissions:

Amending prescribed building dimensions

To back up city administration support for housing-improvement operations and the development of renewable energies, the City of Paris has undertaken to "amend the PLU as soon as possible to allow renewable-energy production plant to extend beyond the prescribed horizontal dimensions of the building envelope" A recommendation to this effect was approved by the Paris City Council on 17 July 2007.

- A slight increase would allow for work on reinforcing insulation or developing renewable energies, without encroaching on the net floor area.
- The various stakeholders concerned will meet to examine the conditions for its implementation, under the aegis of the *Direction de l'Urbanisme* (urban-planning department). Working meetings will be organised with the *Architectes des Bâtiments*

de France and will give rise to the publication of a guidance fact sheet.

Renewable-energy production plant will be allowed to extend beyond the prescribed dimensions of the building envelope, providing they blend into the urban landscape.

Bonus on the Coefficient d'Occupation des Sols (COS, land-use coefficient)

In its decision of 12 and 13 June 2006, the Paris City Council approved the principle of applying a bonus on the COS for constructions that fulfil energy-efficiency criteria or contain renewable-energy production plant.

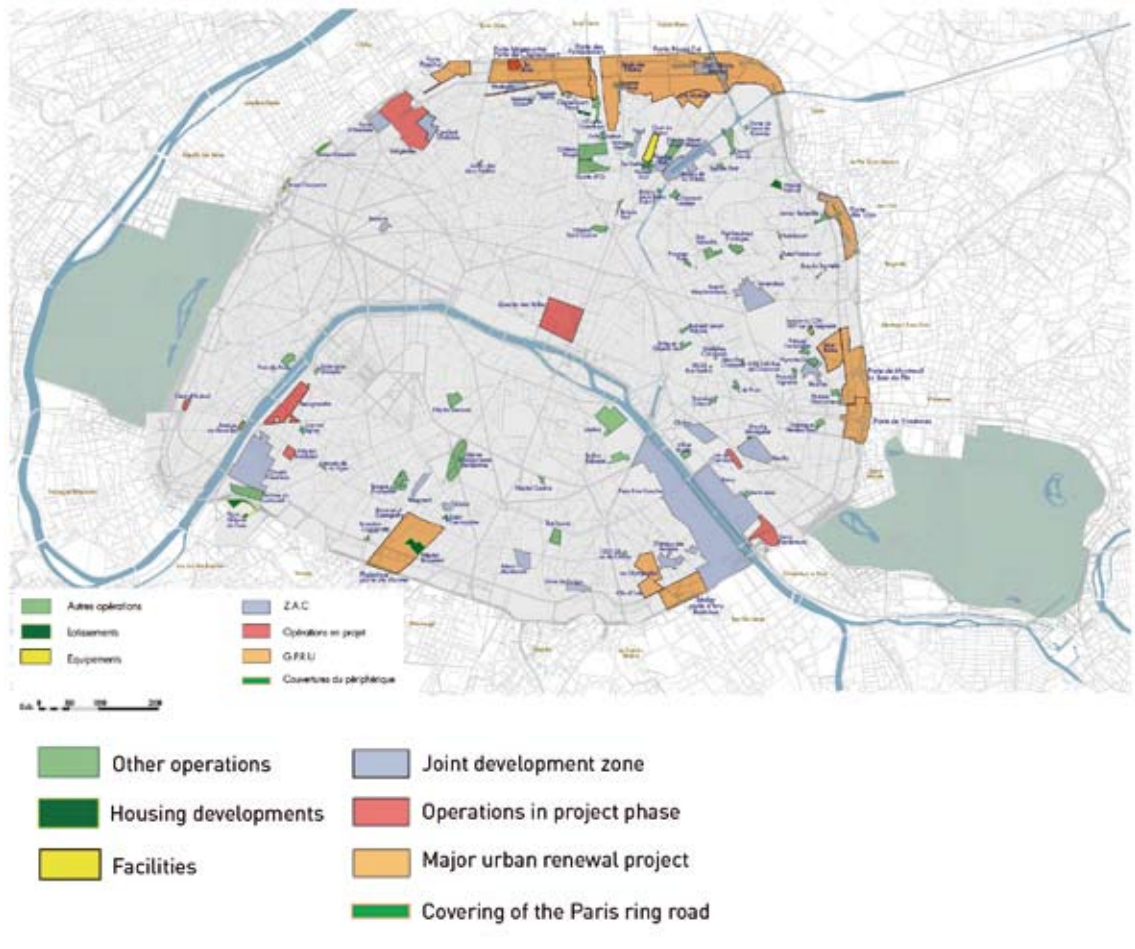
The application orders of 3 and 8 May 2007 set out the conditions of entitlement to this bonus. New-build constructions must meet French standards for low-energy or ultra-energy-efficient buildings (respectively *Bâtiment Basse Consommation énergétique*, BBC and *Très Haute Performance Énergétique*, THPE EnR 2005). Specific provisions are planned for renovations.

Increasing the density of city centres

In keeping with the goals of the *Schéma directeur de la région Ile-de-France* (SDRIF, a regional development and urban-planning master plan for the Ile-de-France region), the City of Paris will give precedence to dense developments in the projects it undertakes or in which it is involved. Its aim in so doing is to contain urban sprawl, limit the city's ecological impact and curb the use of private cars, by providing a suitable alternative in the form of public transport and "soft" transport.

Urban development operations

MAIRIE DE PARIS Direction de l'Urbanisme (City of Paris Urban Planning Division)



TRANSPORT

03

The carbon audit highlighted the key role played by transport in emissions. The emissions from all forms of transport used in Paris can be divided into two main categories:

- passenger transport: by car, motorbike, or plane for holiday-makers...
- goods transport: of all types (air, road, railway, river, etc.)

To calculate total greenhouse gas emissions, the carbon audit takes into account the entire journey (for example: a delivery to Paris from Germany, or a Parisian's trip to Venice). The emissions generated by the entire journey are included in the 12.8 million t CO_2e of the transport item.

In its decision of 12 February 2007, the City of Paris adopted its *Plan de Déplacement Paris* (PDP, Paris transport plan), aimed primarily at reducing the greenhouse gas emissions due to traffic in Paris by 60% by 2020.

THE CITY ADMINISTRATION'S STANDARD-SETTING ACTION ON TRANSPORT AND MUNICIPAL TRAVEL

When applied to municipal transport, the city administration's 60% target reduction in greenhouse gas (GHG) emissions entails a reduction of nearly 27,500 t CO_2e by 2020.

To achieve this target, three concrete undertakings were decided upon:

- the introduction of a *Plan de Déplacement de l'Administration Parisienne* (PDAP, a travel plan for City of Paris staff), applying the principles of the PDP;
- the pursuit of ongoing initiatives that serve the goals of the Climate Protection Plan: reducing the car fleet, using more energy-efficient or more suitable vehicles that use less fuel, and using hybrid or electric vehicles;
- These initiatives are complemented by the promotion of "eco-driving", i.e. reducing fuel-consumption by changing individual driving styles.

THE TRAVEL PLAN FOR CITY OF PARIS STAFF (PDAP)

Travelling by City of Paris staff was estimated in the carbon audit at a total of 46,300 t CO_2e. Of this, 6,200 t CO_2e were for commuting between home and work. This represents 19% of the greenhouse gas emissions attributable to city administration services.

The City of Paris will implement the PDAP transport plan in all city administration departments. The SDIA optimisation plan will work towards the same goal for the city administration's central administrative facilities.

The goal is to make City of Paris staff mobile while at the same time reducing the percentage of car transport in both the daily commute and travelling on city administration business. The PDAP plan will be implemented after consultation with the staff and their representatives.

The PDAP will contain the following measures:

- **rationalisation of the use of city administration vehicles and car parks (car pool);**
- **the provision of financial assistance to officers who use public transport when travelling on city administration business;**
- **a reduction in the environmental impact of deliveries associated with city administration business;**
- **to set a good example, City of Paris vehicles will gradually be equipped with an energy – carbon sticker informing city administration officers and Parisians of their environmental performance;**
- **steps will be taken to support and promote the use of bicycles by city administration officers, in particular by providing incentives to use Vélib' for business travel;**
- **the City of Paris will seek to facilitate car-sharing by setting up car-sharing exchanges;**
- **it will facilitate the use of car-pooling;**
- **in accordance with the Paris City Council recommendation of July 2005, city representatives and officers travelling on city administration business should use the train whenever possible. In cases of force majeure and for long-distance travel, the emissions generated by the associated air transport will give rise to carbon offsetting;**
- **the City of Paris will seek to shorten distances between its officers' place of employment and their home, for officers who so desire, primarily through transfers in the social housing stock (from the housing stock situated in outer Paris to a home in inner Paris);**
- **in keeping with the SDRIF development and urban-planning plan, the City of Paris will seek to encourage a greater density of housing and businesses in sectors close to public transport, in Paris and in densely-built zones (Parisian properties situated outside the centre of Paris) in order to curb urban sprawl and the use of private cars.**

Special attention will be given to helping the staff most reliant on their car (because of the distance between home and work, staggered working hours and the availability of public transport).
The city administration will encourage the other major public administrations in Paris, such as AP-HP (the hospitals authority) or the police headquarters, to adopt similar travel-plan strategies.

THE CITY ADMINISTRATION'S STANDARD-SETTING ACTION ON TRANSPORT AND MUNICIPAL TRAVEL

MANAGING THE MUNICIPAL VEHICLE FLEET

In 2007, the City of Paris's car fleet is made up of 3,847 vehicles (for the Transport Automobiles Municipaux, TAM, or municipal car transport service) – 62% of this fleet is classified as "low-polluting". There are also 841 vehicles (waste collection trucks, street cleaners and salt spreaders) for the Direction de la propreté et de l'eau (DPE, the department responsible for cleanliness and water), with a marked trend already towards the use of alternative fuels (VNG, vehicle natural gas).

The City of Paris is committed to pursuing its efforts through the following initiatives:

- **Reduce the municipal car transport fleet by 10% in three years**
  This means a reduction of 300 city administration vehicles. It is a policy that will reduce emissions by 280 t CO_2e and bring savings of 1.5 million euros. This effort to rationalise the fleet will be conducted in liaison with the PDAP plan.

- **Purchase ever more efficient vehicles**
  The City of Paris is pursuing a policy of purchasing low-emission vehicles. Up until 2006, the vehicles purchased had an emission level of 170 g CO_2 per km. The contract awarded for 2006-2009 lowered this level to 120 g CO_2 per km. The City of Paris will continue to purchase low-emission vehicles, with a view to attaining an emission level of 100 g CO_2 per km.

- **Purchase hybrid vehicles**
  Hybrid vehicles are particularly efficient in urban environments and can reduce energy consumption by 20-40%. This type of vehicle, which is still in short supply today, also helps reduce noise pollution.
  The City of Paris is committed to substantially increasing its fleet of hybrid vehicles, with the ultimate aim of achieving a balance between this sort of vehicle and the others.
  To this end, it has set itself an initial target of 10% of hybrid vehicles by end-2009.

- **Pursue the study into natural-gas vehicles**
  A significant proportion of DPE technical vehicles run on natural gas. Before the principle can be transferred to passenger vehicle fleets, an in-depth study will be necessary into the use of natural gas and the associated constraints (vehicle range, supply network). The City of Paris is committed to investing in the necessary facilities by 2010. DPE vehicles will gradually start running on methane derived from Parisian waste as it becomes available, though without compromising other particularly efficient applications, such as heating.

- **Test and assess agrofuels**
  In a decision dated October 2005, the City of Paris resolved to refocus its car fleet on vehicles that had lower greenhouse gas emissions and could run on agrofuels.
  These policy decisions were translated into the following measures:
  – the replacement, over four years, of 2,055 vehicles in the municipal fleet by diesel vehicles running on bio-diester; A 30% reduction in local emissions is expected, for a total investment cost of 33 million euros. City administration petrol stations have been adapted to accommodate this new fuel. Consideration will be given to forming partnerships with other captive fleets in the public sector so that they can use them too;
  – at the same time, trials of ethanol vehicles have been launched in partnership with ADEME, on a decision by the Paris City Council. The city administration has purchased around fifteen ethanol vehicles (thereby averting 15 tCO_2e per year). Tax incentives have cancelled out the cost of the vehicles and the fuel for the City of Paris. It has however been necessary to adapt a petrol station.

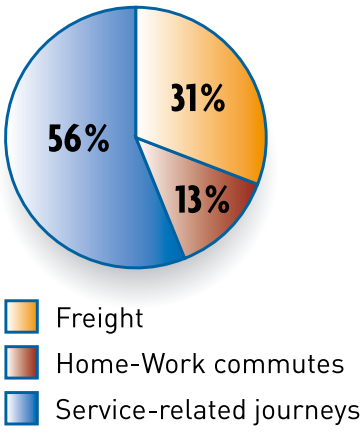
Aftert two years, City of Paris will carry out an assessment of the agrofuel trials and have a detailed carbon audit drawn up by an independent expert. In particular, the audit will include the origin and the crop used for the fuels, so that it can calculate the overall

eco-balance by measuring their impact on food security and biodiversity.
Based on the findings of the audit, the city administration will decide whether or not to continue replacing its vehicles and converting to a different fuel, and if so at what rate. It will also be able to accurately gauge the impact in terms of greenhouse gases.

The city administration will approach UGAP (a public-sector purchasing cooperative) so that the proposed contracts not only meet its own needs but might also meet the needs of other local authorities and the State for the most innovative and the most eco-friendly vehicles.

The above-mentioned fleet reduction and modernisation projects should lead to a reduction of at least 30% in greenhouse gases by 2012 (when current procurement contracts will expire).
It can reasonably be assumed that the new technologies, in addition to rationalisation of the fleet, will make it possible to achieve a 40% reduction in this item by 2020, amounting to 18,500 t CO_2e.
A further 9,200 tCO_2e will have to be shed to achieve the target 60% reduction laid down in the internal PDP. This balance should be addressed by implementing the SDIA master plan and the PDAP plan, with particular attention being given to the city administration's goods deliveries (31% of the 2004 carbon footprint) and city administration officers' commuting.

City of Paris vehicle emissions
12,500 metric tons of carbon equivalent



PARIS AS THE ORGANISER OF THE REGION IT ADMINISTERS

THE PDP TRAVEL PLAN

Target: a 60% reduction in emissions from inner-city traffic by 2020

The draft PDP adopted at the Paris City Council meetings of 12 and 13 February 2007 sets target reductions in greenhouse gas emissions for the Paris region. It aims to apply and extend the policy measures contained in the Île-de-France PDU (urban travel and transport plan) by proposing a set of initiatives to be conducted in the Paris region. The PDP also develops an overall view of future transport in the wider Paris metropolitan area, going beyond the strict scope of authority of the City of Paris. This is why the document combines prescriptions lying within the responsibility of the City of Paris with recommendations implying other partners (the regional authority, STIF (the Ile-de-France public transport executive), the State, RATP, businesses and even the population).

This approach is aimed at ensuring consistency and perspective in municipal transport policy, in time and in space:

- **in time:** by linking up and synchronising the latest reductions in car traffic and by reinforcing the availability of alternative means of transport;
- **in space:** by considering that transport conditions in the city are interdependent with transport conditions in the wider Paris metropolitan area, and fitting in with the organisation of transport on this broader scale.

The PDP sets the following targets [3] for lowering carbon dioxide emissions from vehicles travelling in the inner Paris area, by comparison with the 2001 figures:

- 2013: 25% reduction in CO_2 emissions due to traffic in Paris;
- 2020: 60 % reduction in CO_2 emissions due to traffic in Paris.

The PDP's main goals are as follows:

- give priority to developing new forms of transport as an alternative to private cars: promote the most sustainable forms of mobility by creating complementary mobility services (public transport, self-service bicycle hire, car pooling, etc.). Also give priority to "clean" vehicles. Both measures work towards an overall reduction in car traffic;
- give priority to certain types of travel needs – emergency services, business travel, deliveries, etc. – and facilitate their mobility, while at the same time seeking to limit the nuisances, the pollution and the environmental impact;
- incorporate Parisian policies into a shared vision of the wider Paris metropolitan area.

The majority of the PDP's measures work towards achieving the targets for reducing CO_2 emissions. They are set out below, grouped by focus area.

DEVELOPING ALTERNATIVES TO THE USE OF PRIVATE CARS

The ongoing development and diversification of the public transport offering

- Extend the tram system to the east and the north, with the first extension commissioned in 2012;
- Deploy the second phase of the Mobilien programme, a major bus network ("above-ground metro");
- Extend certain metro lines and build a major underground public-transport link that circles Paris;
- Reinforce the metro (including longer weekend hours) and the bus service, in particular by improving overlap between the "Paris" and the "suburbs" bus networks;
- Diversify the transport offering by setting up a river-boat shuttle service on the Seine and developing neighbourhood bus lines (*Traverses*), which meet new mobility needs (seniors, visitors, etc.).

Develop inter-modality

- Increase traffic on public transport networks by modernising and enhancing relay car parks;
- Increase traffic from buses and bicycles to RER suburban trains.

3. Targets calculated on the basis of CO_2 emission figures produced by Airparif's HEAVEN modelling sequence, from emissions recorded within the boundaries of inner Paris, excluding the ring road.

Bring into widespread use facilities and mobility services that promote "soft" transport and alternatives to the use of private cars

- Deploy self-service bicycle hire: the Vélib' system was installed in July 2007. At the end of its first year in service, the city administration should assess its impact in terms of emission reduction, the migration of users from other modes of transport and growth in the number of cyclists. Already, the total of at least 50,000 uses per day reveals an increase of over 30% in the number of cyclists in the capital;
- Facilitate the coexistence of different modes of transport in public areas, and pay particular attention to the most vulnerable of them, by applying a policy of both awareness raising and control to all users, and by lowering the speed limit for motorised vehicles.
- set up schemes to develop car-sharing and car-pooling, and improve the supply of taxis;
- offer holders of the *carte orange* public transport pass a range of complementary services;
- create pedestrian streets, zones limited to 30 km/h, green districts and *espaces civilisés* (appeased hotspots), etc.

ENCOURAGE BUSINESSES TO IMPLEMENT PLANS DE DÉPLACEMENTS D'ENTREPRISE (PDE, BUSINESS RELOCATION PLANS)

It is essential to involve all players that have an influence on the number and type of journeys made and the mode of transport used. Businesses, in consultation with their employees, play a key role and have numerous tools at their disposal for reducing the cost of transport, improving the conditions of access for their employees and customers, and reducing car traffic and the attendant nuisances (reimbursement of transport costs, vehicle fleets, choice of new business locations, etc.). The numerous public administrations and publicly-owned companies in Paris have considerable room for manoeuvre.

Under the *Plan de Protection de l'Atmosphère Île-de-France* (Île-de-France atmosphere protection plan), it is now compulsory to implement *Plans de Déplacements d'Entreprise* (PDE, Enterprise transport plans) on major employment sites. The City of Paris will join forces with local authories in the Paris metropolitan area and business and social partners to encourage the employment basin's largest businesses to implement PDE plans. To this end, it will set up, with other interested local authorities, a cell to advise businesses on their mobility needs. It will also provide PDE support and coordination for businesses setting up operations in development zones in the Paris region.

FACILITATE TRAVEL FOR BUSINESS PURPOSES WHILE REDUCING THE ASSOCIATED NUISANCES

Goods transport in Paris represents over 32 million tons a year, most of which (90%) is currently transported by road. The PDP provides for reinforcing the use of rail and river transport, in liaison with the provisions of the PLU, which will make it possible to maintain and develop the urban logistics sites necessary for rail and river transport.

Moreover, the regulations governing deliveries in Paris have been extensively rewritten since 2001 in close collaboration with business and social players, and accompanied by a *Charte des bonnes pratiques du transport et des livraisons* (charter of best practices for transport and deliveries). It has simplified the Parisian regulations and added environmental criteria designed to encourage the least-polluting logistics arrangements.

The City of Paris is also supporting the emergence of innovative practices likely to reduce the associated nuisances. These include developing home deliveries and setting up parcel delivery points and "city office" networks. A number of broader focal areas are also under consideration, such as the use of the rail network (RER, metro and tram), in particular on the Les Halles site, waste removal, etc.

The PDP also makes allowance for business travel and the specific needs associated with certain industry sectors. Special arrangements have been drawn up in consultation with industry representatives, covering the parking requirements of shopkeepers and tradesmen, health care professionals, removalists and so on.

PARIS AS THE ORGANISER OF THE REGION IT ADMINISTERS

REDUCE VEHICLE NUISANCES AND EMISSIONS

One of the initiatives included in the PDP consists in encouraging the use of low-polluting vehicles and curbing that of high-polluting vehicles, especially as regards CO_2 emissions.

Incentives for using "clean" vehicles exist already and are of several types:

- **Parking measures:** discount rates for small vehicles and electric vehicles for on-street parking and in public car parks operated on a concession basis (increased numbers of charging stations and reserved spaces);
- **Traffic measures:** wider delivery times for commercial delivery vehicles that meet certain environmental standards, with a possible extension to tourist coaches. The PDP also proposes, for example, to examine and test new conditions for using Paris's ring road, under which priority would be given to the least-polluting vehicles. This would be done in accordance with joint decision-making procedures, in liaison with the elected members of the *Conférence métropolitaine* (a discussion forum for elected representatives from local authorities) and the government.

Lastly, the city administration has suggested that the regional authority provide financial support to help taxi operators purchase cleaner vehicles.

The PDP makes provision for phasing in restrictions on the use of the most heavily-polluting vehicles. Such restrictions are aimed at encouraging consumers to buy the least-polluting vehicles and car-makers to improve their vehicle ranges accordingly. They will be adopted progressively and only after consultation, taking into consideration not only their environmental aspect but also their social and economic impact. The measures will be the subject of broad-based discussion and will be phased in gradually so that individuals and businesses can anticipate the changes. To be truly effective, such measures should logically be taken at regional level. Failing this, the City of Paris and interested local authorities could be led to take measures in their specific regions.

Any such measures will have to be based on the current Euro standards. Special attention should be paid, though, to the latest vehicles, some of which have been shown to generate particularly high levels of greenhouse gases and, correlatively, be heavy consumers of petroleum products (7.7% of new vehicles on the market today release over 200 g CO_2 per km).

INCREASE THE SHARE OF PUBLIC AREAS DEVOTED TO ALTERNATIVE MODES OF TRANSPORT TO PRIVATE CARS

The urban regeneration of key public areas (inner-city squares, major intersections, suburban public areas, the major avenues, the "*maréchal*" boulevards when the T3 tramway was extended) and dedicated developments to facilitate bus and bicycle traffic will be synchronised with development of the public transport offering, to promote a large-scale migration to modes of transport that generate far fewer greenhouse gas emissions. Special measures will be taken for locations such as the inner-city districts, the woods and the riverside roads. Lastly, the use of Paris's ring road will be adapted, in coordination with the other motorways in the centre of the metropolitan area and within the framework of a joint decision-making process with the State, the regional authority and neighbouring local authorities.

The city administration will continue to give priority to residential parking. At the same time, it will rationalise the available parking spaces. Its aim in so doing is to promote residential balance and blend and encourage Parisians to leave their car at home whenever possible.

The initiatives under way since 2001 produced a 9% drop in emissions in inner Paris between 2002 and 2007 [4], There was in fact an 11% drop due to falling traffic, despite a 2% increase in emissions per vehicle because of qualitative upgrading.

4. Source: Airparif; 2007; Etude de l'impact des évolutions de circulation sur la qualité de l'air (report on the impact of changes in traffic levels on air quality)

SET UP A TASK FORCE TO STUDY TRANSPORT IN THE HEART OF THE METROPOLITAN AREAN

To facilitate a new metropolitan governance of transport policy, which plays a decisive role in achieving the goals of the PDP and the Climate Protection Plan, and to help the different players coordinate and link up their initiatives, it would be useful to pool the existing data and the expertise tools, to construct common diagnoses and coordinate evaluation procedures by setting up a task force to study transport in the heart of the metropolitan area.

The full battery of measures described above will make it possible to achieve the target 60% reduction in greenhouse gas emissions associated with inner-city car traffic by 2020.

TRANSPORT OUTSIDE PARIS

Target: a 25% reduction in emissions in the transport sector by 2020

As Paris's carbon audit showed, the emissions counted against Paris also depend on the means of transport used and the journeys made outside Paris, in the region, in France and beyond.

While the PDP admittedly proposes a large number of initiatives to reduce greenhouse gas emissions arising from inner-city traffic, the overall target of a 25% reduction in emissions by 2020 cannot be achieved without involving the entire community, in the Ile-de-France region, the French government and Europe.

A marked reduction in emissions from goods transport will therefore entail a shift in the mode of transport used, from rail to river transport. The PDP provides for building logistics platforms close to rail and river infrastructures, but the government and Europe will have to step up their efforts to develop rail-road transport (e.g. the Perpignan-Luxembourg link) or river transport (opening of the Seine-Northern Europe canal).

In passenger transport, half of the emissions generated stem from car travel between the region and Paris. Developing public transport throughout the metropolitan area will help achieve this ambitious goal.

The City of Paris will suggest to the Ile-de-France regional authority and local authorities in the metropolitan area, within the framework of the *Conférence métropolitaine*, that they undertake a joint study of the initiatives that need to be taken to achieve the target reduction in greenhouse gas emissions in the transport sector. As the PDP advises, the parties will need to ensure that measures to restrict car traffic are combined with the development of alternative modes of transport.

To support this initiative, a task force could be set up to study mobility in the dense zone. There could also be more frequent exchanges of experience with major international cities, as suggested in the PDP.

ROLE OF THE GOVERNMENT

Measures to encourage "clean" vehicles and curb high-emission vehicles require a tightening of the regulatory framework.

The PDP advocates a certain number of legislative and regulatory reforms:

- The notion of "clean" vehicles needs to be extended to other technologies alongside electricity and gas. It should apply to all types of vehicles (private car, commercial vehicles, trucks, motorised two-wheel vehicles, coaches, etc.) and take into account primarily emissions of air pollutants and greenhouse gases. At the same time, incentives for using "clean" vehicles should be determined in liaison with the regional authority, the government and ADEME.
- Restrictions on the use of certain vehicles imply first establishing the rules and the procedures for vehicle identification and control.
- The introduction of a "street code" that protects and facilitates non-motorised traffic.

The development of alternative means of transport to private cars helps reduce greenhouse gas emissions and calls for the allocation of new, permanent sources of financing.

A number of avenues should be explored, such as:

- transferring a percentage of the *Taxe Intérieure sur les Produits Pétroliers* (TIPP, domestic tax on petroleum products) to the STIF;
- raising the rate and the tax base of the *Versement Transport* (a transport tax based on a company's payroll);
- taxing certain traffic generators;
- transferring the *Fonds d'Aménagement de la Région Ile de France* (FARIF, Ile-de-France development fund) to the local authorities, and changing its rate and tax base;
- increasing transport credits in forthcoming project contracts, by 2020;
- and, in a broader perspective, shifting the burden of taxation to eco-taxes.

Given the urgent social and environmental issues at stake, the city administration is counting on rapid decisions in these areas.

CONSUMPTION

04

The City of Paris has already embraced a bold sustainable-development agenda through its procurement operations. Sustainable procurement does not only involve economic issues (even though the associated financial stakes are considerable): it contributes to curbing greenhouse-gas emissions as well. It involves assessing products and services from a holistic angle, i.e. from the beginning to the end of their life.

RESPONSIBLE MUNICIPAL PROCUREMENT

Certain products may cost more to purchase, but indeed cost less over the long term (because they cost less to run, take a lower toll on the environment, and last longer). That is what makes responsible procurement a sensible option from an economic standpoint.

The City of Paris's responsible-procurement policy stems from three main principles:

- **eco-responsible purchasing,** which is tantamount to buying the most eco-responsible products, equipment and services (i.e. choosing recycled, recyclable, cost-efficient and clean options in the case of goods and services);
- **eco-responsible management,** which involves administrating equipment and supplies as sensibly as possible (i.e. not wasting supplies and making equipment last) as well as simplifying administrative management procedures (i.e. using a standard reference base and streamlining stock management);
- **eco-responsible advice,** which entails circulating best practices on the sustainable-development front to municipal staff, users and elected representatives through the intranet site.

THE RESPONSIBLE-PROCUREMENT REFERENCE BASE

The City of Paris is involved in efforts to build and develop a responsible-procurement reference base. This practical and dynamic tool encompasses four scenarios and the associated greenhouse-gas emissions: short-life products (consumables, supplies and packaging), capital goods that consume energy, capital goods that do not consume energy (the goal is to favour robust equipment in both these categories), and services (where the goal is to promote eco-responsible behaviour).

The Code des Marchés Publics (public-procurement code) requires buyers to refer to the equivalent documents and standards issued by French or European public authorities in particular, and to certified eco-labels, in particular. The two "labels" that have proven most effective in efforts to curtail greenhouse effects are the Energy Star logo (for computer equipment) and the *Étiquette Énergie* (for electric and household appliances). The city administration also uses all the ISO 14001, 14020 and associated standards, the EU Eco Label, and its foreign equivalents.

topten
Réfléchissez avant d'acheter !

THIS EXPERIENCE HAS ENABLED THE CITY OF PARIS TO WORK WITH FIVE COMMUNITIES

(Communauté Urbaine de Lyon, Lille, Châlons-sur-Saône, Nord-Pas de Calais and Corsica), the WWF and the CLCV (a consumer association) to develop what we have called "TopTen", a compendium of information about the environmental aspects of the products that public-sector administrations purchase most often.

PAPERLESS ADMINISTRATIVE PROCEDURES

Paris City Council information, bid reviews, contract awarding and invoicing are already going paperless, and authorities have pledged to step up efforts in this direction. Besides simplifying formalities and access to information, doing so cuts the need to travel and the use of paper whenever the Internet provides a feasible alternative.

The goals involve slashing the amount of paper that the Paris City Council uses by 95% in 2008, and the amount of paper that the Paris administration as a whole uses by 66% by 2013.

CRÈCHE AND SCHOOL CANTEENS, AND STAFF RESTAURANTS

The Climate Protection Plan aims to promote organic and local produce, which release lower quantities of greenhouse gases. In line with France's national plan for sustainable public procurement, the City of Paris is aiming to ensure that organic produce accounts for 15% of the food served in canteens and staff restaurants in 2008 and for 20% in 2010.

All the minced beef, potatoes, spinach and carrots served in crèches have been organic since 2006. The fact that they contain no pesticide residue and lower nitrate content are all the more important as children in crèches are still at a young age and as these staples account for a large portion of their diet.

Another step in this direction involves buying in-season local produce whenever possible (again because doing so entails releasing less carbon).

As early as 2007, the integrated clauses will reduce the number of deliveries by 60%, and cut the amount of associated packaging and throwaway products (by returning trays, using reusable tableware, reusable linen, etc.). Factoring these clauses into contracts does not entail higher costs.

School authorities, which report to local ("arrondissement") city administrations, source the food served in their canteens. The fact that Parisian school canteens serve 20 million meals a year explains their substantial environmental impact. Plans on this front involve taking stock of best practices in district local city administrations and stretching them to all school canteens in Paris.

This plan will also apply to the meals that other City of Paris organisations serve (for the elderly, in particular).

The city administration will raise trade awareness of food's carbon footprint and of the importance of taking it into account.

AGRICULTURE BIOLOGIQUE

WASTE MANAGEMENT

The City of Paris is rolling out a sustainable waste-management policy in the Plan de Prévention des Déchets Parisiens (Parisian waste prevention plan) that it is currently drafting. This plan sets targets for 2010 based on 2005 figures.

The city administration collects 1.2 million tons of household and small-business waste a year. That is twice as much as 50 years ago. Waste-elimination costs are rising and waste-treatment regulations are tightening.

Waste spawns greenhouse gases regardless of the process used to treat it. So cutting waste production is the first issue. Doing so entails using durable (i.e. reusable or repairable) goods, and thereby sparing the natural resources and energy needed to produce and transport new ones. Routing items that Parisians want to discard towards channels that enable reuse is the option that the city administration is focusing on.
When it comes to treatment processes, the goal is to promote systems that use less energy and natural resources, i.e. recycling and its upshot, waste screening at source. The glass collected in Paris in 2006 kept 38,500 tCO_2eq out of the atmosphere.
The Plan de Prévention des Déchets contains more than 50 initiatives to reduce greenhouse-gas emissions associated with waste management (which are estimated at 367,000 tCO_2eq). These initiatives fall into one of three categories, namely reducing waste production, improving screening efficiency (i.e. enhancing screening quality and thereby increasing recycled-waste quantities), and improving material and energy conversion efficiency.
SYCTOM, the company in charge of processing waste from Paris and its outskirts, has also embarked on a waste-reduction plan. It is gradually reducing its incineration capacity (incineration is the waste-management option that generates the highest quantities of greenhouse gases). Incineration capacity at ISSEANE, the new plant it is building, will be 20% lower than the incinerator it will replace. Incineration capacity in Ivry, a plant it is currently designing, should by 50% lower.

CURBING WASTE PRODUCTION

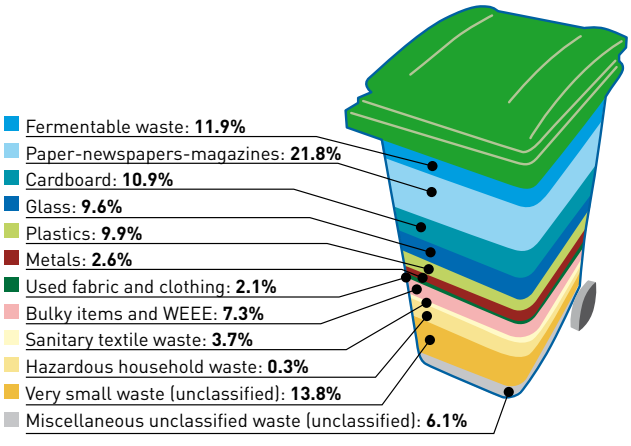
The target: -15% in 2020

The goal is to cut the amount of waste that each inhabitant generates each year by 25 kg. This should add up to cutting 30,000 tons of household waste, repairing and reusing 8,000 tons of waste, and rerouting 10,000 away from municipal channels through pending extensions of producer responsibilities (Waste Electrical and Electronic Equipment, etc.).

ENHANCING SCREENING AND RECYCLING EFFICIENCY

Recyclable-waste collection (in bins with yellow tops) and glass collection (in bins with white tops) have been the norm since 2002. A second weekly collection run and plans to step up communication will add 13,000 to 26,000 tons to household-waste collection and recycling figures. Efforts to equip 450 municipal gardens beginning last summer, and experiments on certain transport networks, are also expected to contribute. In 2006, 120,000 tons of materials were screened at source.

Efforts will focus on using new tariff-based incentives passed in September 2007 to encourage business firms to sort their waste (paper and cardboard mainly) and to channel it to recycling plants (the potential is between 10,000 and 45,000 tons).



CONVERTING ORGANIC WASTE

City of Paris is already channelling fermentable waste from its parks and gardens (15,000 tons) towards conversion plants. The experiments that the city administration is conducting at this point involve processing plant waste where it is produced (plus possibly taking in fermentable waste from the area's residents). Wood waste from lopping operations will be used to heat municipal greenhouses.

Catering accounts for 11.7% of the 400,000 tons of non-household waste that the city administration collects every year. The constraints associated with storing rotting waste are of course substantial, so screening at source in restaurants and canteens will be developed whenever and wherever possible. This uncontaminated fermentable waste could be used along with plant waste to produce biogas and compost. Whenever possible, this option will be facilitated in areas covered by pneumatic collection.

SYCTOM has started conducting feasibility studies involving methanisation facilities using waste left over after recyclable-waste segregation. In these units, waste collected in green bins will go through a mechanical sorting system at the beginning of the chain in order to channel fermentable waste towards biogas-production operations. This new option should be operational by 2012.

A NETWORK OF DÉCHETTERIES-*RESSOURCERIES*® (WASTE-PROCESSING AND RESOURCE-GENERATING UNITS)

Paris' Plan de Prévention des Déchets calls for promoting a culture of reuse as well as the associated economic considerations. Doing so will entail developing options involving reuse and promoting social-economy players involved in reclamation operations (which already provide their own collection services complementing city administration-run operations). These players collect used goods and equipment and repair them to sell them second-hand, or recover the materials or parts. The City of Paris's local urban planning agenda calls for creating a network of waste-processing plants housing reuse channels (or *ressourceries*). The goal is to provide *ressourceries* within a two-kilometre radius for every inhabitant.

As far as possible, all districts with more than 60,000 inhabitants should have at least one déchetterie-ressourcerie.

réseau RR Recycleries & Ressourceries

PRODUCER RESPONSIBILITY

Regulations pertaining to spent batteries and waste electrical and electronic equipment have enshrined producer responsibility for processing. The City of Paris discourages the use of appliances requiring disposable batteries, and encourages the use of rechargeable batteries to avoid wasting energy, as well as channelling them back to distributors at the end of their useful life. Likewise, the waste electrical and electronic equipment that the city administration collects through cumbersome-waste channels is routed to producer-funded eco-organisations within waste-processing plants. Lastly, the city administration will work with companies distributing small appliances and with eco-organisations to provide collection windows for electronic waste (current regulations, which need to change, require consumers to buy a comparable product before taking the used one back). This is already the case with lamps and batteries.

Waste mountain representing the annual production per Parisian, i.e. 3 sq. m and 372 kg.

WASTE MANAGEMENT

DISPOSABLE SHOPPING BAGS

In Paris alone, plastic bags spawn 8,000 tons of waste and eliminating them costs taxpayers €1.6 million. Disposable plastic bags are the perfect example of poor environmental stewardship if you take into account the amount of greenhouse gases they generate and the amount of time they are actually used.

Current regulations will ban petroleum-derived disposable shopping bags on 1 January 2010, but the city administration plans to do so earlier. The charter it is drafting with the trade sets 2008 as the deadline and calls for an awareness-raising campaign in Paris.

Potentially, this could be tantamount to a 1.5 kg cut per inhabitant, which would in turn keep 4,000 tons of waste out of waste streams and 10,890 tons of carbon dioxide away from the atmosphere.

COLLECTING USED FABRIC

Used fabric is collected through Le Relais receptacles in public areas. In 2005, these 370 containers gathered 1,800 of the estimated 10,000 tons of used fabric that Parisians dispose of every year. The Plan de Prévention des Déchets aims to collect 4,000 tons a year.

Screening at source, in this case, channels fabric away from incinerators and provides raw materials for second-life applications (thus saving primary raw materials and energy).

PNEUMATIC WASTE COLLECTION

Plans to fit pneumatic waste collection systems in Clichy Batignolles (17th), north-eastern Paris (18th and 19th) and the eastern Maréchaux tramway area are currently at the study phase. The goal is to build suction systems that channel waste to a central terminal that in turn reroutes it to appropriate treatment plants. This option will streamline screening at source and cut the need to transport a considerable number of collection bins (for non-glass recyclable, fermentable, residual and other waste).

PROMOTING TAP WATER AS THE ALTERNATIVE TO BOTTLED WATER

Paris has to play an exemplary role in its efforts to promote tap water, and is pushing ahead with plans dating back to 2001 to reduce bottled-water consumption. Stretching these plans across municipal administration facilities, and to city administration-organised events, makes sense.

The city administration will not use bottled water in any of the public organisations it oversees (local city administrations, town halls, schools, extracurricular activities, etc.), and systematically use tap water instead. Doing so will provide a powerful incentive for other public institutions in Paris to do likewise.

On a broader scale, the city administration will encourage Parisians to drink tap water. It will raise awareness of the fact that tap water in Paris generates 2,500 times less greenhouse gases than bottled water of comparable quality (producing, transporting and distributing one litre of bottled water, and managing the associated waste, generates 0.05 grams of greenhouse gases).

ECONOMIC ACTIVITIES

05

The fight against climate change is creating significant new jobs in the building, energy, lighting and refrigeration sectors as well as in the property sector by reducing the importation of fossil fuels, the price of which has tripled over four years.
In partnership with the economic players and their professional bodies, the City of Paris will be taking part in developing economic activities related to climate change and, together with its partners, will be making an effort to promote economic development and employment. The ***Agence Parisienne du Climat*** (Paris Climate Agency) in particular will be responsible for filling this motivating role in partnership with the ***Direction du Dévelopment économique et de l'Emploi*** (Economic Development and Employment Department).
The proposals arising out of the White Paper provide the basis for the strategies adopted by the City of Paris and its partners: informing and training small-to-medium enterprises (SMEs), motivating companies whose business activities contribute to the fight against climate change and using financial mechanisms, particularly those arising out of the Kyoto protocol. Together with its main partners the City administration will undertake an in-depth assessment of the economic impact of a Paris Climate Protection Plan.

THE ECONOMIC EFFECTS EXPECTED FROM THE CLIMATE PROTECTION PLAN

JOB CREATION

Recent research carried out in Europe by the *Confédération Européenne des Syndicats* (CES - European Trade Union Confederation) and in France by the *Syndicat des Energies Renouvelables* (SER - Renewable Energy Industry Association) and the ADEME (French agency for environment and energy management) found that the fight against climate change will be a major factor in job creation in the future.
While the CES survey found that tens of thousands of jobs would be lost across Europe in the sectors that consume the most energy, it also found that the professions in these sectors are likely to develop and, most notably, that significant job creation is to be expected in other branches: 12% in electricity production, 14% in the housing sector, 30% in the transport sector, i.e. several hundred thousand new jobs.

In France alone the SER predicts that 75,000 new jobs will be created in the renewable energy sector by 2010 while the ADEME estimates that 50,000 additional jobs will be created in the wood-energy sector by 2015. What is more, the ADEME says that energy renovation work on buildings could rapidly create 100,000 new jobs.

Even though there may be disagreement about the methods used and the figures published, the trends all concur. But if job-seekers are to have access to these new posts, much support needs to be given to these changes and major training programmes agreed.

STIMULATION OF JOB CREATION AND THE DEVELOPMENT OF PROFESSIONS RELATED TO ENERGY MANAGEMENT

A partnership agreement with the construction industry

The City has drawn up a partnership agreement with the profession bodies, ANAH (the national housing improvement agency), the Greater Paris FFB (French building federation), the Paris and inner suburbs CAPEB (small builders' trade body) and the *Fédération parisienne des SCOP du bâtiment et des travaux publics* (Parisian federation of cooperative companies in the building and public works sector).
The agreement is designed to structure and optimise all the skills available to encourage the private sector to make the necessary changes to the housing-stock. It is aimed at developing this sector and encouraging job creation. The City has a motivating and liaison role in this project.

Businesses related to summer comfort

Heat-waves are encouraging the development of air conditioning particularly in the health and social sectors, shops and the entire tertiary sector. But there is little coordination between the different professions involved in ensuring comfortable temperatures in summer such as insulating walls or fitting shutters and blinds, and those installing ventilation and air conditioning systems. The City will work to ensure these professions network with the Chambers of Commerce to bring users the best possible service, particularly by promoting passive solutions and reducing the need for individual air conditioning units.

Develop a business centre for companies in the ecologically efficient building sector

(*THQE – très haute qualité environnementale* – very high environmental quality). One of the major problems faced by craftspeople, very small enterprises and small-to-medium businesses in the construction industry is finding premises at affordable prices. The City would like to examine with the trade organisations the possibility of creating a dedicated 10,000 m^2 business centre. The centre could be a private-sector project acting as a show-case for innovatory construction and energy management techniques. Several different sites should be considered as the project could be housed at modified CAP 18 or CAP 19 or in ZAC (joint development zone).

Developing eco-industries

As Germany, the world's largest producer of wind-turbines and second largest producer of solar panels has shown, the employment potential in this sector is enormous at every level of qualification. With its entrepreneurs, researchers, specialist financing, etc., Paris has great potential in the sector. The City will help structure and run this innovation programme in partnership with all the players, in particular those of the *Pôle de compétitivité "Ville et mobilité durable"* ("Sustainable City and Mobility" Competitiveness Cluster).

The City can support the project in three ways:

- Encouraging large and small industries, the laboratories and universities to come together to create a Competitiveness Cluster on the eco-industries;
- Develop a business incubator dedicated to the eco-industries;
- Set aside a significant number of orders

placed by the City for eco-industry SMEs with eco-friendly clauses included in a Paris-style Small Business Act.

A commitment has already been made to create a 4,000 m^2 area dedicated to environment- and sustainable development-friendly companies on the site of the Macdonald warehouses in the 19th district. These companies' business will be concerned particularly with energy management, producing renewable energy and reducing carbon footprints

Reinforcing the social and welfare economy

This sector particularly concerns the "environment, recycling, urban logistics" branch. It therefore has a part to play in the struggle against climate disturbance. It is, however, an emerging sector that is estimated as having the potential to create 1,000 jobs by 2014.

The City will play a full part in developing the social and welfare economy in Paris.

To do this, 4 levers may be used:

- Making greater use of local d*épartement* services, the voluntary sector and *coopératives d'activité* (business cooperatives);
- Developing microcredits and rental securities for people setting up businesses;
- Creating other incubators devoted to this sector;
- Setting aside 5% of former "hôtels industriels" – factories (250,000 m^2) for the welfare economy to enable projects to develop in surroundings suited to their financial standing.

Stimulating companies' adoption of sustainable development practices

It was with this in mind that in 2007 the City created the "Paris Sustainable Development – corporate section" prize awarded each year to two very small- and 2 small-to-medium enterprises that have distinguished themselves in this field. The prize is worth €20,000 each year. It also includes the creation of an original "Paris Sustainable Development" trophy by the *Ateliers de Paris.* This trophy is handed over at the awards ceremony.

A further avenue will be explored to support the financing of small-to-medium enterprises and very small enterprises through a Guarantee Fund or by mobilising the bank sector to obtain the most favourable interest rates.

Facilitating new ways of organising work

Policies fighting climate change imply new ways of organising work that consume fewer resources, involve less transport and develop the use of new information and communication technologies. Even though the City of Paris has few ways of influencing this type of decision, which is dictated by companies' own policies, the Climate Protection Plan gives an opportunity to explore these subjects. The City of Paris will support discussions between the various economic players on the creation of telecentres or developing teleworking. These discussions must obviously be part of cooperation projects with the Greater Paris authorities, the Regional City administration and the various economic players.

THE CITY WILL INITIALLY APPLY THESE PRINCIPLES

in its capacity as an employer (46,000 staff). If staff so wish, the City of Paris will attempt to house them closer to where they work.

NEW ECONOMIC INSTRUMENTS

The influence of very stringent sustainable development standards on the success of planning operations depends on how the balance between construction costs and the resulting savings affects selling prices, the property market and the costs payable by the resident occupier or the tenant.
Builders or developers now believe there can be a balance between the cost of HQE® measures (*haute qualité environnementale* – High Environmental Quality) and the management savings they generate, the additional costs being largely offset by the energy savings achieved. But the difficulty lies in the fact that in the current state of the law and practice, the money saved does not go into the pockets of those who make the investments.
It is clear that the banks took little account of energy charges when calculating debt-to-equity ratios. This highlights the need for in-depth discussions between the City, construction-industry professionals and the banks. A task-force will be set up on this key question involving public authorities, developers, construction-industry professionals and the banks to develop solutions that are in the long-term public interest, improve the quality of building and distribute finance more equitably.

THE ECONOMIC EFFECTS EXPECTED FROM THE CLIMATE PROTECTION PLAN

Including climate in the decision-making processes with a new financial approach

Climate change and energy policies are modifying the processes of decision-making that require new financial and contractual instruments.

The City of Paris is thinking of adopting new selection criteria that will anticipate these changes and try out new mechanisms in order to support future investment projects. Our objective is to develop a new financial approach that is based on the technical expertise already at work in the projects.

The new "Finance Innovation" Competitiveness Cluster, of which the City of Paris is a member, could include the commitments of the Climate Protection Plan in its projects, particularly as concerns financing new growing businesses and the Chair of "Finance and Sustainable Development" that has been launched.

Experimenting with new financial products

- **Energy-saving certificates**

In order to meet the objectives of reducing energy intensity laid down by law, a system of energy-saving certificates has been created. The system consists in requiring so-called "mandatory" energy suppliers to make energy savings or require their customers to do so. The suppliers therefore have a duty to achieve a given result, failing which they are fined €0.02 (cumulative, discounted) for each kWh not achieved by the end of the first application period (July 2006 – July 2009). These savings may be achieved on the basis of identified standardised operations or of exemplary operations. Under this system, "mandatory" energy suppliers may enter into partnerships with local authorities by financing part of the cost of investment programmes from a range of energy efficiency and renewable energy measures eligible for energy-saving certificates. These are new measures that will come to maturity over the next few years particularly due to the new international negotiations on climate which will stabilise the monetary value of carbon by 2012 and beyond.

For the moment this is an exploratory phase, but once it has considered the real opportunities the City of Paris will go into partnerships with the mandatory players for investment programmes on its assets that are eligible for certificates. These partnerships will complete the funding available for the projects.

TOGETHER WITH THE PARIS CLIMATE AGENCY,

the City of Paris will also facilitate the use of this funding mechanism and assist in undertaking grouped operations with its partners such as public housing authorities.
The City will also investigate the possibility of using these certificates as part of a Climate Fund designed to finance moves to reduce greenhouse gas emissions, possibly at regional level.

- **Domestic projects**

The mechanisms set up under the Kyoto protocol only target businesses in certain industrial sectors and energy producers who are responsible for less than 30% of the greenhouse gas emissions in France. As far as the other 70% is concerned, it is composed mainly of diffuse emissions produced in the transport, building and agricultural sectors. France is starting to experiment with a new system to award carbon credits to players such as local authorities who invest voluntarily in projects to reduce their emissions. The *Caisse des Dépôts et Consignations* is organising this system and issued a call for projects in June 2007.

The City is investigating the advisability of using a domestic project system to finance operations to reduce emissions of greenhouse gasses. It will undertake a feasibility study on the basis of a first experiment as part of a first call for projects issued by the *Caisse des Dépôts et Consignations* in June 2007 particularly designed to finance social housing operations.

DEVELOPING SUSTAINABLE TOURISM

As the world's tourist capital, Paris receives some 27 million visitors each year, 60% from abroad. Tourism has enormous economic benefits (8 billion euros) and directly or indirectly employs nearly 300,000 people. Paris's carbon audit has demonstrated the dependence of tourism on domestic and international air transport that emits an enormous 4 million tons coal equivalent per year of greenhouse gasses. Once they arrive in Paris, however, the vast majority of tourists use public transport to get around, thus accounting for approximately 10% of metro users.

As Paris's leading economic sector, tourism is both responsive to the impact of energy prices and concerned by greenhouse gas emissions.

Maintaining Paris's status as the world's number one tourist venue means that the city must face the challenges of climate change head-on and make significant changes to its economy.

The Climate Protection Plan offers a range of ways these changes could be made.

The following strategies have been adopted:

- **Improving awareness of the impact of the tourist sector**
  - Measuring the environmental impact of certain tourist activities (travel, the hotel industry, restaurants, shops, etc.) using appropriate indicators (quantitative and qualitative audits) and undertaking technical, fiscal and legal feasibility studies of planned modifications.
- **Increasing awareness among professionals**
  - Organising conferences and talks for professionals where best practice can be shared;
  - Together with the *Office du tourisme et des congrès de Paris* (OTCP – Paris Tourist Office), targeting the hotel industry to promote environmentally-friendly building and renovation standards as well as measures to save energy and water, manage waste, etc.
- **Particularly in tourist material published by the OTCP, encouraging the use of less polluting means of transport to reach Paris, e.g. promoting rail over air travel.**
- **Improving the quality of service of tourist coaches**

  Extending policies controlling traffic and parking:
  - Following up the launch in 2003 of a Coach Pass designed to reduce and control the number of tourist coaches coming into Paris by creating flat-rate parking packages and centralising the management of the parking spaces available, gradually move from the Euro 2 standard, which is currently in force for applications for an annual Coach Pass, to the Euro 3 and Euro 4 standards governing anti-pollution measures for this type of vehicle;
  - After the 2003 ban on tourist coaches accessing or parking on the islands on the River Seine, developing new types of river transport (shuttles);
  - Drawing up a quality charter to motivate professionals who belong to the *Accessibilité Stationnement des Autocars de Tourisme association* (ASAT – Access to Tourist Coach Parking), one of the aims of which is to reduce emissions of greenhouse gasses in this sector.
- **Making it easier to use public transport**
  - As part of the *Plan de Déplacement de Paris* (PDP - Paris Travel Plan), extend the night service of the metro to seven days a week (*currently only open Saturdays until 2.15 a.m.*) in order to limit the use of cars by people who work at night, particularly hotel and restaurant staff.
- **Incorporating the Climate Protection Plan into the City tourism policy**
  - Drawing up a carbon evaluation of tourist events organised by the City;
  - Setting up a team specialising in the engineering of questions related to sustainable tourism.

DEVELOPING SUSTAINABLE TOURISM

- **Reducing the impact of air travel**

– Under the Exemplary Administration plan, draw up carbon evaluations of journeys to be taken by elected representatives and employees of the City;
– Enter into discussion with the Paris airports with the aim of reducing emissions of greenhouse gasses by rationalising management of air traffic approaching Paris;
– Offsetting emissions related to air travel: the Paris City Hall will launch a consultation with professionals in the tourist, transport, hotel and restaurant sectors with the aim of creating a fund for financing sustainable development projects to offset emissions of greenhouse gasses from air travel; this will contribute to making Paris the world capital for sustainable tourism. This fund could be added to by tourists and businesses such as organisers of trade fairs and congresses and their visitors.

THE CITY OF PARIS HOPES THAT THE FRENCH GOVERNMENT WILL BE PROACTIVE

in international negotiations in having air travel included in the post-Kyoto protocol and seeing that this mode of travel is made subject to taxation in proportion to its contribution to emissions of greenhouse gasses.

- **Thinking about changes in business tourism**

The challenges of climate change relate particularly to business tourism. Paris must use all its resources if it is to keep its place as No. 1 city in this sector by reconciling levels of participation in trade fairs, congresses, etc. with reducing emissions of greenhouse gasses. Business tourism operators will be asked to draw up carbon evaluations and take concrete action to reduce emissions of greenhouse gasses for events held in Paris. They will also be expected to include new technologies such as video-conferencing, conference rooms fitted with "walls of pictures", etc. to reduce the ecological impact of their activities.

A STRATEGY TO HELP PARIS ADJUST TO CLIMATE CHANGE

06

That the climate is changing is undeniable. Temperatures across France rose an average of 1°C over the 20th century. Addressing this issue entails rolling out two distinct but necessarily complementary strategies: mitigating emissions (the core of our Climate Protection Plan, as discussed above), and helping our society to adjust.

The White Paper highlighted the fact that and the extent to which the City of Paris and Parisian housing are vulnerable to climate change, and the city administration has accordingly decided to embark on discussions about the necessary adjustment strategy that this entails.

Heat waves constitute the main vulnerable point (because of the surprise factor). Seine flooding risks rank second.

THE "PLAN CANICULE" (HEAT-WAVE PLAN) IN PARIS

Summer 2003 brought to light the consequences of exceptionally long and abnormally intense heat-wave phenomena and their impact on public health.

A 127% rise in death rates that August, which hit the most fragile and exposed population groups, was one of its most dreaded consequences. The fact that the planet's temperature is constantly rising means that similar episodes are likely to return more often. Intense heat is especially harmful when temperatures do not drop below the 25°C mark at night. Studies have furthermore shown that abnormally high death rates lingered long after the heat wave due to the damage it had caused to bodies, and that it had grown 30% due to the air pollution that the heat had exacerbated.

The city administration recommends measures to drastically reduce urban motor vehicle traffic during heat waves.

These phenomena entail considerable risks in Paris: this city was built for a predominantly temperate climate. The building materials typically store heat during the daytime and release it at night. Lofts under poorly-insulated roofs are often converted into living areas. Paris is also home to a wide variety of fragile and exposed population groups.

The City of Paris and regional authorities have worked together to roll out a plan to address and contain the impact of heat waves on the population. This plan encompasses the following measures.

ACTIVATING THE CHALEX REGISTER

The CHALEX (short for *Chaleur Extrême*, extreme heat) register is a list of self-enrolled elderly and disabled people in a community. City administration staff uses this list to phone them on a regular basis during abnormally hot spells. The City of Paris strives to lengthen its list and to keep it accurate by encouraging fragile and isolated people to register every year, and to improve control over the relief logistics that their calls trigger.

SPECIFIC MEASURES FOR THE EXPOSED, WITH RELEVANT PARTNER ORGANISATIONS

- Channelling inter-generational solidarity towards efforts to watch over vulnerable people in the community, through local doctors, chemists, shopkeepers and other points of contact, in order to accelerate the circulation of information about possible incidents.
- Working with occupational medical officers to identify the members of staff facing the highest risks and thereby mapping out appropriate preventive action.

SPECIFIC MEASURES TO IMPROVE WORKING CONDITIONS

Measures for City of Paris staff and contractors will involve adjusting working hours for municipal staff and including clauses enabling contractors to do likewise or indeed suspend services, mirroring existing clauses applying to inclement weather conditions (and touching on road works, work on roofs, etc.). This may entail amending the labour code.

MONITORING THE EFFECTS OF GLOBAL WARMING ON LOCAL WILDLIFE

The city administration will play an active role in a European phenological observatory from 2008.

IMPROVING COMFORT LEVELS AND ADAPTING BUILDINGS

CONTROLLING THE USE OF AIR CONDITIONING

One indirect upshot of the 2003 heat wave was a surge in the use of air conditioners. Air conditioners, however, are not the only or indeed the best option. They cool buildings at the expense of considerable greenhouse-gas emissions. The greenhouse-warming potential of the fluorinated gases in their cooling circuits is 1,300 times higher than that of carbon dioxide. ADEME (the French agency for environment and energy management) estimates that as much as 10% of those fluids are lost through leaks, especially in the case of poorly-serviced systems. Their environmental impact, given the fact that they are only used for less than a month a year, is therefore disproportionately high.

The city administration will therefore run inspections and apply necessary sanctions in order to enforce the often neglected requirement to apply for building permission.

The CLIMESPACE network, which is available in a number of neighbourhoods, provides an attractive alternative.

DEVELOPING A BUSINESS SECTOR AROUND SUMMER COMFORT

There are a number of ways of preventing overheating in buildings.

- Outsulation (to prevent heat from accumulating in walls and raising indoor temperatures).
- Blinds, shutters or visors on windows.
- Ventilating and humidifying.
- Active-cooling systems (cold-air networks, air conditioning, ground-coupled heat exchangers, groundwater-coupled heat pumps, etc.).

The city administration will contribute to trade efforts to provide a choice of professional options through a partnership with FFB (the French building association), CAPEB (the French confederation grouping small building contractors and craftspeople), the Parisian federation grouping worker cooperatives in the building and public-works sector, and ANAH (the French national housing-improvement agency).

The list of environmental recommendations attached to the town-planning agenda which is handed out to planning-permission applicants will include practical information about improving comfort levels during hot weather while reducing the use of air conditioners.

PLANTING PARIS

Plants play an important role in cities' efforts to curb global warming: their evaporation processes humidify and cool the air, relieving the microclimates that built-up areas generate. The heat bubbles that buildings form explain the fact that temperatures are usually several degrees higher in cities than outside them, and exacerbate the suffocating effect of heat waves. Green areas and roof gardens (which also provide insulatation) contribute to improving water cycles by limiting impermeable areas and reducing the amount of water that flows into gutters.

Carbon fixation by photosynthesis is only beneficial in large expanses (such as the two woods skirting Paris). Upkeep cancels out the benefits of carbon sequestration in other green areas. But the latter still play a considerable role providing shade, capturing dust and muffling sound.

Plants, in other word, have a twofold role to play in efforts to curb climate change: they can help to prevent it, and mitigate its effects.

Wall gardens have also spread: 55 of the 174 projects originally in the pipeline are now finished, and more than 90 other spots are being reviewed. In the course of this programme, neighbourhood city administration staff spotted top-priority walls, approached owners, and shared the decisions with them. Combining plantations and insulation may be worth considering in the future. This drive to plant public areas has also stretched to streets, boulevards (the "espaces civilisés", i.e. appeased hotspots), squares and tramways. In total, nearly 3 hectares mineral areas are now green.

A multi-year plan to promote roof gardens – much like the drive to encourage wall gardens – will be developed.

The DEVE commission's Green Hand unit has promoted community gardens on city administration land. More than 30 gardens spanning more than 9,300 sq m were created in 2007, and 10 new projects will materialise in less than two years. The City of Paris will map out a 20-year plan to plant all possible areas.

Upkeep has also evolved towards methods that consume less energy, use less engines, require drastically less pesticide (pesticide production, as an aside, releases greenhouse gases), and consume less water (sensible irrigation).

DURING THE CURRENT TENURE,

Paris will see 32 hectares of new green areas, including the Éole gardens (4.22 ha), Clichy Batignolles park (4.28 ha) and a large number of neighbourhood gardens. By March 2008, 100,000 trees will have been planted in the streets of Paris.

Following a survey covering ten sites, 20,000 sq m of roof gardens will be planted by 2009. About ten operations are already underway. A survey by APUR (the Parisian town-planning agency) found 314 ha of planted roofs in this city, and plans call for gauging the effect that a portion of those roofs have on the urban microclimate.

"Crimée Thionville" community garden 19th district.

THE "PLAN DE PRÉVENTION DES RISQUES D'INONDATION" (FLOOD RISK PREVENTION PLAN)

The consequences in Paris and beyond, if the Seine were to flood as it did in 1910, would be huge. A similar flood would affect 3,000,000 people, entail evacuating 270,000 and deprive 1,000,000 of electricity, heating and domestic hot water (the networks would be flooded). It would handicap Paris' economy for months.

The Paris Prefecture has thus prepared its Plan de Prévention des Risques d'Inondation (PPRI). This plan states which public-service facilities and infrastructure have to operate normally – or at least withstand immersion for several days without enduring structural damage – should such a flood arise. This measure should avert the need to evacuate high buildings.

The Paris Climate Protection Plan suggests completing the city's PPRI with the following measure.

- Concerning public electricity and gas concessions, the City of Paris, in its capacity as contracting authority, requires the following:
  By virtue of their public-service missions, electrical utilities agree to equip ground floors of buildings in flood-prone areas with networks guaranteed to remain watertight for several days. Systems to separate ground-level power supplies and higher-storey power supplies shall be used in flood-prone areas. All new agreements or planning permissions shall include these particular measures.

CARBON OFFSETTING

Carbon offsetting involves compensating for practically unavoidable emissions with investments that will reduce emissions elsewhere (more often than not in a developing country).

Whereas efforts to counteract climate change focus mainly on curbing emissions by enhancing efficiency, promoting stewardship and developing renewable energies, carbon offsetting contributes to useful projects outside Metropolitan France.

The City of Paris is involved in projects to enhance energy efficiency, develop renewable energies and plant forests in developing countries as a way of compensating a portion of its greenhouse-gas emissions. "Carbon sinks" aim to sequester carbon dioxide in trees and play a social and environmental role in the local communities. Three developing countries – Madagascar, Haiti and Cameroon – have been short-listed. The City of Paris will be working with the Office National des Forêts (France's national forest authority) to plant 2,000 hectares of forests over the next five years and thereby store 400,000 tons of carbon dioxide. Paris will be the first territorial community to complete an operation such as this one.

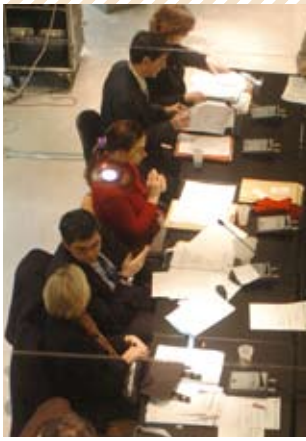
Carbon-offsetting projects will be included in the Kyoto Protocol.

PARIS CLIMATE PROTECTION PLAN IMPLEMENTATION

07

Rolling out the Paris Climate Protection Plan will require hands-on involvement on the part of the territory's players. The process that led to the White Paper was the first step in this direction.

TERRITORIAL GOVERNANCE



The many proposals pertaining to the Paris Climate Plan's governance follow.

- The territory's partner organisations joined forces with the City of Paris to establish the Climate Club. This club will contribute to streamlining their individual efforts around Paris Climate Protection Plan goals.
- The monitoring committee will have authority to call on independent experts when and as required.
- A Parisian Climate Agency will be established to support Paris Climate Protection Plan implementation. It will work with and supplement City of Paris services in charge of energy and environmental issues rolling out the Climate Protection Plan. Its role will involve inciting and coordinating the territory's players. It will convene the private- and public-sector stakeholders working on issues pertaining to climate and energy in Paris to do so.
- Plans call for initiatives spanning Paris and the suburbs, involving relevant communities and existing facilities straddling more than one commune (SIAAP, SYCTOM, etc.).
- Plans likewise call for organising effective and efficient corporate-travel plans inside and outside Paris (Parisians often work in the suburbs and vice versa).
- PCP-consistent improvement work on City of Paris properties outside Paris, liaising with host communities, is also n the plans.
- Shortening distances between employment and residential areas across Paris and the suburbs is also on the agenda. Plans underway to provide more suitable housing for Paris-based workers may be completed with deliberation on changes in communities' city administration-housing landscapes with a view to bringing workers closer to their workplaces.
- Decentralised cooperation and international exchanges – especially with southern-hemisphere countries bearing the brunt of climate change – are also on the plans.

THE ABOVE EXPLAINS THE IMPORTANCE OF TIGHT PLAYER COORDINATION.

The Climate Club, furthermore, will not only coordinate Paris Climate Protection Plan development: it will also support implementation over the long run.

All investment projects exceeding €5 million will be submitted to the City of Paris along with full estimates comprising:

- investment costs,
- operating costs,
- environmental costs and ripple effects.

ESTABLISHING THE PARISIAN CLIMATE AGENCY

THE REQUIREMENTS THAT HAVE COME TO LIGHT

One proposal that emerged in the course of the workshop discussions that led to the White Paper on combating climate change involved a local energy agency for Paris.

A number of factors underlie this proposal:

- City of Paris services working on energy-related issues only have a restricted scope of action (restricted, that is, to city administration property) and lack the resources to direct efforts outwards.
- The fact that oil and gas prices have spent the past seven years hovering near the levels they spiked to during the 1970s oil crises has entailed substantial hikes in heating costs (for households and very small business, especially). Steeper gas bills have spurred the need to revive efforts to cut energy consumption in buildings. Electricity-market deregulation is also pushing prices up.
- Advice on the technical and financial aspects of saving energy has become all the more critical in efforts to curb climate change. This advice must be available to households, public-sector services and private-sector businesses, and address specific Parisian issues. The ADEME arm in Ile-de-France (Greater Paris) understandably lacks the resources to provide that advice.

SCOPE OF ACTION

This agency will work with all Paris territory players. It will work on incipient projects to fast-track clearance.

Its main aims follow:

- Concentrate expertise and intelligence, monitor developments, and spur partnerships.
- Lend technical support on projects aiming to save energy and develop renewable energies.
- Harness and share Paris' experience with its properties, city administration housing and improvement projects.
- Conduct studies for the City of Paris.
- Group the tradable energy-saving certificates instated in a French law passed in July 2005.
- Provide services free of charge, focusing exclusively on the interests of energy consumers and on the public interest (i.e. independently from energy and equipment suppliers), and help consumers rank priorities based on those considerations.
- Identify the technology and trades that can address consumer issues, and direct them to suitable professionals.
- Estimate the economic advantages of investing in prescribed technical improvements.
- Lend more general advice on responsible behaviour and provide an overview of impact of greenhouse-gas emissions.
- Simulate and present viable financial and fiscal options.

This agency will therefore play a networking role, pooling public- and private-sector resources.

LEGAL STATUS

This agency can take on any of a number of legal forms: it can be an association, an SCIC (public-interest cooperative), an SEM (roughly the equivalent of a public-private partnership), or an SA (public limited company). Once the Climate Protection Plan is adopted, the City of Paris will conduct a feasibility study to ascertain the most appropriate legal status in the light of the agenda that this agency will pursue.

PARTNERSHIPS

This agency will encourage active involvement on the part of the City of Paris, Ile-de-France regional authorities, ADEME and other communities interested in taking part in the project through inter-communal cooperation. It will also solicit direct involvement on the part of the Paris Chamber of Commerce and Industry, and on the part of trade federations (FFB, CAPEB, SCOP, etc.). In keeping with rules pertaining to competition – especially as regards energy suppliers and market deregulation in the backdrop – private-sector partner firms may be invited to contribute to discussions without providing financial support. The prospect of involving banks and other such organisations will be considered in an open application situation.
The European Commission's involvement is necessary (with or without funding under the European Intelligent Energy programme). More broadly, this agency will work with national

ADEME

Agence de l'Environnement et de la Maîtrise de l'Energie

and international networks comprising similar organisations (Flame, Energie-cités, Amorce, etc.) with a view to harnessing their experience and promoting exchanges.

FINANCING

A one-off inception grant from ADEME may be envisaged, along with funding for the *Espaces Info Énergie* network. An application for funding under the European Intelligent Energy programme will be prepared to secure complementary funds for the first three years.

INTEGRATING THE *ESPACES INFO ENERGIE* NETWORK

Plans also call for this agency to take the helm of the *Espaces Info Énergie* (energy information centres) network in Paris. There will be discussions about the transition, with ADEME and the associations running those centres.

The goal of this reshuffle is to:

- provide household-oriented advice services, and to promote them proactively enough to generate an adequate flow,
- stabilise centre staff by stretching their skills – in particular to encompass Paris-specific issues (multifamily housing, architecture specifics, etc.),
- secure long-term funding by involving the several relevant public-sector organisations.

PAVING THE WAY

Pending this agency's inception, it makes sense to further promote the *Espaces Info Energie* network in Paris (which ADEME and the City of Paris have been running together since 2004). These centres are spread across nine locations (there was only one in 2004) and are currently providing some of the aforementioned services for the general public. The City of Paris will work side by side with ADEME, providing logistic and financial support with a view to cementing this network. By 2009, the city administration will cover up to one-third of the cost of its operations, and ADEME and Ile-de-France authorities will cover the remaining two-thirds. An initial provision amounting to a minimum of €350,000 will be allotted for 2008.

It also makes sense to provide more advice on energy management and sustainable construction. The number of enquiries touching on these fields is growing and advice is available from the DU (urban-planning authority) via PASU (user reception and service centre) and from the Paris CAUE (architecture, town-planning and environment city administrations). The *Espaces Info Energie* will be involved in the Bilans Patrimoine Habitat (heritage and housing surveys), whereby lessors are required to run energy-efficiency assessments for acquisition-rehabilitation and acquisition-enlisting operations, and for refurbishing projects under PALULOS (a city administration-housing improvement scheme) involving existing properties.

ADEME, the City of Paris and the *Espaces Info Energie* are drafting an MOU laying out their goals and missions, and outlining assessment and continuous-improvement methods.

STREAMLINING SECTOR POLICY

Residential, town-planning, and travel-and-transport policy updates will include the Climate Protection Plan's imperatives and goals.

COMMUNICATION AND AWARENESS RAISING

08

To step up efforts to raise awareness of climate change and the related energy challenges, City of Paris will get involved, with its partners, in a programme providing information and advice on concrete actions to Parisians. Children are naturally more sensitive to environmental impact, particularly concerning biodiversity. They are a proactive link to making essential changes in families' behaviour. Yet raising awareness in order to cut greenhouse gas emissions must also target adults and the elderly, even more so as the average lifespan is increasing.

INFORMING THE PUBLIC

YOUNG PEOPLE

As of the 2007-2008 academic year, more than 20,000 primary school children will be taught simple daily gestures so that they can all contribute to cutting greenhouse gas emissions. This large-scale in-depth initiative will be conducted using the City's network of environmental-education equipment.

A competition involving primary schools will be organised at the start of the 2007-2008 academic year. The aim is to imagine Paris in 2050. The entries will be exhibited in Paris City Hall. Over the following years, the competition will be extended to the issues of sustainable development as part of Agenda 21. For secondary school pupils (*collège*), a programme teaching them how to save energy through simple gestures, including conferences and debates and also concrete visits (of buildings displaying their energy performance as part of the European Display campaign, waste sorting centres, exemplary buildings or development zones, etc.) will be developed by the City administration's departments and the *Espaces Info-Energie*.

PARISIANS

Information campaigns will be launched each year to raise awareness of the actions that can efficiently cut greenhouse gas emissions and promote other ways of living, in which people spend less or differently, are in better health or save time (travelling by bicycle, heating homes at 19°C in winter, actions to go through the summer without air conditioning, etc.).

From autumn 2007 and for the duration of the *"Défi pour la terre"* climate campaign up to 2009, City of Paris will provide active support to this national initiative which invites each person to take up the challenge of committing to one of the ten daily actions to combat climate change (the ADEME *"Faisons vite ça chauffe !"* (Let's hurry, it's getting hot) operation and the Nicolas Hulot Foundation). The City administration will distribute their commitment leaflet tailored to the Paris area during events. Poster campaigns will be organised in the city's streets, administrative buildings, public places and on the City's website.

Local associations specialised in sustainable development will also be approached to promote the major information campaigns implemented by City of Paris.

City of Paris is also reviewing its local advertising regulations with an aim of reducing measures including street furniture by 20%. This percentage will vary from 13% on average for signs to 50% for illuminated advertising. To promote a shift towards actions which emit less greenhouse gases, a percentage of advertising space may be reserved for this purpose.

In order to help consumers favour the most eco-friendly and energy-efficient products in each field (refrigerators, cars, washing machines, etc.), the Topten rating will be put online at paris.fr, indicating the actual cost of products over their entire lifespan. This information initiative is conducted in partnership with WWF and CLCV – one of the leading consumer associations in France.

More fun for children and adults, a quiz will be put online at paris.fr in 2008 so that each person can calculate his/her own greenhouse gas emissions.

TRAINING AND AWARENESS RAISING PLAN

DEVELOPING A SHARED CULTURE OF EFFICIENCY AND ADAPTATION

To support a proactive and efficient commitment in the fight against climate change, City of Paris will develop an awareness-raising strategy involving its 46,000 employees. This strategy is aimed at obtaining shared notions leading to improvements in behaviour and in each person's area of expertise.

- **Information campaigns**
  They will be conducted in the following ways: the 20,000 employees with computer access will be informed by email; *La Lettre Capitale* (the Capital Letter) which accompanies pay slips will also provide information, as will the internal newsletter *"Mission capitale"* (Capital mission), sent to all 46,000 employees. These campaigns will subsequently be extended to the issues connected to Agenda 21.
- **Life-long learning**
  Conferences and debates will be organised each year to give employees a sense of responsibility. Ultimately, internal then external competitions will include questions on the subject of climate change, then on the wider subject of sustainable development.

TAILORED PROFESSIONAL TRAINING

- **For technical departments**
  Resources will be put into place so that efficient solutions which are coherent with the City's objectives may be found. As regulations and techniques change very rapidly in the fields of construction, insulation, heating, renewable energy, etc., specific technical training is becoming essential for the City administration's various departments in charge of, for example, driving licenses, heating systems, specifications for urban developments, etc.

- **For communications departments**
  The creation of communication tools (printed documents and events) has a direct effect on the environment and greenhouse gas emissions. The departments have been trying to reduce this impact for some years now (selecting EU Eco-label certified paper, vegetable-based ink, biodegradable packaging film, etc.) and these efforts will be stepped up to show our involvement and that the City administration's announcements and actions are indeed consistent. Events will include an environmental assessment from the design phase (travel involved, energy consumption, product waste, etc.). Specific training will be rapidly conducted to incorporate these new approaches which are sometimes complicated to implement.

PRIZES AND OTHER MEASURES

PRIZES AND OTHER MEASURES

A CLIMATE PROTECTION PLAN LABEL

To promote exemplary approaches, two additional initiatives are being considered and have been discussed with partners

When the White Paper was being drawn up, Parisians suggested the creation of a *"Climate Protection label"* which would be granted by the City to craft workers and shopkeepers committed to a responsible approach. This tool would be aimed at businesses which are clearly identified by Parisians and have undertaken to comply with certain sustainable development principles, and in particular those concerning the fight against climate change.

As a certification or labelling procedure is cumbersome and complex, City of Paris has decided to draw up an ethics charter with volunteer companies who wish to adopt an approach cutting greenhouse gas emissions in the Paris area. This charter will be accompanied by a logo which is easily identifiable for Parisian consumers.

Following the model of existing charters, the commitments are:

- communication and raising customer/ supplier/public awareness,
- implementation of concrete initiatives to cut energy consumption and greenhouse gas emissions,
- non-circulation, whether intentional or not, of messages or advertisements contrary to sustainable development.

This project could receive support from the CCIP (the Paris Chamber of Commerce and Industry).

"INNOVATION - FACTOR 4" PRIZE

When thought was given to City of Paris's future Agenda 21, the Economic Development and Employment Division (*DDEE - Direction du Développement Économique et de l'Emploi*) worked on creating a sustainable development prize for businesses (*Prix Développement Durable mention Entreprises*). This prize is set to be awarded for the first time this year at the SIMI trade fair for corporate real estate. Four companies - two very small businesses and two SMEs - will be awarded this prize for having undertaken sustainable practices internally or for having marketed a product or service which meets sustainable development criteria.

City of Paris has decided to create a "Factor 4" prize exclusively based on climate change criteria, intended to reward particularly effective achievements.

SUPPORT FOR RESEARCH ON "CITIES AND CLIMATE CHANGE"

In order to improve knowledge and to anticipate changes in the area, financial assistance will be granted to research work on the many components of climate change, paying particular attention to the specific issues concerning urban areas and the impact of climate change on a municipal scale. A specific budget will be allocated each year to scholarships and research programmes focusing on this theme.

MONITORING MEASURES AND INCLUSION IN BUDGET

10

- **A political steering committee**

- **A long-term "Climate Protection Plan" unit within the City of Paris**
  With the adoption of the Climate Protection Plan, a monitoring and implementation structure has been created within the City of Paris.

  This structure's roles include the following: help to define climate policies, set up initiatives, manage internally all players involved, measure the impact of policies, assess initiatives. These are the main concerns for the implementation of the Paris Climate Protection Plan. The "Climate Protection Plan" unit will work in close partnership with the *Agence Parisienne du Climat* (Paris climate agency).

  Time will be spent over the first two months following the adoption of the Climate Protection Plan to define the unit's position. Its cross-cutting stance compared to the various other departments is integral to the Climate Protection Plan's success. The unit's future status and mission statement will be defined in coordination with the Agenda 21 unit and preferably placed under the Secretary General.

- **A yearly performance project (Bleu budgétaire)**
  Each year a financial statement will be drawn up to evaluate the investments made and the outcome in terms of greenhouse gas reduction. During the budget talks, a costing of the initiatives related to the Climate Protection Plan will be presented to the Paris City Council. A performance project will also be drawn up each year.

- **Carbon information for Paris city administration**
  In order to involve the Paris City Council in this practice, the sustainable development information sheet which accompanies deliberations authorising the signature of supply or service contracts will state the environmental characteristics which can be legally required (environmental standards for production, if possible place of origin and transport method) from the supplies and equipment subject to the contracts.
  Ultimately, Paris city representatives must be able to access, in a call for tender commission or at the City administration of Paris, a carbon audit concerning the production and transport of supplies and equipment for each competing bid.

- **A community-based monitoring body**
  A community-based body will be set up to monitor the Climate Protection Plan, in keeping with the spirit of preliminary work on the White Paper.

- **Assessment tools**
  Indicators and instruments, particularly concerning assessment, are essential components and are defined in the initial phase of the Climate Protection Plan launch.

  For example, the *Bilan Carbone™* (carbon audit) will continue to be used for reference. It has been used to define the challenges in terms of greenhouse gas emissions over the City of Paris's area in the preparatory phase. Other studies added to this framework and helped to refine our considerations. It is this set of references which must be used in the implementation of the Plan.

With the Paris Climate Protection Plan, City of Paris is committed to continuing this assessment work:

– By updating the *Bilan Carbone™* (carbon audit) every five years to measure the progress made and the remaining improvement areas

– Through indicators on shorter timeframes, in order to assess the implementation of the action plan.

The Climate Protection Plan links in with the initiatives underway in the city, Agenda 21 in particular. It is based on a high level of internal communication and brings together all stakeholders: the *Club climat*, CEMEDD, etc. The Parisians who took part in drawing up the Plan and who wish to be involved also play a part in its implementation.

AGENDA21
Paris s'engage

Quel temps fait-on demain ?
PLAN PARISIEN
de lutte contre
le dérèglement
climatique

GLOSSARY

A

ABF : Architectes des bâtiments de France (government architects)

ADEME : Agence de l'environnement et de la maîtrise de l'énergie (French environment and energy management agency)

ANAH : Agence nationale de l'habitat (national housing improvement agency)

AP-HP : Assistance publique – hôpitaux de Paris (Paris hospital authority)

APUR : Atelier parisien d'urbanisme (Paris urban planning agency)

arr. : *arrondissement*

ASAT : Accessibilité stationnement des autocars de tourisme (Access to Tourist Coach Parking)

B

BBC : Bâtiment basse consommation (low-energy building)

BET : Bureau d'études techniques (engineering firm)

Bilan Carbone™ (Carbon audit): the Carbon Audit tool developed by the ADEME is used to calculate the greenhouse gas emissions from any organisation: industrial or tertiary companies, etc.

BTP : Bâtiment et travaux publics (public buildings and works)

C

CAP : Centre d'affaires parisien (Paris business centre)

CAPEB : Confédération de l'artisanat et des petites entreprises du bâtiment (small builders' trade body)

CASVP : Centre d'action sociale de la Ville de Paris (the City of Paris's social welfare centre)

CAUE : Conseil d'architecture, d'urbanisme et de l'environnement (architecture, urban planning and environment city administration)

CCIP : Chambre de commerce et d'industrie de Paris (the Paris Chamber of Commerce and Industry)

CEMEDD : Commission extra-municipale environnement et développement durable (extra-municipal commission for the environment and sustainable development)

CERQUAL : Organisme de certification du logement (housing certification body)

CES : Confédération européenne des syndicats (European Trade Union Confederation)

CHALEX : Extreme heat register – list of self-enrolled elderly and disabled people in a community.

CLCV : Consommation logement cadre de vie is one of the largest national consumer and user associations in France (founded in 1952).

Climespace : Paris urban cooling network

COS : Coefficient d'occupation des sols (land-use coefficient)

CPCU : Compagnie parisienne de chauffage urbain (district heating company)

CRE : Cahier de recommandations environnementales (set of environmental recommendations)

CUMAC : Energy-saving certificates are calculated in kWh CUMAC of end energy saved. CUMAC is a contraction of "*cumulé*" (cumulative) and "*actualisés*" (discounted) because the kWh is calculated for the product's lifespan and discounted from the market.

D

DDEE : Direction du développement économique et de l'emploi de la Ville de Paris (City of Paris Economic Development and Employment Division)

DEVE : Direction des espaces verts et de l'environnement de la Ville de Paris (City of Paris Green Areas and Environment Division)

DPE : Direction de la propreté et de l'eau de la Ville de Paris (City of Paris department responsible for cleanliness and water)

DU : Direction de l'urbanisme de la Ville de Paris (City of Paris Urban-planning Division)

E

ECS : Eau chaude sanitaire (domestic hot water)

EDF : Electricité de France

EHPAD : Espace Info Énergie (energy information centre)

EIE : Espace Info Énergie (energy information centre)

ENL : Engagement national pour le logement (national housing commitment)

ENR : Énergies renouvelables (renewable energy)

F

Facteur 4 : Global greenhouse gas emissions are currently three times higher than the biosphere's ability to recycle them. As the responsibility of climate change traditionally falls on developed countries, they must cut their emissions by 4 before 2050, in order to achieve an equitable global emissions per capita average.

FARIF : Fonds d'aménagements de la Région Île-de-France (Île-de-France development fund)

FFB : Fédération française du bâtiment (French building federation)

FSE : Fonds solidarité énergie (energy solidarity fund)

FSL : Fonds de solidarité pour le logement (social housing fund)

G

GDF : Gaz de France

GES : Gaz à effet de serre (greenhouse gases)

GNV : Gaz naturel pour véhicules (vehicle natural gas)

GPRU : Grand projet de renouvellement urbain (major urban renewal project)

GWh : 1 Gigawatt-hour = 1,000 MWh = 1,000,000 kWh = 1,000 000,000 Wh

H

ha : hectare, multiple of the are unit of measure of surface area equivalent to 10,000 sq. m

HQE : Haute qualité environnementale (high environmental quality)

I

IDF : Île-de-France (greater Paris region)

ISO : International organization for standardization. The ISO 14001 standard is the most used standard of the ISO 14000 series for environmental management. It was created by the International organization for standardization, internationally known as ISO.

IUT : Institut universitaire de technologie (university institute of technology)

K

kWh : Kilowatt-hour, the energy consumed by an appliance with power equivalent to one kilowatt (1,000 watts) operating for one hour (1 kilowatt _ 1 hour).

GLOSSARY (cont.)

L

LED : Light Emitting Diodes

lm/W : The light output of a light source is the ratio between the luminous flux emitted by the light source and the power absorbed by the source. It is expressed in lumens per watt (lm/W).

Loi POPE : French planning law setting the direction of France's energy policy.

M

MDE : Maîtrise de la demande d'électricité (curbing electricity demand)

O

OPAC : Office public d'aménagement et de construction de Paris (the public development and construction office)

OTCP : Office du tourisme et des congrès de Paris (Paris Tourist and Conventions Office)

P

PADD : Projet d'aménagement et de développement durable (planning and sustainable development project)

PALULOS : a city administration-housing improvement scheme

PASU : Pôle d'accueil et de services aux usagers (user reception and service centre) - 17, Boulevard Morland, bureau 115 à rez de chaussée, 75004 Paris.

PCP : Plan climat de Paris (Paris Climate Plan)

PDAP : Plan de déplacement de l'administration parisienne (a travel plan for City of Paris staff)

PDE : Plan de déplacements d'entreprises (enterprise travel and transport plan)

PDP : Plan de déplacements de Paris (Paris travel and transport plan)

PDU : Plan de déplacements urbains (urban travel and transport plan)

PIB : Produit intérieur brut (Gross Domestic Product)

PIG : Projet d'intérêt général (general interest project)

PLH : Programme local de l'habitat (residential plan)

PLU : Plan local d'urbanisme (local urban-planning plan)

PME : Petites et moyennes entreprises (small-to-medium enterprises)

PMI : Protection maternelle infantile Plan national de lutte contre le changement climatique (the national climate plan)

PNLCC : Plan national de lutte contre le changement climatique

PPRI : Plan de prévention des risques d'inondation (flood risk prevention plan)

R

RATP : Régie autonome des transports parisiens (Paris city transport authority)

RER : Réseau express régional (suburban train network)

RFF : Réseau ferré de France (France's railway infrastructure manager)

RT2005 : Réglementation thermique 2005 (2005 thermal regulations)

S

SCIC : Société coopérative d'intérêt collectif (public-interest cooperative)

SCOP : Société coopérative de production (cooperative company)

SDIA : Schéma directeur des implantations administratives (City of Paris's master plan for rationalising its administrative facilities)

SDRIF : Schéma directeur de la Région Île-de-France (regional development and urban-planning master plan for the Ile-de-France region)

SEM : Société d'économie mixte (roughly the equivalent of a public-private partnership)

SER : Syndicat des énergies renouvelables (Renewable Energy Industry Association)

SHON : Surface hors œuvre nette (net floor area)

SIAAP : Syndicat interdépartemental pour l'assainissement de l'agglomération parisienne (inter-municipal syndicate for sanitation in the Paris conurbation)

SIEMP : Société immobilière d'économie mixte de la Ville de Paris (a property development company based on a public-private partnership with the City of Paris)

SIMI : Salon de l'immobilier d'entreprise (trade fair for corporate real estate)

SNCF : Société nationale des chemins de fer français (France's national railway company)

STIF : Syndicat des transports d'Île-de-France (the Ile-de-France public transport executive)

SYCTOM : Syndicat intercommunal de traitement des ordures ménagères (company in charge of processing waste from Paris and its outskirts)

T

TAM : Transports automobiles municipaux (municipal car transport service)

teqCO_2 : Carbon is the yardstick measurement selected by the ADEME for its Bilan Carbone (Carbon Audit). For greenhouse gases, metric tons of carbon dioxide equivalent (tCO_2e) and metric tons of carbon equivalent (tCe) are both used. A mole of CO_2 weighs 44g and a mole of carbon weighs 12g. To establish an equivalence, carbon is multiplied by a factor (44/12) to obtain CO_2.

TFPB : Taxe foncière sur les propriétés bâties (land tax on built property)

THPE : Très haute performance énergétique (ultra energy efficient)

TIPP : Taxe intérieure sur les produits pétroliers (domestic tax on petroleum products)

Topten : Guide developed by WWF-France and the CLCV association. The first compendium that compares products, putting forward those with the lowest environmental footprint.

TPE : Très petites entreprises (very small enterprises)

TVA : Taxe sur la valeur ajoutée (value-added tax)

TWh : 1 terawatt-hour = 1,000 GWh

U

UGAP : Union des groupements d'achats publics (a public-sector purchasing cooperative)

W

WWF : World wide fund for nature is an international non-government organisation for the protection of nature and the environment

Z

ZAC : Zone d'aménagement concerté (joint development zone)

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b: bottom, t: top, r: right, l: left, m: middle

MAIRIE DE PARIS

DIRECTION GÉNÉRALE DE L'INFORMATION
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