COP 21 Berlin: global goals and local consequences

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- State Secretary (retired) to the Governing Mayor of Berlin and first spokesman of the reunited Berlin
- Honorary Professor at Sofia University / Member of the Society for Economics and Management at the Humboldt University Berlin
- Co-founder and CEO/Vice-chairman of the INFRANEU main association since 1994 and head of the management of CHINA GATE BERLIN since 2005
- Co-founder of INFRAWIND EURASIA and President since 2008 (Sister association of Chinese Renewable Energy Society)
- Head of the Advisory Board of the “Club of Sophia” (since 2014)
- Member of the Enquete-Commission of the Berlin parliament for the “Climate-neutral Berlin 2050” (2014-2015)
- Member of the Berlin Municipal Utilities (Berliner Stadtwerke GmbH) as anchor partner of the Berlin energy turnaround (since 2015)
- Co-publisher and author of “From the Energy turnaround to Sustainability”

The Decisions of Paris 2015 (Conference of the UN-Parties COP 21)

- In December 2015 the United Nations have agreed that their common duty is to stop global climate warming over 2° Celsius (compared to the preindustrial level).
- This is now the central goal of the United Nations Framework Convention on Climate Change (UNFCCC), which requires Greenhouse gas-reductions of 40 % up to 70 % by 2050 (compared to 2010) and less than one tonne CO2 (including equivalents) per person per year by 2100 (see IPCC-report No. 5 and consider the 5 tonnes of today).
- The United Nations will control every 5 years, if those targets are met, starting in 2020 (pilot balance sheet in 2018).
- All nations are involved, but the wealthier nations will support the poor countries to meet the requirements of Paris.

The Status of Fulfillment (Summer 2016)

- The COP21-agreement will come into power in 01/01/2020, if 55 states have ratified these convention essentials and if these states represent a minimum of 55 % of the total global emission.
- At the moment 180 of the 195 nations have signed the climate contract of Paris 2015. 18 states have already ratified it, at last Norway.
- China (28 %-source of global emissions) and the US (16 %-source of global emissions) have signed the Paris climate change agreement in September 2016.
- The European Union (EU) finds itself in a mixed progress: France and Hungary have already ratified, Germany will do so until the COP22 in Marrakesh (November 2016); Poland is opposing fundamentally.

Restrictions of Fulfillment I

Fundamental opposition

27 US-federal states have opposed the Clean Power Plan introduced by President Obama by appealing to the Supreme Court of the United States. Donald Trump, as candidate of the Republican Party, does not accept the scientific positions of the IPCC, and is among a limited group of very radical political leaders worldwide.

GNP-growth as restriction

The traditional growth of national product is an accelerator of the current climate warming processes. E. g. 6 % growth p. a. will enlarge the GNP with the factor 339 in 100 years. Such huge dynamics stabilise the fossil structures due to the slower implementation of renewable energies which depend on enormous investments in new power lines and complex smart grids. The high speed of traditional expansion is limiting the progress of energetic substitution.

Restrictions of Fulfillment II

Failure of international instruments

An international Emission Trade System (ETS), based on the principle “Cap and Trade”, is the best instrument to reduce CO2 due to its possibility to limit CO2-volumes systematically in combination with tradable, more and more valuable emission allowances. Emitters, who are cleaner than others, are able to sell their warranties to suboptimal polluters; ETS offers a permanent incentive and a continuous additional income for environmental efforts. In the past this approach failed due to a overvolume of emission rights, too many exceptions, national solos and the price dumping of fossil energy suppliers who tried to compensate the cost advantages of sun and wind.

Lack of national strategies and frameworks

In general, economies still operate in the fossil era. Some of them have reduction goals and energy turnaround programs, but there are no real system-change-strategies with ecological-social frameworks, transformation plans, broad participation and financial solutions. Up to this point, the One-Tonne CO2-Society is rather a vision than a concrete policy approach.

“Chances for 2° Celsius are not good!”

- To meet the Paris 2015-goals no more than a maximum of 1.000 gigatonnes of CO2 should be released until 2100. But 15.000 gigatonnes CO2 of fossil energy sources are still stored in the lithosphere; 80 % of those coal resources, 40 % of those gas resources and 40 % of those oil resources have to remain in the soil! (PIK)
- New coal power stations are planned globally for a total capacity of 1.000 gigawatt. If only one third of those will be built, Paris 2015 will become a failure! (PIK)
- The National Oceanic and Atmospheric Administration of the United States (NOAA) warned in 2015: the CO2-concentration has crossed the 400 ppm-line. In less than 20 years 450 ppm will be reached: the 2° Celsius-limit!

The Costs of Climate Change I

A. Costs of direct damages

- Damages caused by heat periods
- Damages caused by floodings and storms
- Damages caused by sea level increases
- Loss of natural resources, diversity

B. Costs of adaptation

- Coast protection, dikes, river bypasses
- Nature cultivation efforts
- Building up of climate -change-resilient infrastructures and buildings

C. Costs of moderating

- Energy turnaround
- Climate protecting products, methods, materials, transports
- CCS, CCU and CEC
- Agricultural strategies (forests, greens)

Only C. has strong prevention potentials!

The Costs of Climate Change II

The National German Administration for Environment (Umweltbundesamt) estimated in 2015:

- If the global community will be able to stop global warming at a level of 2-3 degree Celsius, the costs of Climate Change will increase up to **3 %** (2030) until **5,5 %** (2050), related to the GNPs.
- If the global community fails, the yearly costs will be close to **20 %** of the GNPs (2050).
- In simple terms, for Germany this would mean by 2050:
  - **800** billion Euro costs p. a. in the worst case,
  - **120** billion until **200** billion Euro costs p. a. in the case of a successful realization of the Paris 2015-goals

Priority No. 1: Energy turnaround now!

Primary Energy turnaround

- Renewables substitute fossils
- Less fossil energy (efficiency)
- Less fossil consumption (savings)
- Substitution of fossil based systems and value chaines

Secundary Energy turnaround

- Carbon Capture and Storage (CCS)
- Nuclear Power (Waste? Terrorism?)
- Efficient fossil energy production
- Pricing of GHG-emissions

Sustainable Energy turnaround

- 100% Renewable Energies
- Smart structures and markets
- Electricity, Heating, Mobility and Internet as one system
- Efficient Green Consumption

WORLD-STRATEGY "One Tonne GHG in 2050 as efficient as possible!"

Priority No. 1 plus: System turnaround

Paradigm "Health of Nature and Human"
• No more GHG-emissions! No waste! No toxics! • Adaptation to the balances of our Biosphere • Health (physical, psychological, social) as planning criterion • New understanding of "Wealth" ("Health equals Wealth!")

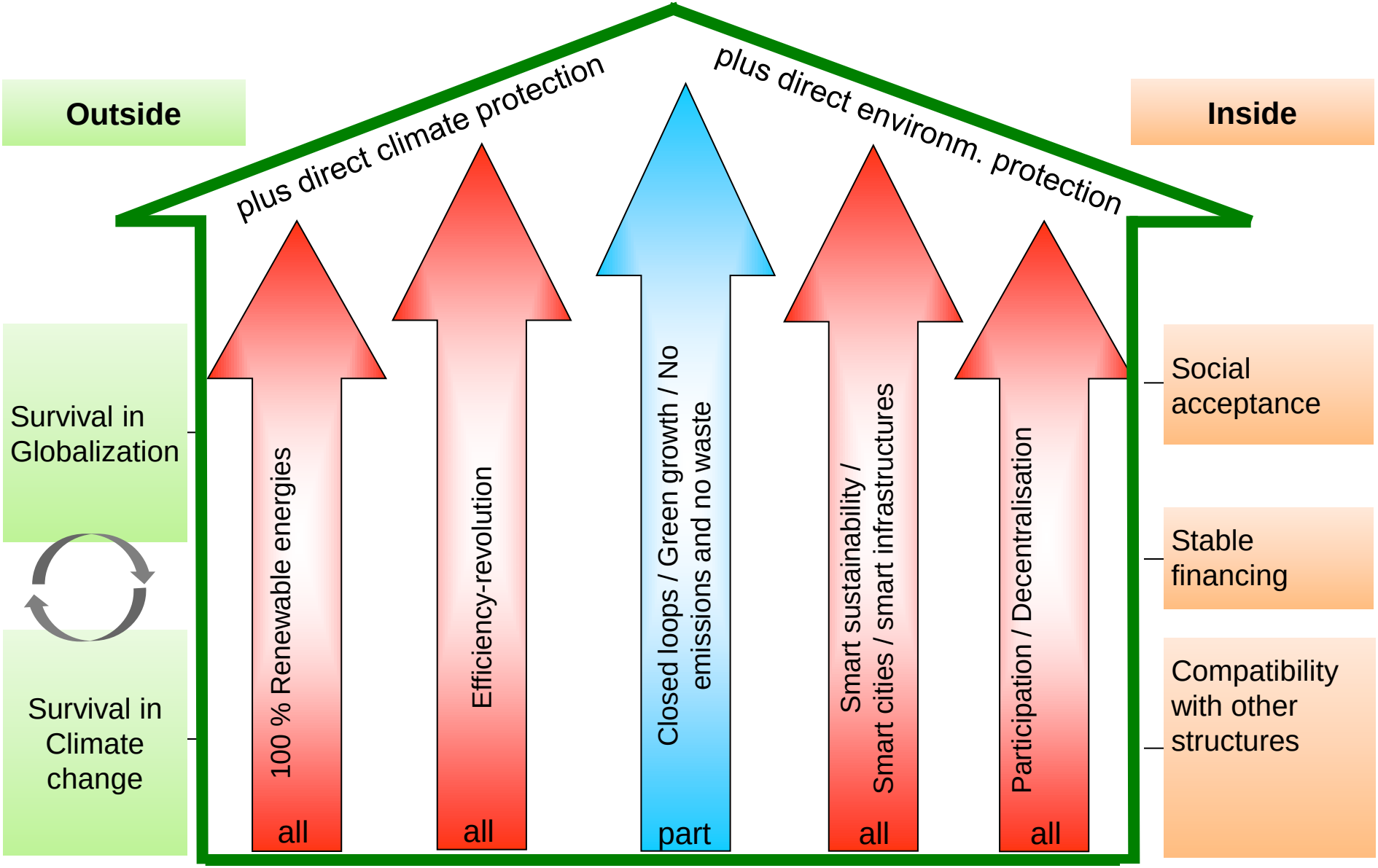
Paradigm "Green Growth"
• GNP-growth: priority for qualities and human survival • Smart technologies as instruments of Sustainability • No tolerance for contaminated growth (emissions, toxics) • Green products and services versus stressing Nature

Priority No. 1 plus: System turnaround II

Paradigm "Closed loops"
• Orientation of Economics towards the circles of Nature • Decentralization and shortening of value chains • Only reusable products: as technical or biological nutrients • Only products which support a greater variety (natural, cultural)

Paradigm "Multidimensional Sustainability"
• Societies with ecological, social and economical sustainability • Societies with moderate lifestyles and value driven states • Societies with active citizens, SME-cultures, diversity • Societies with common sense, respect for balances and circles.

The Goals of an "Agenda 2100"



The Costs of Climate Change III

Germany: costs of the direct Energy turnaround

- Fraunhofer IWES: ~ 1,5 trillion Euro until 2050
- DIW: ~ 800 billion Euro until 2050
- Federal government: ~ 550 billion Euro up to 1 trillion Euro and more until 2050

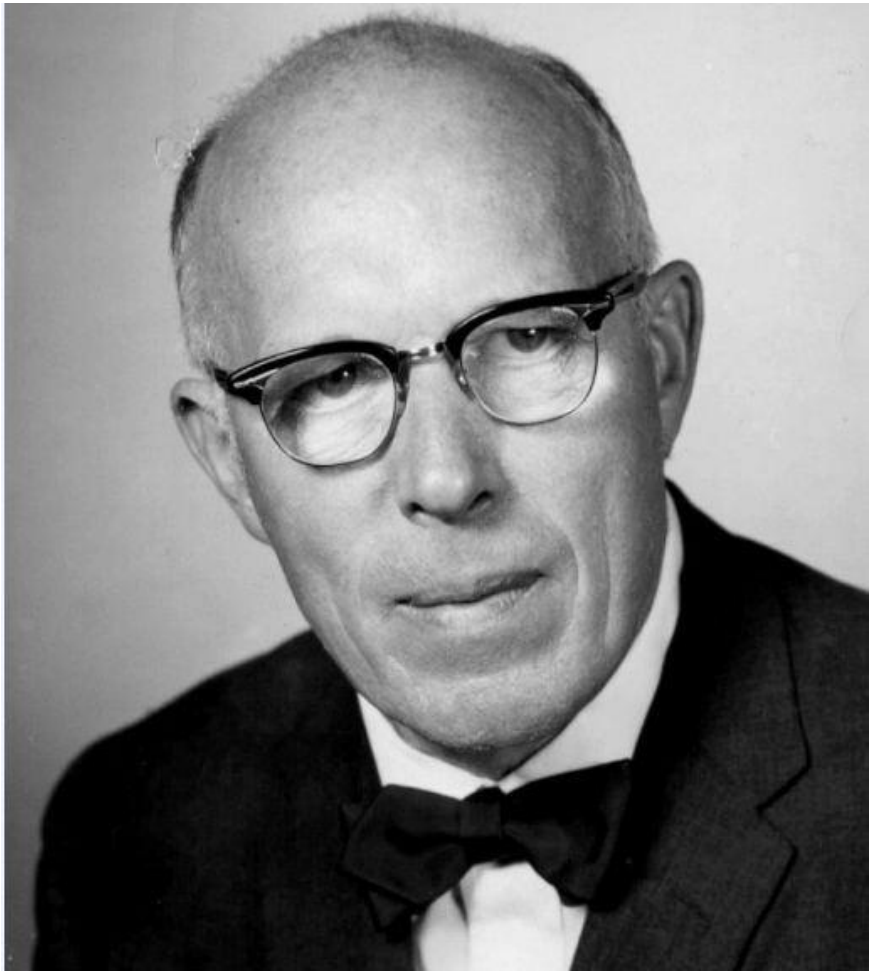
Germany: costs of a System turnaround

- Since the German reunification in 1990: ~ 2,5 trillion Euro for 16 million inhabitants (system conversion)
- German total system turnaround until 2100 (only investments): ~ 10-15 trillion Euros (~4-5 trillion Euro until 2050) with a high RoI-potential

Worldwide: costs of Turnarounds

- Based on the assumption of max 4 % global emission share (Germany) and reduced prices (-50 %):
- Global costs for the Energy turnaround (2050): ~ 18 trillion Euro
- Global costs for a System turnaround (2050): ~ 50 trillion Euro

Turnaround advantages: 15 percent less GNP-related costs p. a., global climate stabilty, green growth-economies united in a Green Kondratjew-boom (see 6th wave of conjunction)!



René Dubos

“Think globally, act locally!”

René Dubos about local consequences

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A ONE TONNE-SOCIETY (1 Tonne GHG per person p. a.)

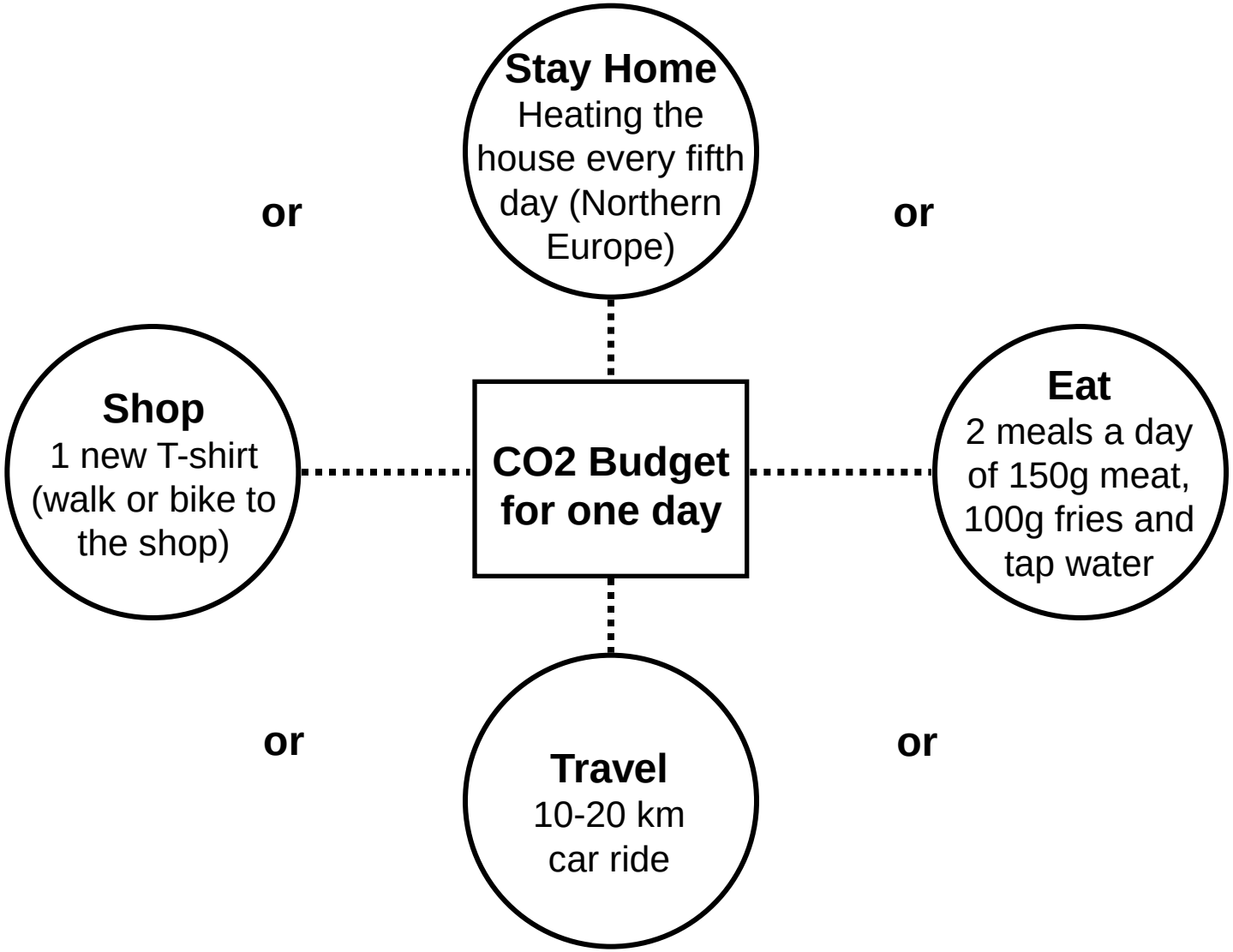
2100

2050 **Climate-neutrality**

2030 **System-change**

2015

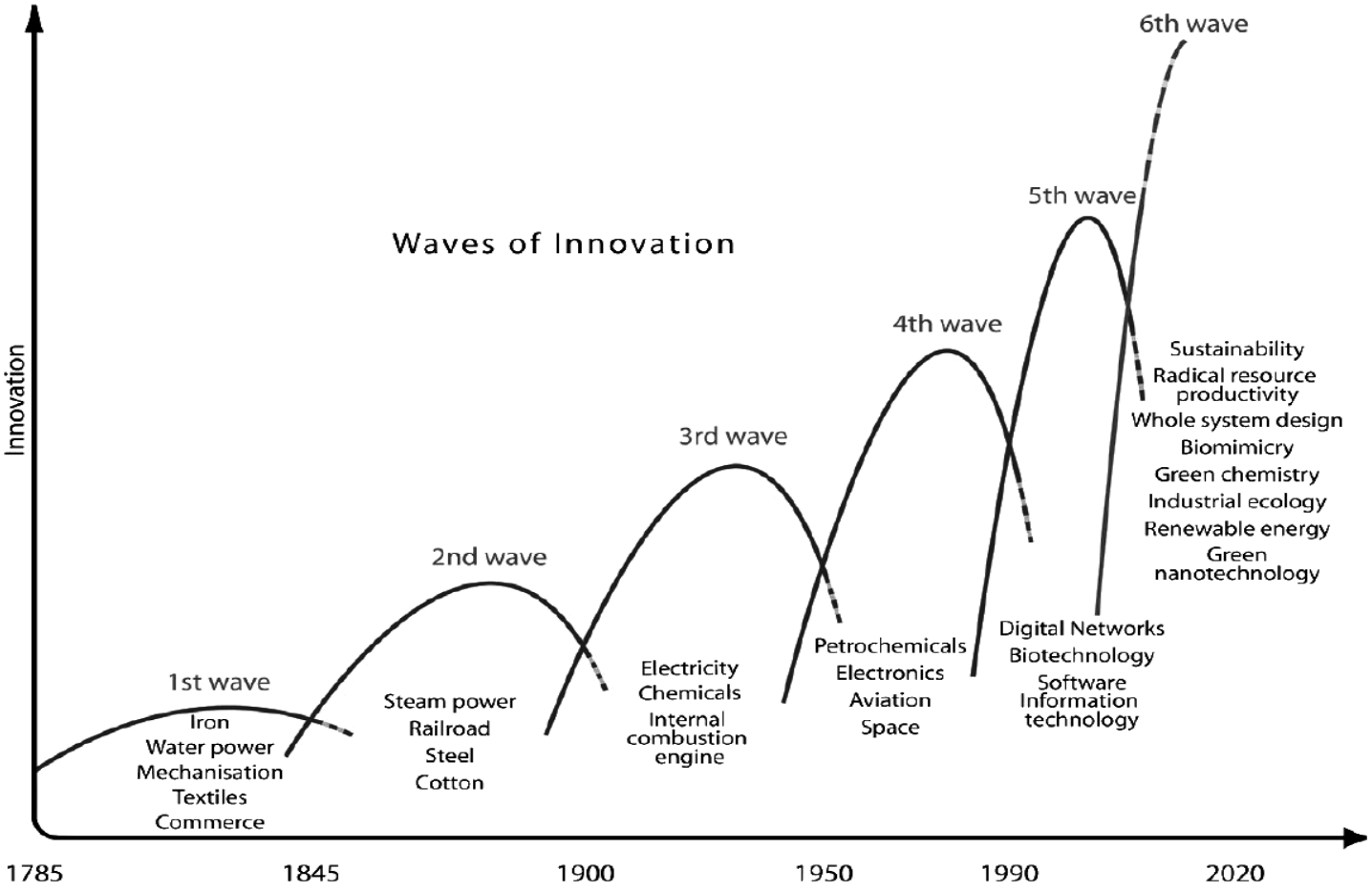
Transformation-strategy 2100



How much is one tonne of carbon dioxide with today's technology?

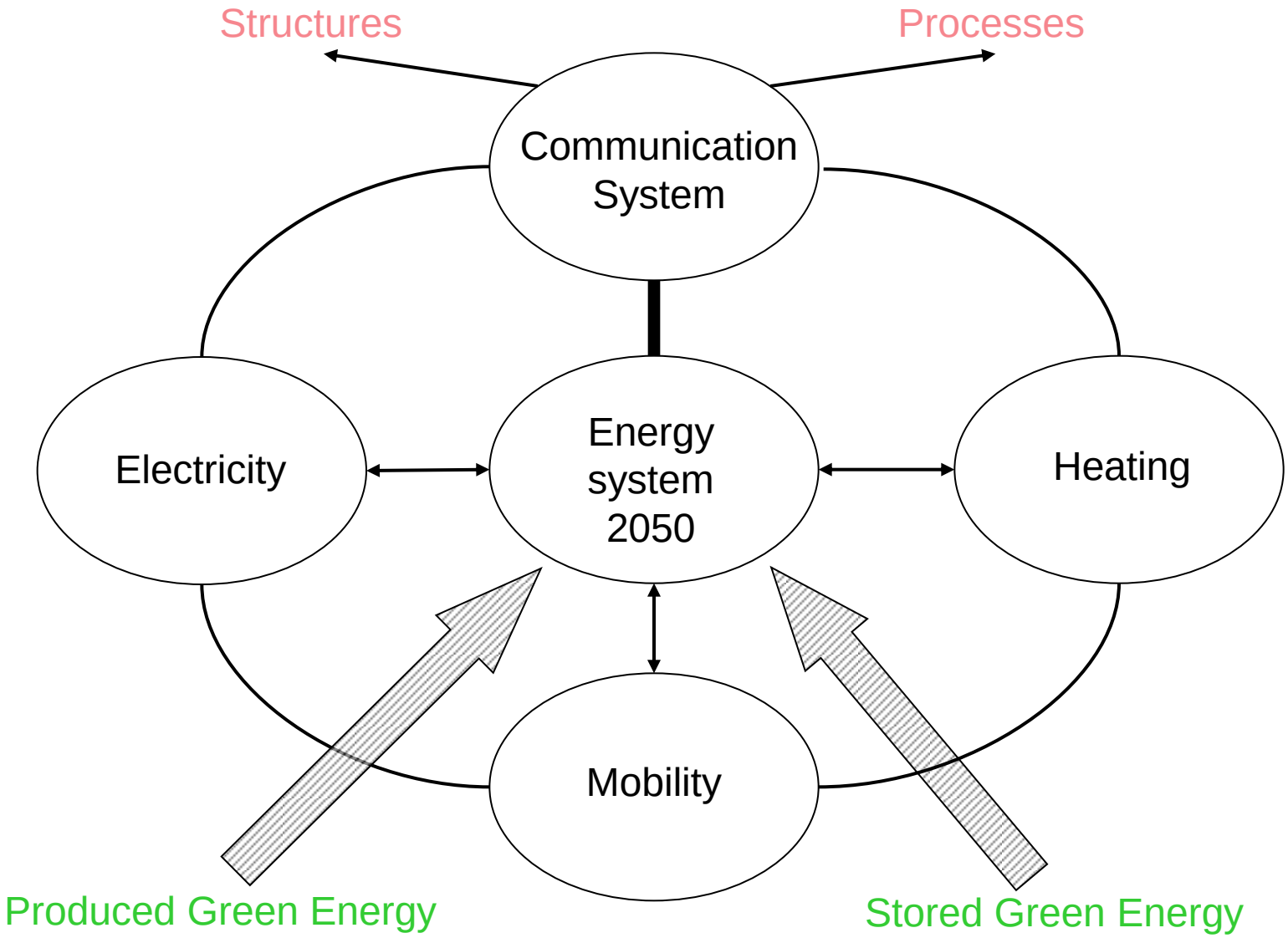
See McKinsey & Co / Vattenfall 2009

The “Green Kondratjev“: new economic chances!



see E. Weizsäcker et al. 2009: 13

The central Turnaround components



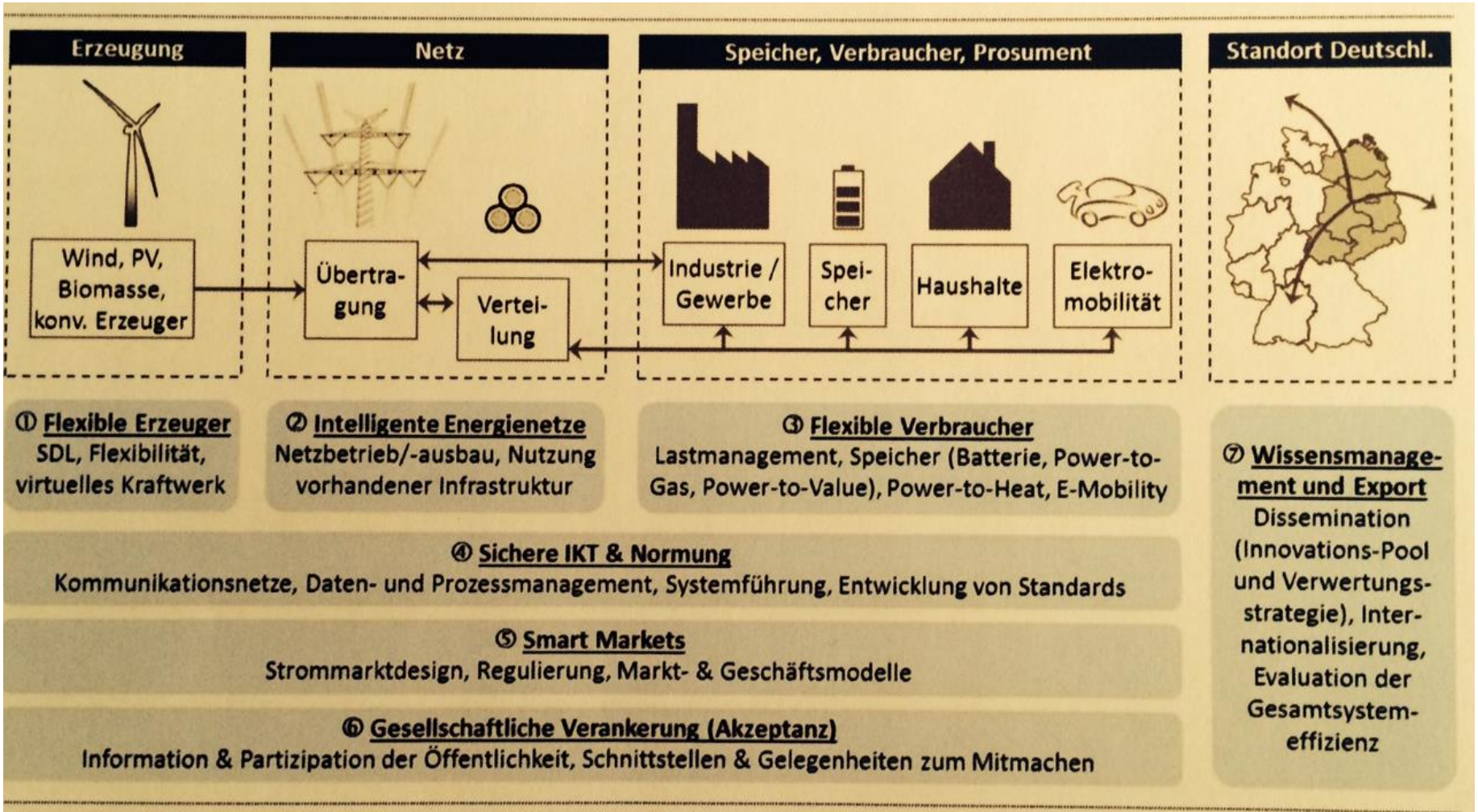


Abbildung 2: *Sieben Handlungsfelder für das intelligente Energiesystem made in Germany.*

The Berlin Turnaround goals (CO2) in figures

- 20 million tonnes CO2 p. a. less emissions until 2050
- plus new emissions of normal economic growth: factor 2 less in the case of permanent GNP-growth of 2 % until 2050
- yearly reduction goal with green growth: ~ 0,57 mill. tonnes
- yearly reduction goal with normal growth: ~ 1,14 mill. Tonnes
- binding target for 2050: max. 6 million tonnes p. a.
- binding target for 2050 per pers.: 1-1,5 tonnes p. a.

Berlin Energy Partnership: the first 50 projects as benchmark (2008)

Total volume of “Energy Contracting”-pools:	22
Total volume of involved assets:	506
Energy costs before optimization p. a.:	41,3 mill. €
Energy consumption p. a.:	784.000 MWh (baseline)
Saving guarantee p. a.:	10,7 mill. €
Budget reduction guaranteed p. a.:	2,7 mill. €
Total investment volume:	46,0 mill. €
CO2-reduction p. a.:	64.700 tonnes

The yearly reduction has to be 10 times more to meet the 2050-goal!

“New Energy for Berlin”-Commission about the Berlin “energy infrastructure” (page 13/1)

“Over the next two decades, an intelligent energy infrastructure must be provided throughout the city for all areas of urban consumption (homes, transport, the economy, administration, leisure, etc.). The infrastructure must allow consumers to see and control their energy use so that they can organise their consumption efficiently. In the transport sector, Berlin must put an end to petrol and diesel use, and develop new, climate-neutral transportation.”

“New Energy for Berlin”-Commission about the necessary “transformation processes” (page 13/2)

„These transformation processes can build on the city’s existing power distribution system, which must be upgraded for the following tasks in particular:

• Connection to regional, national and international (climate-neutral) sources of supply,

• Ongoing integration of alternative, mostly decentralised feeders such as small-scale combined-heat-and-power (CHP) units, solar energy systems, wind turbines, geothermal systems, heat pumps, etc., and the associated combined-heat-and-power and network systems,

...

“New Energy for Berlin”-Commission about the necessary “transformation processes” (page 13/3)

• Use of optimised information and communications technology (ICT) for the efficient, voltage-stable provision of the energy required at any given time from the available range of alternative feeders (security of supply),

• Use of optimised ICT systems to record and adapt consumption as the basis for maximally efficient use of renewable energy sources via direct procurement or from storage capacities (rationality of supply).

As well as in electricity generation, changes also lie ahead in the immediate demand for electricity. For instance, industry, craft trades, retail and services have a particularly large amount of potential for reducing electricity use (20 to 50 percent).“

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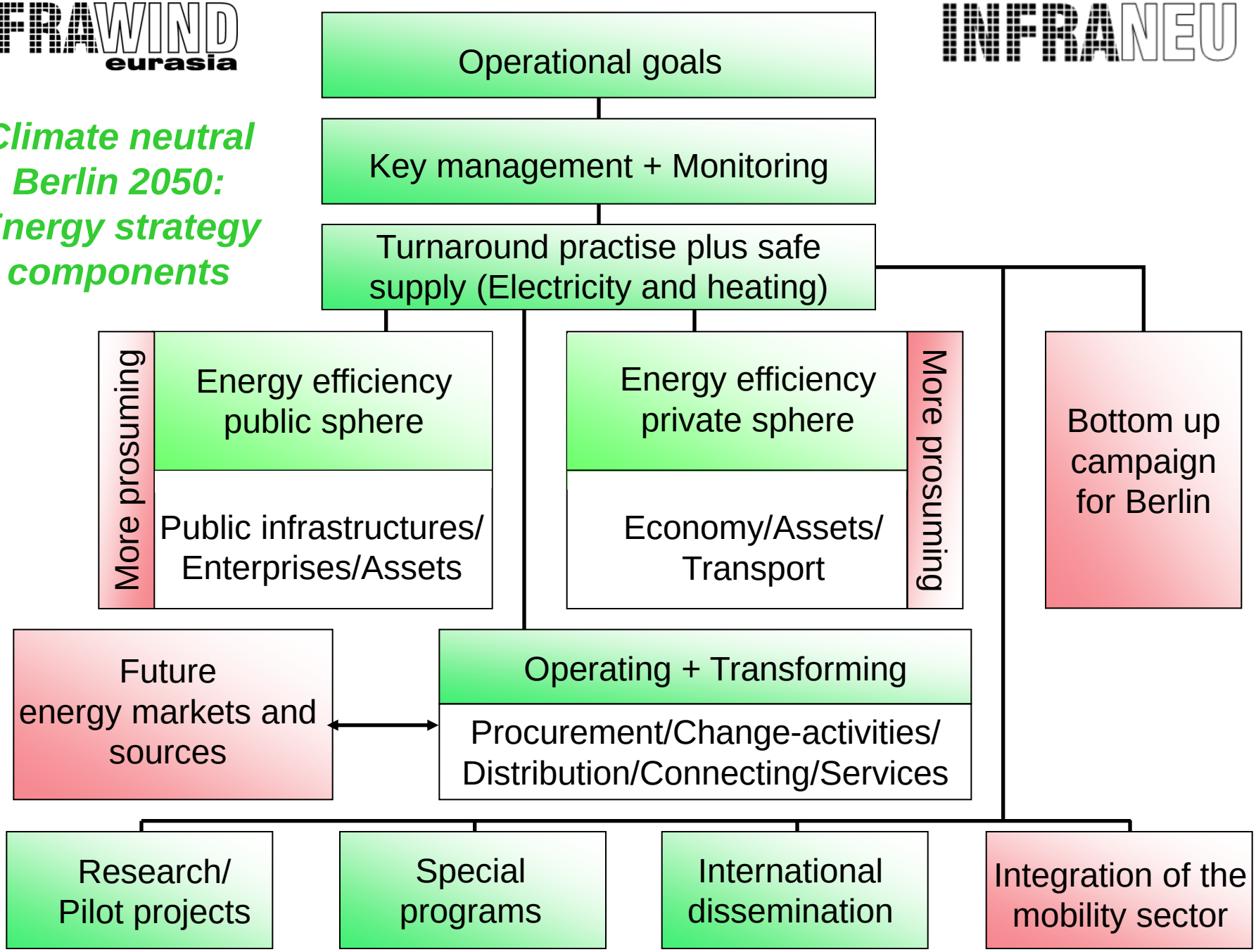
Climate neutral Berlin 2050: Energy strategy components



The clusters for the Berlin Turnaround

based on:
Bullinger, Hans-Jörg, Röthlein, Brigitte, Morgenstadt. Wie wir morgen leben, München 2012, page 5ff

“New Energy for Berlin”-Commission about the needed Berlin “Energy Transition Agency” (page 80/1)

„Setting up an Energy Transition Agency: An adequately staffed Energy Transition Agency would give the city a strong new body to serve as a central contact and implementation point for the major actors of Berlin’s energy transition. In contrast to the Berliner Energieagentur, the Energy Transition Agency should be publicly owned, be bound to the goals of the Energy Transition Act and its action plans, and not have any business operations of its own. Rather, in its role of managing Berlin’s energy transition, it should assume the following responsibilities:

• Operationalise the stipulations set out in the Energy Transition Act and other relevant legislation in conjunction with further specifications from the department and the agreements reached by the Energy Transition Steering Committee.

• Plan, structure, initiate, coordinate, manage, supervise, monitor and review the adopted implementation processes, under the guiding principles of increased decentralisation, subsidiarity and participation.

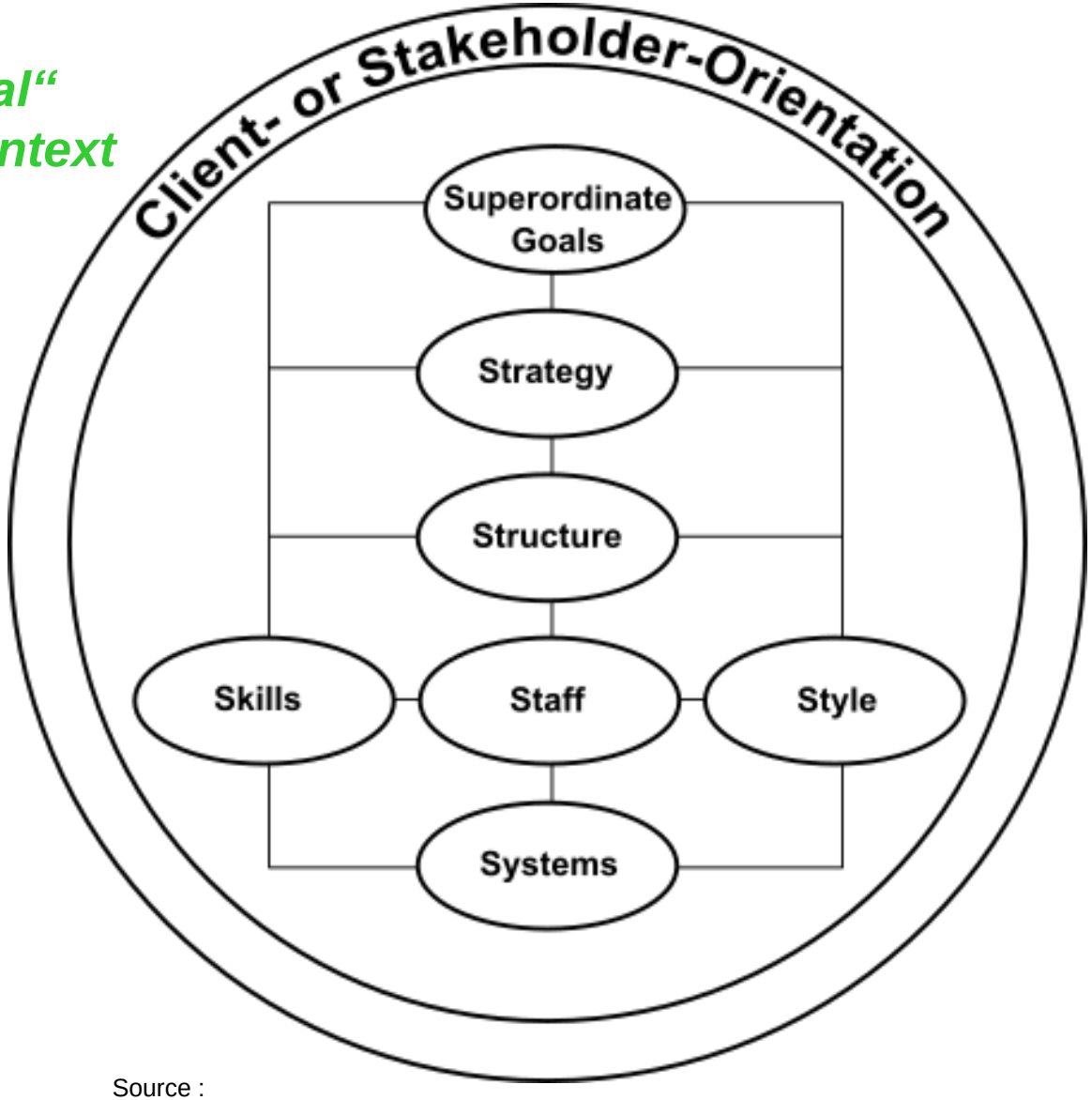
...

“New Energy for Berlin”-Commission about the needed Berlin “Energy Transition Agency” (page 80/2)

• Initiate and support research, development, investment and personnel development processes to generate value added, skilled and competitive jobs, and products and services of national and international interest; particular attention needs to be paid to consumer protection issues throughout this whole process.

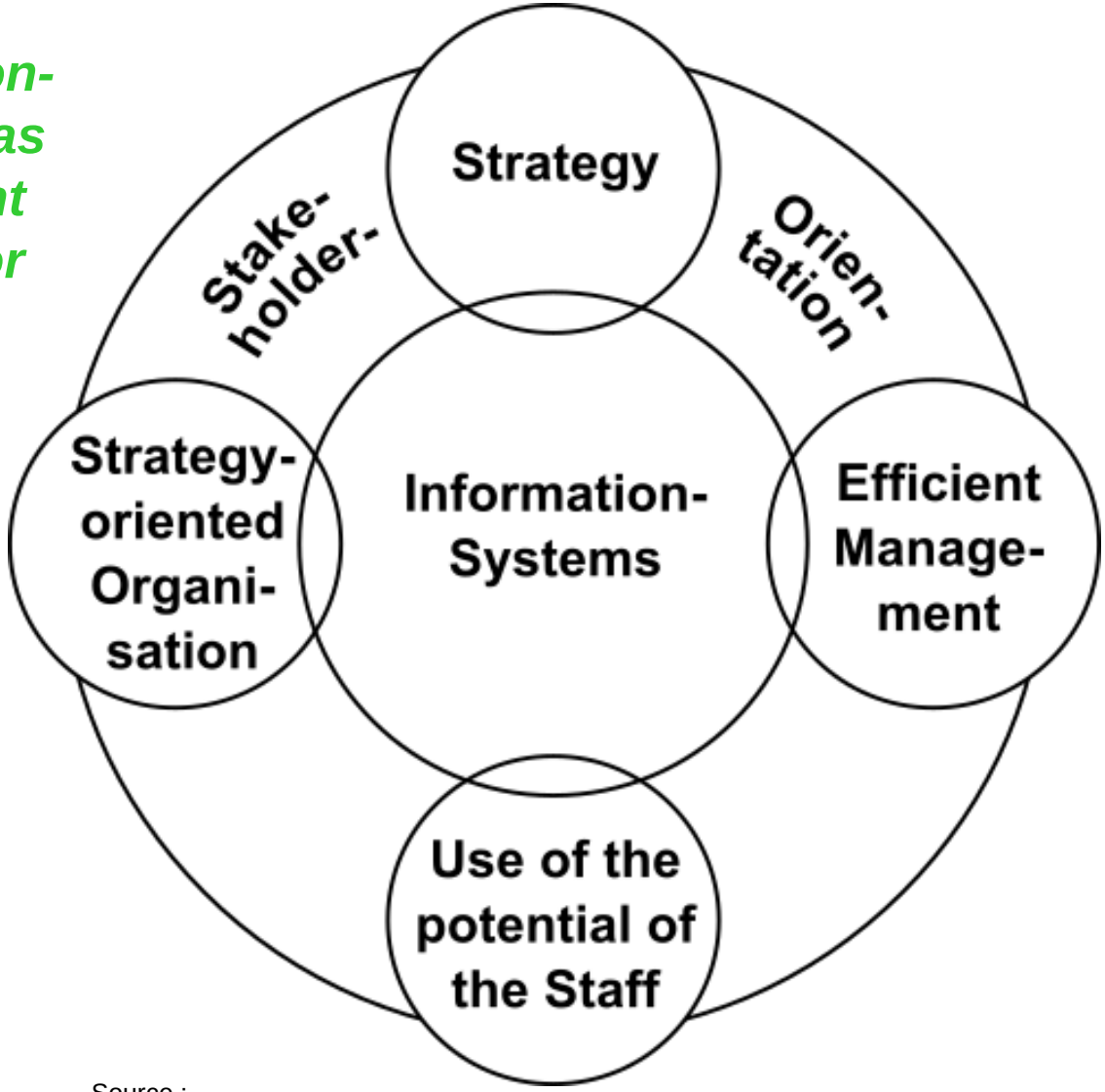
The Energy Transition Agency should in particular work together with Berlin’s industry and science sectors and their institutions and be supported by them (e.g. by seconding personnel) in order to make the energy transition a success factor in the creation of regional value added and the implementation of regional structural change. The agency should be financed by the budget of the Senate Department for Energy and should also be reviewed by this body.“

„Classical“ strategy-context



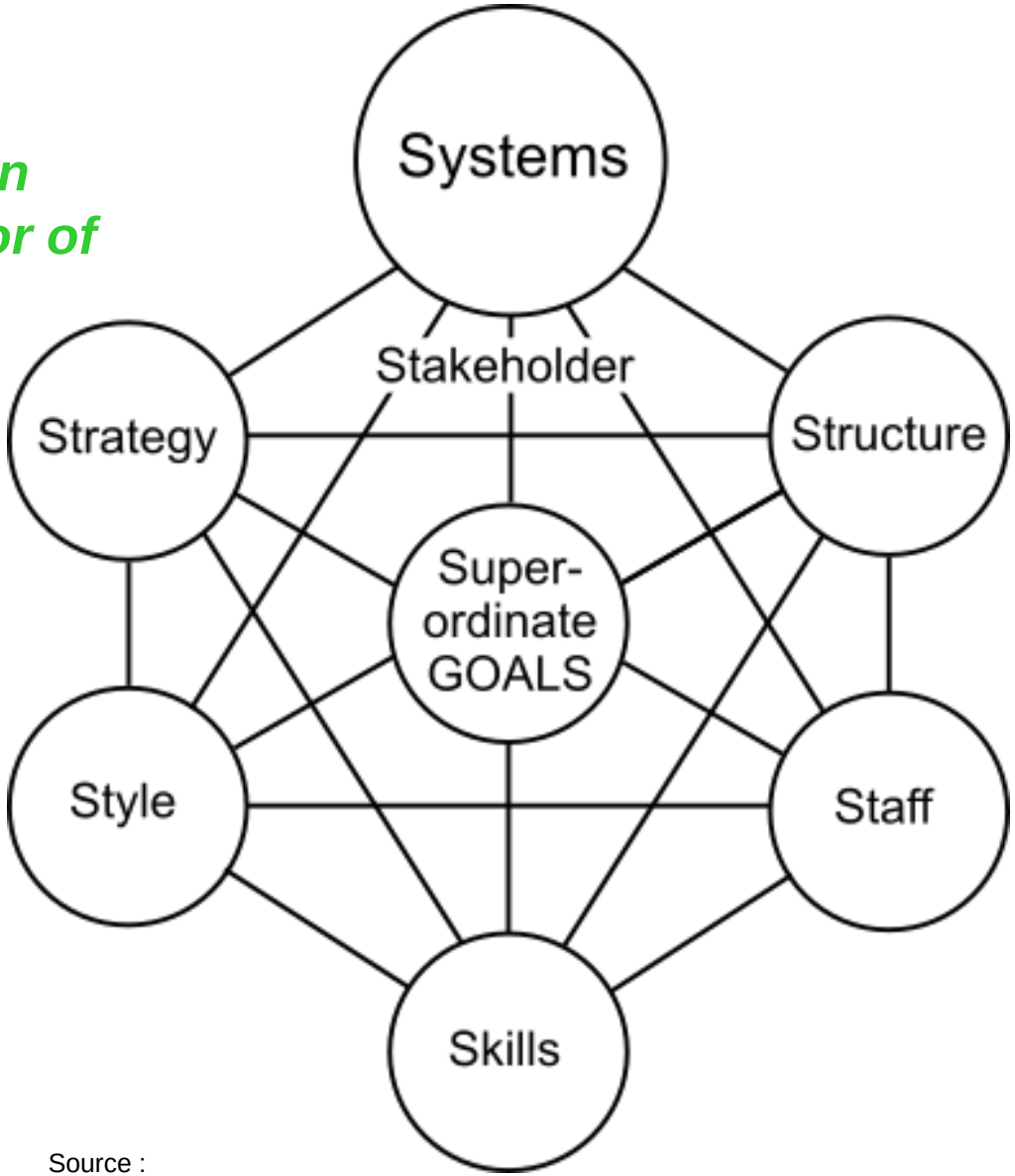
Source :
modified chart of Peters, T., Waterman, R. H. (1984) in Nagel, K. (1991)

Information-Systems as intelligent integrator



Source :
modified chart of Nagel, K., The 6 Factors of entrepreneurial Success (1991)

Information-Systems as an integrating motor of success



Source :
modified chart of Nagel, K., The 6 Factors of entrepreneurial Success (1991)

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The key strategies of the IPCC for the global Turnaround

1. Energy efficiency
2. Fuel switching
3. Heat and power recovery
4. Renewable energy
5. Feedstock change
6. Product change
7. Materials efficiency
8. Reducing non-CO_2 “Greenhouse Gases”

Source :
von Weizsäcker, Ulrich u. a.
Factor Five, Transforming the Global Economy through 80% Improvements in Ressource Productivity, München 2009, page 37

Transformation-Strategy: Diversity and Bottom Up

Transformation-Emphases

- Renewable Energies
- Efficiency-Offensive
- Smart Sustainability
- Blue Economy
- Direct Climate-Protection
- Cradle to Cradle
- Transition-Town-Movements
- CSR-Economy
- Postgrowth-Economy

Economy of Closed Loops

Transformation-Instruments

- Energy-Turnarounds
- Green Growth-Policies
- Participation / Education
- Middle-Class-Policies
- Infrastructures / Pilot areas
- Climate-Protection-Pension
- Generative Sciences

Thank you for your attention!