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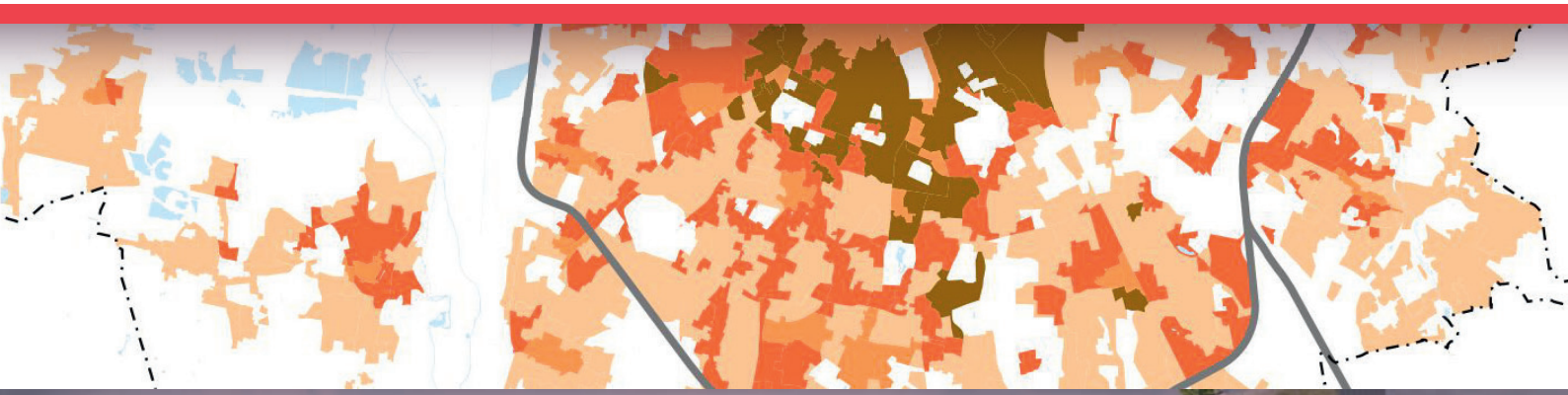
LES DOSSIERS FNAU

FACTOR 4 PLANNING



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

FÉDÉRATION NATIONALE DES AGENCES D'URBANISME
FNAU

EDITORIAL

Factor 4 planning

Factor 4 is the goal of cutting our greenhouse gas emissions by 75% by 2050.

Achieving this objective will necessitate radical changes in our practices, in particular concerning transport and housing; the measures currently implemented, such as positive-energy buildings, low-impact mobility and eco-neighbourhoods, will not be enough to meet this goal. These measures must be conceived in the framework of broad territorial planning that integrates environmental and energy objectives far upstream.

To this end, the French Environment and Energy Management Agency (ADEME) and the French network of Urban Planning Agencies (FNAU), pursuing their missions in their respective areas of competence, have joined forces to make infrastructure and land use planning an integral part of the environmental and energy transition process. In 2013, the two organisations signed a partnership agreement and compiled an inventory of practices that are relevant to Factor 4 planning.
This work was led by Epures, Saint-Étienne urban planning agency, along with FNAU, drawing upon the expertise of a dozen urban planning agencies in precursor territories.

This inventory describes the stakes, resources and strengths for each territory, which have led to cross-sectoral territorial planning exercises with ambitious environmental and energy objectives; the importance of evaluation in attaining these goals is emphasised.

Current experience, questions and available methodological tools are summarised in this document, to encourage territories and help them design their planning policies along a trajectory to achieve Factor 4 goals. The compilation also aims to be a contribution to the COP21 climate conference.

BRIGITTE BARIOL-MATHAIS
GENERAL MANAGER, FNAU

DANIELA SANNA
DEPARTMENT HEAD, URBAN ORGANISATIONS, ADEME

Urban planning agencies and FNAU (French network of urban planning agencies)
Gathering 52 urban planning agencies, FNAU is a network for local authorities and political representatives and a technical network of 1500 town planners.
Their main missions are territorial observation and prospective, territorial and urban planning, support public policies (housing, mobility, social development...) and design urban projects.

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URBAN PLANNING AT ADEME TO ACCOMPANY THE ENERGY TRANSITION IN TERRITORIES

ADEME's areas of competence encompass most of the building blocks of sustainable cities – buildings and construction, transport, energy, waste management, action against noise pollution, preserving air and soil quality; the agency marshals technical expertise, the capacity to support experimentation, and a strong territorial presence via ADEME's regional offices.

In 2012, ADEME created an Urban Strategy department[1] that outlines the agency's position and thinking on urban and territorial planning and organisation. In the field, outreach and raising awareness of these issues among all stakeholders are the preferred modes of action, along with decision-making tools that are made available to public and private-sector decision makers, to define and analyse a political vision of sustainable development, and support operational decisions and management.

In other action ADEME has contributed its expertise to the Sustainable Cities Plan at the French Ministry for Environment and Sustainable Development since the programme was started in 2009. ADEME is strongly implicated in the work prefiguring the Institute for Sustainable Cities that aims to share resources, coordinate public and private initiatives in this area, and develop a more highly integrated approach to urban issues.

To elaborate visions and pathways to achieve the environment and energy transition in territories, ADEME has conducted forward-looking studies (Ville Post Carbone[2], « Challenges and perspectives for effective sustainable cities: climate, energy, environment »[3]) and wide-ranging research on cities and territories, including observation, adaptation to climate change, the acoustic environment, highly energy-efficient zones within cities, urban modelling and evaluation, etc. The aim is to ensure the progression from research findings to operational results in urban and territorial planning, design, renewal and rehabilitation.

For over 10 years, ADEME has been working on AEU_2[4], a tool for local authorities and developers, to assist in decision making and action that take sustainable development in to account in land use planning. The second-generation AEU tool includes a methodological handbook, *Réussir la planification et l'aménagement durables*, updated with new strategic components, and technical leaflets that accompany the implementation process. Evaluation tools will soon be added.

Factor 4 is an objective that gives structure to planning work. Feedback on experience with Factor 4 planning is presented here to highlight the issues and the levers that are specific to the planning process, opening the way to new thinking on the operational aspects of evaluation of these initiatives in light of Factor 4 goals.

This work is the fruit of the collaboration between ADEME and FNAU, showing the convergence between the missions of energy and climate outlook and territorial action that are shared by the two organisations. More broadly, this collaboration extends to joint construction and dissemination of decision-making tools, under local agreements between urban planning agencies and ADEME's regional offices, and on a national scale.

Going beyond this joint work, ADEME is committed to working with a wide range of partners to draw up reference guidelines for evaluation of the planning process.

1. www2.ademe.fr/servlet/KBaseShow?sort=-1&cid=96&m=3&catid=12377.
2. *Repenser les villes dans la société post-carbone*, report, ADEME-MEDD, 2013.
3. www2.ademe.fr/servlet/getDoc?id=90470&p1=30&ref=12441.
4. *Guide méthodologique AEU2*, éditions ADEME-Le Moniteur, 2013.

FACTOR 4 PLANNING: WHAT IS AT STAKE?

To reduce greenhouse gas emissions, it will be necessary to reach a balance between territorial development, economical use of resources, and protection of the natural environment, while anticipating changes in life style. Factor 4 raises a number of issues – technical, political, organisational, financial – for planning on a territorial scale.

Measures to fight climate change decided under international and national negotiations aim to limit global warming to an increase of no more than 3°C in average global temperature by the end of this century. Attaining this objective means balancing greenhouse gas emissions and sinks, to stabilise CO_2 concentrations in the atmosphere by 2050.

Assuming a world population of 10 billion people in 2050, each inhabitant of the planet must have a carbon footprint of no more than 2 tonnes CO_2 equivalent per year. On a global scale this means halving GHG emissions compared to 1990, and in France reducing these emissions by 75%.

This goal has been adopted in successive strategic and regulatory documents. These texts, consolidated in the Energy Transition and Green Growth legislation in France, underscore the need for balance between territorial development, economical use of resources, and protection of the natural environment, while anticipating changes in life style.

Forward-looking studies, such as the 2030 and 2050 energy scenarios published by ADEME, the NégaWatt and Afterres scenarios[1], propose pathways to be followed in territorial planning to achieve the Factor 4 goal. The goals and measures identified in the 2050 scenario raise a number of questions for planning policy, both in setting objectives that seem impossible to reach today, for technical, political and financial reasons, and in defining ways to implement them.

FACTOR 4 PLANNING: WHAT IS AT STAKE?

● SLOWING SOIL SEALING

The prospective scenarios call for cutting the pace of soil sealing in half up to 2030, and to halt this land uptake after that date. This means revising current models of urban development, building construction and renewal of the built environment. This vision challenges today's economic model of land availability, because it implies finding ways to free up property for urban renewal at an acceptable price, and calls upon all actors in the territory to integrate this goal in their operations.

● A NEW URBAN DESIGN FOR MORE EFFICIENT ENERGY USE

Future scenarios are based on optimised energy use, focusing in particular on different types of activities. The ADEME scenario foresees positive-energy islands in cities, thanks to rational heat management. Taking this concept farther, one can imagine increased heat exchange between industry and commercial and residential buildings, exchange that will be facilitated by emerging smart grids.

VILLE DE NANTES

These changes in practices will involve profound modification of network infrastructure to incorporate «intelligent» operation, and ramping up energy governance at the territorial scale to achieve this structural change. Forms of urban organisation will have to be rethought to keep pace with this mutation.

● NEW MOBILITY MODEL TO UNDERPIN A NEW TERRITORIAL MODEL

To attain the benchmark of reducing travel by 20 to 25% (depending on the scenario), territories will have to be reorganised to reduce non-discretionary commuting and travel, while maintaining quality of service – this is the «close-knit city».

This vision is a challenge for local planning: how can it be achieved in ways that respect local features? How can this vision be implemented in a given territory? How can we work on pathways to achieve this goal? Who are the stakeholders and how can they be involved in this process? How can we share this objective?

● SUPPORT FOR NEW MODES OF MOBILITY AND LIFE STYLES

Future scenarios posit that the modal mix in transport will change, and that vehicle ownership will also evolve. To meet these new goals, going beyond coordination of urban planning and transport policy, planning will have to rally different stakeholders and project sponsors, such as transport organisation authorities, companies, private developers of innovative services, etc. The locus of discussion and negotiation is an issue that will arise in each individual territory.

Planning will also have an important role in land use and infrastructure, by constituting dynamic networks, to make communication between different areas simpler, increasing the attractiveness of transport modes other than private cars. The same process will also contribute to greater public awareness and citizen involvement, via local urban planning documents, for example.
The actors in planning processes must learn to perceive changes in life styles in a given territory, and understand how to adapt services to these changes.


AUDRSO


AGAPE

● MORE AND BETTER BUILDING WHEN LAND AVAILABILITY IS LIMITED

The scenarios analysed here call for more new construction to higher energy and environmental performance standards. As a corollary they indicate that covering over land for urban development must come to a halt in 2030.
Regarding new construction and financial resources, funds must be allocated to building high-quality new housing, shifting costs from the building operation phase to the construction phase. In terms of land availability, a ban on soil sealing and covering will mean that other properties will have to be found; mechanisms for freeing up property will have to be revised to ensure construction of new housing, at prices that preserve the financial capacity to build efficient buildings.

● RAMPING UP ENERGY RENOVATION OF BUILDINGS

One of the keys to achieving the Factor 4 goal is reducing energy consumption in existing housing. All housing stock must be brought up to current standards. This means supporting effective energy renovation in the private sector, via financial instruments and technical assistance. At the same time priorities should be established, targeting the most vulnerable units, to counter the impact of rising energy costs on the budgets of households with the lowest incomes.

● MONITORING AND EVALUATING WORK AND RESULTS AT THE TERRITORIAL LEVEL

Energy consumption for a given territory can be estimated using simulations based on local and national data and parameters. Evaluation of work carried out in a territory remains complex, however. Some measures are hard to quantify because they are carried out by multiple actors. An energy monitoring and evaluation grid must be defined beforehand at the territorial level, as well as the data required to generate a view of the work accomplished.

● RESOLVING CONFLICT BETWEEN FACTOR 4 GOALS AND SHORT-TERM PLANNING IN TERRITORIES

Some territorial decisions may be in conflict with Factor 4 objectives, for instance building up areas that are poorly served by public transport. All public policies must be based on strong energy criteria. To achieve this tools must be developed to assess projects in terms of costs and benefits, in the short, medium and long term, to establish a broad cross-sectoral approach.

● RECONCILING INDIVIDUAL STRATEGIES AND THE FACTOR 4 VISION

Stakeholders in the territory, notably residents and companies, must be mobilised to address planning issues. Strategies must be devised to influence where people decide to live and where companies want to locate their business. In this light thought must be given to the multiple activities of households, to reconcile home ownership with the desire for career mobility, while ensuring complementary qualities to limit competition between territories.

1. Solagro. Afterres 2050. *Un scénario soutenable pour l'agriculture et l'utilisation des terres en France à l'horizon 2050.* May 2014.

LEVERS FOR ACTION AT THE TERRITORIAL LEVEL

Five levers for action that are determinant for the Factor 4 planning process emerge from analysis of measures implemented in different territories. These levers point to steps for successful action, but also raise questions concerning organisation and governance.

1. Putting knowledge at the heart of the process

To address the Factor 4 objective the planning process, from conception to evaluation, is based on an integrated multiple stakeholder approach.

● FROM INFORMATION TO ACTION

Factor 4 action involves elected officials, land use managers, operators, citizens and professionals, including energy producers. These actors bring their specific perspectives and thinking to the process, focusing variously on the economy, public image, quality of life, etc.
Some territories have developed ways to accompany the process, working in particular on energy renovation with homeowners, both in single-family houses and multiple-unit buildings. The support measures range from pooling financial instruments to technical coordination of renovation work.

Build in My Back Yard: the BIMBY experiment in Tours
A study of the increasing density of single-family homes revealed a need for proactive measures to accompany residents, and for technical resources to support this accompaniment.

A local housing plan: the PLH in Nancy
Tools to work with homeowners in multi-family buildings (freeholders) have been developed under the local housing plan in the city of Nancy. These tools are part of a package to help owners set up financing, negotiate with contractors and follow execution of the work to be carried out.

● INTEGRATING KNOWLEDGEABLE STAKEHOLDERS IN THE DECISION-MAKING PROCESS

As the issues and stakes have changed, new stakeholders have to be integrated in the process. Including public entities such as Chambers of Commerce and Industry enriches the discussion on the goals and outcomes of the planning process, but this practice is far from systematic.

● GATHERING AND POOLING DATA

Gathering data is key tool for objective assessment of public policy, but this is a difficult task. Comparison is often necessary to put territorial data into perspective. Sharing observatory units is one way to accomplish these tasks, confronting issues and sharing good practices.

The performance chart for the Nord–Pas de Calais Region
The Nord–Pas de Calais Region and ADEME have developed a shared tool for pooling energy and climate data in territories, based on 10 indicators tracked in each territory that is engaged in a climate action plan. This tool shares information on challenges in the different territories, and contributes to the publication of thematic documents that can be disseminated to all the partners.

● MONITORING AND EVALUATING PLANNING OPTIONS

One of the immediate tasks for Factor 4 planning is defining energy and climate options that do not contradict each other, by using appropriate tools, notably tools on GHG emissions developed by the Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement (CEREMA) and ADEME.

The Grenoble territorial coherence scheme
The environmental assessment conducted under the Grenoble territorial coherence scheme (SCoT) was the occasion for work focusing specifically on energy and climate. The assessment highlighted the scope of these issues for the territory, and the impact of the coherence scheme. Integrating this approach from the start in the SCoT policy and decision process contributed to this success.

BREST MÉTROPOLE OCÉANE/ADEUPA

The Brest metro area was one of the first territories to implement an integrated planning approach with the aim of attaining ambitious energy objectives and preserving its natural setting

2. Accompanying changes in life style

Factor 4 action touches upon areas where both proactive public policy and individual personal choice come into play. Very different behaviours can be seen in territories that are similar in terms of urban configuration and public transport services.

● MAKING CITIES «DESIRABLE»

One condition for achieving Factor 4 goals is to make cities the main place where people live and work, integrating jobs, retail shops, services and leisure activities. The aim is to propose an alternative urban model, taking today's aspirations into account, and examining social aspects such as acceptable density and ageing population that force us to rethink local communities.

«The same city differently», or making a post-carbon scenario acceptable

A sociological study conducted in the city of Tours showed ways to make a post-carbon urban scenario more acceptable. This scenario is based on credible, acceptable and attractive features, deployed on temporal and spatial scales that can be appropriated by individuals. The aspiration for a better quality of life is the main driver for change. A «desirable» city is one that reconciles the functional dimensions of the territory and public policy with the practical wishes and symbolic hopes of residents in terms of their life style.

Conditions ensuring that public policy in Grenoble is acceptable

The Grenoble metro area government carries out regular surveys to gather residents' views on the acceptability of measures enacted or anticipated, for instance to improve air quality or before lowering the speed limit on a major thoroughfare. These polls serve to amend measures and the ways in which information is communicated.

● ACCOMPANYING CHANGES IN PRACTICES

How can cities be made attractive, combining density and fluidity of movement? How should «low consumption marketing» be shaped? Here the task is to identify the elements that «trigger» changes in behaviour, using participatory tools.

Survey of single-family homes in Nancy

The Grand Nancy public housing authority (SPL) conducted a survey in 20 residential areas of single-family homes, focusing on sociological aspects and energy issues. This work served as a major tool for raising residents' awareness and helping them better understand the thermal characteristics of their homes, and be better informed about possible improvements and available aid.

3. Driving change in territorial organisation and urban configurations

Factor 4 goals lead to rethinking urban configurations and their functions, in different areas: the links between urban planning and transport, a bioclimatic approach, access to energy, heat islands, the attractiveness of cities, community and proximity.

● DEVELOPING A FACTOR 4 VISION FOR A TERRITORY

To implement a Factor 4 urban organisation the proper scale for territorial development must be defined, and appropriated by the whole chain of actors. Forward-looking exercises can be used to stimulate implementation of the Factor 4 approach in a territory, and help elected officials make choices.

A forward-looking exercise in the Tours metro area

A study was conducted to think about the future of Tours and its territorial coherence scheme in a post-carbon society, in order to perceive options to be chosen as of today in strategic planning documents.

● COMPACT, ATTRACTIVE, ACCESSIBLE AND ECONOMICAL CITIES

Factor 4 scenarios all agree on the need to implement urban systems that create compact centres and provide all necessary services. In denser cities there is less unavoidable automobile transport, public transport is more effective and energy grids are optimised. Controlling urban land uptake and soil sealing also serves this objective of building compact and active cities. The objective is also to make cities more desirable, to make city centres attractive, with high-quality urban amenities.

Land uptake in the Rennes local housing plan

The territory of the Rennes metropolitan area is structured according to the concept of urban archipelago. To reinforce urban poles and their connection, in order to preserve agricultural areas and natural spaces, the metro area has implemented a territorial coherence scheme (SCoT) and a local housing plan (PLH), tools that call for a minimum level of density and sufficient services.

● FUNCTIONAL MIXED USE AND ENERGY OBJECTIVES

To address energy issues through functional mixed use of urban spaces work must look at residents' transport/travel chains, including thinking on services offered in train stations, and time coordination committees that focus on reconciling the demands of professional and personal life. These approaches can help reduce distances travelled, and make urban areas more attractive. Mixed use also aims to build cross-sectoral energy systems that serve both housing and economic activity. In this approach objectives are to work on equipment life to achieve optimum use over time, while allowing functions to evolve.

4. Cultivating an integrated approach

An integrated approach is based on a multidisciplinary analysis. In Factor 4 planning this approach is implemented within the planning documents themselves. This approach is also grounded in cross-sectoral treatment of thematic policies and coordination between different territorial scales.

● CREATING THEMATIC BRIDGES THAT STIMULATE LOCAL PARTNERSHIPS

Climate and energy issues touch upon many themes covered by the planning process. Accordingly organisational mechanisms are needed to link the actors of the energy sector with urban planners, to enable them to develop a common culture and share tools and practices. Environmental assessment, by nature iterative, can be a space for multidisciplinary work, if it is accorded a central place in defining planning orientation and objectives.

Energy and climate in the Grenoble territorial coherence scheme

Energy and climate were designated as prime topics by elected officials from the very start of elaboration of the territorial coherence scheme (SCoT). To encourage appropriation of these themes, the multipartite SCoT syndicate, working with a technical consultant and the public urban planning agency, focused on increasing awareness, and also developed a modelling tool to highlight the effects of SCoT options on the environment. This approach underscored how important it is to have a group of elected officials who emphasise climate/energy thinking throughout the planning process.

● LINKING STRATEGIC AND OPERATIONAL TOOLS

Planning options are implemented via operational tools. For example, strategic options concerning automobiles in the city are specified in territorial coherence schemes (SCoTs) and implemented via traffic circulation plans and neighbourhood improvement schemes.

The Bordeaux inter-municipal local urban planning document (PLUi)

The local energy agency and the local urban planning agency have pinpointed the potential for developing and optimising urban heat networks, by bolstering construction options in areas served or potentially served by district heating. This approach, implemented prior to revision of the local urban planning document, links strategic and operational components. The success of this operation lies in its ongoing application under a joint work programme involving the two agencies over several years.

A cross-sectoral and cross-disciplinary approach also means working with different tools in a shared framework. Tools such as a local housing plan (PLH) call for a period of negotiation, to address distribution of housing units, for instance. The time required for this exchange must be included in the planning calendar and timetables so that they can be taken into account by other partners working on commuter travel or environmental issues.

The 4-in-1 integrated local urban planning approach in Brest

The Brest metropolitan area has set up an integrated approach combining the inter-municipal local urban planning document (PLUi) and the territorial climate and energy plan (PCET). Mounting these two approaches simultaneously has built up dialogue between municipal departments on the specific tasks and means for action in each policy area. This two-pronged approach has consolidated energy measures related to housing and transport. The observatory tools deployed under the climate plan have coordinated policy action for saving energy and preventing GHG emissions in these two sectors.

● ENCOURAGING DIALOGUE BETWEEN TERRITORIAL ENTITIES AT VARIOUS SCALES

Factor 4 planning emphasises the complementary nature of policies conducted on a scope that is appropriate for addressing issues, for example energy and transport. This scope is often broader than a project scale alone. It may be a question of deploying complementary measures in terms of public transport services, an developing solidarity, in particular financial solidarity, between territories. The first stage in this process is sharing objectives and tools for understanding the territory as a whole.

A charter of commitments in the Nord–Pas de Calais Region

The FRAMEE network brings together the main actors involved in energy and urban planning in the Nord–Pas de Calais Region for the purpose of identifying and sharing their good practices. On the basis of these talks a «manifesto for sustainable urban projects» has been drawn up, presenting a shared vision of the issues at stake.

5. Mobilising territorial resources to carry out Factor 4 projects

Rethinking planning means renewing practices New sources of funding and innovative forms of organisation must be found.

● GETTING RESIDENTS INVOLVED

One of the essential levers for Factor 4 projects is the implication of stakeholders, and more specifically residents, in the projects. Experience has shown that for programmes addressing housing issues a strong level of support to residents is required, e.g. audits or financial aid for improvement work. This means that territorial entities must deploy new financial and organisational resources.

● FINANCING PROJECT ENGINEERING

Planning projects that aim to achieve Factor 4 goals require project engineering and management that can produce the tools needed to involve residents. One of the major tasks is to bolster project engineering in territories where these skills are lacking and in isolated areas, and to develop citizen awareness programmes.

The local housing plan in Rennes

To attain the density objectives fixed by the local housing plan (PLH) and the territorial coherence scheme (SCoT) the Rennes authorities have set up a contractual arrangement with the municipalities in the metro area. These municipalities are eligible for technical assistance to mount their projects, from funding of preliminary studies to operational assistance, on the condition that they meet the objectives set by the projects.

● FINANCING OF REAL ESTATE DEVELOPMENT IN QUESTION

Factor 4 planning has two main effects on housing construction, beginning with the impact on land available at a low cost. With the halt of soil sealing and covering, available land will be scarcer, and new spaces will have to be exploited, by denser construction, rehabilitation of brownfields, renewal of existing built-up areas by demolition and reconstruction, etc. The second effect is the higher cost of construction to achieve better energy performance in housing. Studies are underway to find ways in which the financial benefits of low-energy homes can be mobilised.

In brief

Integration of Factor 4 goals in the planning process is an important task that territories are beginning to tackle. The steps already taken point to levers for success. The Factor 4 approach must be shared by partners, in an integral fashion, from initial observations to final decision. This cross-sectoral and cross-disciplinary implementation, spanning actors, territories and themes, is one of the keys to success. Factor 4 planning questions the ways in which cities are made, via new urban configurations, appropriation by residents and its vision for the territory.

In this dossier technicians and elected officials recount their experience and the concrete work conducted by urban planning agencies to help territories rethink their tools and resources, in order to better address the issues of the energy transition in planning, at different project stages.

FEEDBACK ON EXPERIENCE

The Factor 4 objective proposes a new way of thinking about territory: an integrated and collaborative process at all stages of planning. Urban planning agencies, positioned at different scales, recount their experience with Factor 4 approaches.

COLLECTIVELY ANTICIPATING OUTCOMES

TOURS

Prospects for a Factor 4 SCoT in the Tours metro area: local levers for a post-carbon urban area

The Tours urban community proposes an urban transition scenario that aims for a steep reduction in greenhouse gas emissions, deploying a pedagogical attitude today based on projections for the distant future.

The work carried out by the urban community authorities, in parallel with the elaboration of the territorial coherence scheme and the territorial climate and energy plan, determined levers to achieve Factor 4 objections via land use planning decisions. The ensuing sociological study evaluated the impacts of the land use scenario in terms of life style, to avoid disruptive changes.

● RESEARCH UNDERPINNED BY A SCOT

In 2009 ADEME and the forward-looking studies unit of the French Environment Ministry launched a call for research proposals under the title «Rethinking cities in a post-carbon society».
One of the targeted objectives is to elaborate, in collaboration with large metropolitan area authorities, a framework for the simulation, application and evaluation of scenarios for urban transition to a post-carbon society. The guiding principles of the Tours SCoT up to 2020 are indeed ambitious, but do not impose a scenario for radical change that would sufficiently reduce greenhouse gas emissions that continue to rise in this growing territory.
This observation prompted thinking about a new SCoT up to 2030, aimed at designing possible futures along a Factor 4 trajectory, in order to challenge public policies that are still anchored in the short term. This process also aims to show the limitations of land use policy that are insufficiently proactive, and to emphasise the need for a mobilisation driven by a common focus across the range of public policy tools (PLU, PDU, PLH, SCoT, PCET, etc.).

● A THREE-STAGE APPROACH

Different time scales were considered. The present situation was examined, to detect strengths, weaknesses and opportunities to be seized to reduce GHG emissions. The first-generation SCoT was approved by the Tours urban community in 2013, the first step towards a low-energy future, and later evaluated to determine areas for improvement. A second-generation SCoT for the medium-term period 2020-2030 proposed a scenario for radical change.

● A FIRST-GENERATION SCOT FAR FROM FACTOR 4 GOALS

The first-generation SCoT called for reducing areas of urban expansion by half, and sought to truly coordinate urban planning and public transport. Under this scheme, however, GHG emissions reductions that could be achieved by 2020 were estimated at only 8%.
This foreseeable contraction in the residential and commercial sectors, industry and agriculture is explained by the combination of local and national government policies. Emissions would fall below their 1990 level, due to the application of new thermal regulations in 2012 and the implementation of the urban community climate plan along with the SCoT, but are still far from the 75% reduction set under Factor 4. Indeed, GHG emissions from transport, the sector with the highest emissions, will continue to rise, despite the measures enacted, essentially due to projected population growth.

● THE PRINCIPLE OF LOCAL COMMUNITY, A VALUE THAT CREATES TIES

A second-generation SCoT was thus devised, based on a broad coalition of partners, including the local energy agency, the urban community government, academics, election officials and technical staff in local authorities, who took part in a workshop moderated by Francis Beaucire.
The workshop discussions focused the scenario on the principle of local community to address the challenges of climate change, and also of ageing population, fragmented family structures, and rising energy costs. In keeping with this principle of local community, supplemented by the notion of short supply cycles, the model of a dense and compact city emerged as the keystone of the scenario. The concept of good living in a local community is present at several levels: location of stops for access to public transport, local food production, energy derived from resources found in the territory, etc.
In this SCoT all new development is subordinated to the principle of zero land occupied by urban expansion. The point of view is fundamentally altered: farmland and undeveloped nature areas are no longer seen as a reservoir of land for urban development, but as a resource to be preserved. The growth of cities can be fuelled only by renewal of existing urban areas. All areas that are rehabilitated must include equal areas of built space and green zones. Nature returns to the city, with family and market gardens close to housing. The principle of urban diversity replaces that of sin-

ATU

The forward-looking scenario for a Factor 4 SCoT in Tours

gle-use zoning, and large commercial centres are replaced by medium-sized and small businesses located in residential areas. The city of local communities reduces physical and social distances.
Building on thinking started during preparation of the first SCoT, the second-generation scheme strengthens the pillars that link environmental and agricultural issues to transport, land availability and urban density.

● INTEGRATING THE FORWARD-LOOKING SCENARIO IN LOCAL POLICY

The SCoT, the PCET and the forward-looking scenario were elaborated in parallel. The various thought processes fed and stimulated each other, forging a new and clearer vision of the prerogatives in each policy area.
The scenario adopted for the future, and its assessment, showed that planning should be cross-sectoral and not restricted to housing, or transport. The PCET, which initially targeted these two sectors, was broadened to include issues such as agriculture, «blue» and «green» bands, and adaptation to climate change.

● FACTOR 4: AN AMBITIOUS AND ATTAINABLE OBJECTIVE

This research contributed to national and local thinking, by calling into question the aims of local planning documents that were being drafted, with regard to climate change mitigation and adaptation.
Research findings show that Factor 4 goals can be achieved through local measures, such as limited investment in roadways, and conservation of farmland. On top of these measures come national initiatives, such as promotion of electric vehicles and new thermal regulations to take effect in 2020. These steps taken across all sectors of activity will hold down GHG emissions.
Other scenarios might lead to the same outcome, with less effort in one sector compensated by greater reduction in another. The selected scenario was chose, on the basis of the sociological insights of the study.

● LIFE AFTER CARBON: THE SAME CITY INHABITED DIFFERENTLY BY RESIDENTS

The sociological enquiry conducted by the CETU EticS unit at Université François Rabelais in Tours looked at the ways in which metro area residents appropriated the scenario. The scenario is interpreted in the light of current life styles, and seen as the anticipation of the foreseeable future, to which they will have to adapt. Mastering the scales of coming change is in fact one of the conditions for accepting this scenario: the components of the scenario appear all the more credible, acceptable and attractive because they refer to temporal and spatial scales that can be appropriated by individuals. City dwellers give their preference to the local scale, the community, the «neighbourhood», the «village». This enquiry confirms that it is hard for households to envision change at scales of time, space or action that engage an abstract collective group, and that refer to levels of responsibility and modes of action that elude their grasp. In short, the attitudes adopted by the households surveyed attest to multiple strategies to adapt to new constraints and opportunities.

RENNES

Games in support of political debate to elaborate a SCoT for Rennes and environs

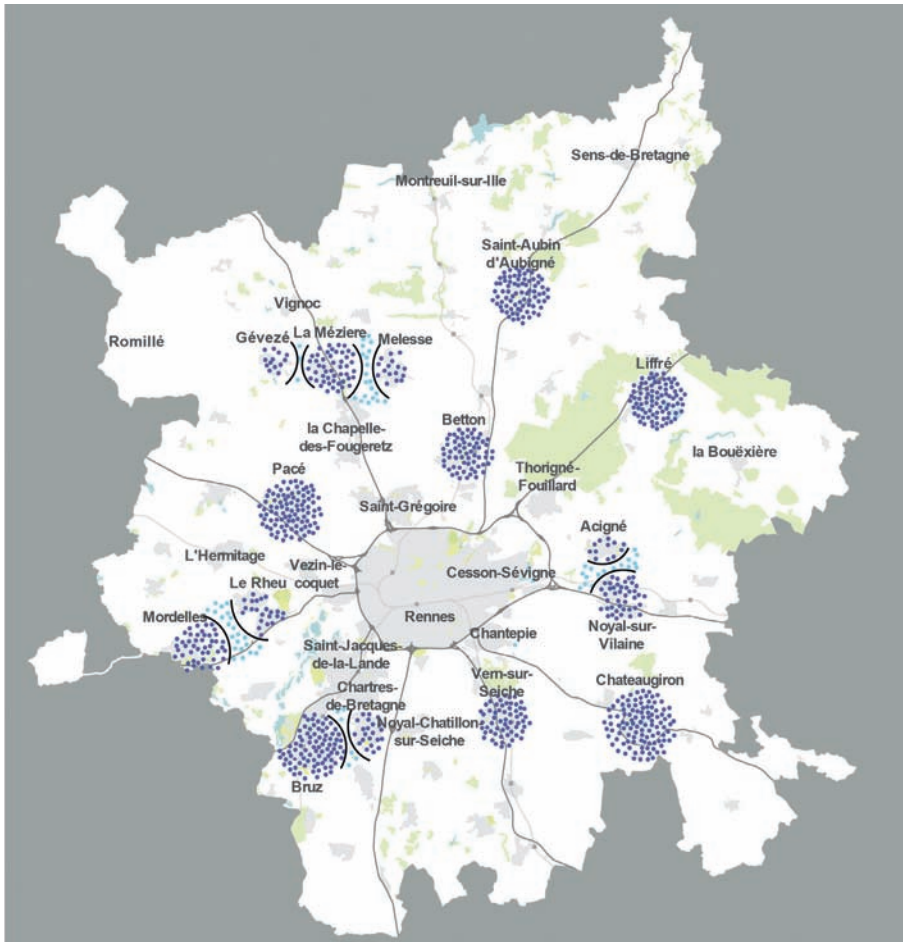
The new Pays de Rennes SCoT is not strictly speaking a Factor 4 SCoT. Nonetheless, it is an exemplary document, by virtue of the high-quality debate conducted upstream of revision, based on sharing a sensitive approach to the notion of central-ness.

● SCOT: BETWEEN OPEN-MINDEDNESS AND THE IMPERIOUS NEED TO MAKE PROGRESS

In the context of revising its SCoT, the multipartite syndicate at the head of the Pays de Rennes territory sought to bring as many elected officials as possible into the discussion. The Agence d'urbanisme et de développement intercommunal de l'agglomération rennaise (Audiar), the Pays de Rennes authority and various public establishments for intercommunal cooperation (EPCI) mobilised a broad range of elected officials representing different territories.

A first seminar was held with 190 participants from Rennes and environs, on the topic «Looking forward to 2030, how can differentiated spatial development be implemented, while maintaining a coherent whole?» While this initial seminar was meant to be broad and cross-disciplinary, the succeeding seminars were designed to delve deeper into discussion of concrete issues, to outline a land use planning and sustainable development project (PADD).
With these seminars there was a risk of becoming mired in a fuzzy discourse, full of commonplace remarks, especially as the cross-disciplinary and systemic approach chosen by the elected officials was met with some scepticism by technical staff. Indeed, with this approach possible outcomes are less clearly visible than when following conventional thematic approaches.
To counter this risk, the in-depth seminar discussions used three entertaining techniques: a «Happy Families» card game, stickers, and drawing activities.

1,000 stickers reveal 10 poles in the Pays de Rennes area in 2030



AUDIAR

● «HAPPY FAMILIES»

This game modelled after the «Happy Families» card game facilitated discussion of the distribution of roles for each municipality in the urban fabric, which had previously been precisely analysed by Audiar. The seminar's role was to give a political dimension to the options, while explaining this technical work to the intercommunal establishments.
In the course of the game the participants discussed what might be the rights and obligations of the different poles found in the strata of the urban area: structural poles, supporting poles, community poles.

● STICKERS AND POLES

Having defined the functions and conditions for success of the structural poles, the participants put stickers on a map to locate these poles in 2030. The participants' task was to reason on the basis of the future needs of the territory and its inhabitants.

● DRAWINGS AT THE HEART OF THE METROPOLITAN AREA IN 2030

In this activity, intuitive and personal, the participants were asked to draw the outlines of the heart of the metro area as they imagined it would be in 2030, using a map on a sheet of A4 paper. These 160 drawings, classed in three major groups, were the subject of discussion in a plenary session.

● SUCCESSFUL APPROPRIATION

These methods put the discussion on a more objective footing, and enabled the elected officials to produce results. Later, subgroups were formed with elected officials at each table, and in addition to creating a good mood, placed the debate on a larger scale, the scale of intercommunal entities. The appropriation was successful, as the discussion techniques made it possible to harmonise the various levels of expertise among the elected officials, and to build a common culture.
The tools used during the seminar helped the participants move beyond the notion of hierarchy between primary and secondary poles, between large and small municipalities, to understand the importance of links between municipalities and to grasp the notion of local community, in order to more easily implement it. While these tools do not resolve complex issues such as trade or energy, they enable participants to leave behind questions of form, and work on the substance of issues. The PADD document was reread and amended by the elected officials.

BROAD TERRITORIAL COHERENCE IN THE FACTOR 4 FRAMEWORK

GRENOBLE

Climate in the Grenoble Urban Region SCoT

When revising its SCoT the Grenoble urban region wanted to radically break with past trends, to construct a project for a balanced and community-centred territory.

The SCoT document was approved on 21 December 2012, for a vast territorial area of 3,720 sq. km., comprising 276 municipalities, 751,300 inhabitants, 361,900 housing units, 324,800 jobs, 2.9 million daily commuting trips. The Grenoble Urban Region SCoT public establishment (EP SCoT) is the project authority ensuring global oversight; the regional public urban planning agency for Grenoble (AURG) is in charge of implementation, environmental assessment and supporting measures.

● PLANNING RESPONSIBILITY FOR CLIMATE ISSUES

In the evaluation phase of the preceding master scheme (dating from 2000), election officials took stock of persistent and marked phenomena in the territory: urban sprawl, land uptake, increasing commuter travel and problems of pollution and other harmful effects, access to the Grenoble metro area, and disparities between municipalities in terms of housing, jobs, retail activity, etc.

At the time of starting work of a new scheme, the regional elected officials called for "a master scheme that breaks with past trends", so as to mitigate competition between sectors and build a development project for a denser and more balanced territory ensuring solidarity between its components. Their request specifically listed work on transport services to meet objectives in terms of territorial balance and community, in keeping with the principles of time optimisation, and consideration of residents' living space, to reduce the negative effects of development.

The SCoT syndicate committee also sought to include elected officials representing all the territories in the environmental assessment steering committee, that includes an energy/climate segment. This segment received close attention as the project was drafted, and also served as the basis for assessment of the environmental impact of the project.

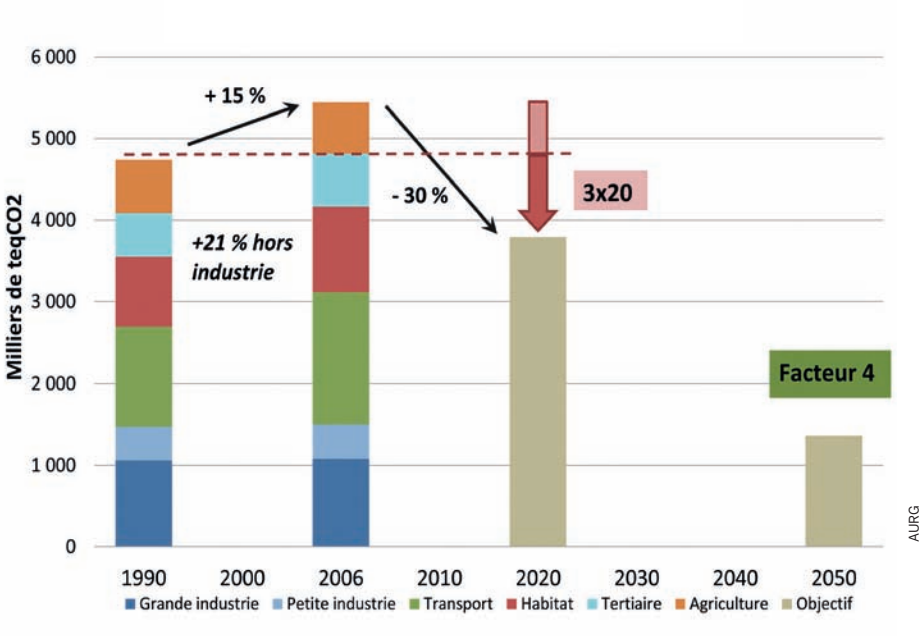
● KNOWLEDGE FOR ACTION

A current status assessment of the territory was drawn up by consulting firms specialised in energy, quantifying energy consumption and GHG emissions by sector (agriculture, housing, travel, etc.). Shared thinking on the SCoT "strategy" was the basis for assigning planning responsibility for reducing GHG emissions; these options were confirmed by the technical audit and upstream assessment of the scheme's impact conducted by AURG. The specialised consultants also helped identify room for improvement in terms of energy savings and GHG emissions under the SCoT. The energy and emissions impact of the scheme was simulated in a model constructed by Air Rhône-Alpes and AURG, working with consultants.

● A SCOT FOR RADICAL CHANGE TO MOVE TOWARDS FACTOR 4 GOALS IN THE NEXT GENERATION

The approach used in preparing the SCoT offered an objective vision of the territory in terms of 20x20x20 and Factor 4 objectives, and quantified possible GHG emission reductions under different projected scenarios. These findings confirmed the importance of adopting an energy efficiency strategy under the SCoT, and the need to established prescriptive guidelines to ensure a coherent policy, even if the latter are complex and strongly debated. This work outlines pathways for concrete improvements: better localisation of jobs, housing, shops and services across the Grenoble region; more coordinated articulation between urban planning and transport; restriction land uptake; development of energy-efficient housing and urban configurations via greater compactness, diversified forms and adaptation to the territory; pooled energy production and decentralised heat systems; use of renewable energy resources in multi-family housing and single-family dwellings, in construction and renovation work, etc.

Despite the precocious and proactive determination of this SCoT, the expected results will not yet attain Factor 4 goals, that will be targeted by future territorial schemes.



AURG

The SCoT aims to hold down the increase in GHG emissions

DOUAI

The Greater Douai area: towards integrated energy planning

In the framework of analysis of its territorial scheme, the Greater Douai area undertook an exemplary energy and climate planning process, adding a climate plan to the initial SCoT.

● A PROACTIVE CLIMATE PLAN TO ROUND OUT THE SCOT

The multipartite SCoT syndicate was created in 2003 by four intermunicipal entities, to jointly set the main orientation for planning in the Greater Douai area. The syndicate, conscious of its limited room for manoeuvre when confronting disruptive climate change, rapidly put into place a "proactive" territorial climate plan. This climate plan targets 20x20x20 and Factor 4 objectives, and was drawn up according to the three principles of the NégaWatt model: low consumption, efficiency and renewable energy.

Measures to encourage low consumption and energy efficiency have been engaged since 2009. At this date a carbon assessment showed that the Greater Douai area was energy dependent, because its production of renewable energy was low, supplying only 0.6% of electricity and heating needs. The area's situation was further jeopardised by the upcoming closing of the Hornaing power plant. Renewable energy production is thus a major target under the Greater Douai climate plan.

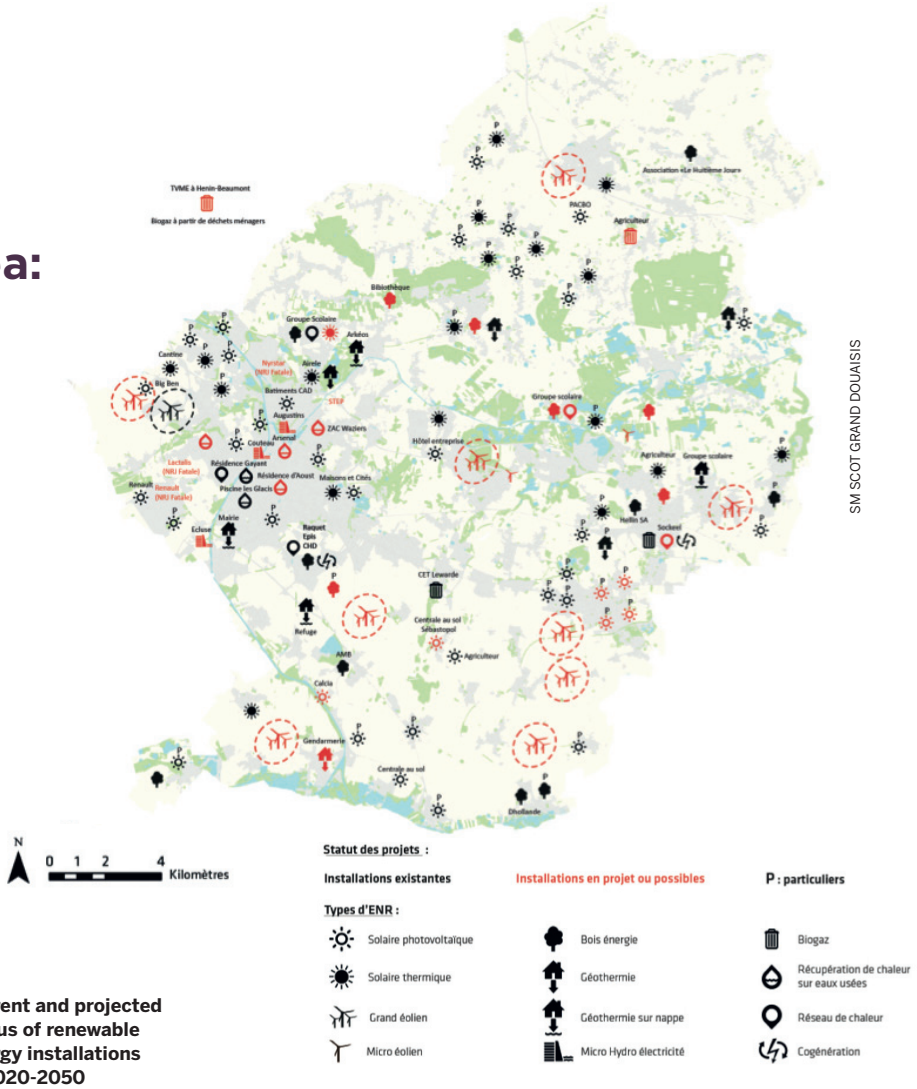
This impetus is also found in policy decided by the Nord–Pas de Calais region, which wants to start a third industrial revolution by giving renewable energy the preponderant role, in particular via the regional climate air and energy scheme (SRCAE), and the "Rifkin" master plan. The SRCAE objective is to multiply the share of renewable energy threefold by 2050.

● ANALYSIS OF AVAILABLE ENERGY RESOURCES

The SCoT elected officials decided in 2012 to carry out a study of renewable energy supply and development, to analyse potential resources with a view to development in the 2020-2050 period, in parallel with cutting energy consumption.

This report, conducted between 2012 and 2014 with assistance from a consulting firm, analysed the specific characteristics of the Greater Douai territory, in terms of current energy production and the nature of renewable energy resources that could be harnessed in the 2020-2050 time frame, their impacts on local development, and synergies to be encouraged between the SCoT and the climate plan. It became apparent that over 70% of the objectives set under the Territorial Climate Plan could be attained by applying the measures stipulated by the SCoT.

There was some difficulty, however, is gathering accurate data on production and gross reserves for some forms of renewable energy, because certain types of data are not compiled.



Current and projected status of renewable energy installations in 2020-2050

● CREATING A COMMON CULTURE OF ENERGY AND CLIMATE PLANNING

To evaluate the conditions for development of renewable energy, thematic workshops were held with a wide range of actors, from local authority energy suppliers to researchers, businesses and not-for-profit groups. The requisite conditions were clearly formulated on the basis of obstacles and levers revealed by technical input on grid interconnection and complementariness, and on energy storage. With this input energy planning could be truly integrated into local urban planning, on a broader scale and with greater coherence. Now the challenge is to get all partners in the territory to effectively appropriate this knowledge for the long term.

● ENERGY PLANNING, A PUBLIC POLICY COMPONENT AT THE URBAN PROJECT SCALE

The task at hand is to integrate the energy dimension in policy choices, without imposing constraints, but as a lever for local development. The multipartite syndicate rose to this challenge by creating a common culture, drawing on long-term discussions and thinking initiated in 2007. This work helped participants recognise energy as an issue just as important as water supply or real estate, and gave legitimacy to SCoT planning teams in their action to address this issue when revising local urban planning documents. Energy planning enables local decision makers and technical staff fine-tune their vision of the future, and gives them data to supplement indicators to measure the impact of their choices on property, landscape and social characteristics, in future development zones in particular.

The next step will be to elaborate decision-making aids for elected officials and developers, based on technical assessments of renewable energy resources that have been shown to be potentially beneficial for the territory (geothermal resources, biogas, heat recovery from waste water, etc.)

AMIENS

The energy/climate dimension in the Greater Amiens SCoT

Early attention to the energy and climate dimension in the SCoT process mobilised actors and tools for implementation.

● PRIOR EVALUATION

The ADEME regional office in Picardy worked to encourage integration of energy and climate issues in the course of the SCoT process. A multi-component study supported this integration process: an audit of energy consumption and GHG emissions along with a forward-looking analysis of the scenarios proposed under the scheme; a survey of untapped energy savings and perspectives for renewable energy production; analysis of territorial vulnerability to climate change; and finally proposals for energy and climate measures to be included in the SCoT. The forward-looking approach was carried out using a simulation tool developed by ADEME Picardie, along with the regional energy-climate performance tracking chart, and underpins the environmental assessment process under the SCoT. It gives support to the territorial project, by showing that the recommended territorial organisation meets residents' needs, while at the same time setting the territory on a track to consume less energy.

● THREE MAJOR TARGETS IN THE SCOT

Reducing car travel is one of the objectives that guided the organisational plan for the territory, in addition to access to facilities and services, and control of land uptake. By delimiting urban systems and subsidiary areas of community life, the SCoT refocuses residential development around the municipalities that are the best endowed in terms of facilities, services and jobs. This strategy helps reduce GHG emissions, in conjunction with measures to develop modes of transport that provide an alternative to personal cars. Regarding housing, the SCoT encourages energy renovation of old units, in particular by including this aspect in local housing schemes, in addition to measures for new construction to renew the housing stock.

● MAKING THE MOST OF TERRITORIAL RESOURCES

Focusing on the features of local agriculture, the SCoT calls for enhanced mobilisation of local farm resources to produce renewable heat supply, most notably in the form of biogas. This process must be organised to produce energy from biogas, substituting a short carbon cycle for fossil fuels, and exploiting farm effluents, thereby reducing agricultural emissions.

● UNDERSTANDING LIFE STYLES

When drawing up an assessment, solid knowledge of residents' practices and of the way a territory functions must be acquired. Elected officials and technical staff relied on three surveys for this knowledge: a survey of households' travel within the greater region; a survey of highway travel, and a survey of households' purchasing practices. Running under SIG, these surveys are more than just a population census, and measure the attraction exercised by urban poles and life on a community scale.

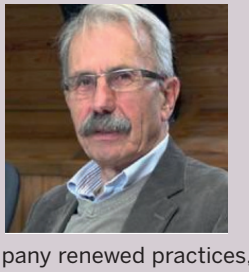
● APPLYING TOOLS FOR IMPLEMENTATION

Various conditions are key determinants of a successful SCoT: achieving the objectives set, for example by local authorities under their contractual commitments with territories; and respecting the SCoT provisions that themselves set conditions, requiring implantation of new economic activity with new housing, among others.

ADUGA

Distribution of new housing construction within the SCoT territory

THE VIEWPOINT OF AN ELECTED OFFICIAL



DR

François COSSERAT, chair of the environment and agriculture commission of the Greater Amiens territory, 2008-2014

The Amiens Metropolitan Area project and the SCoT must not set forth only objectives and rules. They must also encompass discussion of ways to develop financial resources. The triple environmental focus must accompany renewed practices, encouraging conceptualisation and implementation of social and technical innovation.

Today we live in a society in which cupidity is the main driver of the economy, and in which individual entrepreneurship is the key to success. It is not easy to nourish collective hopes for new ways of producing and consuming.

We must establish a prevention plan to leave behind the "society of waste" and enter into a production-consumption mode. This will not be easy, but moderation in terms of resource use is a prime target of the Amiens 2030 project, on the condition that this analysis be extended to cover the entire community living space. The SCoT is designed to embrace this dimension.

AN INTEGRATED APPROACH TO ENERGY IN URBAN PLANNING

BORDEAUX

Energy planning in the Bordeaux metropolitan area

Proposals for the development of renewable energy resources, based on scenarios for different urban configurations, were drawn up jointly by the urban planning agency A'URBA and the local energy and climate agency ALEC.

● THE EXPERIENCE OF THE BORDEAUX METRO AREA GOVERNMENT AND FACTOR 4 PLANNING OBJECTIVES

The experience gained in Bordeaux underscores the advantages of collaborative work carried out by energy managers and urban planners, linking operational, regulatory and strategic aspects of energy issues. Energy planning fed into the revision of the local urban planning scheme for the urban community. It also highlighted the potential gains to be attained by including heat networks in urban development options. Going beyond the local planning scheme, the urban fabric was analysed to identify opportunities for the development of heat networks, with the advantage of being rapidly operational and more instructive for operators. In addition this work provides a vision of possible balanced financial frameworks for district heating projects, in the context of increasingly dense urban fabric in Bordeaux.

This work covers a first stage. Energy demand management projects for buildings and the development of renewable energy in private homes are underway, and will gradually complete the energy planning approach.

● MODELLING HEATING NEEDS

As early as 2009 A'URBA decided to tackle energy issues in relation to urban planning, via a study of residential heating needs in the metro territory, using the methodology elaborated by APUR at the time. This work yielded the first findings on the thermal characteristics of local buildings.

In parallel ALEC conducted an energy audit of the Bordeaux metropolitan area and elaborated forward-looking scenarios for attaining the Factor 4 target by 2050. These scenarios stipulate a 66% reduction in energy consumption in buildings, and an 83% share of renewable and recovered energy (RRE) in residential consumption.

These goals were included in the climate plan approved by the Bordeaux metro area government in 2011.

In this framework the metro area government, the City of Bordeaux and ADEME sought operational solutions. Joint work by the urban planning agency and ALEC emerged as a good way to propose a combined energy and urban planning approach.

● DIFFERENT STRATEGIES FOR VARIOUS KINDS OF URBAN FABRIC

The main distinctive feature of the joint approach was to consider energy at the urban fabric scale, and not at the building scale as is usually done.

The first stage was therefore to qualify the residential urban fabric in the Bordeaux metro area. With this in mind we based our study on the four large residential zones delimited by the 2006 local urban planning document. Energy transition solutions were imagined for each zone, with RRE options tailored to each kind of urban fabric.

In central areas, the Bordeaux metro area has a rich resource in the form of large industrial brownfields in the heart of the community, which are suitable for major urban projects. The proposed strategy for these sectors is to create district heating networks at these project sites, serving an area wider than just the operational scope of the project, in order to meet existing demand in nearby buildings.

In so-called "mixed" areas of both post-WWII multi-family buildings and scattered single-family homes, the proposal is to design district heating networks around existing large consumers (multi-family buildings, public facilities) that will progressively extend to surrounding project sites. These networks would be smaller than in central areas.

In outlying areas of single-family dwellings the preferred options are individual RRE installations, while at the same time emphasising the stakes of thermal renovation in this type of urban fabric: single-family homes represent close to one-half of heating consumed in the Bordeaux urban area.

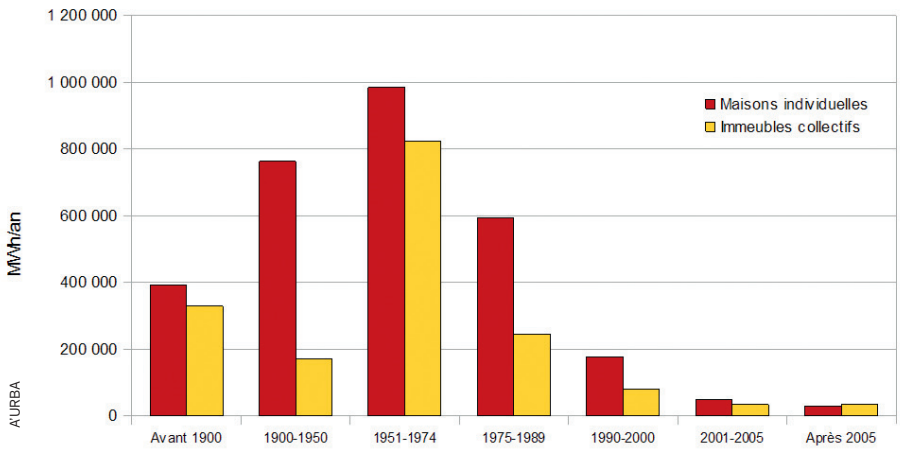
Other research is underway in parallel to this work, conducted by the A'URBA/ALEC team: analysis of electricity needs in the Plaine Rive Droite zone on the right bank of the Garonne, an area that is experiencing considerable development; and studies to underpin strategic thinking for the renovation of residential building stock on the scale of the Bordeaux metro area.

● FROM ENERGY PLANNING TO URBAN PLANNING

In the beginning the energy planning mission was not conceived in relation to the elaboration of a local urban planning document.

Nonetheless, the energy planning results were taken into account when the metro

Overall building energy needs by period of construction



area planning document was revised in 2012 to become the "3 in 1" PLU. First of all, the knowledge acquired in the course of the energy study was a useful source of information for the initial environmental assessment and audit. Secondly, while the urban planning document cannot issue prescriptions for development of district heating networks or be substituted for the network qualification procedure, it does contain maps of areas that are suitable for district heating that can support plans to build up urban density in existing areas and create dense zones in project sites. And finally the components of thermal renovation strategy are given a prominent place in the orientation and action programme of the urban planning document that serves as the local housing plan.
In conclusion, it is to be regretted that some measures authorised by law are not feasible in practice: the construction zoning bonus, or the possibility of fixing higher energy and environmental performance for certain sectors, are hard to justify when the principle of equal treatment of territorial entities is taken into account.

● EFFECTIVE PARTNERING OF ENERGY SPECIALISTS AND CITY PLANNERS

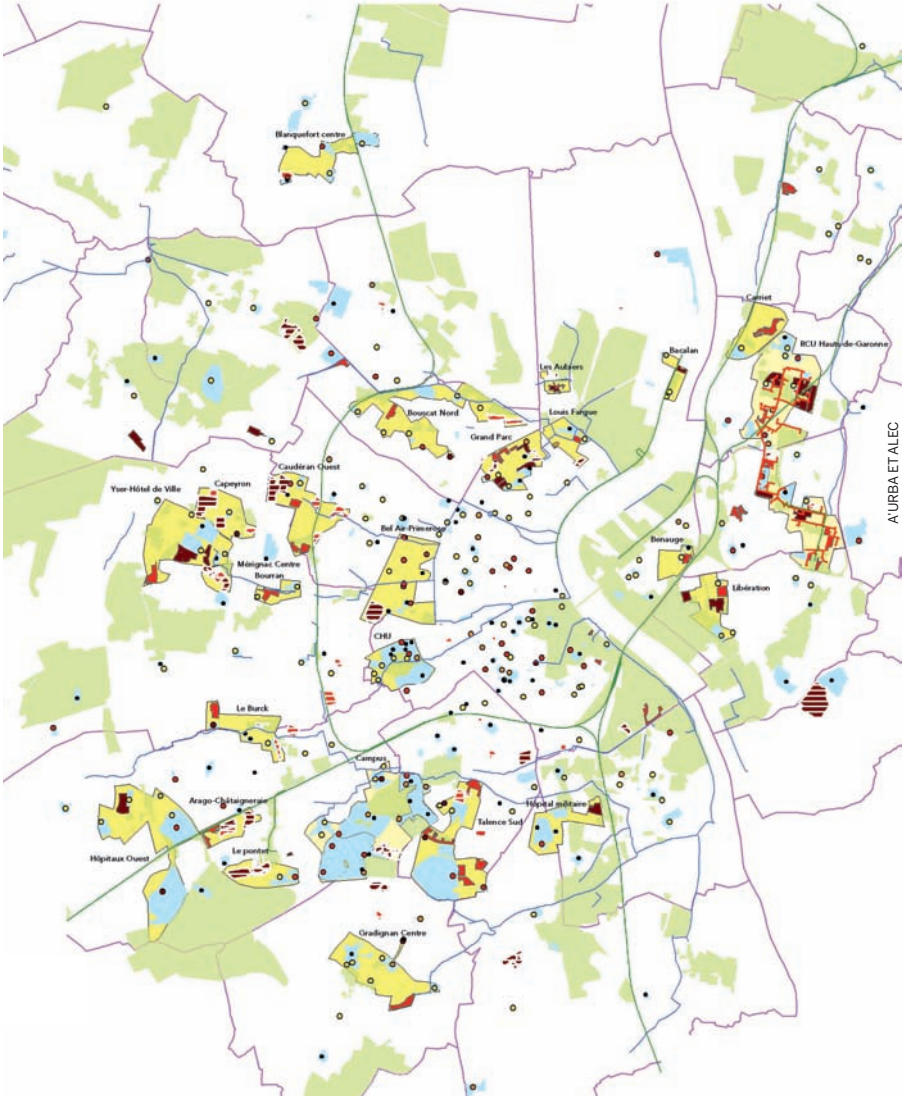
One of the factors for success of this work is the partnership created between the Bordeaux urban planning agency and the energy agency ALEC 33. This partnership is founded on a document that reiterates the general principles for achieving the Factor 4 target. Each year the two agencies contribute their views on the development of renewable energy in urban areas, opening up new areas of discussion, for instance via work on the potential gains of renovation of the existing built environment in 2013.

POINT OF VIEW FROM ALEC


DR

Par François MENET-HAURE, director of ALEC 33

"ALEC has worked with the urban planning agency since 2011, sharing a common objective: a sustainable metropolitan area that achieves a 75% cut in its greenhouse gas emissions. This collaboration associates the skills and expertise of each agency. According to the principles of energy planning, the "regulatory framework publication" regarding the scope of energy services for urban projects has in some cases led to extended operational studies conducted by local authorities to bolster the general interest of their projects.
Our two federations, respectively the Fédération des agences locales de maîtrise de l'énergie et du climat (FLAME) and the Fédération nationale des agences d'urbanisme (FNAU) are working to develop this type of partnership in many territories: information sheets on energy integration for the Grenelle objectives local planning documents in Saint-Etienne (ALEC 42 / Epures); the sustainable development approach for urban planning in several municipalities in Rennes and environs (ALEC du Pays de Rennes / AUDIAR), etc. Networks of complementary actors come into contact through the advanced multi-criteria analyses that area supported by these partnerships of specialists.



A'URBA ET ALEC

Potential for creation of district heating networks in areas of the Bordeaux metro are (suitable sectors, outside of the Bordeaux city centre)

BREST

The Factor 4 intercommunal planning document for Brest Métropole Océane – a cross-sectoral approach

The new local urban planning document for the Brest metropolitan area is entitled «Factor 4 local planning document», serving as both the local housing plan and the urban travel plan, as stipulated by the Grenelle environmental conference. Elaborated under the same timetable and governance framework as the territorial climate and energy plan (PCET), this document confirms the convergence of these four planning documents.

The intercommunal planning document (PLUi) was completed in a short time (under three years), with the benefit of past experience: the Brest metro area started working on a community land use plan in the 1970s. This new approach, combining three documents, turned out to be a singular experience.

Integrating local housing plans, urban travel plans and climate/energy plans in the PLUi required considerable organisation of human and material resources. Policy oversight was ensured by a steering group, the formal validation instance, and by an operational group that supervised process advancement.

On the technical level, a major advantage was that the bulk of necessary expertise was grouped in one deputy directorate general, spanning housing, urban planning, travel and commuting, and economic development. Three outside contractors provided project management assistance, legal advice and environmental assessment services. Preliminary studies were assigned to local authorities, the urban planning agency or outside consultants, as the case might be. In addition to working on these studies (economic analysis of landed property, spatial surveys), ADEUPa produced several components of the document: the territorial audit, the sustainable development and land use plan, the housing planning and programme orientation document and the section of the environmental orientation document devoted to green and blue "bands" in cities.

● A CROSS-SECTORAL WORKING METHOD

The steering unit for the full ensemble, made up of the Urban Dynamics Division and ADEUPa, made sure that the thematic groups (elected officials, technical staff, associated public personalities, etc.) and technical workshops (professionals) both worked across sectors and disciplines. A key factor was the presence of an outside moderator, whose role was to encourage workshop and group leaders to appropriate other themes and topics.

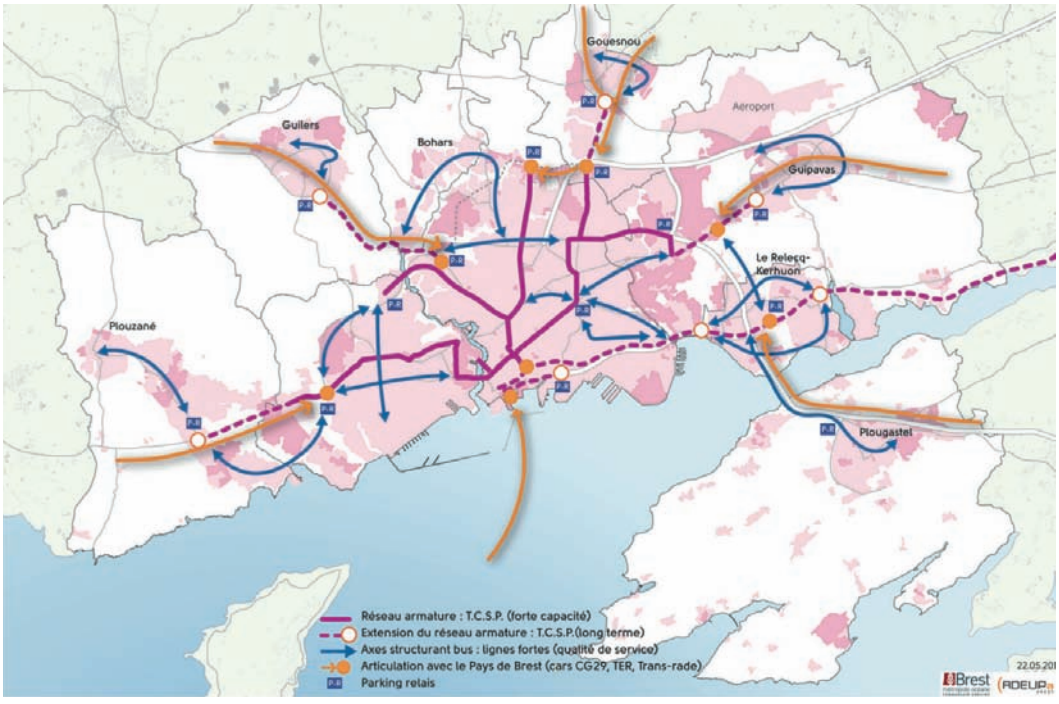
The impact of the climate plan in accelerating the pace of thermal renovation of housing units should be noted. Urban renewal was at last included in local housing policy, with the same importance as demographics and attractiveness of residential areas.

In terms of economic activity, the city centre and its metropolitan functions are the preferred location for the tertiary sector, with the effect of reinforcing the role of public transport networks, most notably the tramway service. Denser building is encouraged in existing built-up areas and properties and economic activity zones, combining elements that are favourable to reduced energy use.

● A PREFERENCE FOR COMPACT CITIES WITH GOOD PUBLIC TRANSPORT

Coordination of the transport system and urban planning corresponds to commitment no. 3 of the territorial climate and energy plan that calls for action to "Stimulate alternative forms of mobility". The orientation of the travel and commuting theme emphasises changes in public space to ensure greater comfort and safety for active modes of transport, on foot and bicycle, alongside calmer and more fluid automobile traffic. The aim is to give preference to a compact city with good transport services, and preserve the multiple poles of the metro area, a feature valued by its inhabitants. The joint elaboration of a territorial climate and energy plan highlighted the need for a radical change in behaviour to achieve the Factor 4 target, with optimum use of private cars.

The combined PCET and PLUi approach helped disseminate climate and energy awareness, first within various professional departments and cultures, and secondly in the content of the document itself. The preceding Brest metro area PLU had encouraged exchange between departments; in the most recent version a new collective working process has been instituted, via rigorous organisation on the policy and technical levels alike, implemented and sustained throughout the three years of the revision process.



BREST MÉTROPOLE OCÉANE / ADEUPA

Integrated into the local urban planning document, the Brest Métropole Océane urban travel plan emphasises a public transport network with dedicated travel lanes and/or corridors to enhance the attractiveness of activity poles in the territory

HOUSING AT THE HEART OF FACTOR 4 TASKS IN TERRITORIES

AUDIAR

Housing density is determining condition for controlling land uptake and soil sealing

RENNES

The Rennes metro area local housing plan, a tool to control land uptake

The Rennes metro area local housing plan is a tool designed to support dense and mixed-use operations. To meet the Factor 4 objective the consumption of urban space must be brought under control, to help optimise transport networks and reduced greenhouse gas emissions.

In the decade starting in 2010, the urban housing planners observed extensive urban sprawl. Technical and financial support mechanisms were put into place for local authorities.

● 2004, AN OUTDATED MODEL

Between 1990 and 2004 the Rennes metro area experienced two parallel phenomena, sustained population growth and rising real estate prices. A segment of the population was forced out of the metro area by the cost of housing. During the same period available land became scarcer, making it more difficult to start new construction programmes. The transition from urban extension by zoning for housing, to urban planning via coordinated land use programmes has made operations more complicated for local authorities that lack experience, and human and technical resources.

A study conducted by AUDIAR in 2004 assessed land uptake over the preceding decade. Urban extension averaged 200 hectares a year, three-quarters of it outside of Rennes. In 17 years urbanised land area has risen by 45%, while population has grown by 22%. Municipalities develop by the extension of areas dedicated to single-family homes, market demand pushes land prices up, and first-time home buyers are driven ever farther from the city centre. The stock of available land is depleted, access to public transport is more difficult, encouraging use of private cars, which contributes to CO_2 emissions.

● THE CITY AS ARCHIPELAGO AT STAKE

Three-quarters of the new population reside in outlying municipalities, challenging the model of the Rennes urban archipelago, a model based on principles of land use such as alternating built-up and unbuilt areas, and limited travel thanks to local community services. But this model also carries risks, in particular that of greater urban sprawl.

● TERRITORIAL COHERENCE AND HOUSING PLANS WORK TOGETHER

The simultaneous revision of the territorial coherence scheme provides a chance to fulfil the obligation for greater urban density in new construction programmes, using two levers: preservation of farmlands, and density targets for extension of urbanised areas.

● THE PRINCIPLE OF CONTRACTUAL AGREEMENTS

The local housing plan sets common objectives for all, but implementation is the subject of negotiations between the Rennes metro area authority and each municipality. Contractual agreements are drawn up to set targets for each local authority, supported by financial aid and technical assistance.

● THE RESULT IS LESS UPTAKE OF LAND, AND CONSTRUCTION OF LESS RESOURCE-INTENSIVE HOUSING

Since 2005 consumption of natural and agricultural space has slowed, in particular conversion to residential use. Average annual land uptake for the 2000-2010 is about 93 hectares, compared to 127 ha per year in 1999-2004. The combined effects of the SCoT and the local housing plan have resulted in more efficient land management. The local housing plan sets forth new conditions for construction of new neighbourhoods, introducing a requirement for different types of housing. The outcome is a higher number of housing units produced per unit of land area occupied. This increase is also linked to urban renewal action that augments the number of housing units without enlarging the urban footprint.

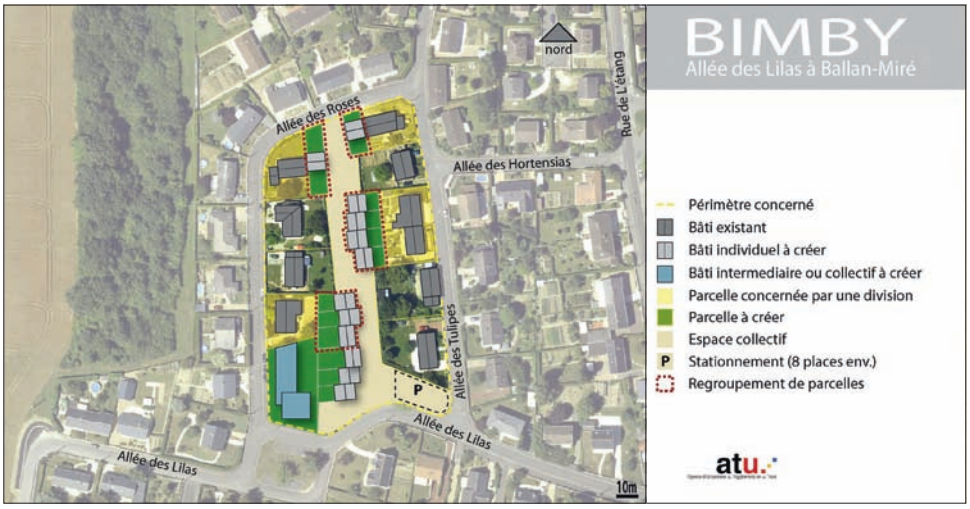
● MANAGING LAND PROPERTIES, A KEY PART OF THE PROCESS

Rennes has been able to attain its density targets thanks to the determination of elected officials and the use of tools suited to the purpose.

From 15 units per hectare of land taken for residential use between 2000 and 2005, density rose to 40 units per hectare between 2005 and 2010. By limiting the land available for construction, the SCoT obliged local authorities to adapt their urban programmes by revising their local housing plans to foresee denser housing construction. Via its housing plan the metro area authority facilitated urban planning on the greater community scale, and was able to put a housing policy into place.

ATU

Photo of a home in Ballan-Miré



ATU

A densification scenario

TOURS

A strategy to regenerate single-family residential areas in the Tours metro area

The Tours metropolitan area authority undertook reflection with local actors to develop a Build in My Backyard (BIMBY) approach to renew its single-family housing stock, in keeping with the Factor 4 objective.

● THE BIMBY EXPERIMENT IN TOURS AND FACTOR 4 PLANNING

Projected scenarios for achieving a Factor 4 city in 2050 all propose a compact city model with significant mixed use, structured around travel and transport modes other than private cars. Today our urban areas include broad swathes of energy intensive single-family housing where automobile travel is preponderant.

In the view of the BIMBY programme leaders, a "gentle" densification of single-family housing tracts, organised and accompanied by public authorities, could transform these spaces into sustainable neighbourhoods and provide homes for new residents, without urban sprawl or heavy investment for local authorities, as these zones are already equipped with sanitation services and connected to power grids.

● SUPPORTING SCOT URBAN RENEWAL OBJECTIVES

The BIMBY project follows on the thinking contained in the Tours metro area planning documents, which stipulates as a major objective that the city renew itself from within. Two inner municipalities, Ballan-Miré and Fondettes, were chosen as sites to test the method.

The experiment took place in 2010-2011, with the participation of researchers from the Normandy–Centre Centre d'Etude Technique de l'Equipement (CETE), associated with the urban planning agency, representatives of local authorities, central government departments and the Tour(s)Plus urban community. The urban planning agency contributed work to identify the renewal potential of single-family housing tracts, and the ways in which the urban planning rules in effect support or impede this process. The CETE team surveyed residents and real estate agents to assess the relevance of the BIMBY approach in the local housing market.

● DIFFICULT INTEGRATION IN RECENT LOCAL HOUSING PLANS

If "growing the city from within" is a top priority under the recently revised SCoT and PLU documents, these plans focus primarily on old districts near the city centres (barracks, industrial properties) and on public transport networks (high-traffic corridors, railway station neighbourhoods).

The BIMBY experiment did not lead to strong endorsement of this approach for renewal of single-family housing tracts in the local housing plans drawn up by the two municipalities chosen for the study. The stated priority for elected officials is not to accelerate the process, but to control it. The urban and social outcomes at stake argue for progressive densification of designated urban areas or sections of streets, rather than for a spontaneous and unfocused process with uncertain impacts in terms of insertion in the urban fabric and social acceptance. Isolated operations to increase density are likely to have undesirable effects, with a risk of excessive exploitation of subsurface networks, elimination of gardens within the sites, conflicts between neighbours, etc. This demonstrates that the conversion of single-family housing tracts to mixed-use spaces, preserving land and resources, cannot be achieved simply by loosening up urban planning rules and regulations.

● WAYS TO CONSOLIDATE THE APPROACH

This study points to the need to develop tools to accompany local authorities and residents when setting up BIMBY operations. The managerial engineering habitually deployed when expanding single-family housing must be considerably reinforced, to identify the best areas for densification and draw up scenarios for their evolution; this could be achieved by including Grenelle conference objectives in urban planning documents. Skills must be acquired to obtain the "proactive" involvement of the population. This aspect was not addressed in the Tours experiment, nor were questions of operational tools for mounting legal and financial frameworks, or technical assistance for execution of projects that reconcile the objectives of sustainable urban planning and the desires of home owners and future residents.

NANCY

Accompanying thermal renovation of private housing stock in the Greater Nancy area

Following on housing policies conducted since 1980, the Greater Nancy authority is trying out new ways to accompany homeowners, to help them make the decision to undertake thermal renovation work.

This strategy comes after audits carried out under the 6th local housing plan and the territorial climate, air and energy plan (PCAET), which underscored the need for an ambitious renovation policy for housing built between 1949 and 1980.
Two measures were initiated in 2011 to bring practical answers to these energy issues: the COPRO-ACTIF mechanism, and a survey of areas comprising single-family homes.
These measures benefited from funding generated by energy savings certificates pooled by the Greater Nancy authority under the PCAET.

● THE COPRO-ACTIF MECHANISM

This is an experimental mechanism, set up for five years, to provide project assistance to multi-owner (freehold) apartment buildings. The objectives are to guide these properties in global renovation projects to meet low-energy building standards: measures include work to get individual owners to agree to a work plan over several years, and a methodology for managing the property improvements.
This assistance includes legal, financial, technical and social aid, formalised by a mutual charter agreement signed by the Greater Nancy authority, the board of the building owners' association, and the property manager. Coordination and monitoring are ensured by a local public corporation SPL Grand Nancy Habitat (SPL GNH), with support from the local energy and climate agency.
Implementation of the mechanism includes: a detailed assessment of the current situation (technical, administrative, legal, financial, occupancy); information on the assessment communicated to all owners so that they have the same level of knowledge; and elaboration of a project in keeping with the collective financial capacity of the owners, drawing upon all available aids and sources of funding.
After 18 months the COPRO-ACTIF scheme had contacted 31 properties totalling 2,900 units; 15 charter agreements had been signed, engaging 1,580 units, and 2 audits had led to programming of improvement work.
One of the properties followed by COPRO-ACTIF has received an ADEME PREBAT award, and is financed by the regional governmental council under a call for projects targeting energy rehabilitation in multi-family buildings (Opération Collective de Réhabilitation Énergétique, OCRE).

● SURVEY OF SINGLE-FAMILY RESIDENTIAL AREAS

This survey was carried out for the purpose of elaborating a strong policy to improve this housing stock, to propose incentives to low-income and/or older homeowners to renovate their homes, and identify measures that could be replicated in other similar residential neighbourhoods. A representative sample of 20 neighbourhoods was studied, numbering 2,850 single-family homes.
The survey was carried out in two stages by SPL GHN, with assistance from a technical consultant on thermal issues.
In the first stage public meetings were held, with support from each participating local authority. A questionnaire was distributed to all residents of the targeted neighbourhoods. Out of the 2,850 questionnaires, 40% were returned and exploited.
In the second stage 40 homes were selected among volunteers for thermal and accessibility audits.
This survey increased owners' awareness of the high levels of energy consumption of their homes, and returned information on the owners' socioeconomic status, in order to identify 430 households eligible for aid from the national housing agency (Agence Nationale de l'Habitat, ANAH). Twenty homeowners have already started work on their dwellings.
Recommendations were made for feasible improvements, and costs estimated according to three scenarios, ranging from €10,000 to €45,000, for the 40 demonstration homes. With this approach each household could reduce energy consumption by choosing improvements that matched the owners' financial capacity.

The French planning system

ACRONYMS

FRENCH	ACRONYM	ENGLISH
Établissement public de coopération intercommunale	EPCI	Public establishment for intercommunal cooperation
Orientations d'aménagement et de programmation	OAP	Land use and planning policy orientations
Projet d'aménagement et de développement durable	PADD	Land use planning and sustainable development project
Plan climat air énergie territorial	PCAET	Territorial Climate Air and Energy Plan
Plan climat énergie territorial	PCET	Territorial Climate and Energy Plan
Plan de déplacements urbains	PDU	Urban travel plan
Plan local d'habitat	PLH	Local housing plan
Plan local d'urbanisme	PLU	Local urban planning document
Plan local d'urbanisme intercommunal	PLUi	Intermunicipal local planning document
Schéma de cohérence territoriale	SCoT	Territorial coherence scheme

ORGANISATION OF ACTORS

NORD-PAS DE CALAIS

Commitment to sustainable city planning in Nord–Pas de Calais

Supported by ADEME, the regional government and public urban planning agencies, this action is designed to give actors in the territory tools to conduct sustainable urban planning.

In the framework of the regional energy management and environment fund (Fond Régional d'Aide à la Maîtrise Énergétique et de l'Environnement), the Nord–Pas de Calais regional government council and ADEME undertook this action in 2010 with planners from urban planning agencies, the mining district task force (Mission Bassin Minier), the departmental public-service advisory council on architecture, urban planning and environment (CAUE 62) and the sustainable development resource centre (CERDD). The aim was to build up comprehensive and shared expertise, by identifying and propagating good practices in sustainable urban planning.

● ACTION AT THREE LEVELS: STATEMENT, GOOD PRACTICES AND NETWORKING

This initiative produced two types of tools. The first is an instructive summary document entitled "Manifeste pour des projects urbains durables en Nord–Pas de Calais". This statement aims to build a common vision of sustainable urban planning to be shared by elected officials and technical staff in local authorities and their partners, and to show that alternative pathways are possible in urban planning. The second tool is a set of information sheets on initiatives, also intended for elected officials, technical staff and their partners. This collection is a repository of local practices to encourage sustainable land use and urban planning, and also lists tools and actors who can provide assistance in devising sustainable urban projects. Noteworthy initiatives are identified and selected on the basis of criteria set forth in the sustainable urban planning manifesto.

The third aspect of this action is a network of actors who meet between one and three times a year. This group keeps abreast of requirements regarding regional, national and eventually European regulatory documents related to territorial land use and planning (territorial coherence scheme, regional climate, air and energy scheme, territorial climate and energy plan etc.)

STRASBOURG

A shared platform to achieve the energy transition in the Strasbourg SCoT territory

The SCoT elected officials in the Strasbourg metro area (known as SCOTTERS) sought to work on consolidating an energy transition strategy for their territory.

This territory has a population of 650,000 and numbers 40,000 companies, located in the densest urban zone in Alsace, with urban configurations and life styles ranging from the brand-new Eurométropole in Strasbourg, a dense and cosmopolitan area traversed by the Ill and the Rhine rivers, to country villages set in vineyards.

The SCOTTERS project took off in 2013 with a number of strong points: a shared desire to change from being a resource-consuming territory to being one that renewed them, possessing renewable deep geothermal, hydraulic and wind resources.

The involvement of local entities was obtained, including the electricity and gas utility Groupe Electricité de Strasbourg et Réseau Gaz Distribution Services, the Caisse des Dépôts et Consignations bank, ADEME, the air pollution monitoring agency ASPA, the Strasbourg Port Authority, and the Energivie competitiveness cluster.

The project, spearheaded by the urban planning and development agency for the Strasbourg metro area, is designed to help elected officials elaborate and then apply their strategy, formulated in the SCoT document.

● A THREE-STAGE PROJECT

The project unfolded in three stages: the first was to gather information on energy use and functioning in the territory, assessing the stakes related to life styles and behaviours in households and companies, to energy grids, and climate issues. Thanks in large part to data from energy producers, this assessment served to identify levers at points where public policy intersects with territorial functioning, levers that when translated into indicators and variables can be used by elected officials. The assessment also set a zero point for benchmarking.

The second stage was the construction of energy transition scenarios based on these variables, including synergy and governance. After discussion the elected officials gradually fine-tuned their choice to select a scenario for the territory.

In the third stage the final scenario was integrated into the planning document and implementation of the selected energy transition measures prepared.

AUDRSO

In the Pays de Saint-Omer, the associated municipalities of the Fauquembergues canton have opted for wind energy

SAINT-OMER

Monitoring and assessment of the territorial climate plan in Saint-Omer and environs

This process to monitor and assess the climate plan, consolidated at the regional scale, strengthens the dynamics of local action, and helps define or recast measures to be taken.

The work conducted in the Pays de Saint-Omer territory shows the importance of monitoring and assessment tool in climate and energy action. The tool gave impetus to new dynamics and synergy between actors and encouraged cross-sectoral approaches. At the regional scale ADEME and the Nord–Pas de Calais regional authorities set up an observatory that facilitated exchange of methodology and good practices, and consolidated data on a scale relevant for action.

LAUNCHING A CLIMATE PLAN

With its territorial coherence scheme (SCoT) Saint-Omer put the environment at the heart of its strategy for development via a voluntary territorial climate plan (PCT). This plan focuses on seven strategic areas that cover major territorial development projects to address energy and climate issues. Among these are: sustainable mobility strategy for Saint-Omer and environs; energy efficiency in buildings; promotion of sustainable urban planning; social, economic and territorial development, and biodiversity management. Another objective is to mobilise all actors in the territory, and ensure monitoring and assessment of the plan. This last objective is a determining factor for the project, to maintain the collective momentum initiated with stakeholders in the territory.

THE REGIONAL CLIMATE OBSERVATORY

Like most territories that undertake a climate plan project, the Pays de Saint-Omer authority assessed its greenhouse gas emissions, using the Bilan Carbone® method. In parallel, ADEME and the regional government council drew up a grid of 10 indicators for evaluation of climate plans, to be filled out annually by each participating territory.
Certain territories, in particular those lacking an observation unit, were unable to provide data for these indicators. For the Pays de Saint-Omer entity, the urban planning agency proactively proposed complementary indicators for which data can be gathered. To help other territories find solutions to their problems, the regional government council, ADEME, departmental government councils and the regional office for environment, planning and housing (DREAL) decided to create a climate pole that includes a regional climate observatory. The agency worked with the other partners to define the role of the observatory, and to elaborate indicators and thematic publications for territorial entities.

THE URBAN PLANNING AGENCY AND CLIMATE OBSERVATION

By virtue of its legal mission as observer, the agency took part in a number of actions: elaboration of the assessment of GHG emissions in the territory; evaluation of the action plan implemented under the territorial climate plan; creation of the regional climate–energy observatory; experimentation to test accounting methodology for indirect GHG emissions, atmospheric pollutants and carbon storage in soil.

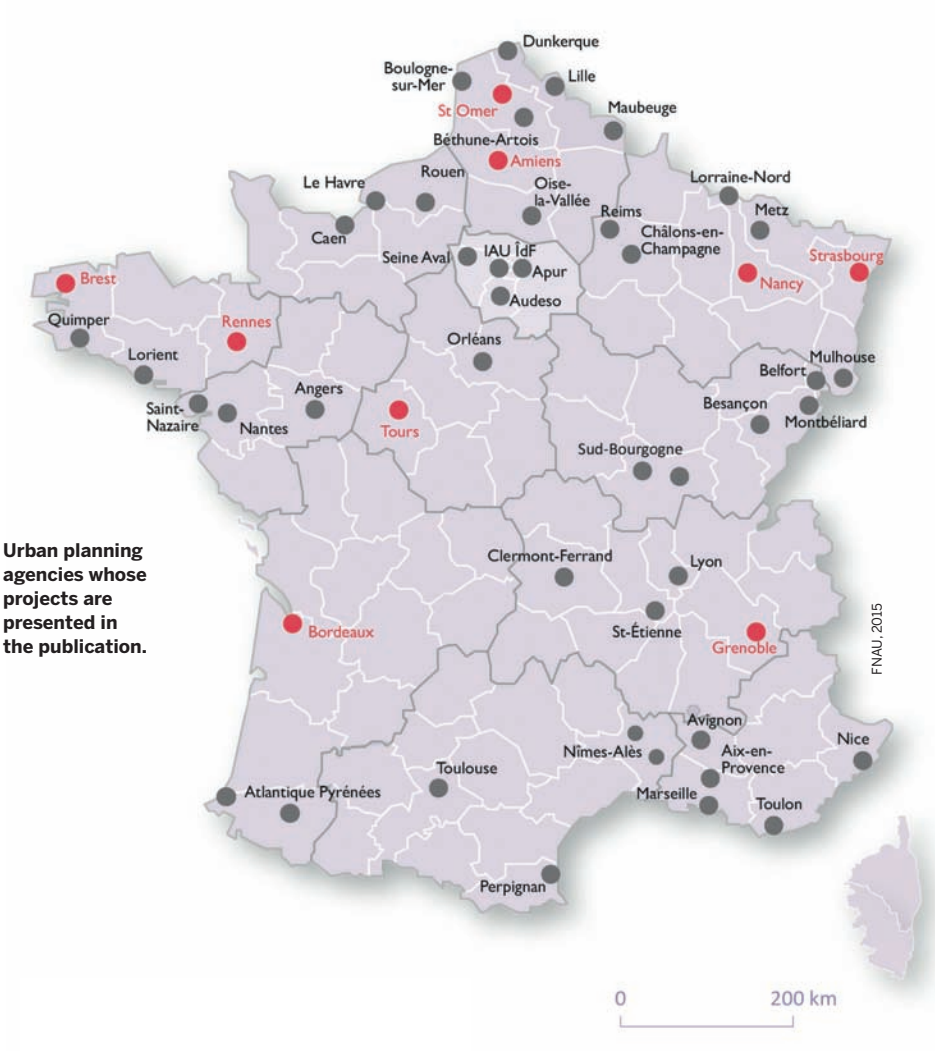
LINKING AUDIT AND EVALUATION?

Emmanuelle LATOUCHE – Deputy director, Centre de Ressources du Développement Durable (CERDD), in charge of the climate pole

Between carrying out a carbon assessment and returning data on the 10 indispensable climate and energy indicators, it is very hard to link assessment to evaluation.

To complete the evaluation cycle of this action, the Saint-Omer planning agency would like to establish a link between the GHG assessment, and evaluation of public policy under the climate plan strategy.
This coherence must be maintained throughout the process. As a result, elected officials and technical staff who do not work directly on this topic find it difficult to assimilate the issues at stake and to calibrate the public action needed to address the project objectives.

In this domain the Pays de Saint-Omer authority tested a new accounting method to estimate indirect GHG emissions, atmospheric pollutants and carbon storage in soil. This new audit tool is proposed by ADEME and the Nord–Pas de Calais regional council.



Urban planning agencies whose projects are presented in the publication.

EDITOR-IN-CHIEF : Brigitte Bariol-Mathais, General Manager (FNAU).
EDITORIAL CONCEPTION AND CONTENT : Maud Marsauche (Epures), Philippine Lavoillotte (FNAU), Sarah Marquet and Sophie Debergue (ADEME), with Florence Gall-Sorrentino (FNAU) and Marianne Malez (FNAU).
WITH CONTRIBUTIONS FROM : Olufunmi Aminu (ADUAN), Hélène Bernard (AUDIAR), Frédéric Blin (ADUGA), Sophie Caillierez (AUDRSO), Bob Clément (a'urba), Jean-Charles Désiré (atu), Jérôme Grange (ADUGA), Philippe Lannuzel (ADEUPa), Jean-Michel Marchand (AUDIAR), Bénédicte Métais (atu), Dania Muller (AUDRSO), Murielle Pezet-Kuhn (AURG), Anne Pons (ADEUS), Bénédicte Rivoire-Meley (Syndicat mixte du SCoT du Grand Douaisis), Daniela Sanna (ADEME).
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Document can be downloaded on www.fnau.org
22, rue Joubert – 75009 Paris – France
01 45 49 32 50 – fnau@fnau.org – www.fnau.org

FÉDÉRATION NATIONALE DES AGENCES D'URBANISME

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