Energy Efficiency

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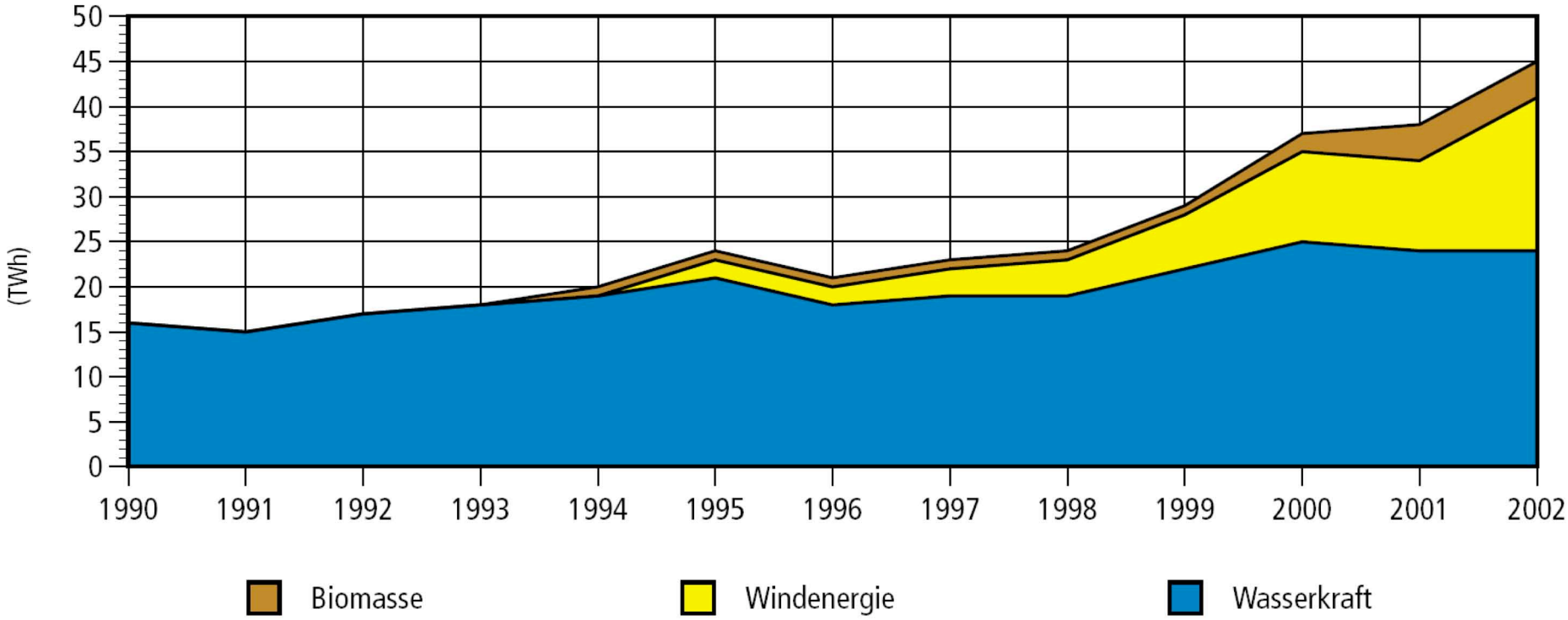
Power Generation from Renewable Energies 1990 - 2002



Der Beitrag der Fotovoltaik ist wegen des geringen Anteils nicht dargestellt.

Quelle: ZSW, vorläufige Werte

Households

Central Heating Circulators in NL 20.53 TWh

Type	hours	power	energy kwh
HR single 5%	2000	65	130
HR combi 14%	2250	65	146
VR 11% (improved efficiency)	2500	65	163
VR combi 34%	2750	65	179
Conventional 18% with switch	2800	65	182
Conventional 9% no switch, manual	5000	65	325
Conventional 9% no switch	8760	65	569

Potential Energy Savings

For the average consumer, the cost of buying a circulator pump is usually the decisive criteria for selection and not the energy consumption costs, or more usual the decision is taken by the installer. Consumers are generally unaware of the energy saving potential of higher efficiency pumps, which will typically have payback times between one to three years, depending on usage.

The electric energy consumption of circulator pumps can be significantly reduced by the application of permanent magnet motors i.e. high efficiency pumps. Compared to a regular circulator pump, the annual energy consumption of a controlled circulator pump with magnet motor can be up to 75 % lower.

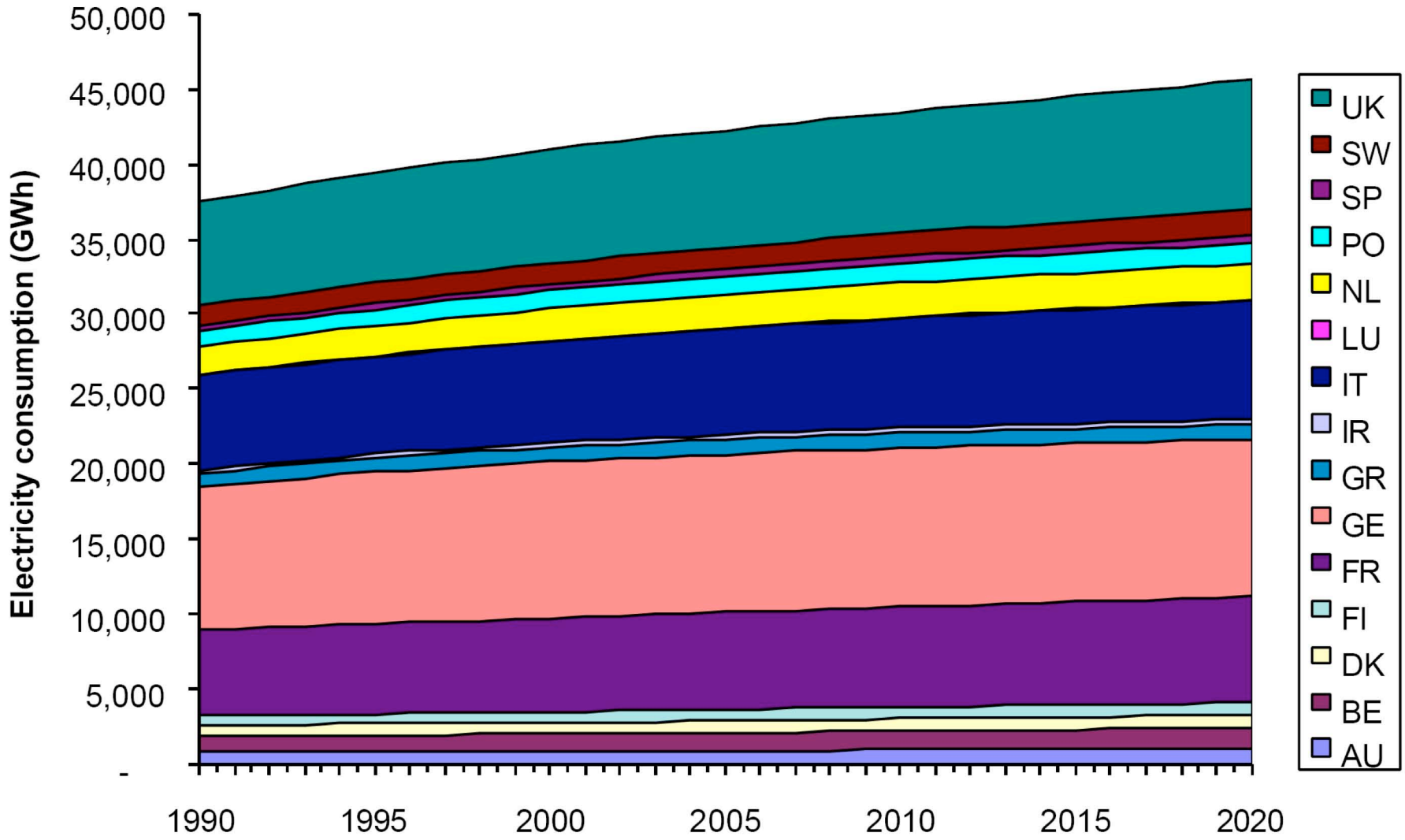


Figure 5: Estimated electricity consumption by EU circulator pumps, by country

Potential Energy Savings

Circulator pumps, in general, are responsible for up to 15 % of the electricity consumption of an average European household. The largest energy consumers in the EU are the residential and commercial heating systems. Their large proportion of energy consumption is mainly caused by operating at partial load. By raising the standard of circulator pumps to energy optimized pumps, the average European household will be able to save up to 10 % of its total consumption of electricity.

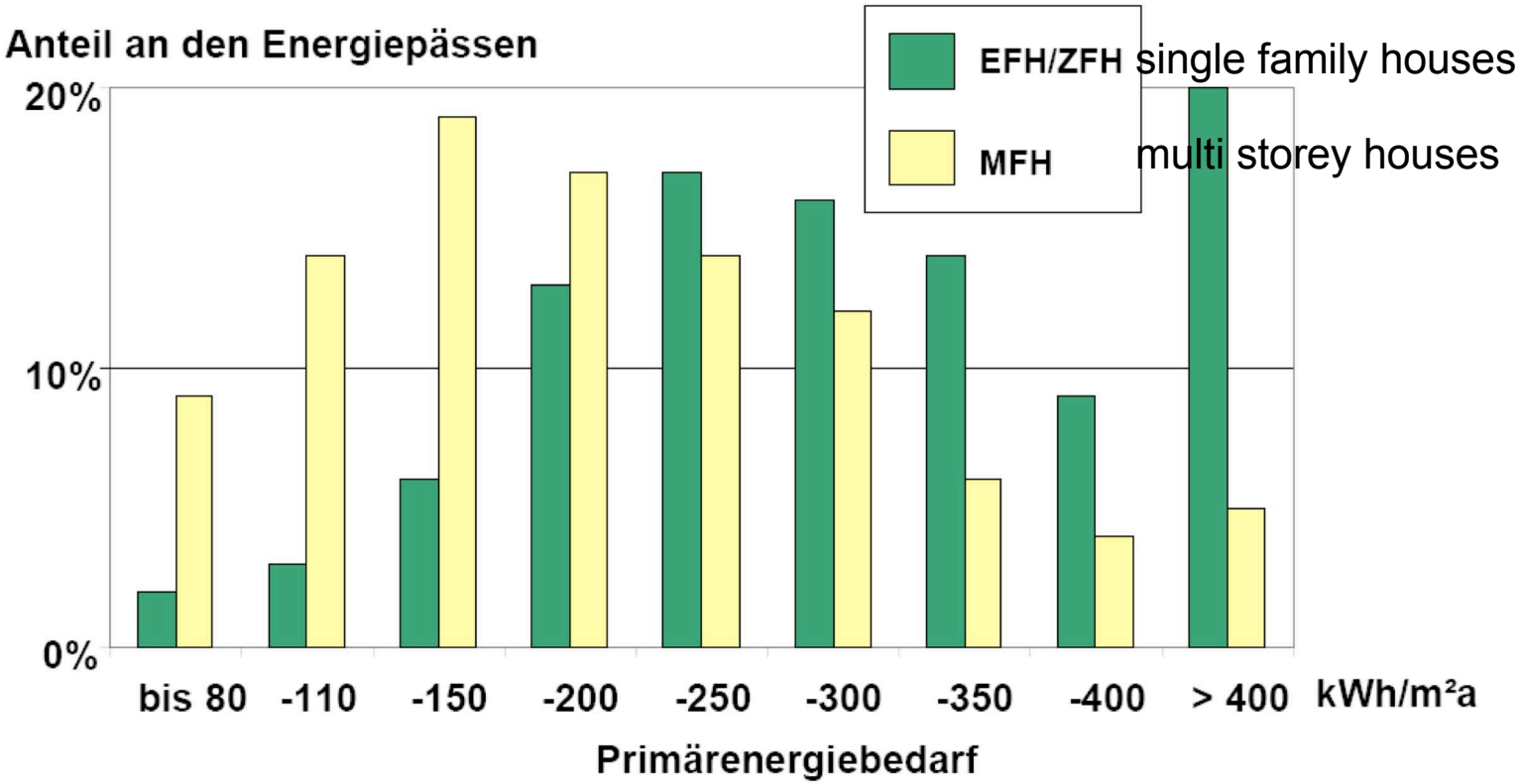
The potential energy savings on the circulator market in EU25 by 2020 could be 48 TWh and **the reduction of CO_2 emissions 17.6 Mtons**. These savings can be achieved with the help of better information, training, labels, rebates, procurement, standards and fiscal measures

Primary Energy Consumption of existing Buildings

- **Bewertung Gebäude im Feldversuch**
  Basisdaten Feldversuch

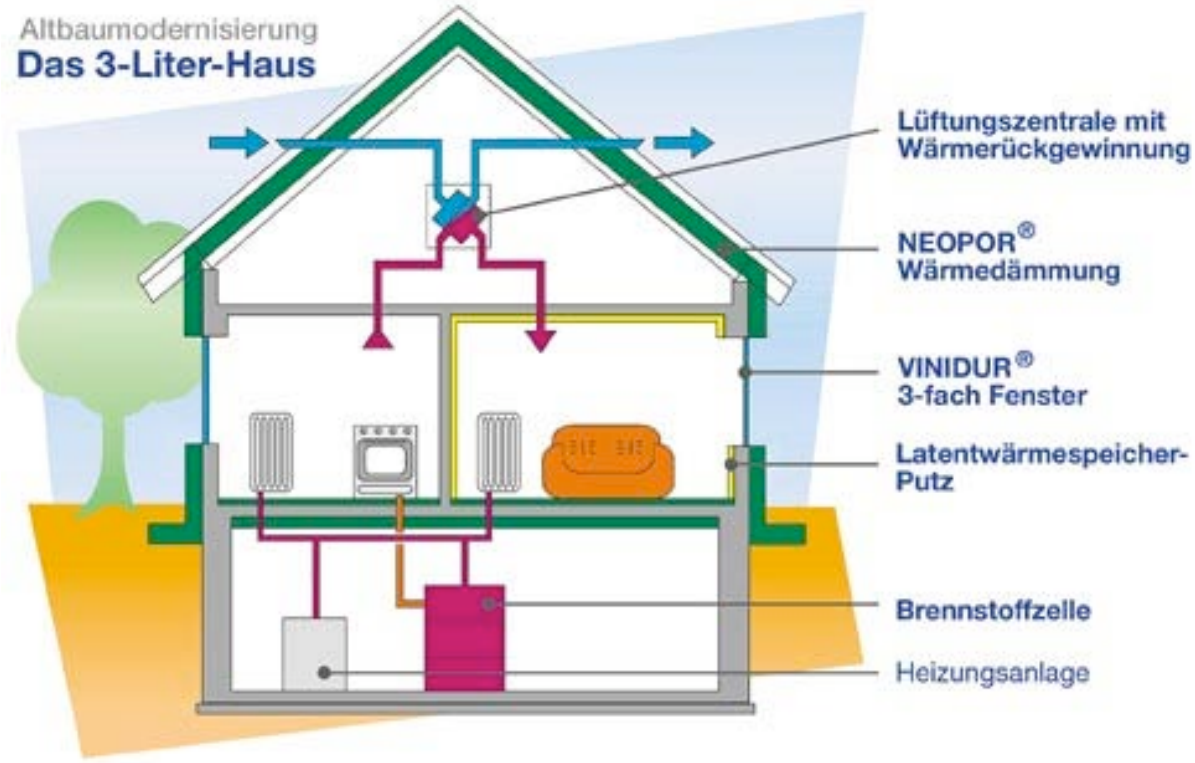
zukunft haus
Energie sparen. Wert gewinnen.

Gut modernisierte Altbauten können die Klassen A–C erreichen oder im grünen Bereich eines Farbverlauflabels liegen



A House full High Tech

Only 3 l heating oil per square metre living area and year, more than 80 % reduction of carbon dioxide (CO2) – made by BASF Ludwigshafen. A team of scientists had modernized a Scientists modernized in this settlement with work dwellings directly before the gates of the BASF an old building all around. Opposite a not modernized old building the yearly heating requirement sinks over up to 90 per cent. And that is worth cash money for the tenants. They pay in a 100 square meters flat instead of 1,000 € annually less than 150 € per. The essence of the 3-litre-house:optimal thermal insulation by new developed building materials of the BASF, a thought through ventilation system and the fuel cell converting CNG efficiently and nearly pollution free in warmth and electricity.



New pre fabricated 3-Liter-House

3-Liter - Libella house - without additional price - standard! Libella made the 3-Liter-House the standard. You get the technology from tomorrow already today, without additional price - standard. Cold bridge-free construction, specially strong special thermal insulation in wall and roof, 3-layer window glass, comfort ventilation heating.

Idle Losses

The private household in Germany consume by idle losses at least 14 billion KWh! This is about 3 % of the total consumption in Germany and is the same as 9 million people consume in their households.
More 11% of the electricity consumption of private households is idle consumption – increasing year by year.
The households pay 2.6 billion per year!
Two large power plants with 1.000 Megawatt power have to be in operation. 10 million tons of carbon dioxide (CO_2)are emitted. This is about 1% of the German carbon dioxide emission.

Industry

Electric drive

The average industry electric drive in Germany is operated with 60% of the rated power!

Recommendations:

Increase the extent of utilization
Avoidance of no-load operations
Manual disconnection at nonusage
Use of time switch clocks

Electric Drive

Alone the usage of high-efficient electric motors and the consequent use of static frequency changers for electronic speed regulation could reduce the **electricity consumption of the German industry by approximately 9%)**

Source: Motor Challenge-Program of the European commission(2001)

Improving the industrial motor systems in Europe (EU-25) could result in an annual saving of 202 billion kWh of energy consumption. This would eliminate the need for adding 45 GW of power generating capacity to the European electricity system12. This is equivalent to:

45 nuclear power units (1 000 MW)

130 fossil fuel power units (350 MW)

The 202 billion kWh is equivalent to about five times the electricity production of all wind power units in Europe (EU-25) in 2003 (5 x 40 billion kWh)

	Savings potential (billion kWh/year)					
	EU-15	EU-25	France	Germany	Italy	UK
High efficiency motors	24	27	4	6	4	3
Variable speed drives	45	50	8	10	7	6
Application part of the motor systems (pumps, fans, compressors)	112	125	19	26	17	15
Total electricity savings potential	181	202	31	42	28	24

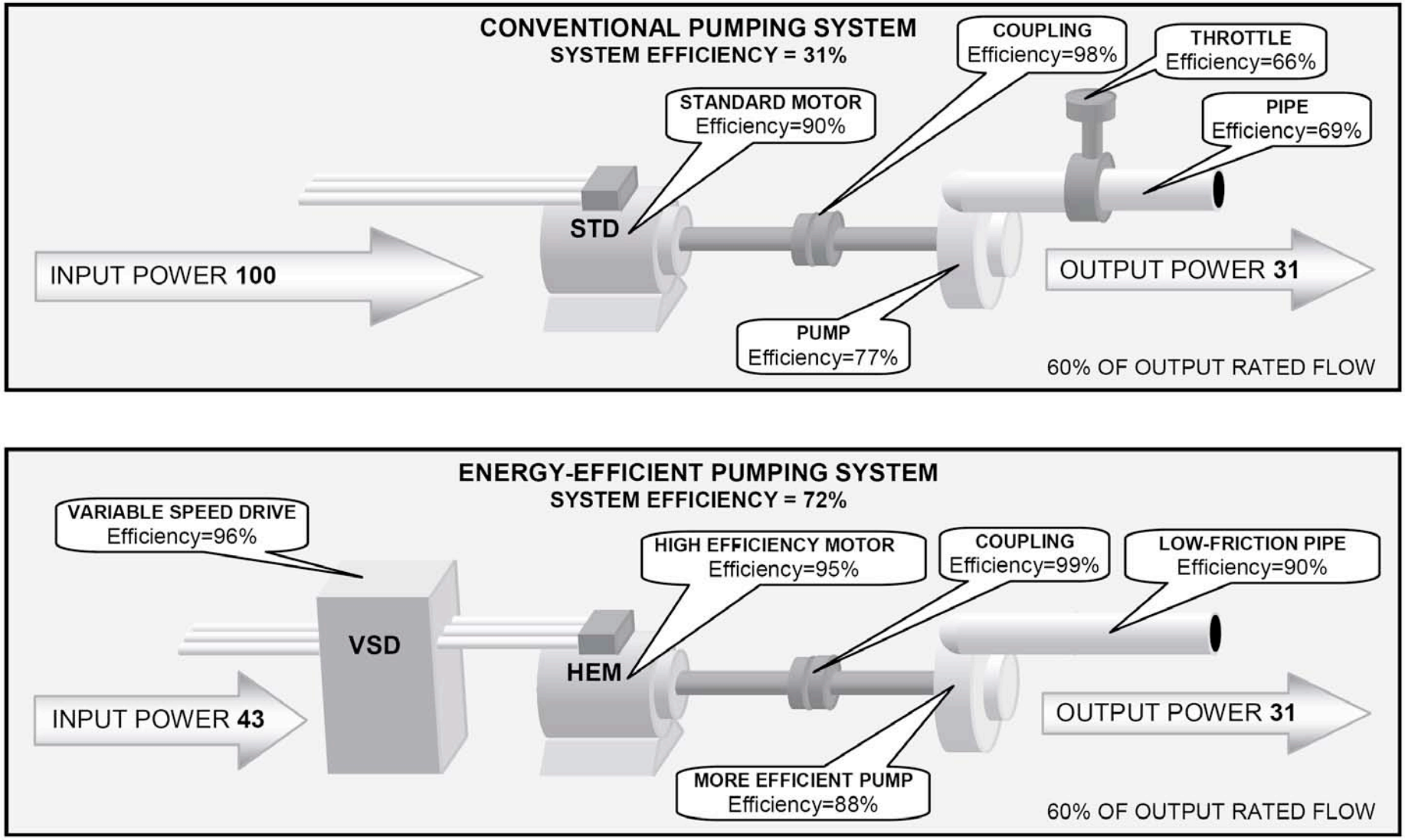


Figure 1 - a) Conventional pumping system (total efficiency = 31%)
b) Energy-efficient pumping system combining efficient technologies (total efficiency = 72%)

Non- greenhouse gas emissions

The 202 billion kWh that can be saved by optimising industrial motor systems means a reduction of 7% in the overall European electricity production, so it will lead to an equivalent reduction of all the emissions of power plants

PRESSURIZED Air

About 7 % of industrial electricity in Germany is used for pressurized air

Energy Consumption 12 Plants :
3.462.000KWh/a
Energy cost 381.000 €/a (11€ct/ kwh)
Average leakage 36 %= 1.246.000 kwh=137.000/ (between 20 and 64% leakage)
Further optimisation:19%
= 658.000 kwh =72.000€
Saving potential heating cost= 88.500 €/a

Pay back period less than 1 year!

Transport

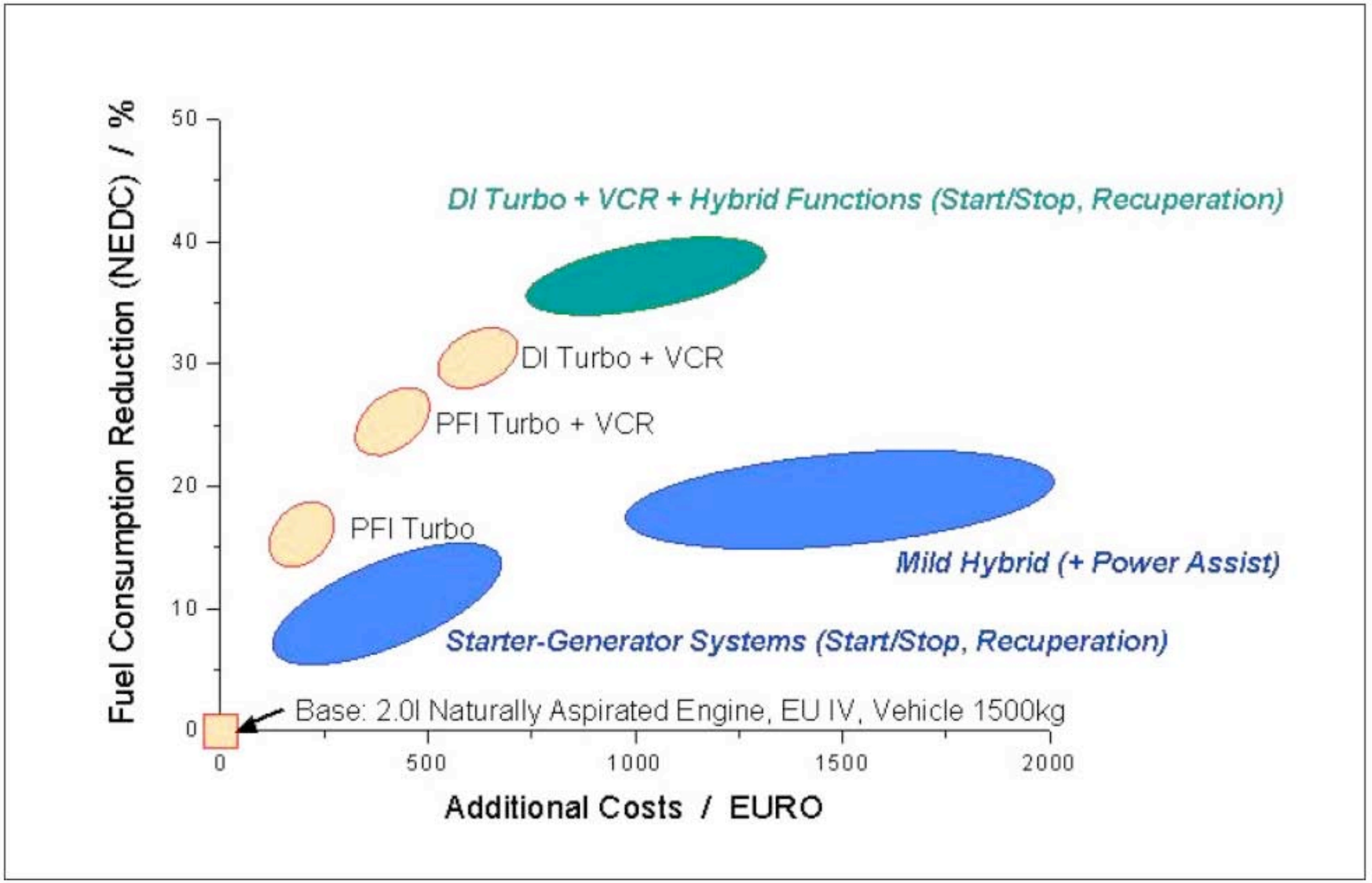


Abb.13: Bewertung von Verbrauchspotenzial und Kosten bei Hybridisierung
Fig. 13: Assessment of fuel consumption potential and costs of hybrid concepts

Source: Lang,FEV Motorentechnik 2004

VW 1 Liter Car

The body was developed in a wind tunnel, is 3.47 metres long, but just 1.25 metres wide and just over a metre in height, and is made completely of carbon fibre composites.The 1-litre car is powered by a one-cylinder diesel engine, centrally positioned in front of the rear axle and combined with an automated direct shift gearbox. The crankcase and cylinder head of the 0.3-litre engine are of an aluminium monobloc construction. The naturally aspirated, direct-injection diesel engine employs advanced high-pressure unit injection technology to generate 6.3 kW (8.5 bhp) at 4,000 rpm. This gives the vehicle, which weights just 290 kg, an astonishingly lively temperament.

Fuel consumption is 0.99 litre per 100 kilometres


WOB L 1

What can be done?

How to make a circulation pump sexy?

Energy Saving Pump

Energy Efficiency has to receive the same attention as Renewable Energy

What we need is an Efficiency Highway

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www.umweltbundesamt.de

No Freedom without Wastefulness

CO_2 versus Driving conditions