



Financing the Energy Transition

- Internal Contracting -

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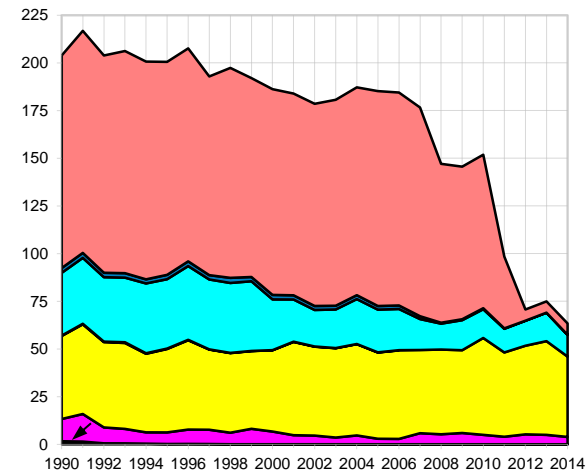
ENERGY CITIES ANNUAL CONFERENCE

1-3 June 2016

Bornova (Izmir)

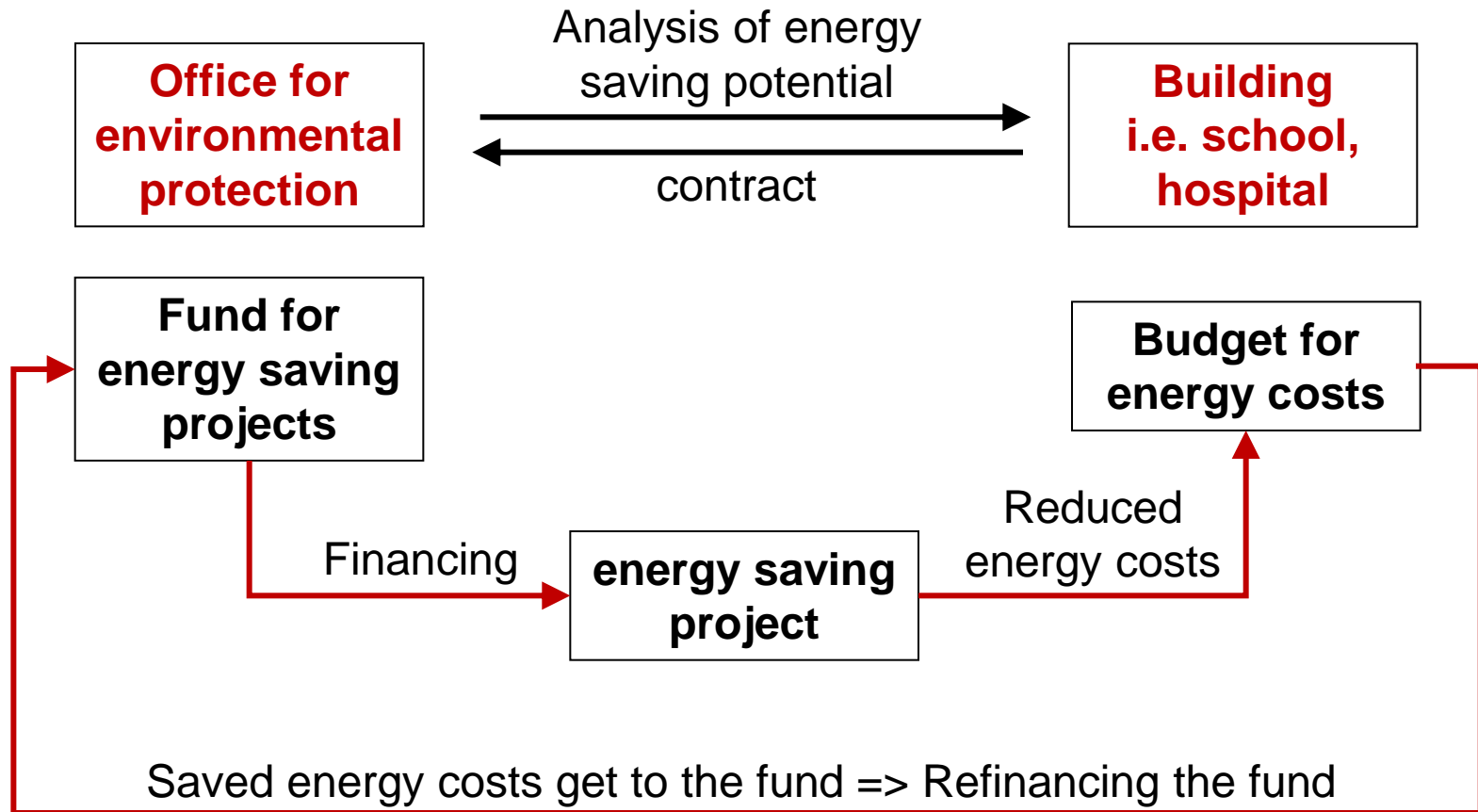
Energy Report 2014 - Municipal Building Stock

- 1.400 Buildings
- Heating: 255.017 MWh/a – 18,2 Mio €
- Electricity: 189.431 MWh/a – 37,4 Mio €
- Water: 1.689.002 m³/a – 8,4 Mio €
- Costs: 63,9 Mio €
- 100 % Green Electricity
- Renewables:
 - Heating: 9%
 - Electricity: 7%
- CO₂-Reduction (1990): - 63,7%
- Cost-Reduction: 41,8 Mio €





The principle of internal contracting





Criteria for Contracting projects

- Identification of measures through municipal energy management
- Costs, Energy-/CO₂-reduction, Payback time
- Proposals of building occupants, evaluated by employees of the energy department

Examples

- Controls for heating, ventilation or lighting
- Insulation of walls or top floors
- Heat recovery systems
- Renewal of lighting
- Street lighting
- Combined heat and power plants
- Photovoltaic plants

Harvesting energy savings

Characteristic of saving measures:

- High savings over technical lifetime
 - High invest
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- High quantity of measures with similar financial parameters
 - equal accounting routines
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- Easy to start with
 - Low invest
 - Short payback time



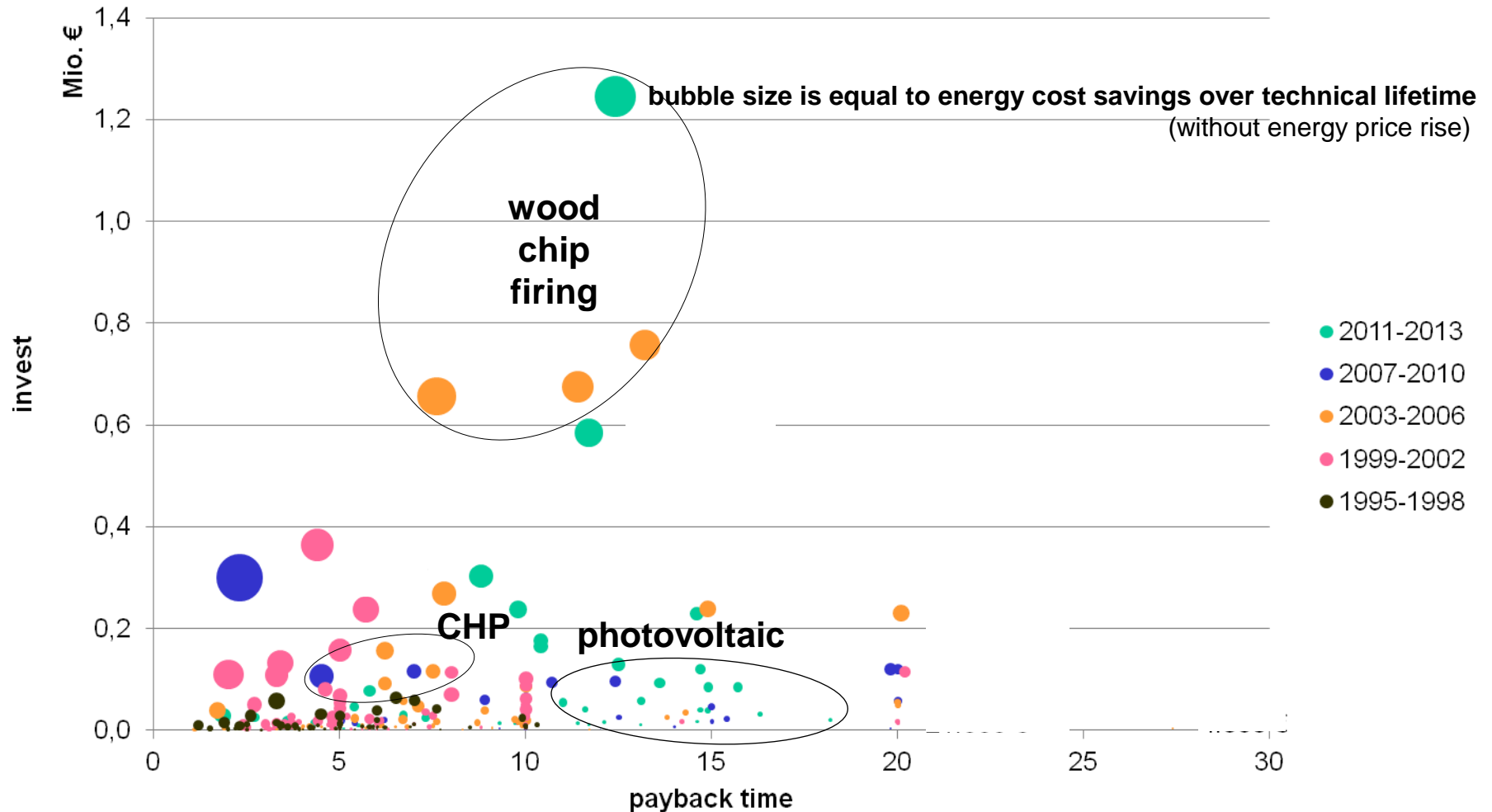
sweet fruits

bulk fruits

low hanging fruits



Implemented measures

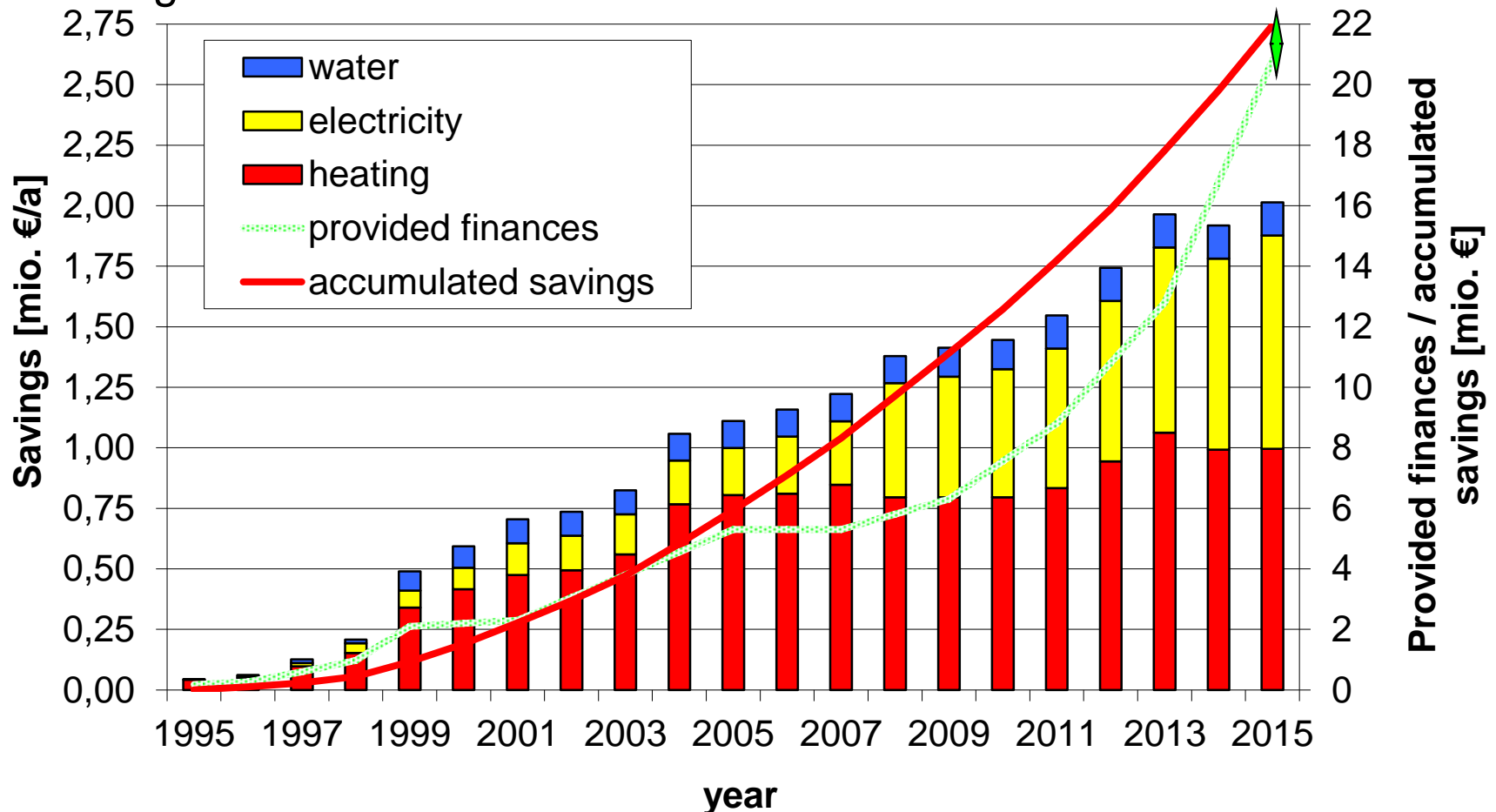




Cost savings

Accumulated energy cost saving: 22 Mio. €

Net saving: 1.2 Mio. €

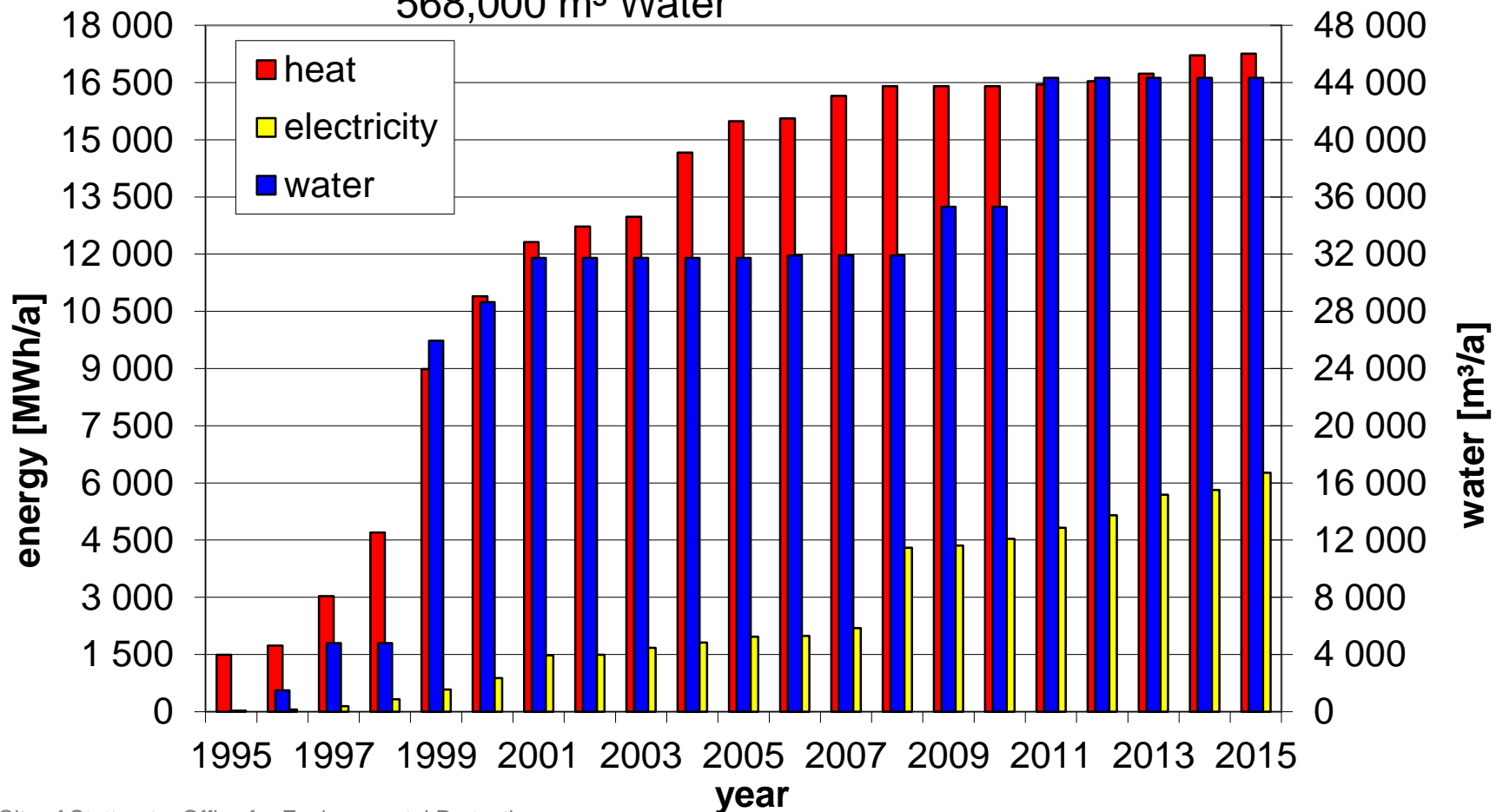




Energy and water savings

Since 1995: 247,000 MWh Heat
 50,000 MWh Electricity

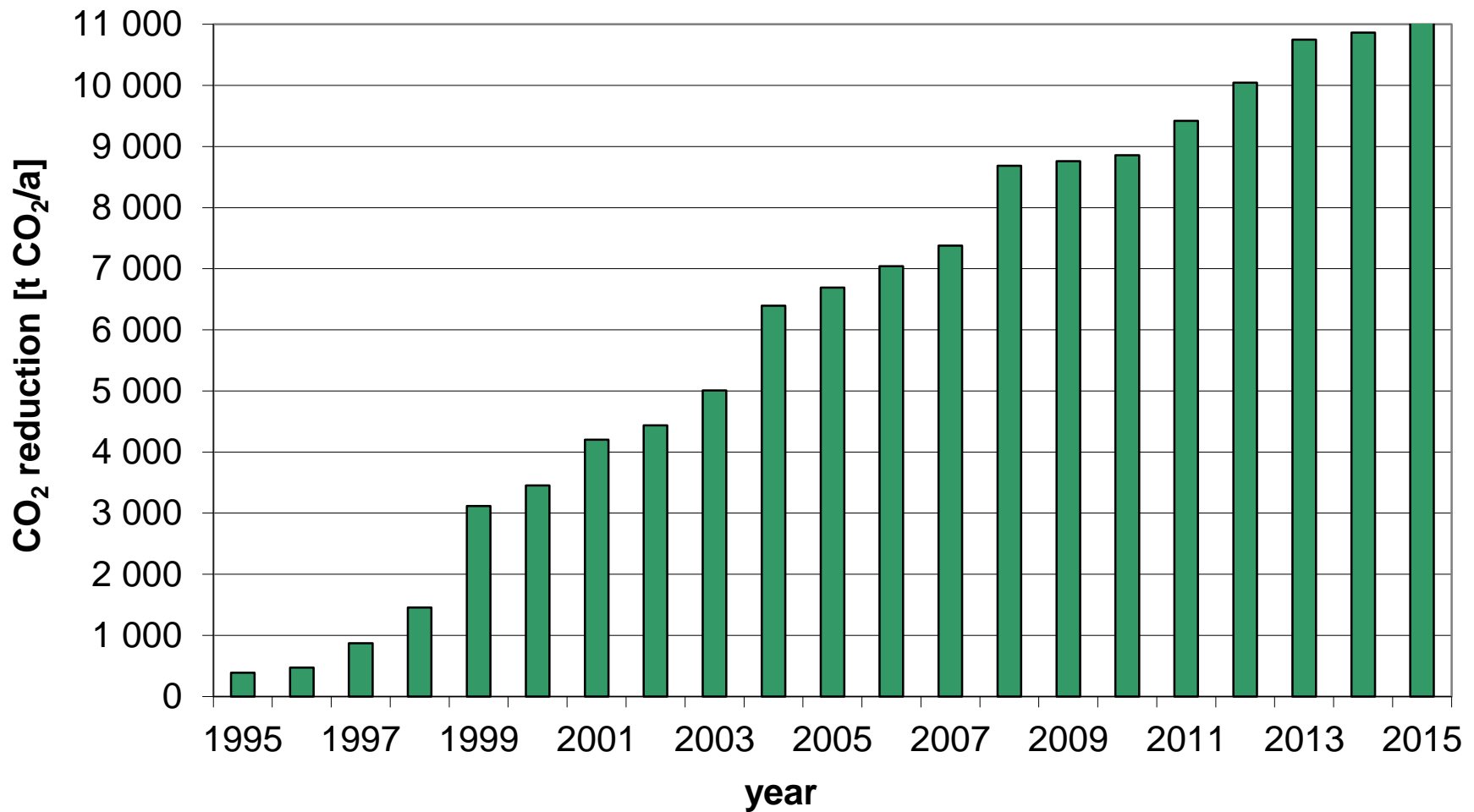
568,000 m³ Water





Reducing CO₂-Emissions

Since 1995: 118.000 t CO₂



Thermal insulation of top floors



Perfect for tiled roofs with big surfaces

- Technically simple
- Cheap

→ Payback time 4.4 years

Combined heat and power plant in a public pool



- 336 kW electrical power
- 652 kW thermal power
- 99,2 % efficiency
- 1.9 mio. kWh electricity/a
- 3.7 mio. kWh heat/a
- 864 t CO₂ savings/a
- 318,000 € cost savings/a
- 1.1 mio € investment
- **3.5 years payback**

Photovoltaic plants



Tilt-mounted PV-systems

- Area: 1,021 m²
- Power: 137 kW_p
- Savings: 130.000 kWh/a, 73 t CO₂/a, 50.800 €/a
- Investment: 647,000 €
- **Payback time: 12,7 a**



Integrated in roofing membrane

- Area: 200 m²
- Power: 12 kW_p
- Savings: 8.800 kWh/a, 5.5 t CO₂/a, 4.300 €/a
- Investment: 105,000 €
- **Payback time: 24,8 a**

Investments in 2016 and 2017

- Budget of 7.1 Mio. €
- Focus on:
 - Wood firings
 - Photovoltaic plants
 - Renovation of schools
 - Switch to LED in street lighting
 - Pump exchange





Summary

- **Advantage:**
- Start with low hanging fruits
- Measures can be implemented rapidly
- Holistic view: Integrating links all energy aspects (Invest, savings, pay back time)
- Energy and investments are paid from different budgets
- No extra cost for the customer - long term cost reduction
- Win-Win Solutions can be promoted to political decision makers
- Integration and use of the energy controlling system

- **Drawbacks:**
- Limited budget and personal resources
- Payback period is limited

VISION 2050 – CLIMATE-NEUTRAL CITY OF STUTTGART

