



Environmental Policy Research Centre

Freie Universität



Berlin



Klaus Jacob
Environmental Policy Research Centre
Freie Universität Berlin
jacob@zedat.fu-berlin.de
www.fu-berlin.de

Concept and Implementation of Ecological Industrial Policy in Germany and Relevant European Strategies

Innovation for Sustainability in a changing world

Second South African-German Dialogue on Science for Sustainability

Pretoria, October 26/27

Outline

- 1) Background: Economic Potentials and Environmental Discourse
 - 2) International Competition on fast growing markets
 - 3) Need for Policies: Regulatory Competition
 - 4) Concept and Instruments of Ecological Industrial Policy
 - 5) European Policies for Ecological Industrial Policies
 - 6) Outlook: Transformative Power of Sustainability?
- => Is the new discourse on Sustainable Industrial Policies only a new package, an increase in resources or a substantial policy change?

Background

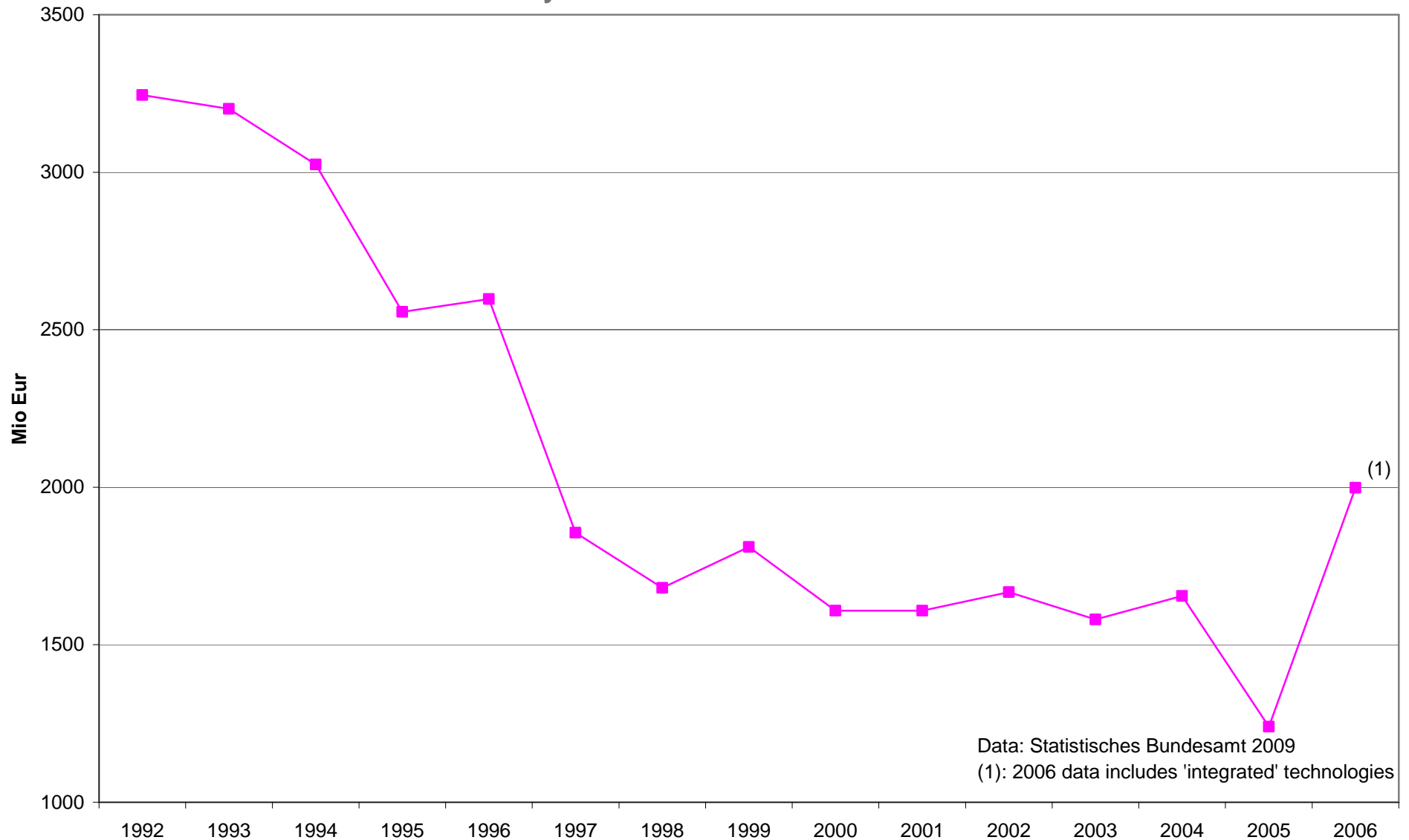
Change in Discourse: Reevaluation of costs and economic potentials of environmental technologies

Concept of a Ecological Industrial Policy

- Memorandum Green New Deal
- Research Program Environment, Innovation and Employment
- EU Presidency
- Series of Conferences
- Instruments for Ecological Industrial Policy

=> Is this only a new package, an increase in resources or a substantial policy change?

Investments in Environmental Protection Technologies, Germany 1992-2006



Data: Statistisches Bundesamt 2009
(1): 2006 data includes 'integrated' technologies

Economic potentials

-Annual Growth (world) (average of 2005-2007):

- Capacity of Photovoltaic: 49% (7,8 GW)
- Biodiesel 44% (capacity 8 bln. litre)
- Investments in Renewable Energies 32 % (71 bln. \$)
- Capacity of Wind Energy 26% (95 GW)

-Prognosis (2020):

- Solar heat: 23%
- Hybrid Cars: 22%
- Bioplastics 22%
- Automatic separation of materials: 15%

Turnover: 2007: 1.400 bln EUR, 2020: 3.100 bln. EUR world wide

(Sources: Roland Berger/BMU 2007, BMU 2009, REN 21 2008)

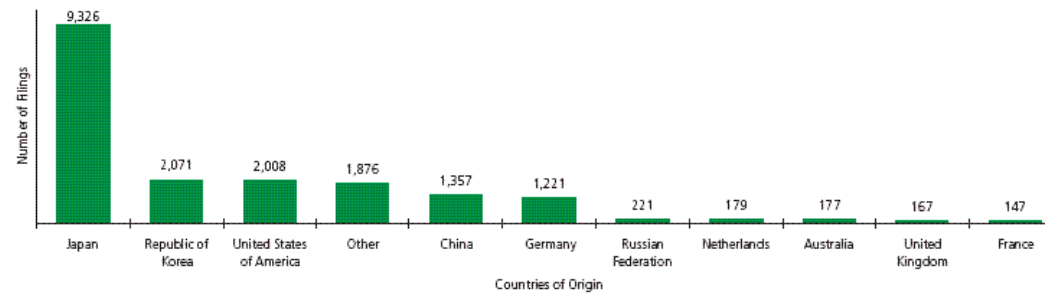
Selected figures for Germany

- Germany: Greentech 8% of GNP (2007), 14% (2020)
- Employment: 1,8 Mio, since 2004: +13-15%/year, Climate Program: +200-800 thousand
- Share in World markets 5%-30% (average 16%)
- Share of SME above average (60% of production)
- Research intensity above average: 5% of turnover (against 3% in average) and higher share of academics (30% compared to 20%)
- 5% of GDP are investments in energy efficient products and technologies

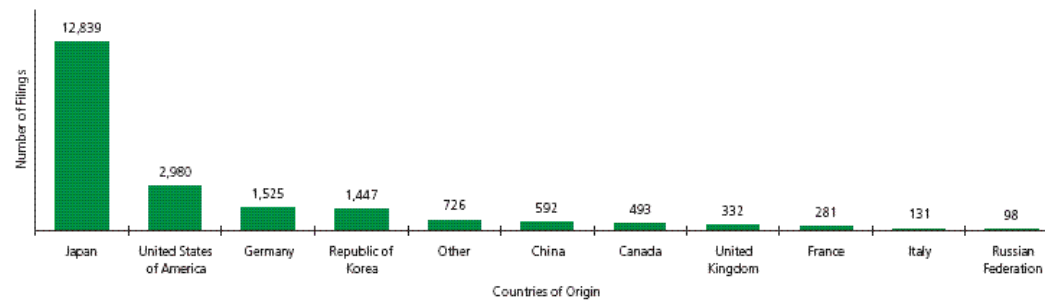
(sources: UBA 2008, Jaeger et al. 2009, BMU 2009, Roland Berger 2007)

Competition, Promotion and Regulation

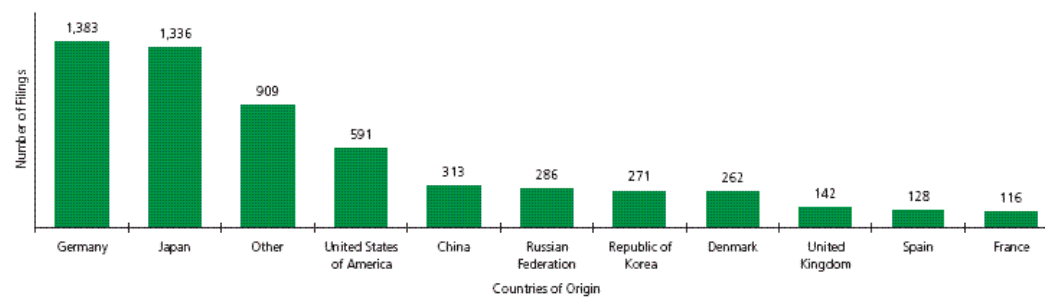
Solar energy technology patent filings by country of origin, 2001-2005



Fuel cell technology patent filings by country of origin, 2001-2005



Wind energy technology patent filings by country of origin, 2001-2005



See annex B for definitions.
Source: WIPO Statistics Database

Selected Programs

Germany IKEP: 2008 2,6 bln EUR, including 400 Mio of ETS. Investments of 30 bln. EUR / year until 2020

Japan: Cool Earth 50: \$30 bln. for R&D in climate friendly technologies for 5 years

USA: \$ 150 bln. public investment in clean energy in 10 years, already 2002: \$ 3 bln. Investments in renewable energies \$50 bln. already in 2007

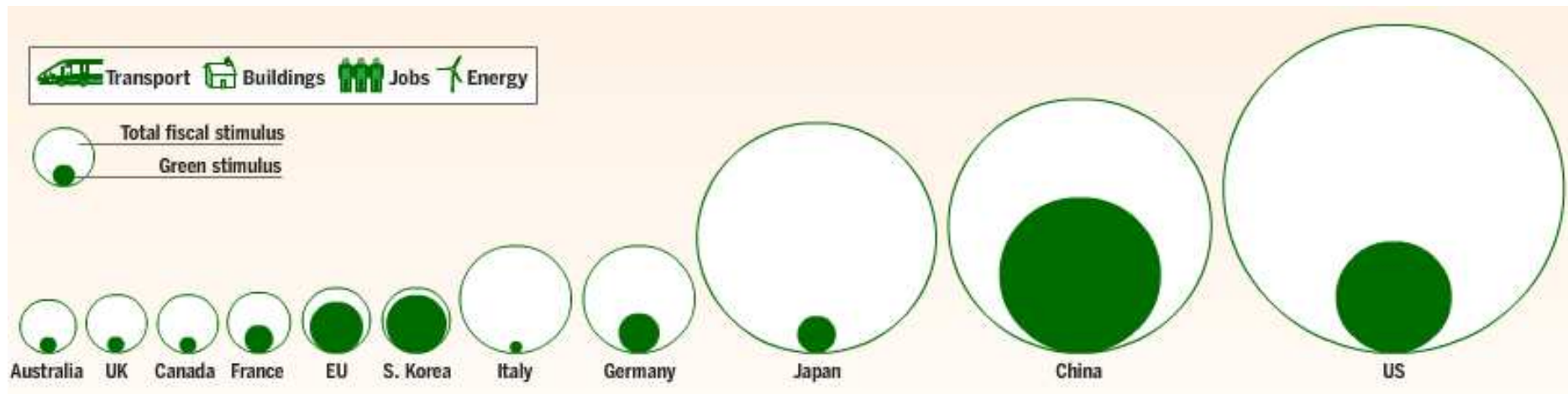
Netherlands: Transition Management: 600 mio. EUR

Korea: 80% of ist stimulus package, equals to 3.2 % of GNP invested in green tech

China: 1/3 of the stimulus package (2nd largest of the world) is inveted in greentech

Regulatory measures: prohibition of light bulbs (AUS, CDN, EU), 120 gr limit for cars, top runner

Economic Stimulus Packages and Greentech



Source: HSCB in Financial Times, 2. März 2009

Why Governmental Action?

Market failures

- Externalities
- Spill over
- Information asymmetries
- Infrastructures

Survey of business (Berger 2007):

- 1) Regulation
- 2) Stimulating Demand
- 3) Subventions

=> Markets for environmental innovations are policy driven

Concept of Ecological Industrial Policy

| | Technology-oriented environmental policy | Ecological industrial policy | Mainstream industrial policy |
|----------------------------|--|---|---|
| Technological focus | Environmental and integrated technology | environmental and integrated technology | technology generally |
| Legitimacy | precautionary principle, external costs | environmental efficiency, competitiveness | Competitiveness |
| Objectives | to develop eco-efficient technology | to develop and diffuse eco-efficient technology, to improve market access | competitiveness and market access, to strengthen entrepreneurship |
| Main actors | Department for environment, research, industry, environmental NGOs | Department for environment, innovation, industry, other ministries, social partners | economic ministry, other ministries, social partners |
| Other policy areas | Research, economic affairs, transport, energy, agriculture | research, economic affairs, energy, social affairs, external relations | research, social affairs, external relations |
| Time horizon | short and medium-term | medium and long-term | medium and long-term |

Instruments of Ecological Industrial Policy

| Objectives/ Instruments | Development of new Technologies | Access to markets | Diffusion | Promotion of Export |
|--------------------------------------|---|---|--|--|
| Direct promotion | R&D Subsidies | Public procurement | Public procurement | State aid for exports |
| Economic incentives | Tax deduction for R&D | Provision of venture capital | Internalising of external costs, e.g. by taxes | Internalising external costs, e.g. by international agreements |
| Regulatory framework. | Stimulating research cluster e.g. by patent law | Opening of home markets | Opening of home markets | Opening of international markets |
| Regulation | Technology Forcing | | Dynamic standards | Development of European and international standards |
| Information based Instruments | Innovation-radar | Obligatory risk assessment for products | Environmental label | Market studies |

European Meta-Strategies

| | Explicit Promotion of Eco-efficient Innovation | Vertical Integration (Member States) | Horizontal Integration (Policy Areas) |
|---|--|--|---|
| Lisbon Strategy | separate goal (not integrated in every relevant guideline) | Important goal. Review of National Reform Programs has considerable potential. | Important goal. For the policies of the Lisbon Programme successful, in many other policy domains at least symbolically integrated. |
| Sustainable Development Strategy | not a prominent goal | Important goal. Unclear if mechanisms will be successful | Important goal. No mechanisms in place. |
| Better Regulation strategy | No | Not important | Important goal, mechanisms with high potentials. |

European R&D and Innovation Policies

| | FP7 | CIP | Innovation Policy | Innovation Aid | EIT |
|------------------|--------|--------|-------------------|----------------|--------|
| Env. Problems | Green | Green | Green | Green | Green |
| Future Markets | Green | Green | Green | Green | Green |
| R&D activities | Green | Yellow | Green | Green | Green |
| Investments | Green | Green | Green | Yellow | Green |
| Consumer | Red | Red | Yellow | White | Red |
| Long Term | Green | Green | Green | Green | Green |
| Int. competition | Green | Green | Green | Green | Yellow |
| targets | Green | Yellow | Yellow | Red | Yellow |
| knowledge | Green | Yellow | Green | Green | Green |
| incentives | Red | Yellow | Yellow | Green | Yellow |
| phases | Green | Green | Yellow | Green | Green |
| networks | Green | Green | Green | Green | Green |
| push/pull | Yellow | Green | Green | Green | Yellow |
| qualification | Green | Green | Yellow | Yellow | Green |
| interlinkages | Green | Green | Yellow | Yellow | Yellow |
| diffusion | Red | Green | Green | Yellow | Yellow |

European Environmental Policies

| | Biofuels | Buildings Directive | IPP | WEEE | ETAP | EUWI | ENRTP | REACH | IPPC | energy efficiency action plan |
|------------------|----------|---------------------|-----|------|------|------|-------|-------|------|-------------------------------|
| Env. Problems | | | | | | | | | | |
| Future Markets | | | | | | | | | | |
| R&D activities | | | | | | | | | | |
| Investments | | | | | | | | | | |
| Consumer | | | | | | | | | | |
| Long Term | | | | | | | | | | |
| Int. competition | | | | | | | | | | |
| targets | | | | | | | | | | |
| knowledge | | | | | | | | | | |
| incentives | | | | | | | | | | |
| phases | | | | | | | | | | |
| networks | | | | | | | | | | |
| push/pull | | | | | | | | | | |
| qualification | | | | | | | | | | |
| interlinkages | | | | | | | | | | |
| diffusion | | | | | | | | | | |

European Economic Policies

| | Regulatory Dialogues | Energy Security | Trade China | Trade Lisbon | Framework Manufacturing | Rural Development policy | Structural Funds | Transport White Paper | Inquiry Energy |
|------------------|----------------------|-----------------|-------------|--------------|-------------------------|--------------------------|------------------|-----------------------|----------------|
| Env. Problems | Yellow | Green | Green | Green | Green | Green | Green | Green | Yellow |
| Future Markets | Yellow | Green | Yellow | Yellow | Yellow | Yellow | Green | Green | Yellow |
| R&D activities | Yellow | Green | Yellow | Yellow | Yellow | Green | Yellow | Green | Yellow |
| Investments | White | Red | White | Red | Red | Yellow | Green | Green | Green |
| Consumer | Green | Green | Green | Green | Green | Green | Green | Green | Green |
| Long Term | Green | Green | Green | Green | Green | Green | Green | Green | Green |
| int. competition | Yellow | Green | Red | Green | Green | Red | Yellow | Green | Yellow |
| targets | Red | Yellow | Red | White | Red | Yellow | Red | Red | Red |
| knowledge | White | Yellow | White | White | Red | Yellow | Yellow | Yellow | White |
| incentives | Yellow | Yellow | Red | Yellow | Red | Yellow | Green | Green | Red |
| phases | Red | Red | White | White | Red | Yellow | Green | Green | Yellow |
| networks | Yellow | Yellow | Green | Yellow | Yellow | Green | Yellow | Yellow | Green |
| push/pull | White | Red | Red | White | Red | Yellow | Green | Red | White |
| qualification | White | Red | White | White | Red | Green | Yellow | Red | White |
| interlinkages | Yellow | Yellow | Red | Yellow | Yellow | Green | Yellow | Yellow | Green |
| diffusion | Yellow | Green | Yellow | Yellow | Red | Red | White | Green | White |

Summary

Eco-innovation is an important objective, however:

- Lack of mainstreaming
- Implementation (more often in white paper than in specific instruments)
- Scope: Much focus on climate issues
- Diffusion
- Implementation in Member States
- Tensions with single market policies?

Transformative power of Sustainability

| | 1st Industrial Revolution: 1780- | 2nd Industrial Revolution: 1890- | 3rd Industrial Revolution 1990- |
|---|--|--|---|
| Dominant technology and raw material | steam engine, power loom, iron processing | electricity, chemistry, combustion engine, assembly line, | ICT, microelectronics, new materials, cleaner technology, |
| Dominant energy source | coal | coal, oil | renewable energies , energy efficiency |
| Raw material | Steel | plastics | Renewable raw material, bio-tech, recycling |
| Transport/ communication | railway, telegraphy | car, airplane, radio, TV | high-speed railway systems, internet, mobile telecommunication |
| Society/ state | Liberal state , freedom of trade, constitutional state, property rights | welfare state mass production, mass society, parliamentary democracy, | Environmental state? civil society, globalization, global governance |
| Core countries | UK, Belgium, Germany, France | USA, Japan, Germany | EU, USA?, China? Japan? |