



Stadt Zürich



Energy Master Plan of the City of Zurich

Legal information

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1. Introduction

The Energy Master Plan is an energy policy tool of the City of Zurich. It defines the principles, objectives, tasks and implementation processes of the city's energy policy and sets out competencies for energy policy. It also provides an overview of the main policy strategies and forms the basis for harmonising energy policy with other municipal policies such as environmental policy (Environment Master Plan), development planning (Spatial Development Strategy [1]) or transport policy (Mobility Strategy [2]) and the action plans of various departments.

The municipal council has developed the Energy Master Plan in order to utilise its scope of action to promote a proactive and coordinated energy policy, to implement the requirements of the municipal code, and to make a substantial contribution to implementing the 2000 watt society. Last, but not least, the Energy Master Plan will help ensure that the City of Zurich continues to meet the requirements of the "European Energy Gold Award" and to set an example in energy policy. The Energy Master Plan is approved by the cantonal administration as part of municipal energy planning and has a binding effect on authorities.

2. The energy policy of the City of Zurich

Energy use is one of the key factors of environmental policy. For many years, total energy consumption and the emission of greenhouse gases have increased globally, even though this development runs counter to the objectives of resource and climate policies. The trend towards an increasing overall energy consumption has continued steadily in Switzerland as elsewhere. It is likely that Swiss climate policy will not be able to achieve its current objective of reducing CO₂ emissions.

The City of Zurich has at least been partially successful in its climate policy: it will meet the Swiss targets for reducing CO₂ emissions covering the period 1990-2010. This achievement is mainly due to the refurbishment of buildings and to the replacement of fuel oil by natural gas. In contrast to Switzerland, the CO₂ emissions for land transport have been stagnating. Factors that contributed to this success are the lower increase in motorised transport and the change of the modal split.

The increase in power consumption, however, continues to present an unresolved challenge. Even though this increase is weaker in Zurich than in other parts of Switzerland, it is unlikely that the objective of the 2008 Energy Master Plan, namely to limit the increase in consumption to a maximum of 5 per cent between 2005 and 2020, will be reached. Even in the longer term, the most optimistic expectations are that consumption may stabilise rather than continue to increase. While it is possible to increase power efficiency considerably, any relevant gains will be largely offset by the conversion of oil and gas heating systems to heat pumps, an increase in electromobility and new uses for power.

Against this background, the City of Zurich will need to intensify its efforts substantially as far as its energy policy is concerned. This is also what voters want: Zurich was the first Swiss municipality to enshrine sustainability and the objectives of the 2000 watt society in its municipal code [3] after a relevant referendum was passed on 30 November 2008. This is why the Energy Master Plan 2012 sets out long-term sub-objectives for the first time, and these are significantly more ambitious than earlier targets. Its greenhouse gas emission targets, for instance, go substantially beyond existing CO₂ laws. This will demand not only a high degree of commitment from everybody involved, but also require measures that will be considerably more effective than previous efforts.

Challenges and conflicting objectives

Energy policy is aligned with the sustainability principle along the dimensions of economy, environment and society. The fundamental change required by the target of achieving a 2000 watt society must always be considered holistically, taking all of these dimensions into account. It is, however, unavoidable that the transformation towards a 2000 watt society will cause conflicts to emerge between the objectives of the various sustainability dimensions, thus creating “winners and losers” in the short and medium term.

Where objectives are in conflict, decisions need to be taken from a long-term perspective and substantiated clearly and transparently. Also, decisions should not be taken systematically at the expense of a single dimension of sustainability. This entails the risk that adjustment processes may be postponed and may be hampered by various barriers, including a significant emphasis on current competitiveness in the market, commercial costs or short-term social consequences, among others. This entails the risk that adjustment processes may be postponed and ultimately left to be dealt with by future generations.

The implementation of energy policy and the 2000 watt society therefore requires a long-term perspective that takes into account macroeconomic prosperity, inter-generational justice and social acceptance. In order to remove the above-mentioned barriers, the City of Zurich can not only rely on its communication and consultancy efforts regarding consumption expectations, user behaviours and changes in legislative framework conditions, but also employ supporting measures at the municipal level. These should be aligned with sustainability criteria such as the macroeconomic costs of reduced greenhouse gas emissions and life cycle costs.

The success of any energy policy hinges on political decision-making bodies designing appropriate framework conditions and setting clear priorities so that the participants who implement the policy are then able to utilise their scopes of action as defined by legal competence and financial considerations in order to promote socio-political and environmental thematic fields in an optimal manner.

3. Objectives and priorities

3.1 Objectives

Zurich's municipal energy policy defines the following objectives, which are based on energy and climate protection laws of the Swiss federal government and the Canton of Zurich and reflect the targets of the 2000 watt society set out in the municipal code:

- To secure an adequate, economically viable energy supply that is environmentally compatible and conserves resources;
- To reduce the emission of CO₂ and other greenhouse gases substantially;¹
- To reduce primary energy consumption considerably.²

3.2 Priorities

The following priorities govern the implementation of the municipal energy policy:

- 1. Sufficiency:**
Reducing the demand for energy-relevant goods and services
- 2. Efficient energy use:**
Reducing the consumption of energy by increasing the energy efficiency of buildings, processes, devices and mobility
- 3. Energy source selection in keeping with objectives:**
Prioritising the use of energy sources with low greenhouse gas emission coefficients and primary energy factors, i.e. energy from waste, waste heat and renewable sources

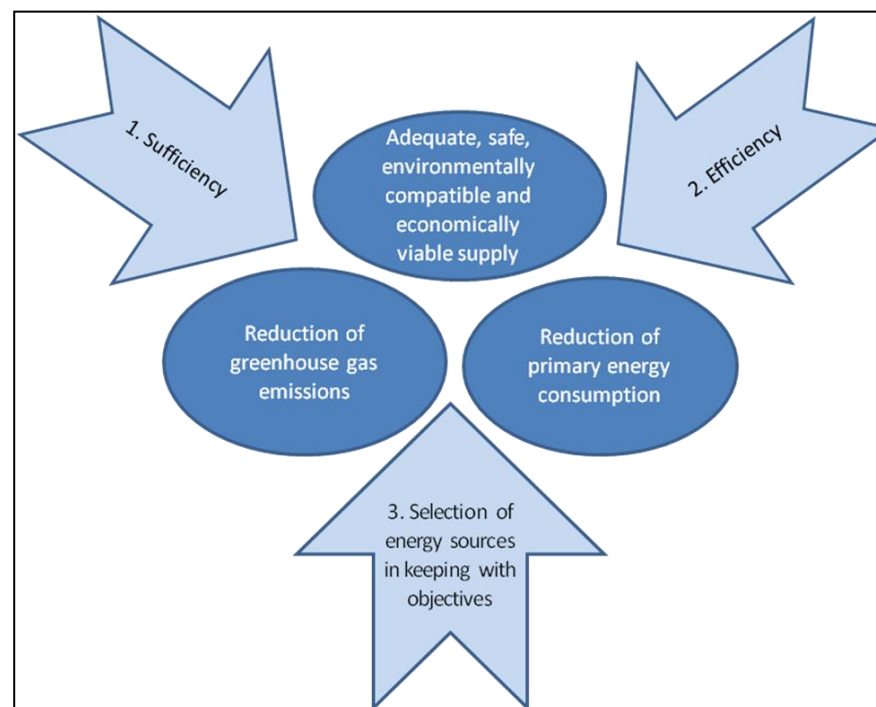


Fig. 1: Objectives and priorities of the City of Zurich's energy policy

¹ The municipal code of the City of Zurich enshrines the target of reducing annual CO₂ emissions to one tonne per resident by 2050. The term CO₂ emissions here refers to emissions of greenhouse gases (CO₂ equivalents) from the energy sector (heating, power, mobility).

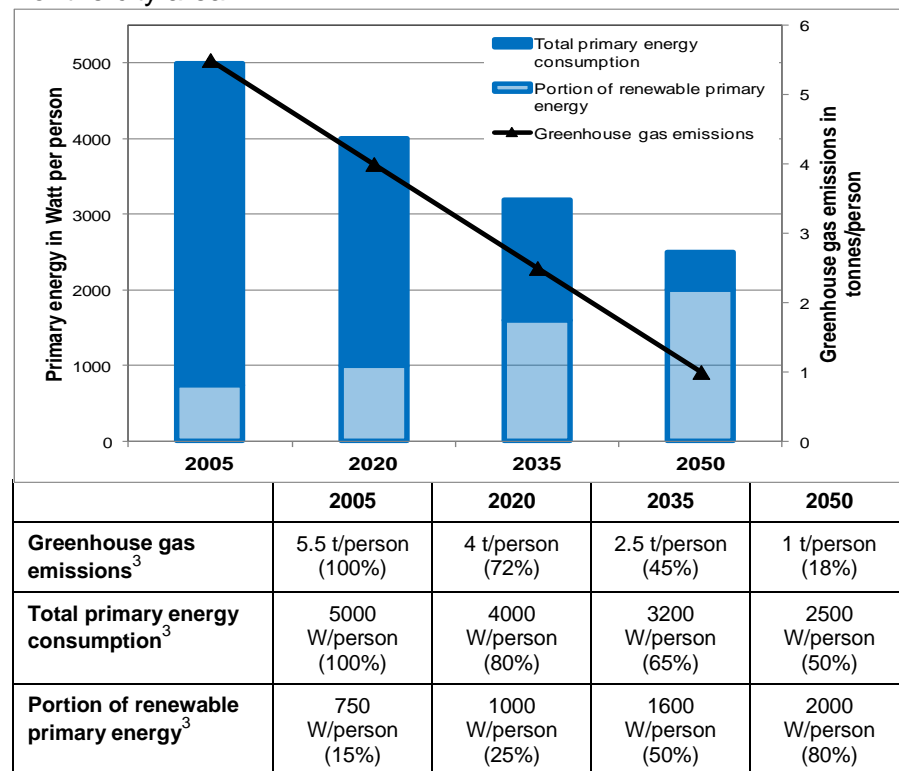
² Primary energy consumption comprises the energy consumption throughout the entire energy utilisation chain, from extracting and converting energy resources through to providing usable energy.

4. Quantitative targets

The Energy Master Plan defines quantitative targets for the main parameters of the 2000 watt society, i.e. primary energy consumption and associated emissions of greenhouse gases. These are differentiated for the city area and the city administration. The definition is derived from the political mandate set down in the municipal code, namely to reduce the emission of greenhouse gases (CO₂ equivalents) to one tonne per person (i. e. resident) by 2050. Various policies and strategies of the City of Zurich additionally define selected targets for individual areas.

4.1 Main targets

For the city area¹

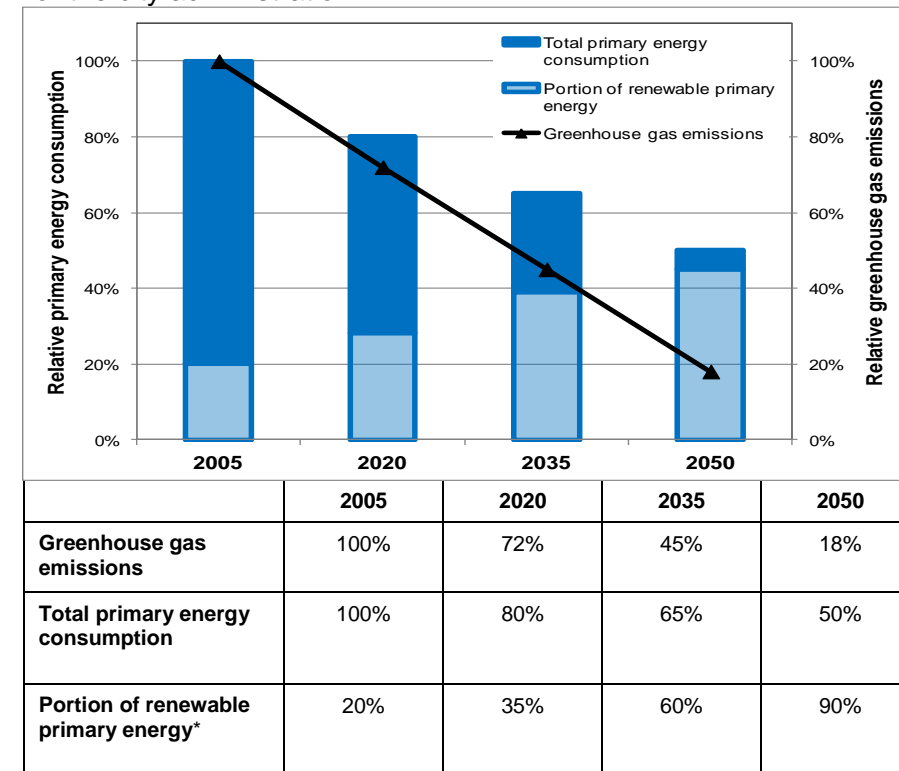


¹ incl. air, long-distance rail, freight and shipping traffic and public transport traction

³ Values in brackets are for the reference year 2005.

Intermediate targets to be achieved by 2020 and 2035 have been defined to provide a degree of control over the implementation of objectives. These represent benchmarks that will be periodically reviewed as part of the ongoing implementation process and adjusted to changing framework conditions. Specific targets to be attained per person and relative objectives to be attained by the city administration apply for the city area. The total energy consumption serves as a basis for the energy balances and monitoring of objectives. Grey energy hidden in goods and services and the relevant grey greenhouse gas emissions will be captured in a shadow energy balance.

For the city administration²



² incl. public lighting, water supply, urban drainage, waste management, hospitals, publicly owned buildings, staff business travel

4.2 Foundations

Long-term strategies and scenarios form the basis for defining quantitative targets along a time line. These include:

- for power supply: the Future of Electricity of the City of Zurich [4]
- for heat supply: the 2050 Energy Supply Concept
- for mobility: the Mobility Strategy³ [2]
- for settlement development: Spatial development strategy (RES)

These strategies and their underlying scenarios and assumptions are periodically reviewed and adjusted to reflect actual developments in order to control the transformation towards the 2000 watt society. In this context, the crucial factors are:

- the demand for energy-consuming goods and services (sufficiency);
- the specific energy consumption associated with providing desired goods and services (energy efficiency);
- the mix of energy sources.

The City of Zurich applies the following tools to define and calculate target processes and to verify whether targets have been reached:

- the ewz navigator (electricity supply and demand),
- the building stock model (energy demand in buildings)
- the "mobility quantity structure",
- the "ECORegion" calculator (to prepare an energy and greenhouse gas balance).

4.3 Selected target for the city administration

Various policies and strategies define specific targets for the implementation of the 2000 watt society by the city administration:

- energy consumption in municipal buildings: "7 League Strides" programme towards environmentally compatible, energy efficient construction [5], target agreements at cantonal level
- portion of renewable energies in municipal buildings: "7 League Strides" programme towards environmentally compatible, energy efficient construction
- energy consumption and CO₂ emissions of municipally owned passenger cars: municipal fleet policy
- production of renewable energies: performance mandates, corporate targets for municipal energy suppliers, etc.

5. Core tasks and strategies

This section defines the core tasks in the implementation of the Energy Master Plan and provides an overview of strategies, policies, tools and resolutions at municipal, local council and city council level that establish an energy policy framework and support the implementation of the tasks. Thematic fields with a focus on the city area and the city administration are differentiated here.

³ In a referendum held on 4 September 2011 the municipal code of the City of Zurich was supplemented, adding the newly defined objective of increasing the proportion of public transport, pedestrian and cycling traffic by at least 10 % with regard to the overall volume of traffic in the City of Zurich within the next ten years. According to this mandate, the mobility strategy will be complemented by the city traffic programme "Stadtverkehr 2025" [7].

5.1 Focus on the city area

Thematic fields	Core tasks	Strategies, policy components, tools, resolutions ⁴
A 1 Settlement development, buildings	Regarding settlement development and individual buildings, the City of Zurich reduces greenhouse gas emissions and primary energy consumption through planning measures, building regulations, financial incentives, consultancy and information. The measures address the aspects of sufficiency, efficiency and energy source selection in keeping with objectives.	<ul style="list-style-type: none"> • Structural planning (regional structural plan, RRB 2000/894) • Spatial development strategy (RES) (STRB 2010/549) • Positions, action guidelines on municipal housing policy [64] • 2050 Energy supply concept (work in progress) • Building and zoning regulations (GRB, AS 700.100) • Mobility Strategy [2], parking space ordinance (GB 2010) • Rational use of electricity (GB 1989) • Efficiency bonus (GRB, AS 732.319) • Conditions of electricity supply (GRB, AS 732.330)
A 2 Mobility	Regarding land transport, the City of Zurich reduces greenhouse gas emissions and primary energy consumption through planning measures, building regulations, active mobility management and economic incentives. The measures address the aspects of sufficiency, efficiency and energy source selection in keeping with objectives. Regarding air transport, the city administration takes measures to contain the forecast increases as far as possible.	<ul style="list-style-type: none"> • Municipal code Art. 2^{quater} (GB 2011) • Spatial development strategy (RES) (STRB 2010/549) • Structural planning, Municipal traffic planning, GB 2004) • Mobility strategy [2], City traffic programme «Stadtverkehr 2025» [7] • Sustainable urban mobility charter (STRB 2010/74) • Parking space ordinance (GB 2010) • Infrastructure development strategy VBZ 2030 (STRB pending) • Urban spaces strategy 2010 (STRB 2010/503 [15])
A 3 Energy supply	Regarding the supply of power and gas and the provision of district and local heating systems, the City of Zurich aims at a long-term transition towards a structure that is largely based on renewable and environmentally compatible energy sources, that conserves resources and provides security of supply. In areas with liberalised markets, the city's own and associated energy suppliers pursue the same goals through their product offerings and sales strategies.	<ul style="list-style-type: none"> • Future of Electricity of the City of Zurich (ewz 2007, [4]) • 2050 Energy supply concept (work in progress) • Strategy report on district heating systems 2010-2050 [8] • Performance mandate for the ewz (GRB 2002/329)
A 4 Energy planning	For heating and cooling purposes, the City of Zurich aims at utilising the available potential for sourcing energy locally from waste, waste heat and renewable energy sources in a targeted manner. This is supported by spatial coordination, coupled with the prioritisation of these energy sources and relevant information and consultancy. The activities of municipal energy suppliers are harmonised.	<ul style="list-style-type: none"> • Structural planning (regional structural plan, RRB 2000/894) • 2050 Energy supply concept (work in progress) • Heat supply concept (STRB 1992/143) • Green book, City of Zurich (STRB 2006/792, [9])
A 5 Consultancy, information	The City of Zurich offers coordinated consultancy and information services on energy-relevant topics. These focus on the aspects of sufficiency, efficiency and energy source selection in keeping with objectives.	<ul style="list-style-type: none"> • Energy communication concept (STRB 1296/2006) • Rational use of electricity (GB 1989) • Mobility Strategy [2] • ewz energy consultancy policy [10] • Eco-compass (GRB 2008/437), energy coaching (GRB 2008/471)

⁴ An overview of municipal core strategies, policy components, tools and resolutions can be found at www.stadt-zuerich.ch/energie.

5.2 Focus on the city administration

Thematic fields	Core tasks	Strategies, policy components, tools, resolutions
A 6 Procurement	The requirements for space, facilities, equipment, consumer goods and motorised means of transport are systematically scrutinised and reduced as far as possible in terms of sufficiency. Energy efficiency, energy source selection in keeping with objectives and ecology are, among others, important procurement criteria.	<ul style="list-style-type: none"> Guiding principles and strategy in procurement (STRB 2007/1478 [11]) Ecological sustainability guideline (work in progress) IT strategy (including the ZOOM output concept, STRB 2011/624)) Building standards for new constructions (2000/215, 2000/910) Zürich baut – gut und günstig initiative (Construction in Zurich - high quality at reasonable cost) (STRB 2003/1497) Municipal fleet policy (STRB pending) Administrative parking space guidelines (STRB 1997/37) CO₂ offsets for air travel (STRB 2007/1392) Mobility pilot project (STRB 2010/1382) “7 League Strides” programme (STRB 2008/1094, 2012/261 [5])
A 7 Provision of buildings and facilities	Buildings and facilities of the city administration itself and institutions closely linked to it ⁵ are built, refurbished and replaced in an exemplary manner according to the targets of the 2000 watt society. This applies to construction (grey greenhouse gas emissions and grey energy), operation and mobility associated with building use. Targeted innovation is promoted through applied research (pilot and demonstration systems, studies).	<ul style="list-style-type: none"> “7 League Strides” programme (STRB 2008/1094, 2012/261 [5]) Zürich baut – gut und günstig initiative (Construction in Zurich - high quality at reasonable cost) (STRB 2003/1497) Real estate strategy (RES 9, under preparation) Portfolio strategies in real estate administration (LV) and management (IMMO) (e.g. STRB 2011/353) Accounting model 2000 watt society. [12] Credit lines (GRB 2009/352 and 353) Specifications of the Technical Centre for Sustainable Construction of the Building Department (AHB) [13] Building technology guidelines [14] Economic efficiency of energy measures (STRB 1998/46) Air quality action plan (STRB 2011/1574)
A 8 Operation of buildings and facilities	The operation of buildings and facilities of the city administration and institutions closely linked to it ⁶ is optimised regarding sufficiency and energy efficiency. Energy requirements are largely met according to the City of Zurich’s priorities for the energy source selection in keeping with the objectives.	<ul style="list-style-type: none"> “7 League Strides” programme (STRB 2008/1094, 2012/261 [5]) Target agreements with large consumers (STRB 2005/1372) ewz efficiency bonus (GRB 2006) Quality of electricity used by the city administration (STRB 2011/1221) Room temperature guideline (STRB 2006/1194)
A 9 Infrastructure	Power supply, public lighting, information and communication technology infrastructure, water supply, waste management, urban drainage and transport infrastructure are optimised regarding energy use, greenhouse gas emissions and consumption of resources.	<ul style="list-style-type: none"> Accounting model 2000 watt society. [12] Target agreements with large consumers (STRB 2005/1372)
A 10 Employees	Employees in the city administration contribute to attaining the 2000 watt society objectives and are supported in doing so through targeted advice, information and specific offers.	<ul style="list-style-type: none"> Energy communication concept (STRB 2006/1296) Climate protection, offers to employees (Motion 2007/235) Rules on the implementation of employment law (Art. 100 et seq.) Sustainable mobility management in the city administration [15]

⁵ Organisations (e.g. foundations) receiving assistance from the city administration (e.g. building permits, financial contributions) and corporations in which the City of Zurich holds a majority of shares.

⁶ Applies to all departments and institutions with an energy action plan.

6. Sub-tasks and thematic fields

The core tasks for each thematic field are given concrete shape in the form of sub-tasks, that is action guidelines that need to be implemented at departmental level through strategies and measures. Sub-tasks consequently form the framework for the energy action plans at departmental level. The departments involved in the implementation as active participants are listed for each sub-task⁷.

⁷ The order of the department listings corresponds with the City Council Resolution on the organisational structure and tasks of departments (DGA), AS 172.110

A1 Settlement development, buildings (city area)

Regarding settlement development and individual buildings, the City of Zurich reduces greenhouse gas emissions and primary energy consumption⁸ through planning measures, building regulations, financial incentives, consultancy and information⁹. The measures address the aspects of sufficiency, efficiency and energy source selection in keeping with objectives.



Sub-tasks	Participants
A 1.1 The aspects related to an energy-efficient utilisation of space (building density, distribution of use, heterogeneity of use) are being taken into account for structural and utilisation plans as well as for project planning (special building regulations, architectural plans).	UGZ, AfS, AHB, energy commissioners
A 1.2 As part of its urban housing policy, the City of Zurich aims to counteract increasing specific space requirements in housing through relevant regulations on tenancy agreements, building contracts and residential development activities.	BfWbf, LV, STEZ
A 1.3 Energy conservation and energy efficiency incentives are provided as part of rates and pricing policies for various energy sources.	ERZ, ewz, Erdgas Zurich AG
A 1.4 Large energy consumers that comply with target agreements concluded with the canton or a commercial energy agency benefit from the ewz efficiency bonus.	ewz
A 1.5 The use of environmentally compatible energy systems with low greenhouse gas emissions and minimal primary energy consumption is supported via energy price incentives, the availability of a range of energy products from renewable energy sources, and financial and implementation support (energy services).	ERZ, energy commissioners, ewz, Erdgas Zurich AG
A 1.6 Building approval processes aim at achieving a balance between the sometimes conflicting public interest in efficient energy use, use of renewable energies and heritage/urban environment considerations.	UGZ, AfS, AfB ¹⁰
A 1.7 The City of Zurich promotes the development and distribution of energy-efficient construction, devices and technologies as well as innovative concepts and tools to support the implementation of the 2000 watt society.	BfWbf, UGZ, AfS, AHB, energy commissioners, ewz, Erdgas Zurich AG
A 1.8 Parameters related to climate protection and the energy efficiency of buildings such as the renewal rate, the scope of the City's building stock and the portion of energy sources in keeping with objectives are systematically analysed and published. Available options for influencing these parameters are reviewed regularly.	AfS, AHB

⁸ Energy consumption here generally refers to primary energy consumption in accordance with the objectives of the 2000 watt society (see accounting model [12]).

⁹ The sub-tasks in the fields of consultancy and information are listed under the thematic field A 5 Consultancy, information, page 15

¹⁰ The engineering authorities (AfB) do not have their own energy action plan.

A 2 Mobility (city area)

Regarding land transport, the City of Zurich reduces greenhouse gas emissions and primary energy consumption through planning measures, building regulations, active mobility management¹¹ and economic incentives. The measures address the aspects of sufficiency, efficiency and energy source selection in keeping with objectives. Regarding air transport, the city administration takes measures to contain the forecast increases as far as possible.



Sub-tasks	Participants
A 2.1 The utilisation of energy-efficient means of transport and the reduction of induced motorised mobility are supported by spatial planning tools (structural and utilisation plans, building and zoning regulations, mobility concepts etc.) as part of urban, suburban and zone planning. In particular, these include the systematic prioritisation of walking, cycling and public transport, the limitation of car parking facilities to a minimum (as per applicable parking space ordinance) and the promotion of car-free living, working and shopping.	UGZ, TAZ, DAV, AfS, Energy commissioners, VBZ
A 2.2 Additional mobility needs arising from an increase in the residential population and the number of places of employment are met through improved attractiveness, quality and performance of pedestrian and cycling facilities and the availability of public transport (reduction of motorised private transport in the modal split). At the same time, a reduction of motorised private transport (vehicle kilometres) is initiated.	DAV ¹² , TAZ ¹³ , VBZ
A 2.3 A systematic upgrade of roads as public spaces, and an improved integration of shopping and leisure facilities with public transport serve to enhance the city's attractiveness for pedestrians, cyclists and public transport users, and support local supply.	DAV, TAZ, AfS, VBZ
A 2.4 The energy efficiency of freight transport is improved in collaboration with private stakeholders by renewing vehicle fleets, increasing utilisation through bundled collective and distributed transport, and by maintaining and upgrading railway connections.	TAZ
A 2.5 The energy efficiency of freight transport is optimised in collaboration with private stakeholders by improving utilisation and promoting a shift towards rail transport.	DAV, TAZ, VBZ
A 2.6 Energy consumption constitutes an important criterion in procuring buses and trams. Annual reports are submitted on the development of energy consumption in the vehicle fleet and the public transport system of the City of Zurich.	VBZ
A 2.7 The City of Zurich acts to limit the increase in air traffic through information and other measures.	UGZ
A 2.8 The City supports R&D and pilot and demonstration projects regarding increased efficiency in mobility and an energy source selection that is in keeping with objectives.	TAZ, energy commissioners, ewz, vehicle committee ¹⁴
A 2.9 Parameters related to climate protection and energy in the mobility sector are systematically analysed and published. They form the basis for developing measures to reduce traffic-related energy consumption and greenhouse gas emissions.	TAZ

¹¹ The mobility management also comprises consultancy and educational services, the relevant sub-tasks are listed under the thematic field A 5 Consultancy, Information

¹² The traffic department of the Police Department has no energy action plan. The task is implemented as part of the mobility strategy.

¹³ Tasks for which the mobility and traffic section of the Civil Engineering Office of the City of Zurich is responsible are implemented within the framework of traffic policy and/or mobility strategy.

¹⁴ The vehicle committee implements its allocated tasks within the framework of the applicable vehicle policy. It therefore does not have its own energy action plan.

A 3 Energy supply (city area)

Regarding the supply of power and gas and the provision of district and local heating systems, the City of Zurich aims at a long-term transition towards a structure that is largely based on renewable and environmentally compatible energy sources while conserving resources and ensuring security of supply. In areas with liberalised markets, the city's own and associated energy suppliers pursue the same goals through their product offerings and sales strategies.



Sub-tasks	Participants
A 3.1 The long-term strategies of the city's energy suppliers and Erdgas Zurich AG regarding the production and procurement of energy are regularly reviewed and adjusted in keeping with the objectives of the 2000 watt society and supply security. This also involves integration with the results of energy demand analyses (building stock model). Energy commissioners participate in developing and reviewing relevant strategies.	UGZ, ERZ, energy commissioners, ewz, Erdgas Zurich AG
A 3.2 The production of energy of high ecological value in own and partner plants is continually increased to an economically reasonable extent in keeping with the quantitative targets of the Energy Master Plan. The production of green power and biomass energy sources by third parties is additionally supported through long-term procurement contracts.	ERZ, ewz, Erdgas Zurich AG
A 3.3 Regarding grid-bound energy sources, the greenhouse gas emission coefficient and primary energy factor of the overall mix and the individual products are continually improved to an economically reasonable extent.	ERZ, GSZ, ewz, Erdgas Zurich AG

A 4 Energy planning (city area)

For heating and cooling purposes, the City of Zurich aims at utilising the available potential for sourcing energy locally from waste, waste heat and renewable energy sources in a targeted manner. This is supported by spatial coordination, coupled with the prioritisation of these energy sources and relevant information and consultancy¹⁵. The activities of municipal energy suppliers are harmonised.



Sub-tasks	Participants
A 4.1 The framework conditions for a long-term conversion of the heat supply in keeping with the objectives of the 2000 watt society are illustrated in various scenarios, which are periodically reviewed.	UGZ, AHB, energy commissioners
A 4.2 In order to achieve an optimum spatial balance between supply of and demand for thermal energy (for heating and cooling), the various potentials that exist within the urban area are mapped in a locally differentiated manner, and the use of energy sources is prioritised according to sustainability criteria (energy planning).	UGZ, AHB, energy commissioners
A 4.3 Energy and development planning are coordinated with a view to utilise fixed potential sources of waste heat and renewable energies in an optimal manner.	AfS, Energy commissioner
A 4.4 District heating and gas supply grids, and local heating systems are developed and adjusted in keeping with the Energy Supply 2050 concept. Relevant long-term sub-strategies help secure the energy supply and reduce market price risks. Inefficient parallel supplies by several grid-bound energy sources are avoided. Relevant details are set out in the heat supply concept.	UGZ, ERZ, ewz, Erdgas Zurich AG
A 4.5 A high connection rate is envisaged within the district heating area, as per S. 295 Planning and Building Law.	UGZ, ERZ
A 4.6 In this context, the utilisation of waste heat from industrial and commercial operations, from treated municipal waste water and from internal waste water circuits of buildings and plants is supported as far as this is appropriate.	UGZ, ERZ, ewz
A 4.7 Organic municipal waste and biomass waste from the city's green spaces and agricultural operations is used for fuel production in municipal plants, unless such materials can be recycled more appropriately.	ERZ, GSZ, Biogas Zürich AG ¹⁶
A 4.8 The energy timber potential presented by the forests of the City of Zurich is extensively utilised in keeping with the principle of sustainability, as far as these forests are controlled by the City of Zurich.	GSZ
A 4.9 Extensive community heating networks are initiated in order to increase the utilisation of renewable energies and waste heat.	UGZ, Energy commissioners, ewz, Erdgas Zürich AG

¹⁵ The sub-tasks in the fields of consultancy and information are listed under the thematic field A 5 Consultancy, information

¹⁶ Tasks for which Biogas Zurich AG is responsible form part of the ERZ energy action plan.

A 5 Consultancy, Information (city area)

The City of Zurich offers coordinated energy consultancy and information services for residents, businesses and experts. These focus on the aspects of sufficiency, efficiency and energy source selection in keeping with objectives.



Sub-tasks	Participants
A 5.1 The City of Zurich operates information centres and creates consultancy and information services regarding energy-related issues in the fields of suburban and zone planning, buildings, mobility, enterprises and companies and consumption. The aspects of “sufficiency”, “grey energy” and environmental burden are systematically integrated into relevant information and consultancy.	UGZ, TAZ, AfS, AHB, ewz, Erdgas Zürich AG,
A 5.2 The relevant departments coordinate information and consultancy activities with corresponding activities at national and cantonal level.	UGZ, ERZ, TAZ, AHB, ewz, Erdgas Zürich AG
A 5.3 There are information and activity packs regarding the topics of energy, mobility and the 2000 watt society that are specifically aimed at schools.	UGZ, ERZ, GSZ, TAZ, ewz, SAM ¹⁷
A 5.4 Events and campaigns serve to sensitise the public to energy, environmental and mobility issues.	UGZ, ERZ, GSZ, TAZ, AHB, ewz, VBZ

¹⁷ The school authority of the City of Zurich does not have its own energy action plan. This sub-task is implemented on a project basis.

A 6 Procurement (city administration)

Requirements for space, facilities, equipment, consumer goods and motorised modes of transport are systematically scrutinised regarding sufficiency, and reduced wherever possible. Energy efficiency, energy source selection in keeping with objectives, and ecology constitute additional important procurement criteria.



Sub-tasks	Participants
A 6.1 Uniform principles apply to all procurement with an impact on energy, resources and climate (machines, equipment, vehicles, space). These comprise efficiency and sufficiency criteria and take into account “grey greenhouse gas emissions” and “grey energy”.	Procurement coordination agency (FD) ¹⁸ , UGZ, OIZ, IMMO, LV, SWkF, SAW, PWG, city hospitals Vehicle committee ¹⁹ Additional departments with lead buyer tasks
A 6.2 The departments procure the required vehicles subject to the requirements of the city’s vehicle policy. They provide annual reports on their vehicle fleets, distances travelled, fuel qualities used and fuel consumption to the city’s vehicle committee.	Vehicle committee (lead), all departments with an action plan

¹⁸ The tasks allocated to the procurement coordination agency are implemented without an energy action plan.

¹⁹ The vehicle committee implements its allocated tasks within the framework of the applicable vehicle policy. It therefore does not have its own energy action plan.

A 7 Provision of buildings and facilities (city administration)

Buildings and facilities of the city administration itself and institutions closely linked to it²⁰ are built, refurbished and replaced in an exemplary manner according to the targets of the 2000 watt society. This applies to construction (grey greenhouse gas emissions and grey energy), operation and mobility associated with building use. Targeted innovation is promoted through applied research (pilot and demonstration systems, studies).



Sub-tasks	Participants
A 7.1 Buildings and facilities are renewed and provided subject to the requirements of the 7 League Strides of the City of Zurich. The building technology guidelines apply additionally to the sustainable building specifications. The number of parking spaces provided is determined by the minimum as per applicable parking regulations.	AHB (lead) AfS, IMMO, LV, SWkF, SAW, PWG, ERZ, ewz, VBZ, city hospitals ²¹ , TAZ
A 7.2 The real estate and portfolio strategies of the City of Zurich are aligned with the requirements of the 2000 watt society.	AHB, IMMO, LV, SWkF, SAW, PWG, TAZ
A 7.3 When applying innovative energy solutions (pilot and demonstration projects, studies), thematic focal points are identified on a cross-departmental basis.	LV, AHB, IMMO, energy commissioners, ewz
A 7.4 Economic feasibility studies and assessments using the key indicators of the 2000 watt society (greenhouse gas emissions, primary energy consumption) are based on uniform assumptions as far as energy-related projects are concerned.	AHB (specifications), Energy commissioners (specifications) All departments with an energy action plan.

²⁰ Organisations receiving assistance from the city administration (e.g. building permits, financial contributions) and corporations in which the City of Zurich holds a majority of shares.

²¹ The city hospitals implement the tasks allocated to them in the Energy Master Plan as part of the cantonal target agreement for large consumers. They do not have their own energy action plan.

A 8 Operation of buildings and facilities (city administration)

The operation of buildings and facilities of the city administration and institutions closely linked to it²² is optimised regarding sufficiency and energy efficiency. Energy requirements are largely met according to the City of Zurich's priorities for energy source selection in keeping with the objectives.



Sub-tasks	Participants
A 8.1 Buildings and facilities are operated in collaboration with users in an optimal manner according to the requirements of the 7 League Strides of the City of Zurich.	AHB (reporting), SWkF, OIZ, LV, IMMO, SAW, city hospitals, ERZ, ewz, VBZ, PWG
A 8.2 The energy consumption of the city's buildings and facilities is recorded in a form that is suitable for energy benchmarking purposes.	LV, IMMO, city hospitals, UGZ
A 8.3 For real estate and facility portfolios with high energy consumption, target agreements with large consumers are made with the canton of Zurich and implemented. A general report is prepared annually on the effect of the city's target agreements for large consumers.	LV, city hospitals, UGZ (co-ordination, reporting), IMMO, ewz, WVZ, VBZ
A 8.4 The ecological quality of the energy consumed by departments is subject to the requirements of the city council. Departments are free to purchase higher-quality energy sources.	Applies to all departments and institutions with an energy action plan.

²² Applies to all departments and institutions with an energy action plan.

A 9 Infrastructure (city administration)

Power supply, public lighting, information and communication technology infrastructure, water supply, waste management, urban drainage and transport infrastructure are optimised regarding primary energy use, greenhouse gas emissions and consumption of resources.



Sub-tasks	Participants
A 9.1 Energy supply grids are operated in an energy-efficient, environmentally friendly manner. They are continually developed further in line with changing parameters on the producer side and changing needs on the demand side. Aspects of nature and landscape are taken into account.	ERZ, ewz, Erdgas Zurich AG
A 9.2 For the waste cogeneration plants, the Werdhölzli sewage treatment plant, the city's data processing centres and the water utility, target agreements with large consumers are made with the canton of Zurich and implemented.	UGZ (co-ordination, report), ERZ, WVZ
A 9.3 The waste cogeneration plants of the City of Zurich make optimum use of the energy content of waste. The target figure is a net energy efficiency coefficient of 0.75 ²³ .	ERZ
A 9.4 Optimum energy use is made of digester gas from the Werdhölzli sewage plant.	ERZ, Biogas Zürich AG
A 9.5 Optimum use is made of waste heat from the sewage sludge utilisation plant at Werdhölzli.	ERZ
A 9.6 In order to reduce the energy consumption of waste water treatment plants, the percolation and retention of rain water are supported, the separation of sewage is extended, and infiltration water in the sewage system is reduced.	ERZ
A 9.7 Public lighting (including Plan Lumière) is planned and operated in an energy-efficient manner, taking into account the principle of sufficiency.	ewz
A 9.8 Where strategic projects of city departments and Erdgas Zurich AG are relevant to energy policy, energy commissioners are involved at an early stage.	LV, ERZ, TAZ, AHB, Immo, WVZ, ewz, VBZ, Erdgas Zürich AG

²³ This target value only applies to the Hagenholz waste cogeneration plant, but not to the Josefstrasse plant, which is to be decommissioned in 2020.

A 10 Employees (city administration)

Employees in the city administration contribute to attaining the 2000 watt society objectives and are supported in doing so through targeted advice and information.



Sub-tasks	Participants
A 10.1 Staff are regularly and specifically informed and trained regarding the economical, environmentally friendly use of energy at the workplace and within their areas of responsibility.	UGZ (lead), all departments with an action plan
A 10.2 Incentives and other appropriate measures are used to reduce the energy consumption and environmental impact of staff travelling to and from the workplace.	HRZ (lead) ²⁴ , all departments with an action plan
A 10.3 Work-related travel within the city area is primarily completed by public transport, council bicycles and on foot according to the city's personnel regulations (AS 177.100 and 177.101). Work-related travel outside the city area is preferably completed by rail. The CO2 emissions associated with unavoidable air travel are offset. Air travel is reported.	Entire city administration, HRZ (lead)

²⁴ The HRZ implements its allocated task without an energy action plan.

7. Implementation process

7.1 Participating functions and bodies

City council

Zurich city council plays two important roles in implementing the Energy Master Plan: On the one hand it works politically to ensure that the framework conditions agreed on at federal and cantonal level support the city's energy policy goals and provide it with the scope of action necessary for implementation, and on the other it sets priorities in case of conflicting goals between energy policy and other policies and strategies of the City of Zurich.

Since the City of Zurich will only be able to reach the ambitious targets of the 2000 watt society – in particular the requirement of reducing greenhouse gas emissions to one tonne per person and year by 2050 – if the Canton of Zurich, the Swiss Confederation and the European Union also implement strong energy policies, cooperation with these participants is essential. Networking with other municipalities and an active collaboration in national and international bodies and organisations are of crucial importance in this context, and this is expressed in the City of Zurich's memberships with the Energy Award trustee organisation, the association of cities, the Climate Alliance, the European Covenant of Mayors and other organisations.

Decisions regarding conflicting goals promote alignment with the city council's energy policy both within the administration and in its external relations. Involving relevant departments and allocating responsibility to them is an important aspect in this context. The city council's decision on structuring the 2000 watt process (STRB 2010/447) provided the mandate to establish the required bodies and processes.

Departments, divisions

The objectives and tasks set down in the Energy Master Plan apply to all departments of the City of Zurich, to some institutions closely linked to it that receive assistance from the city administration (e.g. building permits, financial contributions) and to corporations in which the City of Zurich holds a majority of shares. These objectives and tasks must be taken into account in all energy-relevant decisions and activities. They are primarily implemented at the level of departments and utilities with

energy-relevant tasks, but there is also a need for intensive cooperation and coordination between all of the city administration functions involved ("corporate group mindset"). They are primarily implemented at the level of departments and utilities with energy-relevant tasks, but there is also a need for intensive cooperation and coordination between all of the city administration functions involved ("corporate group mindset"). Finally, the objectives and implementation tools of energy policy must be communicated actively and in a targeted manner, both internally and externally.

Steering group

Responsibility for implementing the Energy Master Plan lies with a steering group, which is headed by the energy commissioners and comprises representatives of the Energy and Sustainability division (ENA) of the Environmental and Health Protection department (UGZ), the Mobility and Planning sector of the Civil Engineering and Waste Management department (TAZ), the Technical Centre for Sustainable Construction of the Building Department (AHB) and an expert on environmental management processes. The steering group has the following tasks (see section 7.4):

- controlling the implementation process,
- updating and reviewing action plans,
- collecting, analysing and interpreting data,
- reporting to the city council (annual energy policy report),
- four-yearly updating of Master Plan,
- supporting the city council and its departments in preparing and reviewing energy-relevant policies and strategies,
- establishing a common foundation and developing uniform tools for assessing energy-relevant projects,
- handling the EEA process,
- coordinating energy-related cooperation at federal and cantonal level and in relation to other cities and external bodies.

Energy meeting

The steering group and energy officers from the various departments conduct annual "energy meetings" to share information on energy policy, reflect together, optimise tasks and implementation processes, and promote technical exchange between departments.

7.2 Tools

Action plans

Action plans tailored to the individual departments and participating external institutions form the main tool for implementing the Energy Master Plan. These participants define the contents of action plans and control their implementation in close cooperation with the steering group. Activities are updated based on discussions that are usually held annually, which also serve to harmonise departments' internal strategies and objectives. The effectiveness of measures is compared to the objectives and tasks of the Energy Master Plan, and adjustments and corrections are applied as required. Action plans are signed off annually by the heads of departments and energy commissioners.

Data collection, analysis and interpretation

These functions are performed at several levels:

- Regarding the implementation of individual measures, data collection, analysis and interpretation is generally carried out by departments themselves as part of internal management processes (environmental management system etc.).
- For certain issues, these functions are located at the overall city level, though. These include the implementation of the municipal vehicle policy (lead: vehicle committee), the implementation of the "7 League Strides" programme for environmentally compatible, energy efficient construction (lead: AHB) and procurement (lead: technical centre for procurement coordination).
- Data collection, analysis and interpretation regarding large municipal consumers to whom a cantonal target agreement applies is conducted separately with the support of the cantonal administration (lead: UGZ).
- At a more senior level, relevant functions to monitor compliance with quantitative targets are performed on the basis of the primary energy balance and greenhouse gas emissions (lead: steering group).

Monitoring, energy balances

Relevant indicators are initially recorded at departmental level. The Energy and Sustainability division of the UGZ collates these statistics annually and supplements them by extrapolations from transport and oil consumption models. Every two years, it publishes statistics on the final and on the primary consumption of energy and statistics on CO₂ and greenhouse gas emissions. The city council is informed of these balances in an appropriate form.

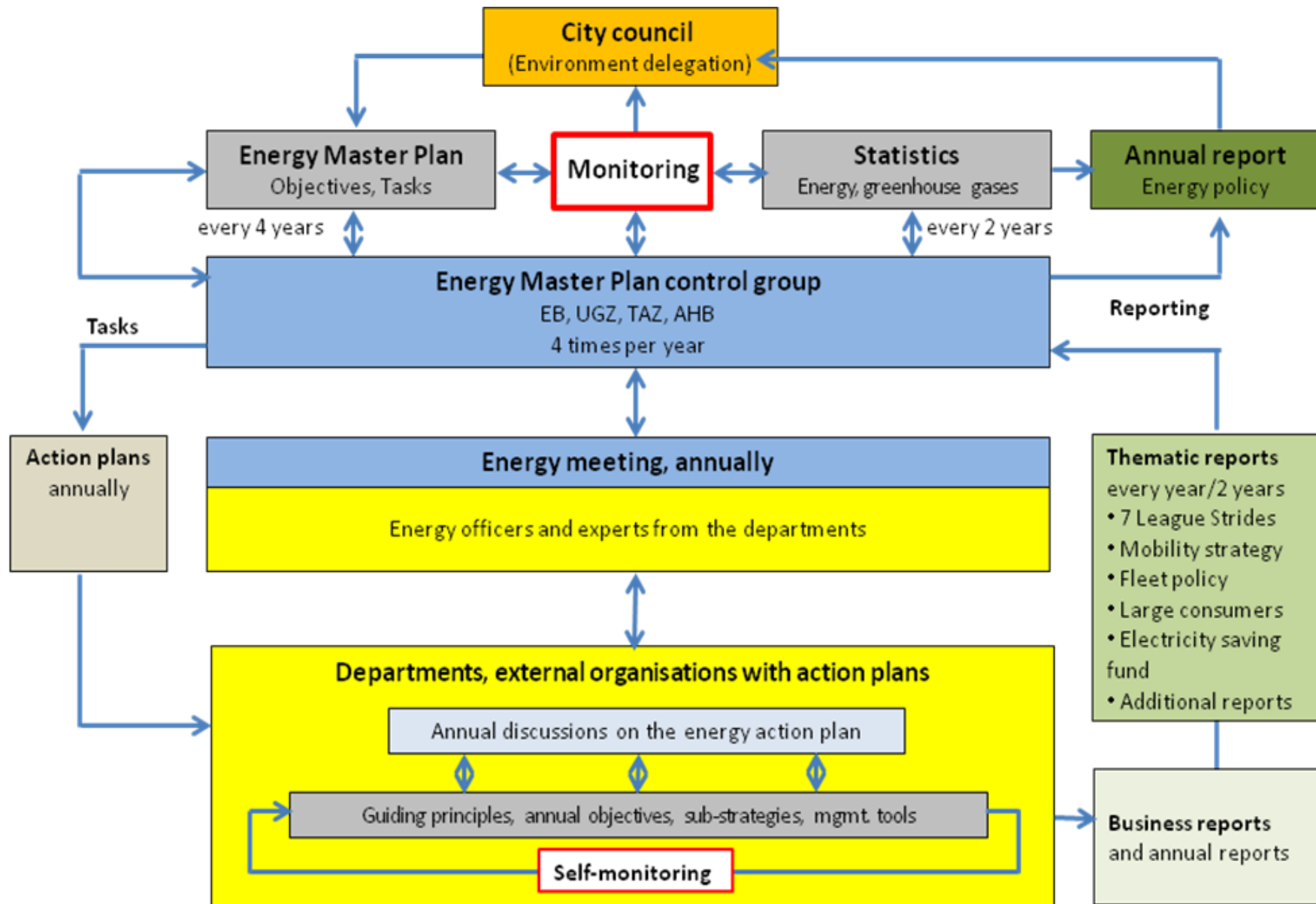
Reporting, annual reports

Reports on the activities and their effectiveness are prepared at several levels. Departmental reports in the form of activity and business reports establish a basis, which is supplemented by periodical reports on energy-relevant policies and strategies such as the "7 League Strides" programme on environmentally compatible, energy efficient construction or the Mobility Strategy. Information from the departments is integrated into the primary energy consumption balance and greenhouse gas emissions on the one hand, and summarised in the energy commissioner's annual energy policy report and presented to the city council on the other. Every four years a condensed version of the data is included in the City of Zurich's sustainability monitoring.

Reviews

The Energy Master Plan is reviewed, updated and resolved by the city council every four years. At the same time, it is harmonised with other energy-relevant policies of the city council, including the Environment Master Plan, Mobility Strategy, vehicle strategy, procurement principles and housing policy. Reviews are conducted in collaboration with relevant departments.

7.3 Process and competencies



7.4 Allocation of tasks

Process control

Sub-tasks	Lead
P 1 The Energy Master Plan is reviewed and updated every four years (in leap years). In the process, quantitative targets are made transparent through an expert report. UGZ, AHB, energy commissioners	UGZ, energy commissioners
P 2 The implementation and planning of measures contained in operative action plans are reviewed annually at departmental and utility level.	UGZ, AHB, energy commissioners
P 3 The key tools for collecting, analysing and interpreting data on the implementation of the Energy Master Plan are statistics on the final consumption of energy and CO ₂ emissions (prepared every two years) and statistics on primary energy consumption and greenhouse gas emissions (prepared every four years). The city council is informed of relevant results in an appropriate form.	UGZ
P 4 The city council, the participants involved in the process and the public are informed of the implementation of the Energy Master Plan and energy-related activities in an appropriate form.	UGZ, energy commissioners
P 5 Energy-relevant strategies and policies of the city council are aligned with the targets of the 2000 watt society and periodically reviewed.	UGZ, AHB, energy commissioners
P 6 A common foundation is established and uniform tools are developed for the assessment of energy-relevant projects. These apply to the entire city administration and are set down periodically.	UGZ, TAZ, AHB, energy commissioners
P 7 Every four years, the City of Zurich undergoes an EEA energy audit. The City plans to maintain its EEA Gold Award; the city council and the public are informed of the audit results (City council resolution STRB No. 2000/236).	UGZ, TAZ, AHB, energy commissioners

Cooperation

Sub-tasks	Lead
K 1 The City of Zurich maintains regular exchange with the Federal Energy Department on energy-related issues.	UGZ, energy commissioners
K 2 The City of Zurich maintains regular exchange with the Canton of Zurich (Office for Waste, Water, Energy and Air (AWEL), Energy Department) on energy-related issues.	UGZ, energy commissioners
K 3 The City of Zurich maintains regular exchange with other major cities in Switzerland on energy-related issues.	UGZ, energy commissioners
K 4 The City of Zurich is a member of the Energy Award trustee organisation (City council resolution STRB No. 2000/236) and is active within the board of trustees as far as possible.	Energy commissioners
K 5 The City of Zurich actively engages with committees of the Swiss Association of Engineers and Architects (SIA) and other organisations regarding issues of energy-efficient construction (e.g. Coordination of Federal Building and Real Estate Authorities (KBOB), Association "eco-bau - sustainability in public construction").	AHB
K 6 The City of Zurich is a member of the European Climate Alliance (City council resolution STRB No. 1993/287) and the Covenant of Mayors, an association of cities and municipalities in Europe that pursue ambitious climate protection objectives under the sponsorship of the European Commission (City council resolution STRB No. 2008/1200).	UGZ, STEZ

8. Appendix

8.1 List of abbreviations

Departments and organisations that maintain Energy Action Plans

AfS	Urban Development Office
AHB	Structural Engineering Department
BfWbf	Residential Development Office
EB	Energy commissioners
ewz	Zurich city power utility
ERZ	Waste disposal and recycling authority Zurich
EZ AG	Zurich natural gas utility
GSZ	Office of Parks and Open Spaces of the City of Zurich
IMMO	Real Estate Management
LV	Real estate administration
OIZ	IT skill centre of the City of Zurich
PWG	Foundation for the Preservation of affordable housing of the City of Zurich
SAW	Zurich Housing Foundation for the Elderly
SWkF	Swiss Housing Foundation for Families with many children
UGZ	Department of Health and the Environment
VBZ	Public Transport Authorities
WVZ	Zurich Waterworks

Further participants

AfB	Engineering Authorities
DAV	Traffic department
ENA	Division Energy and Sustainability, Department of Health and the Environment (UGZ)
FBZ	Technical Centre for Procurement Coordination
GR	Municipal council
HRZ	Human Resources Management of the City of Zurich
SAM	School Authority
STEZ	Zurich Urban Development
STR	City council
TAZ	Zurich Civil Engineering Office

Further abbreviations

GB	Assembly decision
GRB	Council decision
MP	Energy Action Plan
STRB	City Council Resolution
STZH	City of Zurich

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