

On the Way to a Sustainable City - Carbon Neutral Urban Development of the City of Freiburg i. Br.

Kyoto, February 11th, 2011

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Director of the Environmental Protection Agency

City of Freiburg - Germany



FREIBURG GREENCITY

- Historic and modern city
- University city
- 220,000 population
- Area: 150 km²
- **Federal Capital of Climate Protection**



Freiburg

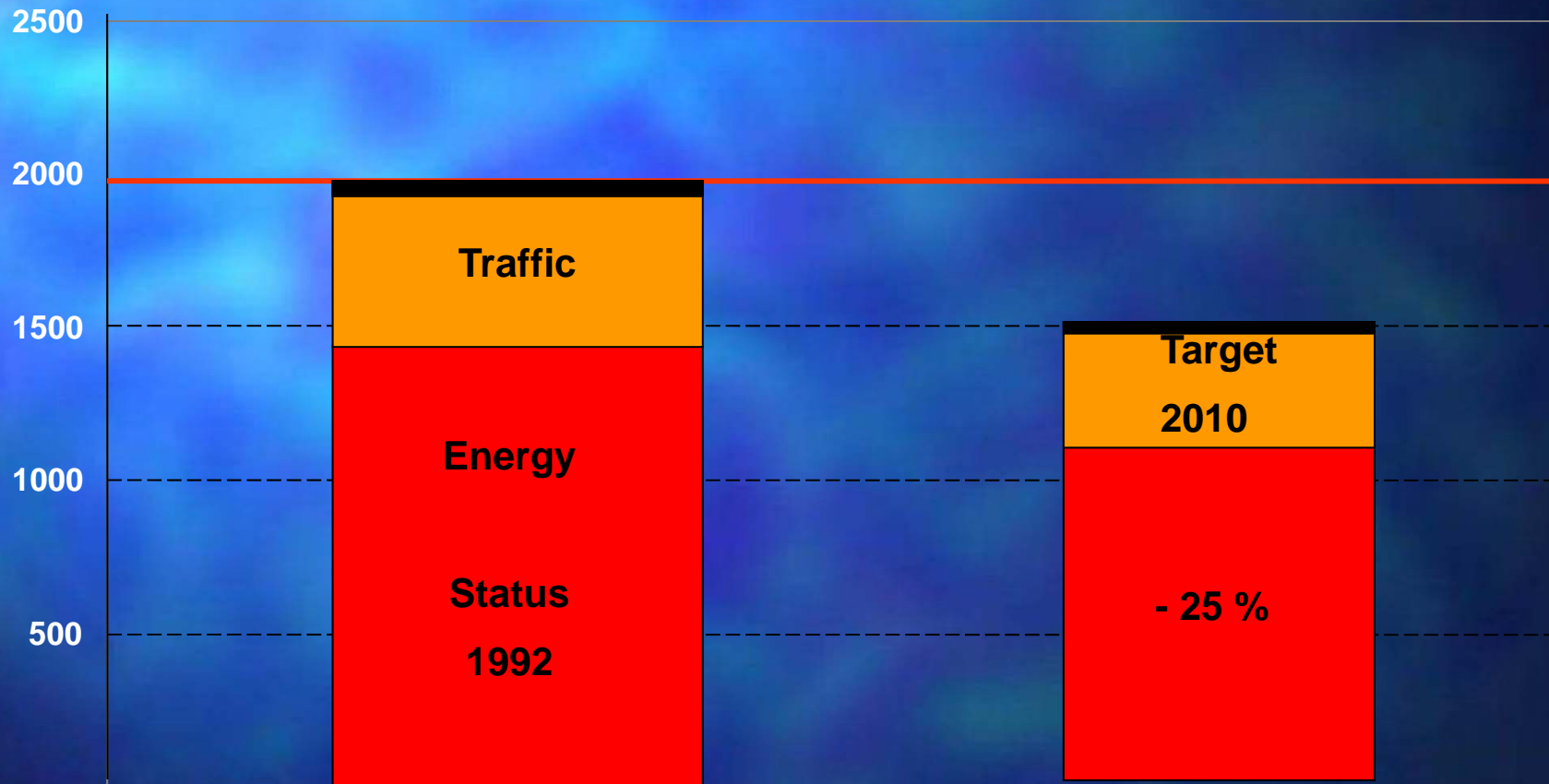


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Climate Protection Concept 1996

CO₂-Emissions



in 1,000 t CO₂ equivalent p.a.



Freiburg Traffic Policy

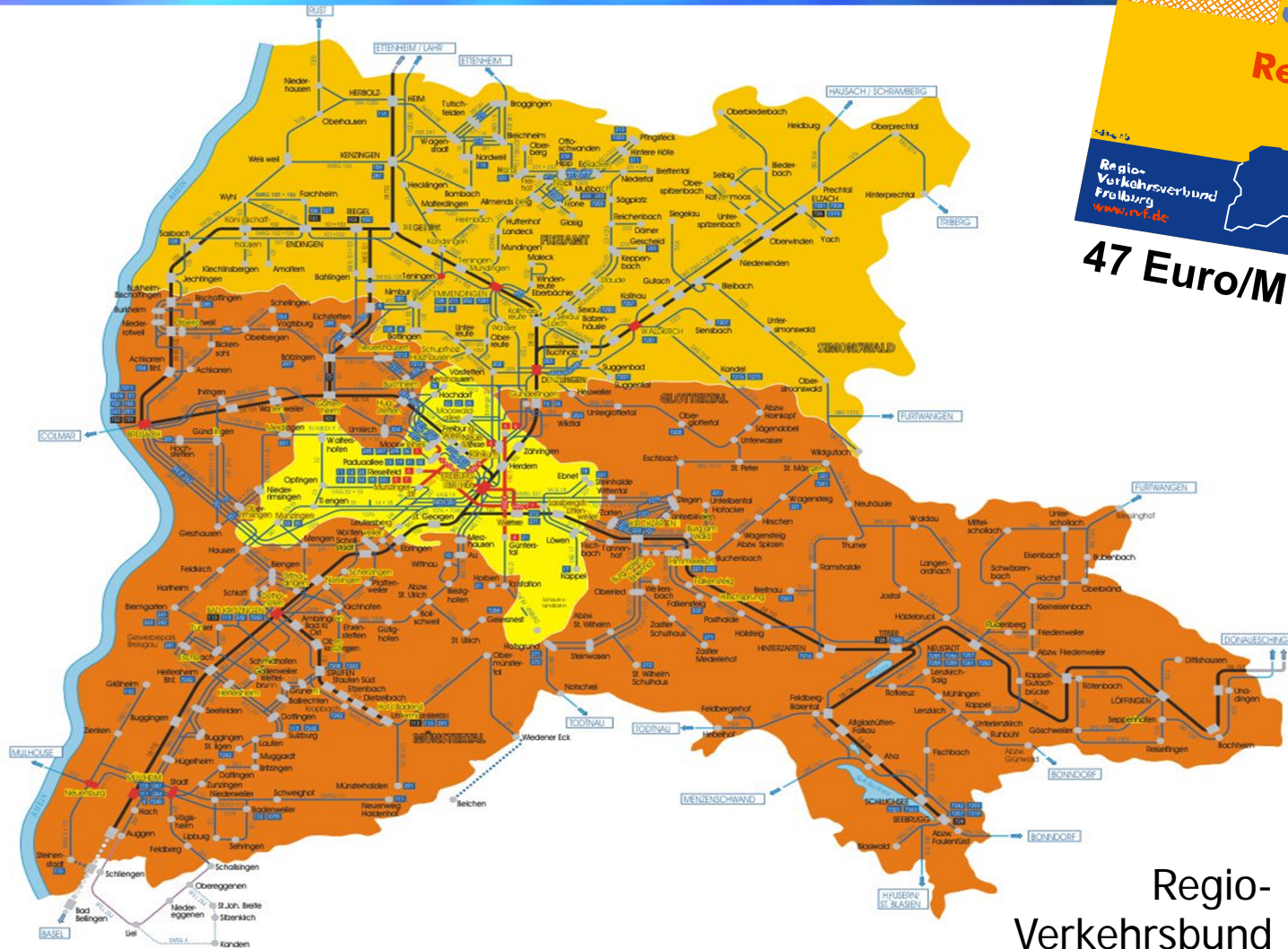
Priorities:

- Pedestrians
- bike lanes
- public transport



Excellent public transport

Total line length: ca. 3000 km



47 Euro/M



In erster Linie



Regio-Verkehrsbund Freiburg

Umweltschutzamt

Freiburg
IM BREISGAU

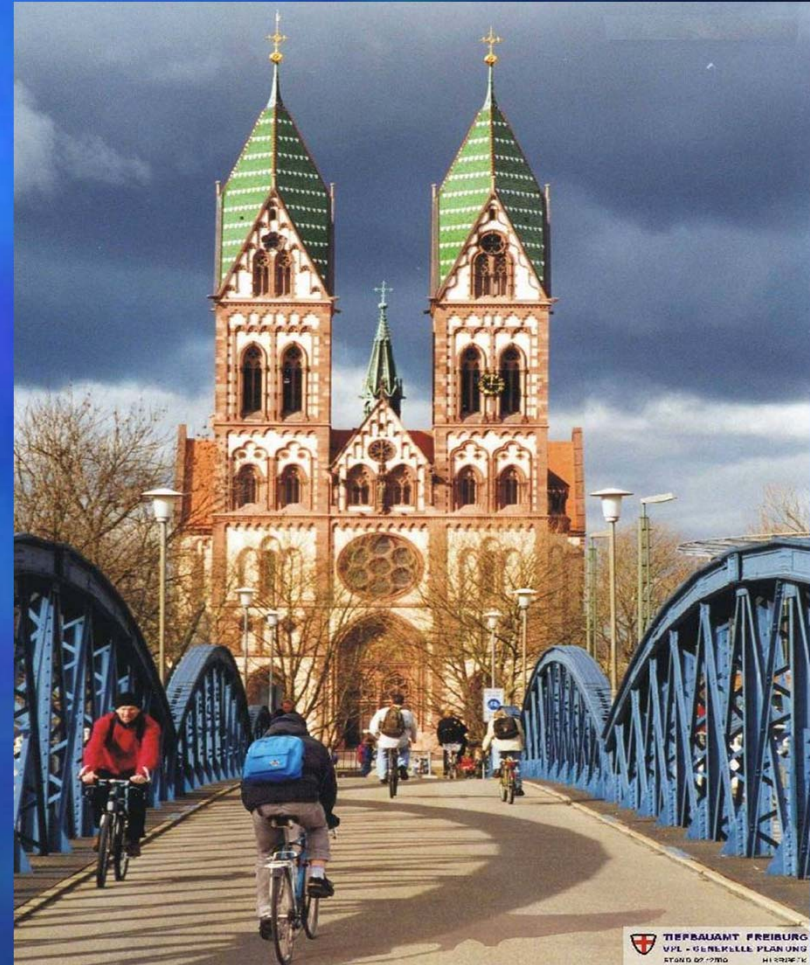


Bike lane bridge in Freiburg

before...



...and after



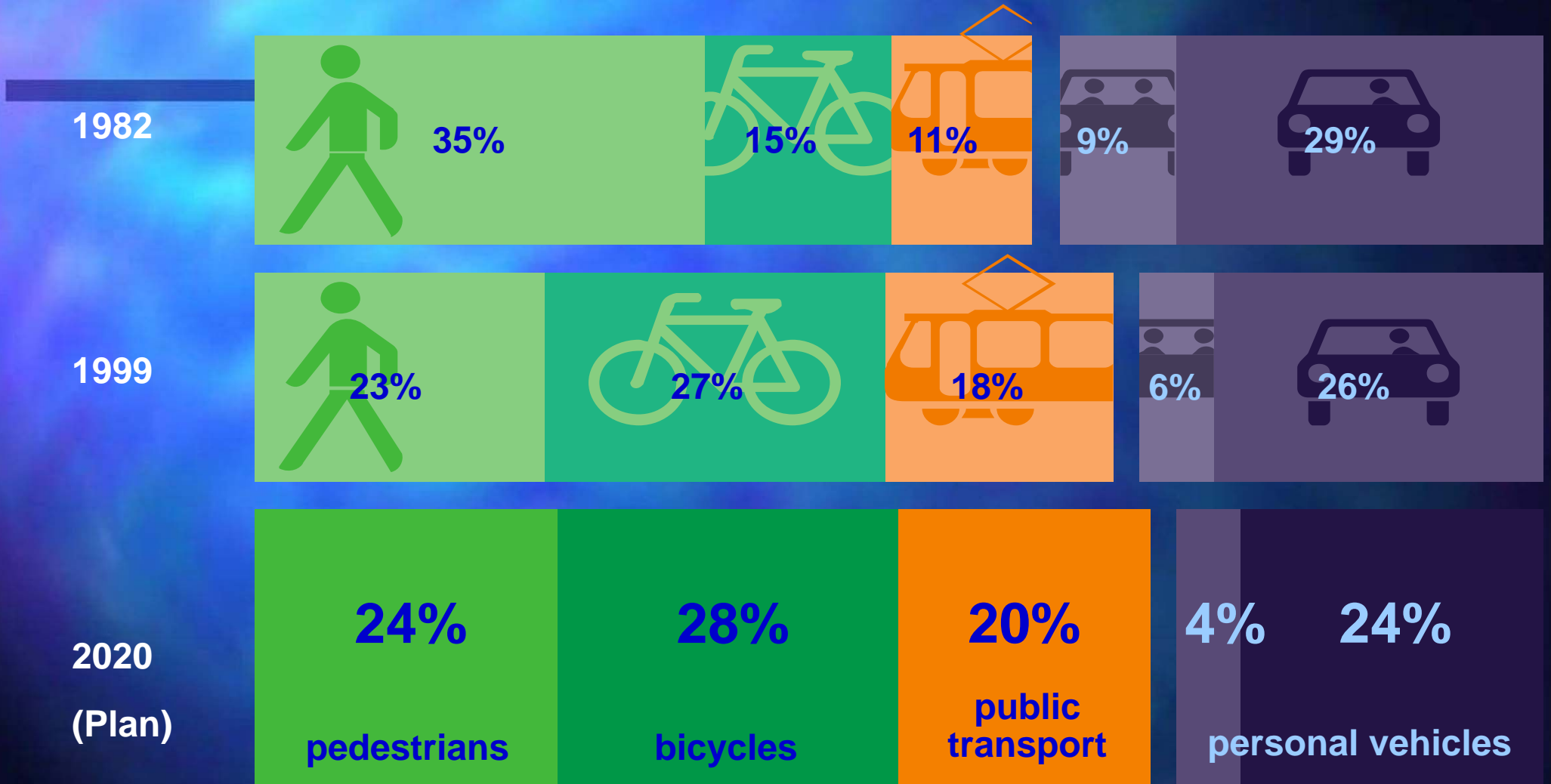
Bike lanes in Freiburg: 410 km

Umweltschutzamt

Freiburg
IM BREISGAU



Modal Split



Energy policy of Freiburg

Goals

Sustainable Energy Supply

Abandoning of nuclear energy – Worldwide Climate protection

Energy saving

- Thermal insulation
- Low energy construction
- passiv houses
- Power saving

Renewable Energy Sources

- Solar energy
- Biomass
- Hydro – Power
- Wind - Power
- Geothermal energy

Efficient Technologies

- Power-heat coupling (Co-generation)
- Block-type thermal power stations
- Long- and short-distance energy



Freiburg "Low energy standard"



- since 1992: 65 kWh/m² p.a. (30% below national standard)
- since 2005: ca. 50 kWh/m² p.a.
- part of municipal real estate sales contracts
- two entire new districts with low energy standard (Rieselfeld and Vauban)



Increasing energy standard in Freiburg

2011 Passive House standard

2010

2009 Low energy standard



Passive house - Restoration

Bugginger Str. 50 as first high-rise building in Germany

Freiburger
Stadtbau
GmbH



139 flats with 7.800m² living space



In the framework of restoration

>social city Weingarten-West< by Freiburger Stadtbau GmbH is restored a 16 storey building with 139 flats, partly are barrier-free

It becomes an attractive and low-cost living room with very low energy costs

Energy and environment protection:

- passive house standards with 15 kWh/m²a thermal heat
- CO₂-Reduction 60 tons per year
- photovoltaic plant 40 kWp
- rainwater leaching

construction time: august 2008 til the end of 2010

Umweltschutzamt

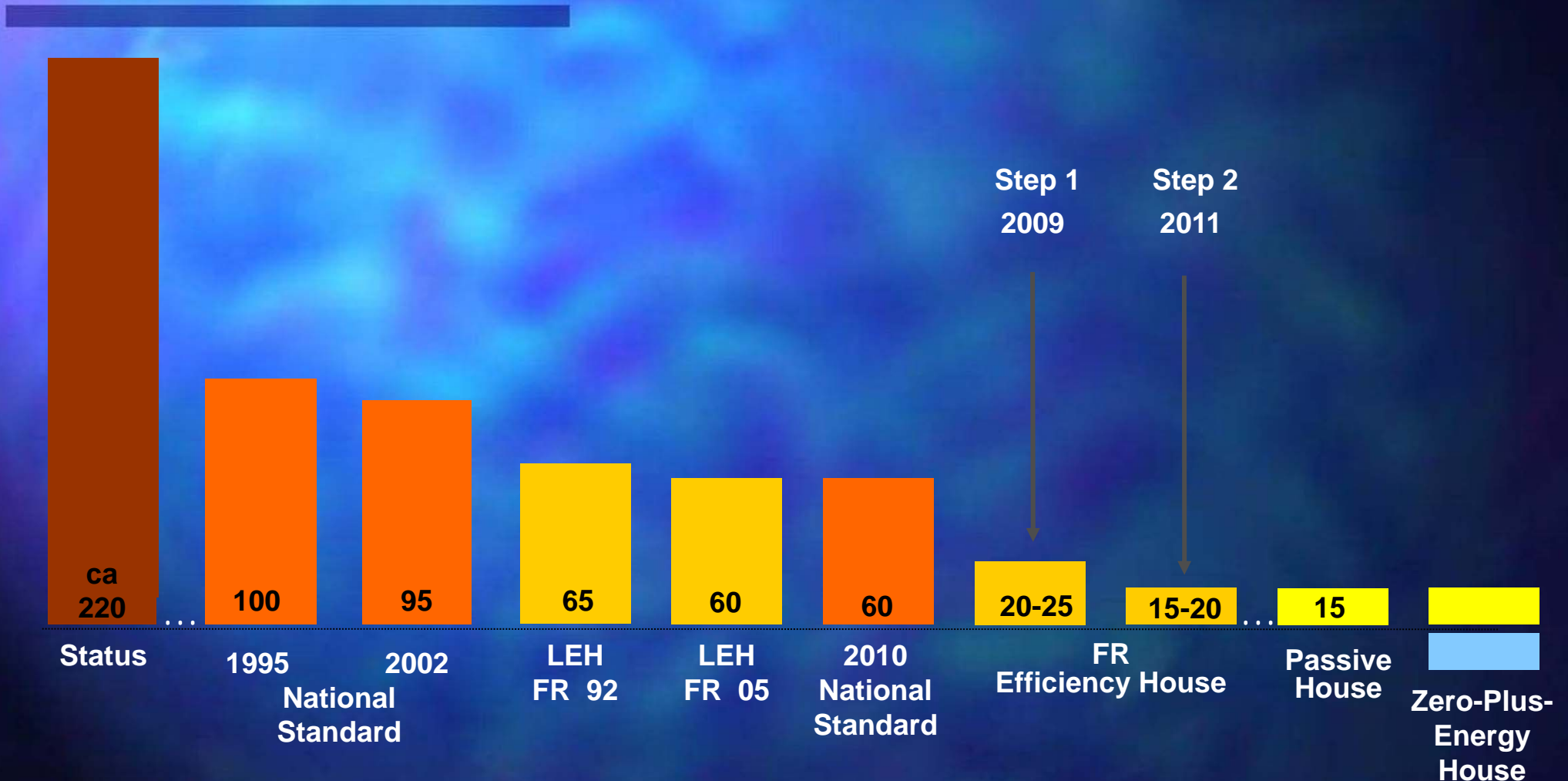
Freiburg
IM BREISGAU



Solar estate Plus-Energy[®] houses



Different energy standards (Heat energy demand - kWh/m² a)



Freiburg Subsidy Programme: „Energy efficient renovation“



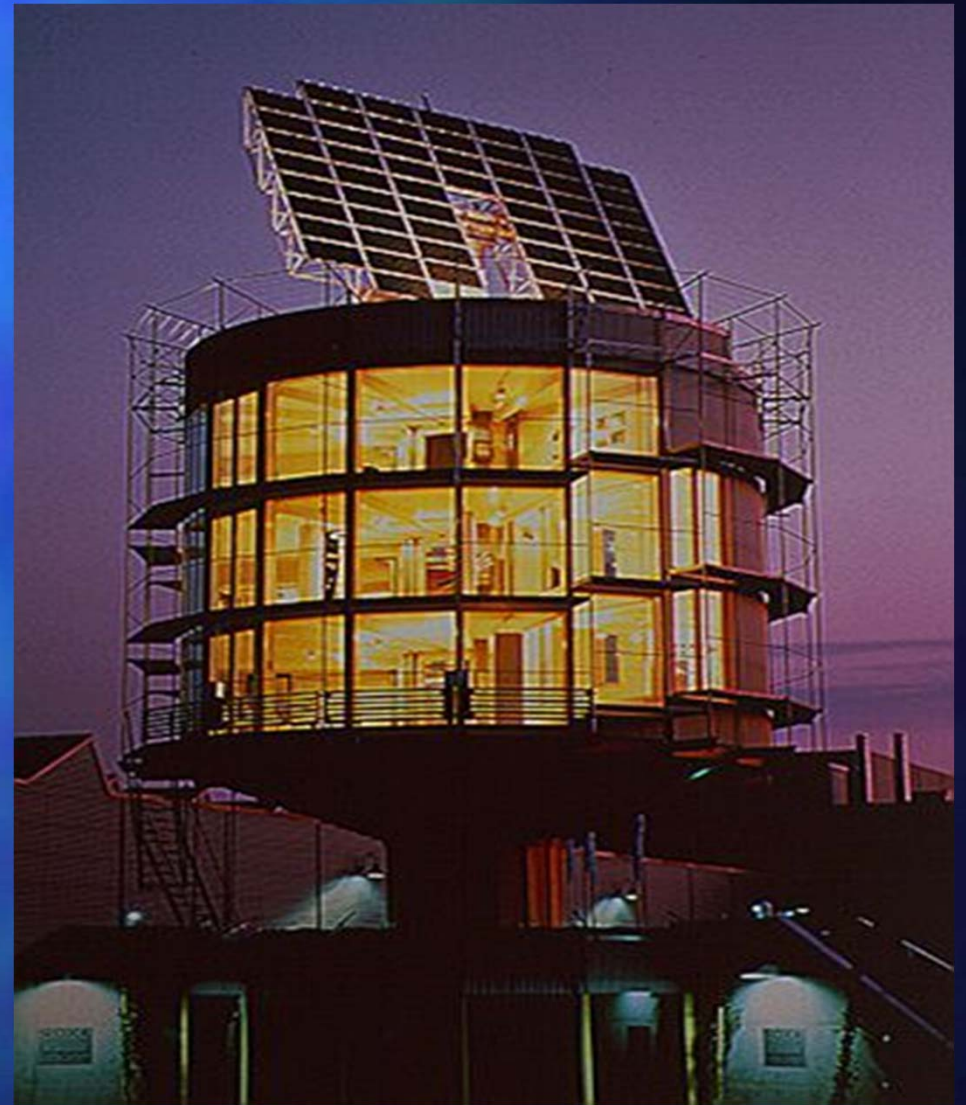
- Investment subsidies for better insulation / windows / heating /
- 5 Year-Balance (till 2009)
 - 1031 applications
 - About 1.7 million € subsidies
 - 18,5 million € investments triggered
 - 6.500 t CO₂ reduction per year
 - Reduction of energy consumption: average 38% per building



Freiburg Solar City



Rolf Dischs Heliotrop





Research and Development

Fraunhofer Institute ISE



Badenova stadium SC Freiburg

Electric Power supply supported by public participation



Photo: Solar-Fabrik AG, Freiburg

Umweltschutzamt

Freiburg
IM BREISGAU



Trade Fair Center Freiburg

700 kW_p



Expressway (365 kW_p)

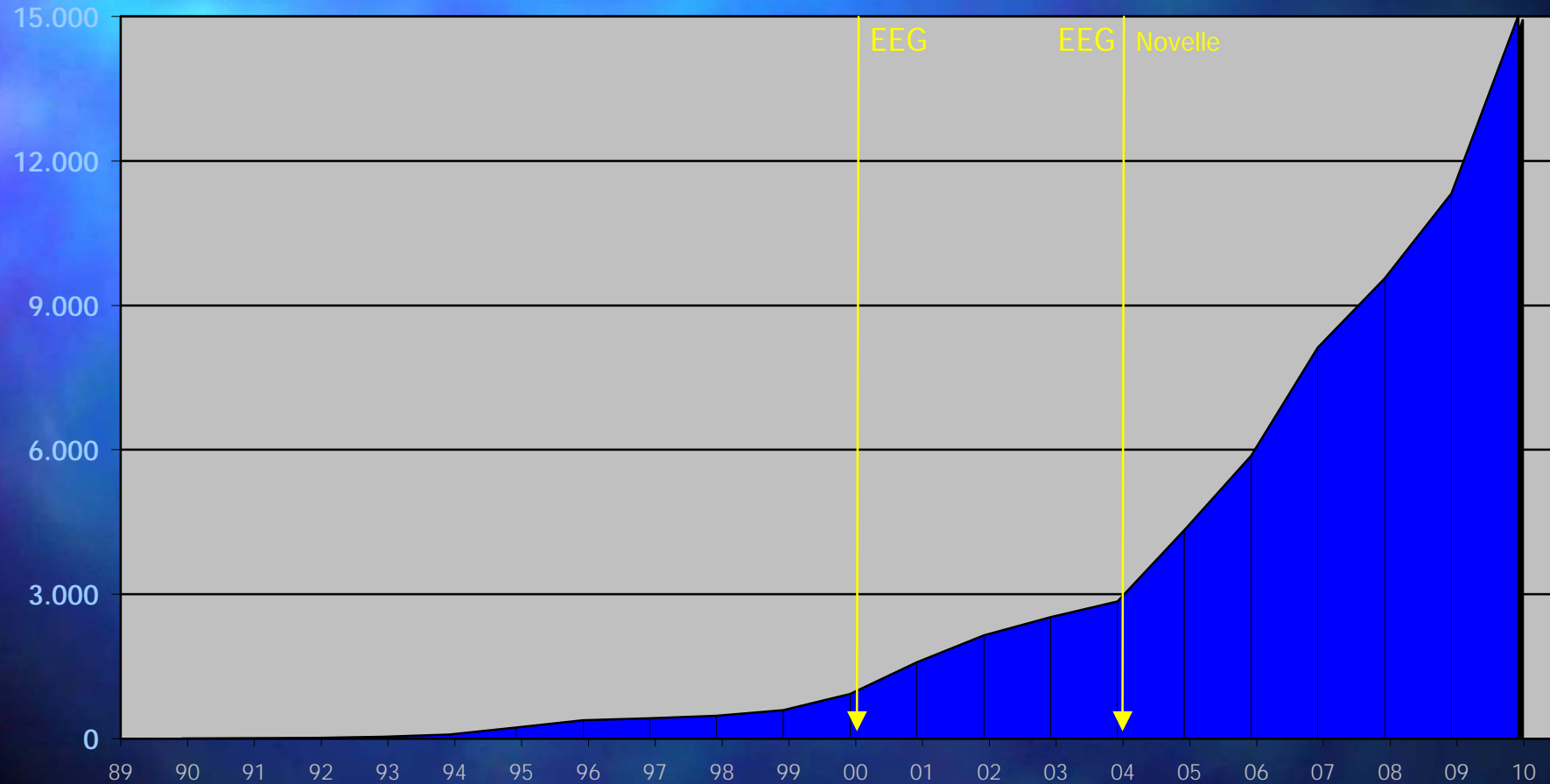


Solar installations in Freiburg

PV: 15 MW, Ertrag > 13,5 m kWh p.a .

Stand: 31.12.2009

PV
(in kW)



Solar factory



Industrial Combined Heat and Power Plant Rhodia



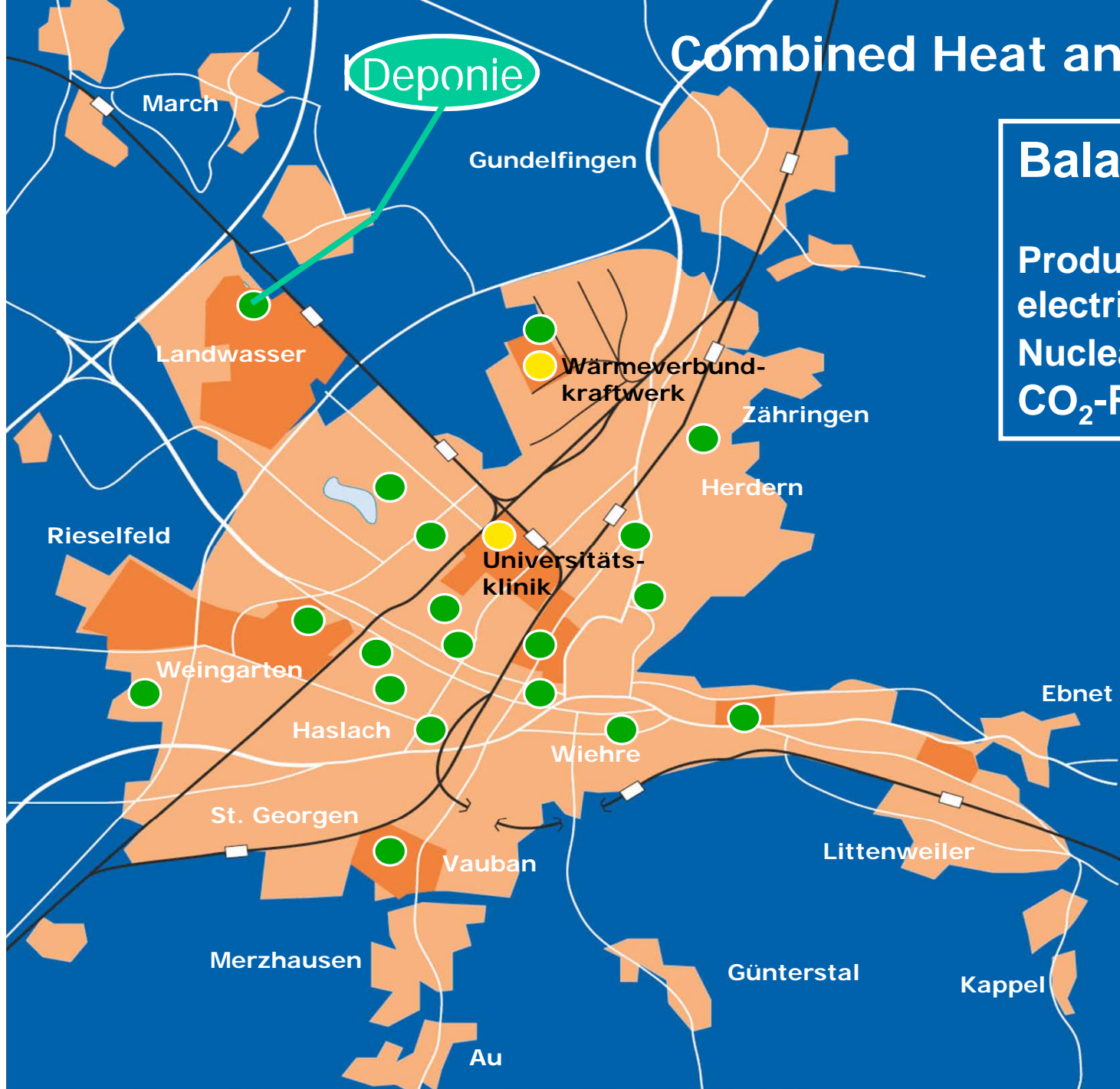
- Start 1998
- Cooperation
Rhodia (chemical company) -
badenova (energy company)
- Gas-steam - turbine power
station
- Efficiency > 80%
- Power:
244 MW thermal,
60 MW electric



Combined Heat and Power Generation

Deponie

Balance		
	1993	2010
Production of electricity	3 %	50 %
Nuclear power	60%	<15%
CO ₂ -Reduction		11%



- Power plant
- Cogeneration plant
- District heating network

Entwicklungs-
maßnahme
Vauban

Residential Area Vauban – Ecological Development



1992



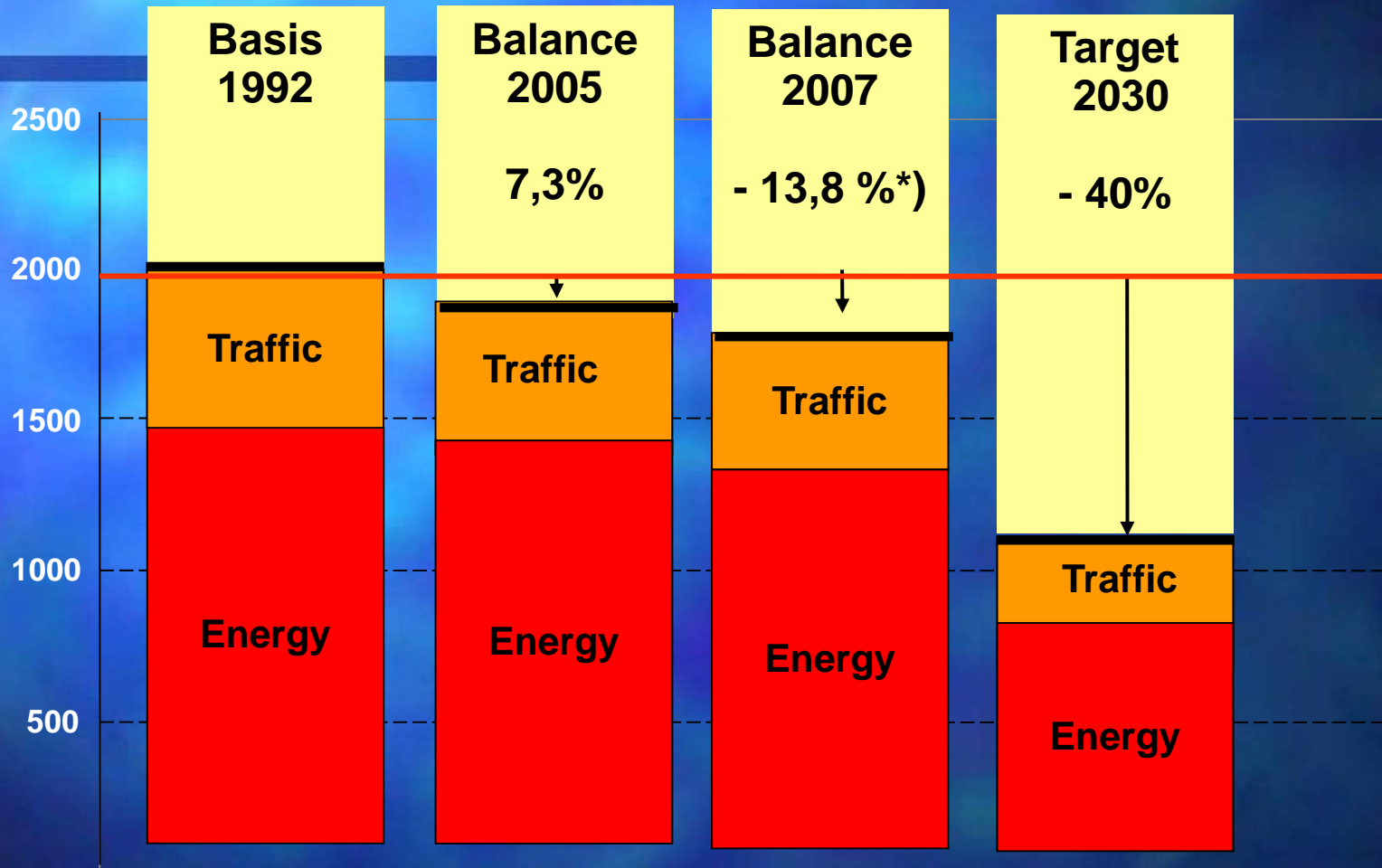
2000



2007



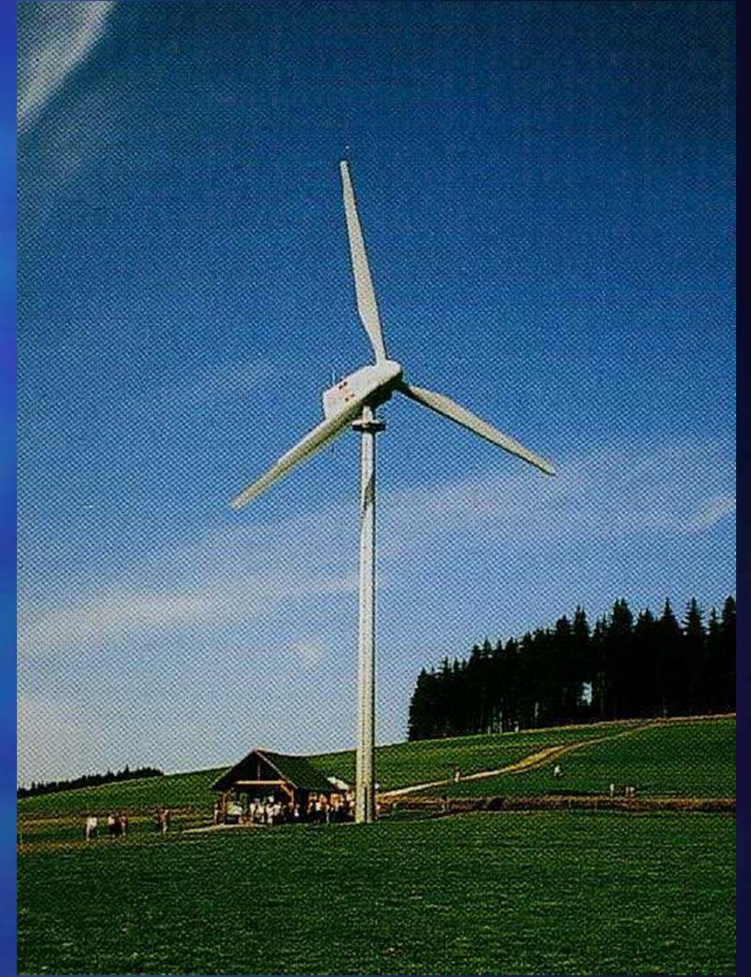
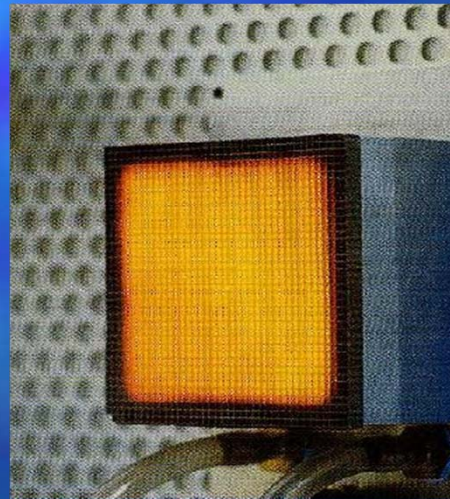
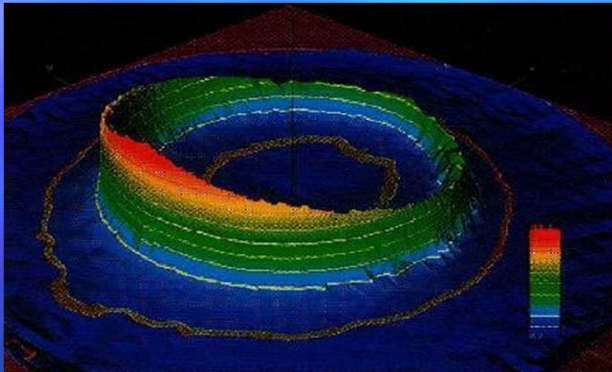
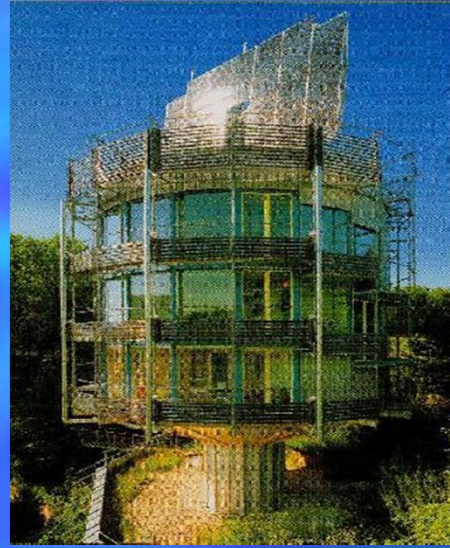
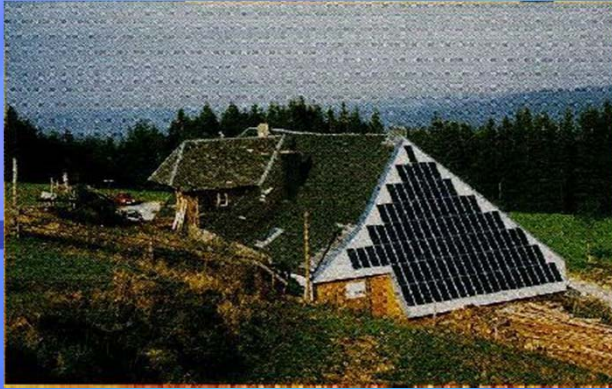
Climate Protection Balances and New Target



in 1.000 t CO2 equivalent p.a.

*) – 20 % per capita





Environmental Businesses in Freiburg



Environmental Businesses in the Freiburg Region

central results (2006)

650.000.000 €
Gross Domestic Product

12.000 employees

2000 companies

Environmental region
Freiburg

strength:

- education
- research
- science
- 710 employees


location factors:

- policy & citizens' commitment
- nature & climate
- expertise & creativity

leadership position & image factor:

- solar industry
- 2.100 employees
- 100 companies





Thank you for your attention.

