

# Freiburg's green city transformation: A roadmap to 100% renewable energy by 2050

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# Freiburg facts and figures

- founded in 1120
- population: 225,000  
164 nations
- students: 30,000  
University founded in 1457
- jobs: 85.5% in service sector
- 1.4 million overnight guests  
per year
- max. alt.: 1,295 m
- Surface area: 155 km<sup>2</sup>,  
of which 43% forest  
(FSC certified)
- sunny spot:  
2,000 sunshine hours p.a.



# Think Globally – Act Locally

- 1986 Sustainable energy policy, abandoning nuclear
- 1992 „Federal Capital of the Environment“
- 1996 Climate Protection Plan
- 2002 „Solar Bundesliga“ champion (until 2004)
- 2007 “Nature protecting City”
- 2010 „Federal Capital of Climate Protection“
- 2012 Germany’s “Most Sustainable City”
- 2013 „Municipal Climate Protection“ (federal contest winner)



# Green Tec and Solar Economy

## Research & Application of Solar Energy

### Region of Freiburg

- 12,000 employees, more than 3% of the working population
- 650 million € added value, 4% of the region's gross domestic product (GDP)
- 2,000 companies

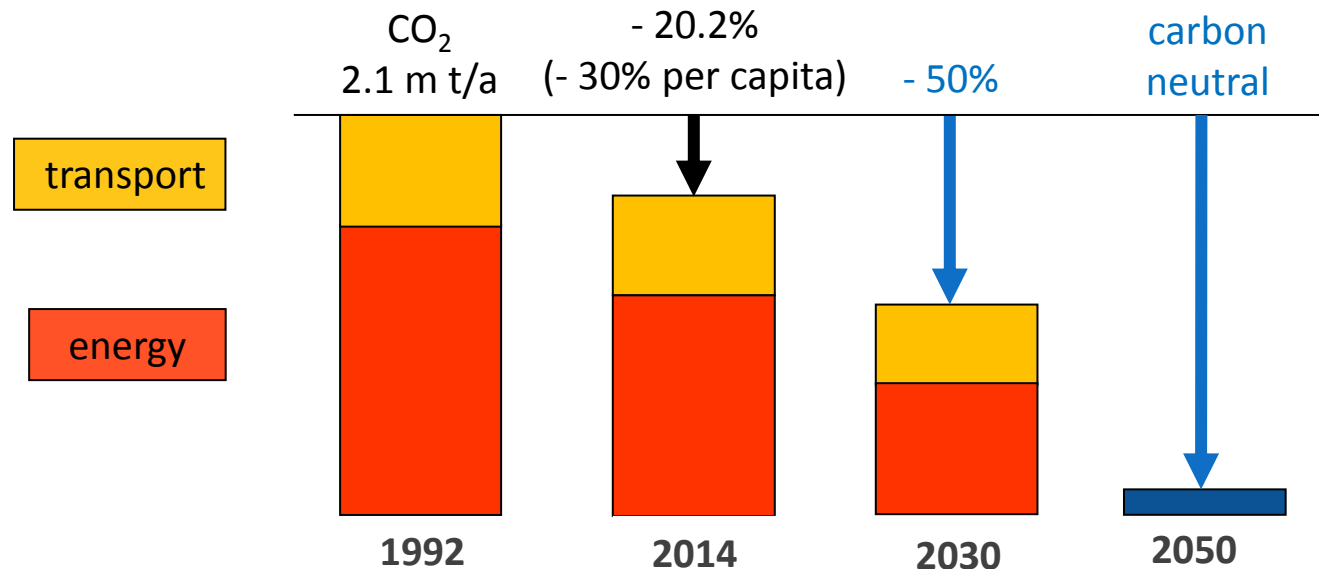
### The "Freiburg Mix"

- environment & climate
- skills & creativity
- politics & civic involvement



# The Local Roadmap for Climate Protection

- Climate Protection Plan adopted in 1996
- revised in 2007 & 2014
- two-year municipal climate balances



# Pillars of Energy Policy

Since 1986, our energy policy has been based on the pillars of

- saving energy
- increasing efficiency of energy provision and
- using renewable energy.



# Renewable Energies in Freiburg

## Solar energy



power generation:  
33 Mio. kWh/a

## Wind energy



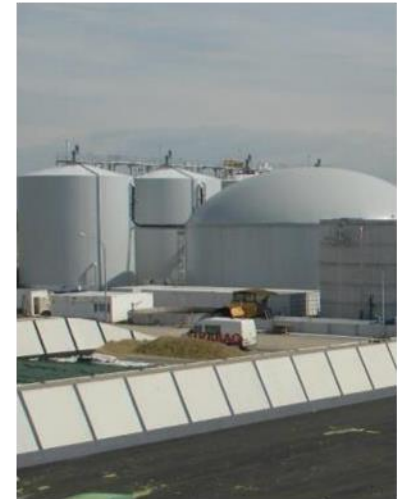
power generation:  
10,3 Mio. kWh/a

## Hydro power



power generation:  
1,5 Mio. kWh/a

## Biogas plant



power generation:  
21,7 Mio. kWh/a

# Solar Power as part of the energy transition

soccer stadium



electric power: 290kW<sub>p</sub>

trade fair center



electric power: 700 kW<sub>p</sub>

waste disposal site



electric power: 2.5 MW<sub>p</sub>



# Information: FREE-sun

Inventory of  
solar potential  
of Freiburg roofs

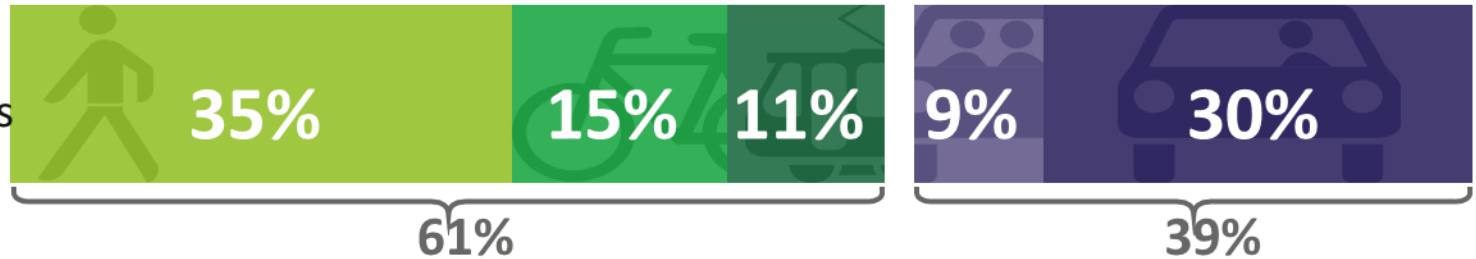


# Modal Split in domestic traffic in Freiburg

Choice of means of transport for domestic traffic of the population of Freiburg (percentage)

**1982**

183'000 adults



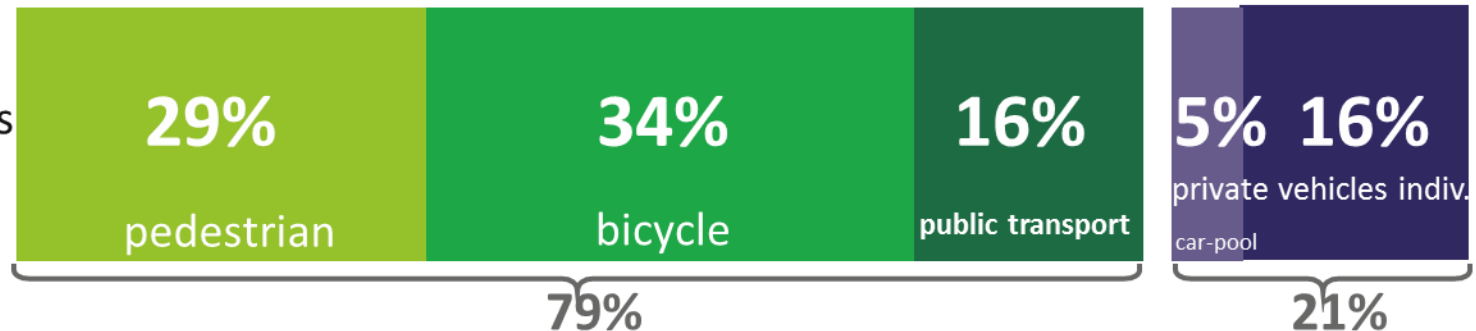
**1999**

196'000 adults

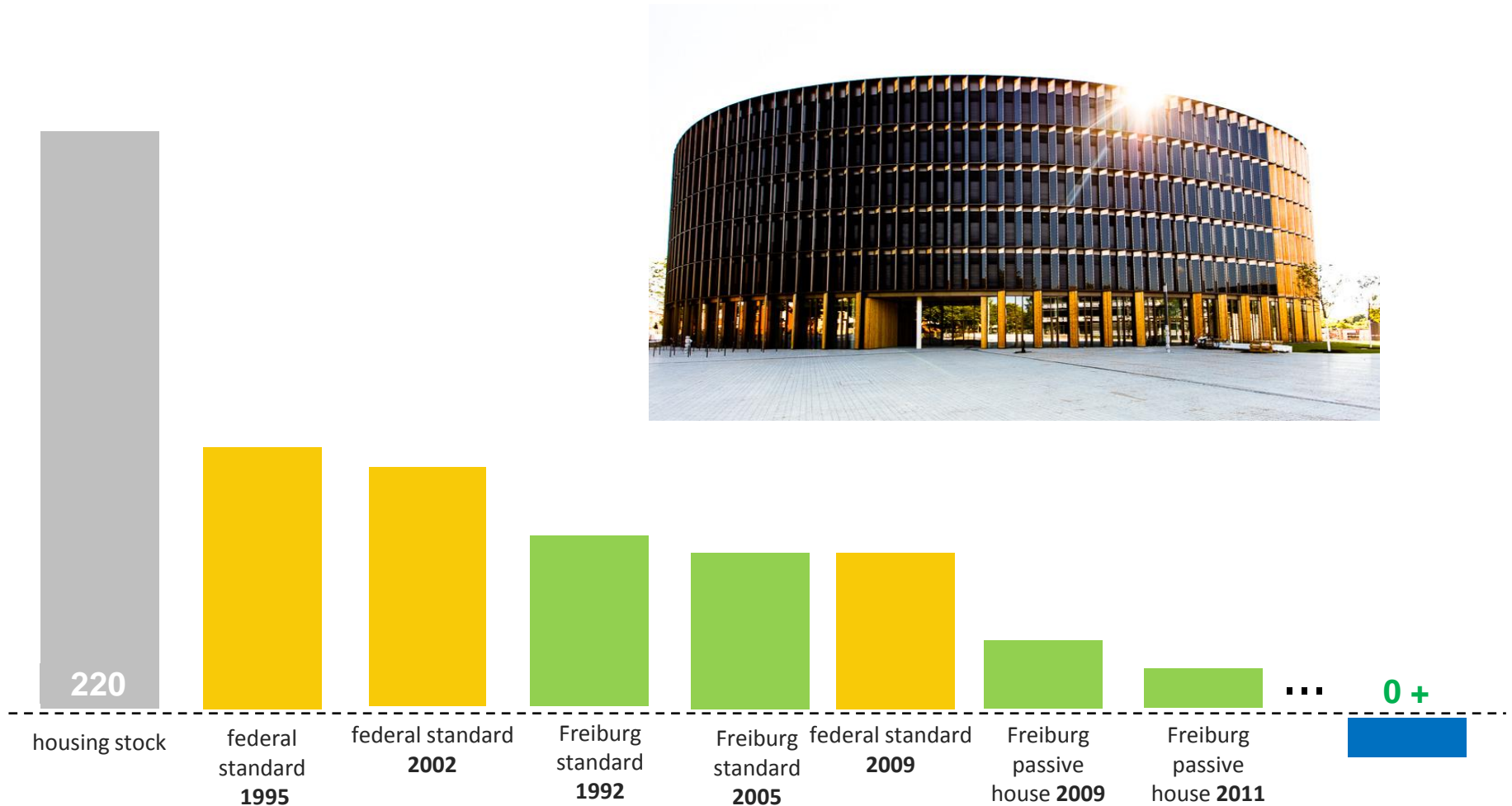


**2016**

227'000 adults



# The Roadmap to Zero- and Plus-Energy-Buildings



Average heating energy demand in kWh/m<sup>2</sup>/a (excludes water heating and electricity)

# Municipal building stock

- 520 buildings (schools, administrative buildings, public amenities), total 630,000 m<sup>2</sup>
- All new constructions according to passive house standard
- Redevelopment according to Freiburg low energy standard



before:  
70 kWh/m<sup>2</sup>/a



after:  
15 kWh/m<sup>2</sup>/a

# Eco Districts

**RIESELFELD**



Quartier  
**VAUBAN**



**GREENCITY**  
FREIBURG

Freiburg   
IM BREISGAU

Thank you for your attention

