

Country Condition Sheet

Solar Urban Planning of Germany

1. Political framework conditions

1.1. National goals

Reduction of GHG emission base year 1990	minus 40% by 2020 (base year = 1990) Source: Federal Environment Ministry http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/44497.php
Share of renewable energy in final energy consumption	18% by 2020 (base year = 1990) Source: Federal Environment Ministry http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/44497.php
Share of renewable energy in electricity consumption	30% by 2020 (base year = 1990) Source: Federal Environment Ministry http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/44497.php
Share of renewable energy in final energy consumption for heat space heat, cooling and process heat and hot water	14% by 2020 (base year = 1990) Source: Federal Environment Ministry http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/44497.php
Reduction of primary energy consumption base year 2008	20% lower by 2020, 50% lower by 2050 (base year =1990) http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/44497.php
Rate of building renovation	2% of total building stock a year http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/44497.php

2. Legal framework conditions

2.1. Urban planning

Legislation/ Obligations/ Minimal requirements
Urban land use planning (Bauleitplanung)
<ul style="list-style-type: none"> National building code (Baugesetzbuch=BauGB), BAuG defines the most important urban planning instruments, www.gesetze-im-internet.de/bbaug Regional Planning Act (Raumordnungsgesetz=ROG)), Law to develop settlement and free space, http://bundesrecht.juris.de/rog_2008/index.html Land development plan / zoning plan (Flächennutzungsplan=FNPlan)), Plan to regulate land use without direct effect on citizens, only authority internal binding guidelines for the land development plan, http://www.gesetze-im-internet.de/rog_2008/__8.html Local development plan (Bebauungsplan)), Plan is use-based (regulating the uses to which land may be put), or it may regulate building height, lot coverage, and similar characteristics, or some combination of these. (per city e.g. http://www.muenchen.de/Rathaus/plan/bebplanung/37891/index.html)
Local characteristics
<ul style="list-style-type: none"> Urban development contract / urban planning contract (Städtebaulicher Vertrag), Contract between the city and a legal personality with the possibility to define specific criteria e.g. minimum requirements, BauGB §11 Städtebaulicher Vertrag, http://www.gesetze-im-internet.de/bbaug/__11.html

2.2. Passive Solar

Legislation/ Obligations/ Minimal requirements
<ul style="list-style-type: none"> No national legislation exists regarding the use of passive solar energy.
Local characteristics
<ul style="list-style-type: none"> DIN 5034 - Daylight in interiors, Minimum daylight requirements, www.din.de

2.3. Photovoltaic PV/ Solar thermal

Legislation/ Obligations/ Minimal requirements
<ul style="list-style-type: none"> No obligations to use PV or solar thermal for energy generation. Act on the Promotion of Renewable Energies in the Heat Sector (Erneuerbare-Energien-Wärmegesetz=EEWärmeG), all new buildings and in some federal states also retrofitted buildings have to integrate one renewable energy to produce heat (could be compensated by a better building standard). http://www.bmu.de/english/renewable_energy/downloads/doc/42351.php Monuments and Historic Buildings Acts (Denkmalschutzgesetz=DSchG); Framework conditions for PV and solar thermal on historic buildings, per federal state e.g. Baden-Wuerttemberg, http://www.landesrecht-bw.de/jportal/?quelle=jlink&query=DSchG+BW&psml=bsbawueprod.psml&max=true&aiz=true
Local characteristics
<ul style="list-style-type: none"> Fire safety regulations (Brandschutzbestimmungen), recommendations how to connect a PV system to the grid.

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2.4. Opportunities for future improvements

- Requirements for minimal share of passive solar in new buildings
- Act on the Promotion of Renewable Energies in the Heat Sector also for retrofitted buildings

3. Economic framework conditions

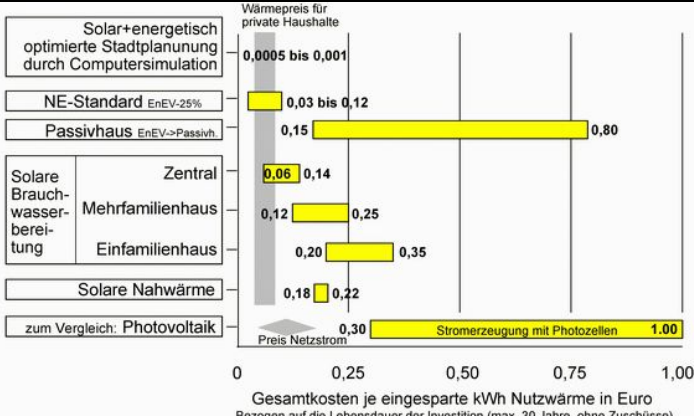
3.1. Urban planning

Subsidy/ grants
<i>National programs</i>
• No national program exists regarding urban planning.
<i>Federal programs</i>
<ul style="list-style-type: none"> • 100 Climate Protection Housing Estates in North Rhine-Westphalia <p>As a component of the North Rhine-Westphalian energy and climate protection strategy, it is intended with the new project "100 Climate Protection Housing Estates in North Rhine-Westphalia" to consistently reduce the heat-related CO₂ emissions in residential estates. For this purpose it is possible to apply all technologies which are suitable for achieving CO₂ reductions. Planners and investors thus have the freedom to choose from a wide range of innovative building standards and supply variants.</p> <p>The present planning guidelines put forward requirements and recommendations for the climate protection estates. Depending on the type of building concerned, the permissible CO₂ emissions in the construction of new buildings are about 50 - 60 % below the figures obtained for reference buildings according to the energy saving regulations EnEV 2009.</p> <p>www.100-klimaschutzsiedlungen.de</p>
Favourable credit/ soft loans
• No favourable credit/ soft loans exist regarding urban planning.
Tax privilege
• No tax privilege exists regarding urban planning.
Cost effectiveness / Example
<p>Wärmepreis für private Haushalte</p> <p>0,0005 bis 0,001</p> <p>0,03 bis 0,12</p> <p>0,15 0,80</p> <p>0,06 0,14</p> <p>0,12 0,25</p> <p>0,20 0,35</p> <p>0,18 0,22</p> <p>0,30</p> <p>1,00</p> <p>0 0,25 0,50 0,75 1,00</p> <p>Gesamtkosten je eingesparte kWh Nutzwärme in Euro Bezogen auf die Lebensdauer der Investition (max. 30 Jahre, ohne Zuschüsse)</p>
0,005 to 0,001 € costs per saved kWh _{useful heat} ¹ (e.g. optimized solar urban planning)

¹ <http://home.arcor.de/gosol/handeln.htm>

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3.2. Passive Solar

Subsidy / grants
<ul style="list-style-type: none"> No national program exists regarding passive solar.
Favourable credit / soft loans
<ul style="list-style-type: none"> No favourable credit/ soft loans exist regarding urban planning.
Tax privilege
<ul style="list-style-type: none"> No tax privilege exists regarding urban planning.
Cost effectiveness
 <p>Wärmepreis für private Haushalte</p> <p>Gesamtkosten je eingesparte kWh Nutzwärme in Euro Bezogen auf die Lebensdauer der Investition (max. 30 Jahre, ohne Zuschüsse)</p>
0,005 to 0,001 € costs per saved kWh _{useful heat} ² (e.g. optimized solar urban planning)

3.3. Photovoltaic/ Solar thermal

Payment tariffs
<ul style="list-style-type: none"> Renewable Energy Sources Act (Erneuerbare Energien Gesetz=EEG) This Act serves to implement Directive 2001/77/EC on the promotion of the electricity produced from renewable energy sources in the international electricity market. http://www.erneuerbare-energien.de/inhalt/42934/
Subsidy / grants
<ul style="list-style-type: none"> Market Incentive Programme for for the promotion of renewable energies (Marktanreizprogramm zur Förderung erneuerbarer Energien - Innovationsförderung thermische Solaranlagen), Funding conditions for solar thermal systems, http://www.bafa.de/bafa/de/energie/erneuerbare_energien/index.html
Favourable credit / soft loans
<ul style="list-style-type: none"> Investitionskredite für Maßnahmen zur Nutzung Erneuerbarer Energien, favourable credits for PV and solar thermal systems (not all are eligible), www.kfw.de
Tax privilege
Solar Thermal
No tax privilege exists regarding solar thermal.
PV
<ul style="list-style-type: none"> Income tax (Einkommenssteuer), losses can be offset, http://bundesrecht.juris.de/estg/index.html#BJNR010050934BJNE033371140 Trade tax (Gewerbesteuer), only relevant if system makes profit above a certain amount, http://bundesrecht.juris.de/gewstadv_1955/

² <http://home.arcor.de/gosol/handeln.htm>

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<ul style="list-style-type: none"> Value added tax (Umsatzsteuer) PV systems are liable to value-added tax and therefore also investments are deductible.
Cost effectiveness³
<ul style="list-style-type: none"> PV: 0,30 to 1,00 € costs per saved kWh Solar thermal: <ul style="list-style-type: none"> Multiple dwelling: 0,12 to 0,25 € costs per saved kWh_{useful heat} Single family house: 0,20 to 0,35 € costs per saved kWh_{useful heat}

3.4. Opportunities for improvements

- National subsidy programs for solar urban planning (in combination with energy efficient architecture)
- Subsidy schemes for solar thermal systems (also for systems that only produces DHW).

4. Technical framework conditions

4.1. Urban planning

Planning background of solar settlement
<ul style="list-style-type: none"> There are no specific technical framework conditions regarding solar urban planning in Germany, only particular experiences.
Potential
<ul style="list-style-type: none"> Round 20% higher solar gains of an optimized urban planning (exemplary)⁴
Best practices/ Examples
<ul style="list-style-type: none"> Solar optimisation e.g. Solenop in München –Funkkaserne: Solar + energetic assessment within the framework of an Urban development competition (http://home.arcor.de/gosol/praxis.htm)

4.2. Passive Solar

Planning background/ Local characteristics
<ul style="list-style-type: none"> No national technical framework exists regarding the use of passive solar energy.
Potential
<ul style="list-style-type: none"> Share of passive solar up to 39% of the total heating demand (on the base of a passive house)⁵
Best practices/ Examples
<ul style="list-style-type: none"> Vauban, District with extensive use of passive solar energy, http://www.vauban.de/info/abstract.html

³ <http://home.arcor.de/gosol/handeln.htm>

⁴ www.erfurt.de/imperia/md/content/stadtplanung/ip_gk/en_bp/gutachten_energieeffiziente_bauleitplanung.pdf

⁵ www.erfurt.de/imperia/md/content/stadtplanung/ip_gk/en_bp/gutachten_energieeffiziente_bauleitplanung.pdf

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4.3. Photovoltaic/ Solar thermal

Planning background/ Local characteristics
<ul style="list-style-type: none"> The Act on the Promotion of Renewable Energies in the Heat Sector has to be checked by the municipalities. At the moment there are only few municipalities that check or monitor the activities e.g. solar thermal
Potential
PV (only PV) <ul style="list-style-type: none"> Single dwelling: up to 100% (5 kWp and 3000 kWh electricity demand per household) Solar thermal⁶ <ul style="list-style-type: none"> Solar share of domestic hot water 60% (strongly depends on the heating demand).
Best practices/ Examples
<ul style="list-style-type: none"> Solar cadastre, Overview over the potential for PV and partly for solar thermal on building level , http://www.enbausa.de/solar-geothermie/fotovoltaik/staedte-mit-solarkataster.htmlName, explanation long, Link

4.4. Opportunities for improvements

- ⇒ Obligatory solar urban optimization for new districts
- ⇒ Systematic controls of the Act on the Promotion of Renewable Energies in the Heat Sector
- ⇒ Overview/monitoring of existing and new PV and solar thermal systems
- ⇒ Solar cadastre for all cities

5. Further reading/information

<http://www.100-klimaschutzsiedlungen.de/page.asp?TopCatID=12248&RubrikID=12248>

<http://www.enbausa.de/solar-geothermie/fotovoltaik/staedte-mit-solarkataster.html>

http://www.augsburg.de/fileadmin/www/dat/04um/uberat/Klimaschutz/Leitfaden_Klimaschutz_und_Stadtplanung/Leitfaden_Klimaschutzundstadtplanung_Augsburg.pdf

http://www.erfurt.de/imperia/md/content/stadtplanung/ip_gk/en_bp/gutachten_energieeffiziente_bauleitplanung.pdf

⁶ This value is only for single family houses and multi family houses with maximal 5 apartments (only solar thermal).