

# Detailed Energy Planning Case Study

## Nantes Métropole, France

Produced by PEPESEC, 2009

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## Contents

<b>Step 1. Context of Energy Planning .....</b>	<b>3</b>
National context .....	3
Local context .....	3
Overview of the scope of Energy Planning .....	4
Links to other programmes and policy .....	4
Overview of co-ordination of energy planning .....	4
<b>Step 3. The Energy Planning Process.....</b>	<b>5</b>
Participation and commitment .....	5
Research and analysis .....	5
Target Setting .....	6
Actions identified within the energy planning process.....	6
Involvement of Citizens.....	7
Interaction between the different stakeholders of the programme .....	8
Issues arising and co-ordinating body's reactions .....	8
Length of time taken for the energy planning process? .....	8
<b>Step 4. Outcomes and results .....</b>	<b>9</b>
Achievements .....	9
Monitoring .....	10
<b>Step 5. Analysis and conclusions .....</b>	<b>10</b>
Analysis .....	10
Conclusions .....	11
<b>References .....</b>	<b>11</b>

## Summary of the case

The Urban Community of Nantes (Nantes Métropole) is a young local administration, constituted in 2001, which groups 24 municipalities surrounding the city of Nantes. Among others, it has the responsibility for coordination, implementation and monitoring of climate change and energy policies.

Nantes Métropole has been undertaking energy planning since the early 90's, when it first acquired tools for environmental and energy accounting in its territory. Through the Local Agenda 21 process (2004-2006), the civil society of Nantes Métropole chose climate change and energy as the two main priorities for the sustainable future of their territory. As a result, energy and climate change were put on the top of the local political agenda and have remained a priority for the local government throughout the years.

The Multi year Energy Action Plan includes energy aspects presented in various local plans and strategies as for example the Local Housing Plan or the Local Urban Design Plan. At the same time, Nantes Métropole has developed a strategic framework (Climate Plan) which integrates and harmonises various policies related to energy, transport, housing, urban planning under a common strategic framework for climate change.

The Climate Plan for Nantes Métropole sets short, medium and long term CO<sub>2</sub> reduction. Such targets are consistent with the international, European and national objectives (Kyoto protocol, the EU targets for 2020 and the national "factor 4" target). The actions defined in the Climate Plan are identified based on their potential to reduce greenhouse gases emissions. Some examples are actions towards town and country development (population density), buildings (old, new, residential and tertiary sector), and transport (goods and people). In addition, the Climate Plan also foresees projects to support CO<sub>2</sub> storage in the conurbation (forest around the city and timber construction) and co-operative forms of action to reduce greenhouse-gas emissions in countries of the South.

The Climate and Energy office of Nantes Métropole coordinates the implementation of the Climate Plan and its related policies. To do that, it relies on the cooperation with other actors as for example departments within Nantes Métropole as well as the municipalities. However, such alliances are not always easy and need to be further strengthened, especially with citizens and the private sector.

Finally, Nantes Métropole is currently working on the introduction of CO<sub>2</sub> quantifications to assess the carbon effect associated to each of the actions defined in the Climate Plan. This methodology is quite innovative and therefore challenging; nevertheless, it will enable the measurement of the improvements in CO<sub>2</sub> emission reductions, quantifying in that way the efforts being made to fight climate change.

## Step 1. Context of Energy Planning

### *National context*

Energy generation in France mainly comes from fossil fuels (petrol and natural gas), nuclear power and in less percentage from renewables and coal. For the past years, national reports on emissions in France point out a tendency to exceed 10% the objective set by the Kyoto Protocol for 2010. In particular, this increase is concentrated in specific sectors such as buildings and transport. In order to readdress such situation, the French government has produced and proposed a consistent framework for its action: the National Climate Plan 2004-2012. This strategy sets priorities for action in each sector, identifying for example specific measures to encourage energy efficiency in buildings and promote cleaner public transport, and setting CO<sub>2</sub> quotas for industry and agriculture. This ambitious plan incorporates the EU targets of reducing 20% of emissions by 2020 and goes beyond by committing to divide by 4 ("Factor 4") its emissions by 2050, identified by the IPCC (Intergovernmental Panel on Climate Change) as a necessary requisite for stabilising the climate by the end of the 21st century.

To achieve those targets, the national government requires a greater involvement from all parties in all territorial levels. At local level, the National Climate Plan 2004-2012 requires the development and implementation of Territorial Climate Plans which constitute a follow-up action for the ATEnEE (Territorial Action for the Environment and Energy Efficiency) contracts developed for the period 2003-2006.

In addition, to better address the rapidly changing energy and environmental contexts and improve current environmental and sustainable development policies, the French Ministry of Environment launched in 2007 a new initiative called "Le Grenelle Environnement" (Environment Roundtable). This large-scale round table aimed to gather all civilian and public service representatives to discuss and define the key government priorities on ecological and sustainable development issues for the upcoming five years. Six workgroups were organised, one of them focusing on "Fight climate change and control energy demand". Based on the outputs from those groups and after a consultation phase with a wide range of public actors, the government started a negotiation phase structured in 4 round tables attended by 5 stakeholders groups (local authorities, the French State, NGOs, employers, and employees). Each roundtable identified the major guidelines for action in all thematic areas. The conclusions from these discussions constituted Le Grenelle I "*Strategic framework*".

Further in this process, at the end of 2007, around thirty operational committees were formed to define guidelines and objectives for the operational programmes (Le Grenelle II "*Operational framework*"). At the same time, assessment and monitoring committees were set up to assess the work undertaken by the operational committees.

The Ministry of Environment is the National Authority responsible of energy, environment and sustainable development policies and coordinates "Le Grenelle Environnement" Initiative. ADEME is a national research institution which supports technically and financially local authorities and other local environmental organisations undertaking energy actions.

### *Local context*

The Urban Community of Nantes (Nantes Métropole) is a young local administration, constituted in 2001, which groups 24 municipalities surrounding the city of Nantes. Among others, it has the competences for urban planning, transport, waste management and environment for Nantes' conurbation. Nantes Métropole is therefore the main body responsible for coordination, implementation and monitoring of climate change and energy policies.

As previously mentioned, the National Climate Plan 2004-2012 requires the implementation of Territorial Climate Plans. During the period 2006-2007, Nantes Métropole made its first step by undertaking a diagnosis of the CO<sub>2</sub> emissions in its conurbation. Such assessment was supported financially and technically by ADEME and provided the basis for the development of Nantes Métropole's Climate Plan. Prior to that, Nantes Métropole had received the ATEnEE contracts (Territorial Action for the Environment and Energy Efficiency) to cover the scope 2003-2006.

Until now, local authorities such as Nantes Metropole were free to implement energy actions in a voluntary basis, as local authorities' competences regarding energy were not very precise. However, as a result of *Le Grenelle* strategic framework, this situation has changed and local authorities over 50.000 inhabitants will have to prepare their energy and climate change territorial plans in 5 years time.

Finally, in the European context of energy competition, Nantes Métropole used to have formal agreements with the electricity, gas and district heating networks within its territory and historical contracts with specific energy suppliers.

## Step 2. Design of local Energy Planning

### *Overview of the scope of Energy Planning*

Nantes Métropole has the competence of environment, which includes wnergy (district heating network and energy efficiency) and risk policies across its territory. Liaising with its 24 municipalities and other public and private actors, the city administration also collaborates with businesses, hospitals and universities, establishing direct links with local actors working on energy and climate change issues. There are some pilot experiences, although not very large at the moment.

### *Links to other programmes and policy*

The Climate Plan of Nantes Métropole constitutes the overarching strategic policy aimed at harmonising energy planning with other city strategies and policies. Under this framework, the city administration is able to develop specific operational measures aimed at strengthening the link between energy policies and other sectors such as urban planning, housing or business development. Even though cross-sectoral links between different policy areas result quite difficult, a general framework addressing climate change issues is proving to be successful in fostering such cooperation.

### *Overview of co-ordination of energy planning*

Nantes Métropole has a Climate and Energy Office in charge of the coordination of the Climate Plan. This office has 7 staff members, each of them working in different areas: renewable energy development, CONCERTO programme, district heating, energy efficiency in public buildings, etc. This office oversees the tasks of integration and harmonisation of different policies regarding climate change, reason why they often work with other departments within Nantes Métropole. The Climate and Energy Office belongs to the department of Environment, Energy and Risk; such organisational structure facilitates for example the work in terms of adaptation and mitigation to climate change within Nantes Métropole by fostering better coordination between this office and the risk unit of this department.

At regional level, over the past years Nantes Métropole has been collaborating with Pays de la Loire region mainly in relation to sustainability aspects and more recently in climate change and

energy aspects. This later collaboration will be strengthened in the near future as regions will be soon starting their CO<sub>2</sub> emissions diagnosis, research already undertaken by Nantes Métropole conurbation in 2004.

At municipal level, the Climate and Energy Office is working to connect all municipalities through the establishment of local sustainable development networks. This initiative is linked to the Agenda 21 process and its ambition is to achieve a better integration of the policies developed at municipal level with the Climate Change policies of Nantes Métropole.

### **Step 3. The Energy Planning Process**

#### *Participation and commitment*

Local actors have been involved in the energy planning process through to the Local Agenda 21 (LA21) initiative. Back in 2004, Nantes Métropole started the LA21 process in order to define the key sustainable development priorities for its conurbation.

600 local actors, including citizens, local businesses, institutions and NGOs, participated in debates, forums and discussions organised by Nantes Métropole. The city administration defined 31 actions and presented them to the local stakeholders who then selected and ranked 21. Local actors chose a sustainable-development model for the conurbation with climate change and energy as first and second top priorities. Other topics such as the development of eco-technologies, ecological districts, sustainable commuting and transport and high population density municipalities were included in the LA21 actions.

The LA21 was a special process which enabled different local actors to share their ideas and opinions, and more important to decide and choose the sustainable future of Nantes Métropole. This process lasted 2 years, and fostered a close collaboration with the municipalities and the conurbation administration. Since then, Nantes Métropole has tried to keep the momentum and maintain the engagement of local stakeholders.

#### *Research and analysis*

In early 1990s, Nantes Métropole acquired tools for environmental and energy accounting in its territory, making it the first urban authority in France to have long run data (1991-2003). This information revealed for example, that for the period 1991-2003, final energy consumption had increased nearly a quarter, which was significantly greater than the rise in population.

For the preparation of the Climate Plan, the first step was to undertake a more in-depth diagnosis of the energy consumptions and emissions of greenhouse gases of the conurbation. This study was done in 2005 by a private consultancy, EXPLICIT, who used the cadastral method based on the IPCC prescriptions to measure the energy consumption and the emissions of greenhouse gases in different activity sectors (businesses, housing, transport, industries and agriculture). This diagnosis revealed that buildings (housing and businesses) and transport were the main sources of emissions in Nantes Métropole Area.

The second step was then to create 2 different scenarios about the evolution of greenhouse gases emissions up to 2025. The first “laissez-faire” scenario showed no intervention or “voluntarism” measures aimed at encouraging a more rational energy use or fighting climate change. In this case, greenhouse gas emissions would increase by 400,000 tone-equivalents (T<sub>eq</sub>) of CO<sub>2</sub> by 2025 making unrealistic to compile with the Kyoto Protocol or the national targets. The second scenario “Factor 2”, based on voluntarist policy, went beyond the Kyoto protocol by reducing

greenhouse gases emissions by half by 2025 and continue the path towards the national target for 2050 of reducing by 4 the greenhouse emissions (Factor 4<sup>th</sup>). The “laissez faire” scenario takes into account for example future improvements in vehicles’ energy efficiency based on EU legislation, and also integrates planned urban development projects within the conurbation. In this scenario, greenhouse emissions would turn down already by 2012 and fall by 3% each year with a potential of reductions of 1.2 million T<sub>eq</sub> of CO<sub>2</sub> by 2025. Such potential for reducing various sources of greenhouse-gas emissions was mainly identified in the building sector (both residential and private businesses) and in transport.

### *Target Setting*

The analysis of scenarios and the development of different simulations of actions provided Nantes Métropole with sufficient evidence and data to set their own targets for CO<sub>2</sub> reduction. Local politicians agreed on adopting the following 3-fold target:

1. The Kyoto 2012 target in a short term aimed at reducing CO<sub>2</sub> emissions to the levels of 1990 by 2012;
2. To the “Factor 2” target as a mid-term objective to reduce by 50% its greenhouse gas emissions by 2025;
3. And to the “Factor 4” target as a long-term objective to reduce by 4 its greenhouse gas emissions by 2050.

By going over the Kyoto protocol and fixing medium and long term objectives, Nantes Métropole has set ambitious targets coherent with the National and European targets.

### *Actions identified within the energy planning process*

The choice of which actions needed to be implemented was mainly determined by their potential to reduce greenhouse gases emissions and comply with the Kyoto Protocol and the Factor 2 target. All forms of action proposed in the strategic framework for the conurbation’s Climate Plan were proved to be technically and economically feasible within the context and situation of Nantes Métropole and were discussed and agreed with concerned local organisations (SMEs, trade organisations, energy suppliers and distributors, property developers, etc.).

In order to decide which actions would be implemented in each activity sector (housing, transport and services), a three-stage analysis was carried out:

- Identification of the energy uses responsible for the higher emissions (heating, air conditioning, private cars...);
- Cost-benefit analysis of the most appropriate technical options (the energy mix, energy performance of buildings and equipments) and subsequent calculation of the expected T<sub>eq</sub> of CO<sub>2</sub> avoided;
- Proposal of quantitative annual targets as for example, number of residences to be refurbished, number of residences to be connected to the district-heating networks or the number of new low emission buses.

As a result, the Climate Plan includes actions based on the following intervention themes:

- Actions towards town and country development (population density) and on the sectors responsible for CO<sub>2</sub> emissions:
  - o buildings: old, new, residential and tertiary sector
  - o transport: of goods and people

- Projects allowing CO<sub>2</sub> storage in the conurbation (forest around the city and timber construction)
- Co-operative forms of actions to reduce greenhouse-gas emissions in countries of the South.

In terms of urban planning, Nantes Métropole chooses the model of compact city for its development, based on high population density which consumes less space and therefore, less energy. This priority is reflected in the Local Housing Plan and the Local Urban Design Plan and includes actions towards new buildings and new energy performance criteria for the creation of new housing, training for construction workers and awareness raising campaigns and advice for the general public.

Refurbishing old buildings to achieve a better energy performance is one of the main priorities of the Local Housing Programme. Some of the actions included in this plan are: increased insulation, high performance electrical equipment and heating systems both for existing residential and tertiary-sector buildings. In addition, the Multi-year Energy Action Plan has introduced the geographical Climate Intervention Zones. Based on a geographic analysis of the conurbation (thermographic indicators of energy loss, building's construction dates, socio-economic indicators and population density), this Action Plan identifies priority intervention areas with the highest potential for CO<sub>2</sub> reductions. The promotion of renewable forms of energy is another priority reflected in the Multi-year Energy Action Plan. Among its actions, this Plan aims at developing and optimising the conurbation's district heating networks replacing fossil fuels by biomass and promoting solar water heating.

In the transport sector, the Urban Travelling Plan sets the priorities of Nantes Métropole in this area including actions to increase the availability of public transport (especially tramway and buses), promote eco-friendly modes such as walking and cycling, improve energy performance for vehicles and the use of bio-fuels and also promote a new mobility culture among its citizens.

The Climate Plan aims to integrate such actions and propose new ones to be introduced when revising the forthcoming action plans. At the same time, the Climate Plan aims to introduce CO<sub>2</sub> quantifications to assess the carbon effect associated to each of the actions and measure the improvements in CO<sub>2</sub> emission reductions which can contribute to reach the targets set by the Climate Plan.

Finally, the Climate Plan also establishes a number of actions to increase the potential of CO<sub>2</sub> storage in Nantes' conurbation (urban forest and timber use for construction), to support projects to reduce CO<sub>2</sub> emissions internationally, especially in countries of the South, and to better adapt to climate change.

### *Involvement of Citizens*

Citizens have been involved in energy planning mainly through the Agenda 21 process. This process finished in 2006 with the approval of 21 actions, being climate change and energy the first and second top priorities.

This process was quite intensive and since then citizens have been mainly approached through awareness campaigns, especially in promoting sustainable mobility and public transport. To further encourage citizens' participation, Nantes Métropole is interested in benchmarking different actions and experiences across European cities to learn how to involve citizens in such policies and decision-making processes.

At this moment, Nantes Métropole organises each year a local energy week to inform, exchange and mobilise Nantes cornubation's citizens. The local administration organises Forums, debates, games and exhibitions to influence citizens' behaviour.

### *Interaction between the different stakeholders of the programme*

Guided by Nantes Métropole, the process of energy planning involved the local authority itself together with the local municipalities, businesses and social stakeholders. For some operational measures, the partnership identified the main obstacles (financial, technical and administrative) and anticipated to them, as for example, providing training to construction workers in new practices, environmental standardisation, etc.

### *Issues arising and co-ordinating body's reactions*

Until now, Nantes Métropole has been pretty much focused on their own competences. As a result of energy planning, public administrations started to change their working routine and developed new tools to engage stakeholders. By making a real effort in understanding the needs of different stakeholders, Nantes Métropole is achieving a greater view of municipal actions as well as stakeholders' actions. For example, Nantes Métropole used to offer buildings or land to private companies, but once granted, they did not ask for their environmental policies or strategies. Right now, such practices are being modified and for example in the business area Euronantes, Nantes Métropole has obliged private buildings operators to connect their buildings to the district heating network.

### *Length of time taken for the energy planning process?*

In Nantes Métropole, energy planning is understood as a long term process, which started with the acquisition of environmental and energy accounting tools in the 1990s, followed by the inclusion of energy aspects in various sectors and local strategies, and the development of the Climate Plan. The approval date for each of the plans and the details of the time taken for each of the energy planning steps is mentioned below:

- Urban Travelling Plan – 2000
- Local Urban Plan - 2002
- Local Housing Plan – 2004
- Local Agenda 21 – 2006
- Multi-year Energy Action Plan – 2006
- 1<sup>st</sup> phase Climate Plan – Analysis and development of scenarios (2005-2007)
  - Building support for the process
  - Research and data collection
  - Analysis
  - Target Setting
- 2<sup>nd</sup> phase Climate Plan – Strategic plan (2007)
  - Startegic Plan Development
  - Consultation and political approval (presented to the metropolis council the 9 march 2007)
- 3<sup>rd</sup> phase Climate Plan – Strategic plan (2007-2009)
  - Building an operational action plan

- Building an active review and evaluation process

A first action plan of the Climate Plan was approved in 2007 for the period 2008-2010. However, given the new international, European and national context, Nantes Métropole is starting to work on a new Action Plan for the next 5 years (covering the period 2010-2015). This new timeframe coincides with the electoral period and aims to harmonise the political, technical and budgetary planning of the conurbation's administration. This new action plan aims to build a strong programme for carbon evaluation, so the selection of actions will be entirely based on carbon aspects. This approach is quite innovative and therefore challenging, and the local administration is now organising internal sessions with public officers from other departments to better explain this new methodology.

#### **Step 4. Outcomes and results**

##### *Achievements*

Nantes Métropole has achieved notable results in their energy planning process throughout the years. The first step was to identify the conurbation's greenhouse gas emissions and to develop CO<sub>2</sub> emissions scenarios. This analysis provided a picture of the energy situation in Nantes' conurbation. The 2 scenarios (voluntarist and "laissez-faire") were also very important in order to raise awareness among politicians as well as the general public regarding the importance of taking actions to combat climate change.

Supported by the Local Agenda 21 process, the citizens of Nantes Métropole chose climate change and energy as 1<sup>st</sup> and 2<sup>nd</sup> priorities for the sustainable development of their territory. As a result, both climate change and energy were put on the top of the local political agenda.

Different local policies from various sectors have successfully included energy aspects on their plans and strategies. Some examples are the Multi-year Energy Action Plan, Local Housing Plan, Urban Travelling Plan or the Local Urban Plan. At the same time, Nantes Métropole has developed a strategic framework (Climate Plan) which integrates and harmonises various policies related to energy, transport, housing, urban planning under a common strategic framework for climate change.

One of the main achievements made in Nantes Métropole is the creation of the Energy and Climate office. This office counts with 7 staff members who coordinate all policies related to climate change and energy. Such structure enables Nantes Métropole to maintain an effective dialogue between different departments within Nantes Métropole as well as with the municipalities and other local actors.

Finally, the success of energy planning in Nantes Métropole has been possible thanks to the political support. Integrated into the Local Agenda 21 process, energy and climate change has remained throughout the years as a key priority for Nantes Métropole. As a result, the conurbation has a well established set of policies regarding climate change and energy which has led to the following achievements:

- Community funds for energy performance in new social housing
- Construction of a show-case high-energy-performance buildings in the private sector
- Creation of an environmental and energy high-quality working party
- Improvement of the district-heating networks, notably in Ile de Nantes
- Development of renewable forms of energy, especially solar for heating
- Development of solar photovoltaic systems (EU CONCERTO project)
- Improvement of the public transport systems

- Development of eco-friendly means of travel, including cycling and walking
- Development of new and innovative means of travelling, e.g. car-sharing
- More extensive application of work travel plans
- Development of a plan for an urban forest
- Project supporting sustainable energy in developing countries

## Monitoring

The monitoring and evaluation of the energy planning process is combined with the Local Agenda 21 evaluation by using established sustainable development indicators. For example, in the housing sector, such indicators assess not only the environmental/energy aspects but also economic and social aspects. In addition, Nantes Métropole is currently working on the development of a monitoring tool to introduce carbon evaluations (e.g.  $T_{eq}$  of CO<sub>2</sub> avoided) for each of the actions foreseen in its Climate Plan.

The Climate Plan also foresees the creation of an Energy and Climate Observatory for Nantes' conurbation. This Observatory will be composed of a development council, a technical and scientific group to monitor and provide information on climate change and related issues and a group of residents. Its main tasks will be to quantify the efforts being made to fight climate change by using a carbon counting meter and to inform local residents and the conurbation's individual towns about the Climate Plan through a Nantes Métropole Climate Plan website.

This Climate Plan is revised every 5 years; however such reviews are flexible and given the changing international and national contexts, Nantes Métropole has decided to review their Action Plan (2007-2010) in 2009 and produce a new one to cover the period 2010-2015.

## Step 5. Analysis and conclusions

### Analysis

SWOT Analysis	
<b>Strengths</b> <ul style="list-style-type: none"> <li>• Long term process and ambitious targets</li> <li>• Political support</li> <li>• Integrated policies</li> <li>• Dedicated staff</li> <li>• Flexible policies and strategies</li> </ul>	<b>Weaknesses</b> <ul style="list-style-type: none"> <li>• Low participation of citizens in the decision-making process after the LA21 process, only awareness campaigns</li> <li>• Low cooperation with local actors, businesses, NGOs, universities...</li> <li>• Low influence towards the energy companies</li> </ul>
<b>Opportunities</b> <ul style="list-style-type: none"> <li>• Development of carbon evaluations and methodology</li> <li>• National support and guidance</li> <li>• Local expertise</li> </ul>	<b>Threats</b> <ul style="list-style-type: none"> <li>• Current financial situation having a strong impact on climate change policies</li> <li>• Losing the interest from the general public</li> <li>• CO<sub>2</sub> reductions not yet visible</li> </ul>

## *Conclusions*

Nantes Métropole has developed throughout the years a clear and ambitious energy and climate change policy. Thanks to the Local Agenda 21 process, the citizens' of Nantes conurbation chose both climate change and energy as the main priorities for the sustainable future of their territory. The citizens' strong interest shown on these topics confirmed the necessity to act at local level and as a result politicians became deeply involved in the energy planning process since the very beginning.

The Climate Plan for Nantes Métropole sets ambitious targets at short, medium and long term. Such targets are pretty much influenced by the international, European and national contexts (Kyoto protocol, the EU targets for 2020 and the national "factor 2" and "factor 4" targets); nevertheless, the decision of committing to those targets has also been well supported by reliable data and analysis. Such evidence will be further improved in the near future with the introduction of carbon evaluations for each of the actions foreseen in the Climate Action Plan.

Nantes Métropole has successfully integrated various local policies into a single strategic framework for climate change. Such integrated approach is also reflected in the composition of the local administration itself. The Energy and Climate office is in charge of coordinating the implementation of the Climate Plan and related policies. To do that, it relies on the cooperation with other local actors as for example departments within Nantes Métropole as well as the municipalities. Nevertheless, such alliances are not always easy and need to be further strengthened, especially with citizens and the private sector.

Finally, the current financial situation may risk ambitious climate change policies such as the one being implemented in Nantes Métropole. However, based on the experience of Nantes Métropole in energy planning and the results obtain so far, the local government is confident about overcoming such difficulties and is prepared to be one of the frontrunner cities in fighting climate change in France and elsewhere.

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