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Decoupling GDP Growth (`Quality of Life`) from Resource Use: Achievements and Shortcomings of `Strategic Governance` in Germany

(On behalf of the International Panel for Sustainable Resource Management, January2009)

1. Introduction

a) Patterns of Environmental Politics in Germany

Addressing overall resource productivity as a key element of sustainable production and consumption only very recently came into the focus of the Federal government with the formulation of a National Strategy for Sustainable Development (NSSD) in 2002. The governments´ goal to double resource productivity by 2020 (base-year: 1994) evolved as a key indicator to evaluate policy progress in the process of formulation of the NSSD. `Governance by evaluation, integration and co-ordination` as Zieschank (Zieschank 2006) labels the use of an indicator set in the NSSD, is, however, quite uncommon in German policy-making as a short overview on the evolution of environmental policy-making will show.

Germany is often described as an early front-runner in environmental policy-making. Early in the 1970s the basis for the successful reduction of air and water pollution and for a proper system of waste disposal and handling of waste was laid (Andersen/ Liefferink 1997). In its 1971 Environmental Programme the Brandt government of Social Democrats and Liberals adopted a strategic planning approach and attempted to treat environmental protection in an integrated manner. The programme formulated ambitious long-term targets for air pollution control and water protection, described nearly 150 concrete policy measures, and set up guiding principles of environmental policy. New institutional arrangements[1] were established, leaving the Ministry of the Interior in charge of environmental policy[2]. Despite formal adoption of environmental policy as a cross-sectional task and formal continuation of the Environmental Programme by the federal government in 1976, the integrated and strategic planning approach in the late 1970s and early 1980s gave way to a medium-term approach relying heavily on detailed `command-and-control` regulations to control emissions at the source. Federal environmental policy thus became increasingly media-centred (air, water, soil), pollution was in most cases dealt with the means of `best available technology`. Though the Kohl conservative-liberal government after 1982 halted further progress in environmental policy, air pollution, water protection and waste disposal and management were successfully dealt with in the 1980s and early 1990s. By the middle of the 1990s, however, the former front-runner had turned laggard as the Kohl

[1] In 1972 the Environmental Expert Council (SRU) was established, as well as Cabinet Committees and Standing Committees of Federal executives; two years later the Federal Environmental Agency (UBA) was set up.
[2] The Federal Ministry for the Environment was established later in 1986.

government failed to formulate an integrated approach towards the concept of sustainable development conceptualised by the 1987 Brundtland Report and the 1992 UNCED in Rio.

b) Development of a National Strategy for Sustainable Development

As the Federal government remained mainly inactive[3], the call for developing a national strategy for sustainable development (NSSD) was raised by think-tanks (BUND/ MISEREOR 1996) and in the Bundestag, the Federal parliament. The work of two successive parliamentary committees of enquiry[4] finally led to the Bundestag asking the Federal government to elaborate a NSSD and to establish a sustainable development council[5]. After the election in 1998 the new government coalition of Social Democrats and Greens transposed this decision into its coalition agreement: a NSSD with concrete objectives should be elaborated by the new government and be prepared by 2002. In 2000 the government decided on the institutional framework for a NSSD. Its main feature is a strong role for the Chancellor´s Office (*Bundeskanzleramt*): its head is to co-ordinate horizontally the work of the Federal Ministries involved in the NSSD through a Committee for Sustainable Development on the level of permanent secretariess[6]. An inter-ministerial working group on the level of sub-directors prepares the meetings of the Committee. Other important institutional innovations were the establishment of the German Council for Sustainable Development (RNE) in 2001 and a new Committee for Sustainable Development in the Bundestag in 2004. The RNE significantly contributed to the NSSD that was finally endorsed by the government in 2002.

Recalling the patterns of environmental policy-making in Germany as described above, it is no small achievement that the NSSD was developed and that its institutional setting was established. The NSSD can be seen as a remarkable policy innovation – whether it proves to be a long-term success remains open as the structural conditions of integrated policy-formulation and policy-making continue to be unfavourable.

c) The Indicator Set of the German NSSD – Key Indicators for Resource Use

The German NSSD comprises strategic, mostly quantitative, trend objectives and indicators – all in all a set of 21 indicators grouped under the headings ´intergenerational equity` (including indicators for natural resource use, state budget, innovation and education), `quality of life` (including indicators for economic prosperity, quality of the environment, mobility, nutrition, health and crime), `social cohesion´ (including indicators for employment, equal opportunities and families) and ´international responsibility´ (including indicators for expenditure for development aid and opening EU markets). In the context of this study, the indicator 1 (`resource conservation´) is the most important one, as it includes sub-indicators 1a ´energy productivity´ and 1b ´resource productivity´. The goal is to double both energy productivity (base year: 1990) and resource productivity by 2020 (base year: 1994). The indicator ´resource productivity´ encloses all used abiotic raw material extracted in Germany as well as abiotic imports. Biotic raw material, though, is not included, which constitutes grave problems (see below). A different indicator (indicator 4 `land use´) calls for the reduction of the daily increase in land use (daily increase reduced from 120 ha to 30ha by 2020).

The NSSD is subject to regular review and some indicators were revised in 2006, though none indicator referring to resource use. Why each of the 21 indicators was chosen is not always easy to comprehend. As Jänicke (Jänicke et al. 2001) points out, there is a fundamental lack of agreement in the federal administration on how to define sustainability. Be it as it may, via the NSSD doubling resource productivity by 2020 became the official goal of the Federal government. This goal was affirmed by the new Merkel government after 2005 and can now be seen as the cornerstone of the governments´ position on resource use. The chancellor’s political commitment to the goals of the NSSD should be seen as an important prerequisite for the continuing efforts and implementation of sustainable patterns of consumption and production in Germany.

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3 A Scientific Advisory Council for Global Change (WBGU) was established.

4 Cp. Deutscher Bundestag 1998.

5 This decision in 1998 was made in a wide cross-party consensus.

6 This Committee was called `Green Cabinet` under the Schröder government; after the election of 2005 this name was dropped.

2. Decoupling

a) The Concept of Decoupling

Increasing resource productivity by a factor of x is widely conceived as a necessary condition for worldwide sustainable development. In a certain respect this is a selfevident and nearly tautological statement: As long as world population and world GDP are growing exponentially and the natural resources of the earth are finite it is common sense that only a massive increase of resource productivity and the decoupling of the quality of life (growth of GDP) from the use of nature can contribute to solve the apparent contradiction between man made growth and natural limits.
However, there are many different opinions concerning the precise understanding of „resources", the „scale of decoupling" (absolut or relative) and the ex post „statistical evidence" compared to ex ante „goals and policies" of decoupling. For example in Germany the seemingly ambitious „doubling concept" up to 2020 neither recognized the imperative of absolute decoupling in industrialized countries (see below) nor did it include burden shifts to other countries or evaluate ex ante possible counterproductive side-effects of proactive resource policies.
For example: even though an **absolute** decoupling and a tremendous increase of resource productivity might be the aim of national resource policies, counteracting social and economic reactions (direct/indirect rebound effects; growth, structural and quantity effects) can „eat up" even massive increases in specific or sectoral resource productivities. Therefore resource policies based on technology driven scenario analysis and respective policy mixes to overcome barriers and to disseminate advanced technologies should always be aware of these counterproductive side-effects. It is the triangle of **efficiency** („more with less"), **sufficiency** („less can be more") and **consistency** („better than more") on which policies and measures for decoupling should be based. At the end of the day, what counts from an ecological and ethical perspective is to **sustain ecosystem services for all countries and generations to come**[7]. This means on a worldwide scale that the necessary increase of well-being for a growing future world population (8-10 billions?) must not further increase unsustainable use of nature.

In reality this seems only to be possible if an **absolute decoupling** in developed („industrialized") countries („reduction of per capita resource consumption") and a **relative decoupling** in developing countries („reduction of growth rates of resource consumption") would be realized.

b) Common, but Differentiated Resposibilites

Paul Ehrlich`s formula (cp. Decoupling Study, Draft 2008) I = P x A x T (I=Environmental Impact; P=Population; A=Affluence per capita; T= Technology) can be interpreted as follows: Taking resource use (R)[8] as indicator for I, Y/P (per capita income) as indicator for "affluence" und T as indicator for resource intensity (reciprocal of resource productivity) then the relation R = P x Y/P x R/Y leads to a simple conlusion: With a positive growth rate of population (w_P) and for per capita affluence (w_A) the global environmental impact can only be constant if the resource intensity decreases by (w_P)+ (w_A)

Concerning the global environmental impact (I) diffentiated for industrialized and developing countries

- I_{IC} can be **absolutely** reduced in **industrialized countries** (IC; assuming constant population) if the growth rate of resource productivity is higher than the increase rate of per capita affluence

[7] This simplified definition summarizes the often cited Brundtland definition of sustainable development; the strenght and impact of substitution between „nature" and „capital" (strong vs. weak concept of sustainability) can not be debated in this context.
[8] R may be measured by the TMR (total material requirement) as a common global indicator for the environmental impact of resource use. See below.

- I_{DC} can be **relatively** reduced in **developing countries** (DC; assuming growing population and high GDP-growth) if the growth rate of resource productivity is as high as possible to offset the necessary increase of per capita affluence.

This concept of „reduction and convergence“ (you may also call it „common, but differentiated responsibilities to save the planet“) is crucial for evaluating the goal and the results of national resource policies in Germany and elsewhere.

In the official German statistics and in the political debate Y is generally identified with real GDP. But within the scientific community it is well concieved that GDP is only an easy measurable and macroeconomic indicator, but not an adequate expression of the living standard or of the „quality of life“.

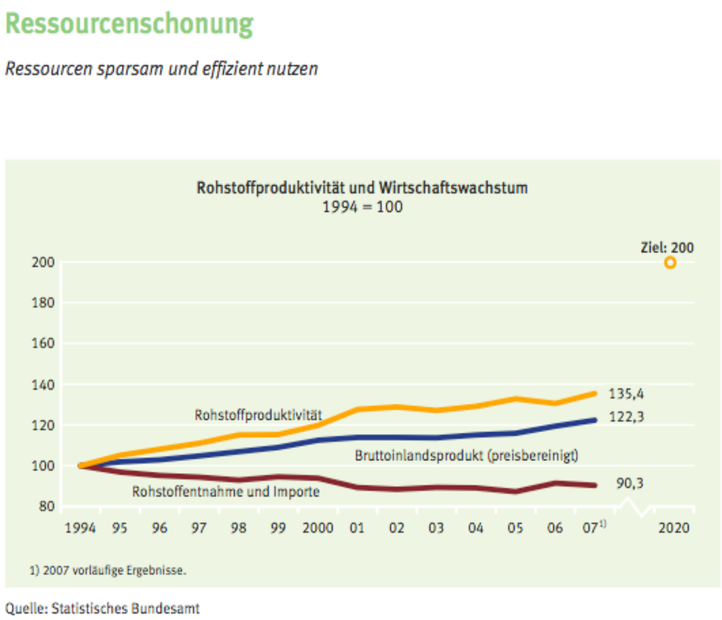
c) Quality of Green Growth

There are at least 11 indicators to measure and compare the „quality of life“ internationally[9]. Taking e.g. the „Economist Quality of Life Index“ Germany ranks only at rank 26. In general there is much evidence that in OECD countries indicators of „Quality of Life“ (or „Happiness“) have negatively decoupled from GDP-growth. Therefore it has to be carefully analysed whether sustainable or unsustainable patterns of production and consumption are disguised behind the monetary aggregations of the GDP. Therefore, it is the **quality of (green) growth** (of the numerator O) which matters: even a **positive decoupling** of the quality of life and happiness from GDP - more „happiness“ in spite of constant or even lower GDP - seems to be possible.

3. Indicators of Decoupling

a) Empircal Evidence

Looking at the denominator (R) the German raw material indicator only encloses **all used abiotic raw material** extracted in Germany as well as imported abiotic materials. Between 1994 and 2007 a seemingly impressive **absolut** decoupling of GDP growth and raw material inputs occured. While the resource (raw material) productivity raised by 35,4% and the GDP by 22,3%, the raw material input decreased by -9,7% (see figure 1).



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9 See G.Szell, Quality of Life&Working Life in Comparison, Opening Speech at the 10th Meeting of the German-Japanese Society for Social Sciences, Osnabrück 28.August 2008

Figure 1: Resource productivity and GDP growth. (Source: DESTATIS 2008)

But the average increase rate of about 2% p.a. between 1994-2007 has to be more than doubled if the official goal („Doubling up to 2020“) was reached. Looking at the potentials and economic opportunities there is some evidence that this goal is still within reach. But it is clear that scaling up existing successful programs and accelerating the increase rate of resource productivity needs ambitious new initiatives especially from the German government and from industry (see below).

b) What Indicator Should Be Used?

The lack of incentives and of comprehensive resource policies is only one topic of the debate on German environmental and economic policies (see below). Furthermore, it has been critized[10] that the German raw material concept does not include on the one hand **biotic** raw materials e.g. excludes the very important trade off between biomass and fossil fuels or between biotic and abiotic raw materials as inputs for industry (e.g. „green chemistry“). On the other hand the economically not used primary material extracted in Germany and all indirect requirements associated with imported goods are not included; thus, important potential effects of the „ecological rucksacks“ (see below) and of the international side effects of the domestic use of resources are neglected.

Concering EU-15 there is clear empirical evidence of burden shifting from growing resource extraction to the outside world, especially to developing countries. Though the **domestic TMR** between 1980 and 1997 in EU-15 absolutely decoupled from GDP-growth, the **foreign TMR** raised in parallel (Bringezu et al. 2005). The problematic substitution of fossil fuels by biodiesel encouraged by tax exemptions and later by a mandatory blending of fossil based diesel („Beimischungsgebot“) and the gereral increase of the energy use from imported and domestic biomass (in most cases not certified from sustainable production) is also not covered by the German raw material indicator. It has to be recognized that substituting abiotic materials by unsustainable use of biotic materials through resource policies would have negative side-effects on sustainable development and the sustainable use of biomass.

The Total Material Requirement (TMR) measures total primary material requirements of production and consumption. It comprises the domestic and foreign share and the used and unused extraction of resources. In so far the TMR includes the „ecological rucksacks“. These consist on the one hand of unused domestic extraction like overburden from coal mining, excavated soil for construction or soil erosion in agriculture. On the other hand, TMR includes all foreign liye-cycle wide required primary materials, used and unused, which are necessary to provide an imported good (indirect material flows). Thus the TMR constitutes the most comprehensive **quantitative** Input-indicator (aggregating quantities of all primary material flows besides water and air) for the magnitude of potential environmental pressure through the extraction and use of natural resources. However, to get a more comprehensive picture of the various specific environmental pressure the TMR has to be complemented by additional analyses and indicators of the **quality and impact** of different material flows. On the other hand comparing the TMR with the German raw material indicator, it adds at least two important informations: the development of the quantitative share of biotic materials and of the domestic and foreign „ecological rucksacks“ to identify possible burden shifts.

4. Goals, Integrated Strategies and Policy Mix

a) A Feasible Vision? The “2000 W/cap Society”

The feasibility of raising **energy efficiency** by a factor four (at least) has been demonstrated for many specific examples and with national and global scenarios[11]. Especially the Swiss concept of a “2000

[10] See UBA 2008.
[11] Compare Weizsäcker/ Lovins/ Lovins 1998 and Lovins/ Hennicke 1999. WBGU 2003 and Ecofys/ DLR et al. 2007 and 2008.

Watt per capita society” is interesting, because it includes a vision for the **combination of energy efficiency with material efficiency** as a goal, though the mutual reinforcing effects have not been quantified in integrated scenarios up to now.

Meanwhile, the concept is debated in Germany as well: Decoupling, leap frogging and socio-technical innovations is the basic rationale behind the concept of the “2000W per capita society“ for OECD-countries. 2000W/cap (= 65 GJ/cap) corresponds to 1/3 of today’s European per capita energy use. Enabling a GDP/cap growth of 2/3 up to 2050, the “2000W per Capita Society“ implies a factor 4 to 5 increase of energy efficiency. Swiss research institutes have been working on this concept for many years demonstrating the technical feasibility of this challenging vision. As the world average energy consumption in the last two decades has been 70 GJ/cap one of the Swiss report’s hypothesis is, that 65-70 GJ/cap could even be a future convergence value for a sustainable world energy system.

Thus, an ambitious increase in energy and material productivity, a complete change of the innovation systems, the exploitation of long re-investment cycles and the gradual structural change to more sustainable patterns of consumption and production are important preconditions for establishing a “2000 Watt per capita world society“.

It should be added that by reducing the gigantic losses of existing energy systems[12] and by raising the share of renewables (as decided for EU27 and especially for Germany) the vision of “a sustainable energy society“ could even today be taken as guidance for concrete implementation steps. Meanwhile, for Germany very sophisticated databases and dozens of midterm (2020) and longterm (2050) scenarios are available which demonstrate the feasibility of a sustainable German energy system.

b) The Key to Sustainable Energy: Efficiency Increase by a Factor x

Up to now, the debate on resource efficieny is focussed on energy. Many detailed data bases and sophisticated scenarios are available, especially for Germany. But no fully integrated scenario analysis of strategies to foster the **combined increase of material and energy productivity** for Germany or other countries exist.
The latest detailed, but again only energy related analysis of the feasibility of a sustainable energy system has been presented for Germany[13] in the so called “BMU Leitszenario”[14] which serves as an orientation for energy, climate and resource policies advocated by the German Ministry of Environment. This scenario demonstrates that the phase out of nuclear power (up to 2023 as decided), the reduction of $C0_2$ by 80% (up to 2050), a moderate (green?) increase of GDP-growth (of 1,2% p.a.) and additional jobs are technically feasible and cost-effective for the society at the long run: the moderate additional societal costs for the energy system up to 2030 will be overcompensated by benefits until 2050. One crucial assumption is that (besides an ambitious increase of the share of renewables in all sectors) the energy productivity raises at least by a factor of four.

With the so called “Integrated Energy and Climate Program” (IECP 2007/2008) the German Government decided on two dozens policies and measures which up to 2020 aim to raise the share of renewables for electricity to 30%, for heat to 14%, the share of CHP for electricity to 25% and to save energy in all sectors; it is expected that with the help of the IECP and additional measures at least a 30% $C0_2$-reduction up to 2020 (and 40% reduction conditioned to ambitious goals of the EU27) can be reached.

Though not being fully convincing concerning implementation (e.g. too moderate goals for new coal power plants and efficiency standards for the car industry) the IECP nevertheless is one important step forward in the direction of the new “Ecological Industrial Policy” of the Ministry of Environment.[15] The key of this new strategy is to foster the increase of resource productivity (e.g. the integrated increase of the energy and material productivity) and the development of “lead markets” e.g. for sustainable energy and mobility systems, for renewables, for recycling technologies and for

[12] On average only about 30% useful energy is derived from 100% primary energy inputs in the worldwide energy system and in most national energy systems; see Jochem 2004.

sustainable water and waste management.[16] It has been calculated that the world "market" (profitable potential)[17] for "GreenTech" adds up to 1000 billion € (2005) with the perspective to more than double up to 2020.

c) Integrating Material and Energy Efficiency Strategies

Up to now, strategies to foster energy efficiency and climate-/resource protection are separated from activities to develop and disseminate material efficient production processes, products and services. Within enterprises an integrated accounting of energy and material flows is still an exemption. But from the **cost perspective** of enterprises as well as for the national economy there are close interlinkages if energy and material productivity is stepped up in an integrated way. In general, adressing resource productivity increase as a top priority seems to be a promising strategy for decoupling added value and economic growth from resource use and to create structural changes to new green patterns of growth.

To make it happen, this mainly technology and resource prices driven **eco-efficiency revolution** should be accompanied (see above) by a discourse and policies on more environmentally viable lifestyles and on new patterns of sustainable consumption and production. In that case, the technological efficiency revolution helps to gain time and may support a structural change to new models of wealth.

According to official statistics the average cost share of material throughput (more than 40%) in the German processing industry is more than twice the labour cost share. The energy cost share in processing industry in Germany thereby lies on average only at about 2 %. Thus, the cost factor „material" at the one hand is more important for the competitiveness of the economy and of enterprises than the labour costs.[18] The same order of magnitude applies to other OECD-countries.

On the other hand raw material and energy prices (oil; gas) are mostly determined by the world market and thus will influence competitors all over the world in a more general and equalized way than domestic wages. Furthermore, concerning material and energy costs there are specific market failures and obstacles – even in the period of rapidly growing raw material and enery prices up to summer 2008 – why especially SMEs are reluctant to harvest even very cost-effective options for cost reduction. The lists of **obstacles** to realize cost effective **energy efficiency potentials** is long (e.g. deficits of awareness, information, market transparency and capital availability, missing life cycle-costs calculation, asymetric payback expectations split incentives etc.) and will be certainly even longer and more complex when it comes to **material efficiency**.[19] Concerning materials the huge variety of raw materials, substances, composites etc. and of substitution or recycling options are the main reasons why without the help of a new policy mix (e.g. external experts, networking, information programs and incentives) high cost-effective potentials are not realized.

In this respect, it makes sense to ask how to jointly increase material and energy efficiency in practice by an integrated strategy and how to create positive incentives especially for small and medium enterprises. The management consultancy Arthur D. Little (AdL) assumes that companies can regularly reduce their material throughput costs by 20% by means of consulting by external experts.

[13] Sustainable world energy scenarios with comparable goals and results have been developed by Lovins/ Hennicke 1999, WBGU 2003 and Ecofys/ DLR et al. 2007 and 2008.
[14] See BMU 2008a.
[15] See BMU 2008b.
[16] See BMU/ UBA 2007.
[17] Though the study speaks of „markets" we prefer the formulation „profitable options". Because of market failures and obstacles it needs incentives, guidelines and a new policy mix to convert these gignatic profitable options into selfsustained markets.
[18] To lower pressure on labour costs and to foster innovations are motives for the German Trade Unions (especially IG Metall) to engage in resource strategies on the enterprise level; see BMU/ IGM/ WI 2006.
[19] See Bleischwitz et al 2008.

Experience shows that this annual reduction of costs can be achieved by non-recurrent expenditure that has an average payback of 12 months.[20]

A macroeconomic analysis for the German industry ("Aachener Modell", see below. Aachener Stiftung Kathy Beys 2005) demonstrates that a realization of only 50% of the existing efficiency potentials would increase the gross national product, create new business areas and offer chances for jobs.

Results of the Aachener Modell (reducing material costs for German industry by 10%) **At the end of the simulation periode (2020):**	
• Additional employment:	+ 1,000,000 jobs
• Additional business revenues:	+120 bn Euro
• Additional increase of economic growth:	+ 1% per annum
• Harvesting first mover advantages of competitiveness	
• Reducing import dependency of strategic resources	
• Contributing to geostrategic risk minimisation	
• Approaching the official German goal („doubling resource productivity in 2020")	

Based on this macroeconomic effects, a long-term modernisation and innovation policy for reducing material costs, growth and employment could be initiated. Within a feasibility study of AdL and others (Jochem/ Kristof/ Liedtke 2005) a first **mix of instruments and measures** were identified how to address and overcome the barriers.

d) Empirical Results

Based on the encouraging results of these studies the German Government decided in 2005 on a pilot phase for an "Impulseprogram Material Efficiency" (see below) for testing instruments and for creating pilot projects and networks for SMEs and public enterprises.

The Pilot Phase of the German "Impulse Programme Material Efficiency" (2005-2009)

- **Government target**: Raise resource and energy productivity by a factor of 2 (1990-2020)
- **Overall economic goal**: Reduction of material and energy costs in the manufacturing industry and public sector
- Cost savings, new business fields, increased employment and competitiveness
- Minimization of resource use, residues, waste and emissions
- Pre feasibility study identified potentials, priority sectors for pilots (see: www.wupperinst.org)
- "German Material Efficiency Agency" (Deutsche Materialeffizienz Agentur/DEMEA) established;
- Financial support for audits (VerMat) and for establishing networkls (NeMat) are offered for SMEs

Meanwhile the DEMEA hat successfully supported indepth audits for more than 236 projects (9/2008); on average 229.000 €/a (a share of 2,48% of revenues) with a payback time of less than 6 months were demonstrated. Additionally the establishment of about 40 networks between SME for raising material efficiency were established.

In Northrhine Westfalia (NRW) the Efficiency Agency (EFA) was established in 2000 in Duisburg; since then the EFA supported more than 700 projects in NRW together with meanwhile 5 affiliates in other towns in NRW. A balance sheet of 140 realized projects summarizes that with an investment in

[20] See AdL/ ISI/ WI 2006.

resource efficiency technologies of 27.8 million € a cost reduction of 8.7 million € (average payback time of about 3 years) has been achieved.

e) Further Research on Integrated Strategies ("Ecological Industrial Policy")

Based on the scientific research results and on successful practical examples the German Ministry of Enviroment und the German Environment Agency decided to commit a 4 years research program on material efficiency and resource conservation ("MaRess")[21]. Wuppertal Institute is coordinating this ambitious research program in cooperation with a consortium of 30 partners from research institutes, universities and industry. The structure of the research project is summarized in the following figure 2:

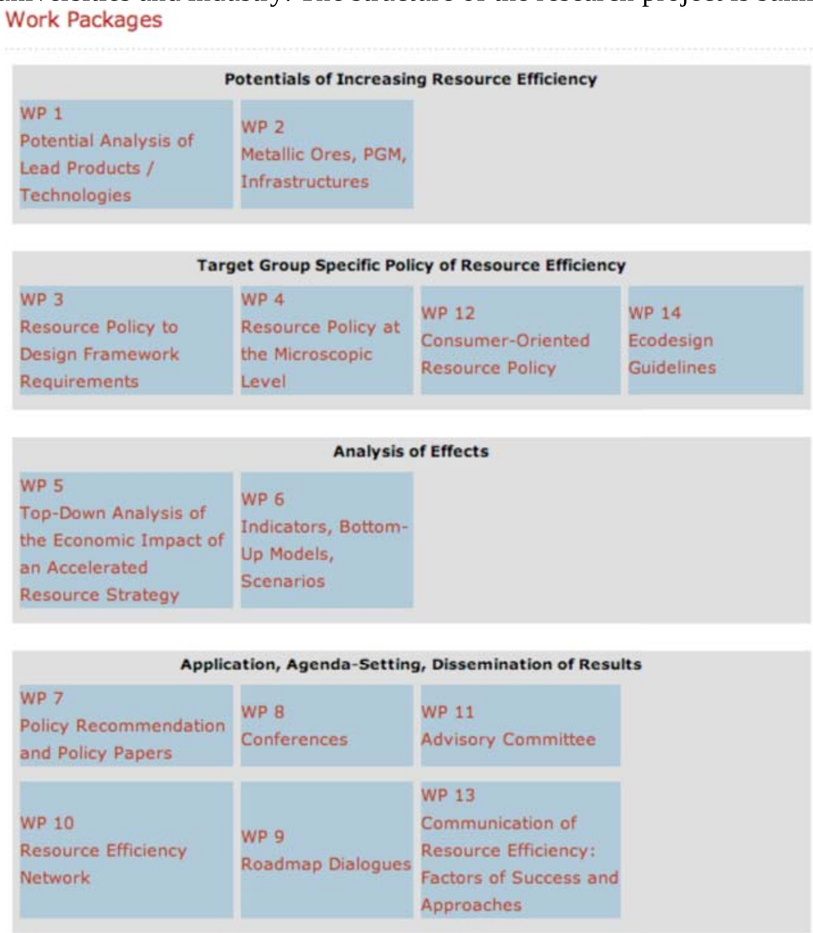

Figure 2: Structure of the project MaRess.

It is expected that a new policy mix for increasing resource productivity as key strategy of the new „Ecological Industrial Policy" will be the final outcome of MaRess.

In a policy paper within the context of MaRess Wuppertal Institute suggested an „Innovation Programm Resource Efficiency" as a longterm part of a comprehensive German „Konjunkturprogramm" to mitigate the economic crisis[22]. The program is intended to be be implemented up to 2015 to foster ecological modernisation, create new business fields for GreenTech and (net) employment effects. It scales up existing experiences of the Demea and the Efa (see above) with a total amount of 10 billion Euros of support from the federal budget for the SME-sector. It would be operated by a lean federal „Resource Agency" together with a network of regional and local partners. The support for SMEs comprise a mixture out of impulse and indepth audits combinded with investment subsidies. The key ratonale for this „Impulseprogram" is a **threefold integration:**

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[21] See www.wupperinst.org

[22] See Hennicke/ Kristof 2008.

1. Integration of five key thematic strategies	
	- create sustainable markets, give innovations a direction - establish strong institutions, build partnerships and networks to foster the diffusion of existing GreenTech - develop sustainable products („craddle to craddle-approach“) - use the market power of the state as a consumer - create new thinking through training and education (e.g. „Establish a Resource University“)
2. **Integration of sectoral policies**	
	At least the Ministry of Economics, the Ministry of Science and Education, the Ministry of Transport and Buildings and the Ministry of Environment should cooperate and harmonize overlapping and target oriented policies
3. The integration across technology and product development cycles	
	The program integrates target oriented R&D to raise material and energy efficiency with Demonstration, Pilots and Market Aggregation (fostering diffusion)

It has been estimated that (especially through this integrated approach) the program would have a high self-financing effect for he federal budget and would contribute to defend and extend the world market position of German GreenTech industries.

There is no doubt that the succesful implementaion of this program depends on many factors e.g. the convincing demonstration of the economic benefits, the effective scaling up of the German innovation system, the mitigation of rebound and conterproductive growth effects, the development of an effective communication strategy and - in general - the acceptance of the target group and the citizens/voters.

In the closing part of this paper we scrutinize one decisive political prerequisite concerning the management of „integrated“ policy interventions through „Strategic Governance“ which - for the German context - seems to be a very important, but often neglected issue of environmental policies. Especially for the implementation of the „New Ecological Industry Policy“ this is a hot potato, because up to now it is mainly driven by the Ministry of Environment with strong economic arguments that are not shared and supported in general by other Ministries and, may be, even not by the Chancellor herself. If this weakness can not be overcome there remains a gateway for counterproductive interventions of the „looser lobby“ of ecological modernisation.

5. Germany`s Institutional Context for Decoupling: Selected Problems

Integrated environmental policy-making in the sense of sustainable development proves difficult in the institutional context of the Federal Republic of Germany. The federal structure leads to an asymmetrical allocation of environmental competences between the federal and the Länder level. Moreover, Germany is characterised as a strong example of a consensus democracy (Lijphart 1999), its constellation of veto players leading to incremental policy evolution or, even worse, deadlock in times of opposed majorities in both chambers of parliament. The electoral system leads to coalition governments, normally comprised of a big (Social Democrats or Conservatives) and a small (Liberals or Greens) party, with considerable ideological heterogeneity of the actors involved. Coalition governments of the German kind tend to view their coalition agreements as binding contracts, making the formulation of new policies not agreed upon in the original agreement very difficult (Martin 2004)

– this holds true especially for the current `Grand Coalition` between Conservatives and Social Democrats. Although the Chancellor has the competence to specify the overall direction of government policies (*Richtlinienkompetenz*), the administrative structure of the Federal government is, in general, not favourable for integrated policy approaches and horizontal co-ordination as Ministers have strong positions, leading their Ministries on their own responsibility – or their parties' responsibility, respectively. Finally, Germany is usually described as a `high regulatory state`, meaning that the body of environmental laws and regulation is dense and policies are, overall, geared towards top-down approaches. The use of `new instruments of environmental governance´, such as market-based instruments (e.g. eco-taxes, tradable permits etc.) was only reluctantly introduced in the repertoire, none of them addressing the issue of sustainable production directly. On the other hand, (legally non-binding) voluntary agreements between government and industry were used quite often in the context of sustainable production, e.g. leading to the phasing-out of the use of harmful substances (such as lead in petrol) (Wurzel 2003). In the field of waste policy, however, instruments were implemented to influence product design at an early stage. The principle of producer´s product responsibility was introduced with the Waste Management Act of 1986 and reconfirmed in the Cyclic Economy and Waste Act in 1996. Regarding packing materials for household products and batteries, this approach was rather successful (Müller 2002).

The failure of the Federal government to formulate and implement a consistent policy mix to address the issue of decoupling is, in our view, linked to the patterns of policy-making described in the first part of the paper and above. As noted earlier, political commitment of the chancellor to the goals of the German NSSD is regarded as a prerequisite for its success. In addition, the leading responsibility of the Chancellor's Office is widely regarded as a key factor for the relative success of the NSSD in reviews and analyses (cp. Tils 2007, Steurer/ Martinuzzi 2005, Niestroy 2005)). Yet, this second condition demands further investigation. It is true, horizontal co-ordination by the Chancellor's Office can prevent conflicts between ministries from the outset (Niestroy 2005)). But: Does the Chancellor's Office really have the capacity and the competence to steer an integrated policy mix for dealing with problems such as decoupling? As Knoll (2004) points out, in German political science the executive is only rarely systematically analysed. It recent studies, Kaiser (2007) and Sturm/ Pehle (2007) assess the central executive's capacity to formulate and steer major cross-sectoral reform programmes (the decoupling of GDP growth from resource use clearly can be seen as such a major reform programme). Kaiser stresses that the main task conducted by the Chancellor's Office is to moderate the chancellor's claim to power in the `quadrangle of Chancellor – Party – Parliamentary Party – Coalition Partner`. A proactive, strategic steering of major cross-sectoral and cross-ministerial policy programmes proves to be very difficult as the Chancellor's Office only has small capacities of personnel that can deal with special governmental projects. This deficiency is aggravated by the fact that by far the greatest portion of the Chancellor's Office's staff is `lend out` from the different ministries and by the fact that policy advisors hired from outside the ministerial domain are unknown to the German governmental system. Moreover, regarding coalition governments in Germany, Martin (2004) was able to show that it is not the priorities of the central government (i.e. the chancellor and his Office) who destine which legislative projects the governmental coalition regards as priorities but rather it is the parties.
In short, the leading responsibility of the Chancellor's Office for the NSSD goals falls short of a sufficient condition for the formulation and implementation of a policy mix leading to a decoupling of resource use and GDP growth. Political commitment of the chancellor and leading responsibility of the Chancellor's Office should thus be seen only as necessary but not sufficient conditions for major policy change in the field of sustainable production. For major policy changes to take place, Kaiser (2007) notes, the preferences of the important governmental actors have to be close to one another (either via ideological convergence or via pressure from outside).

6. Summary and Outlook

On the one hand there are still numerous problems to be solved and obstacles to be overcome for a "decoupling policy" in Germany. The successful implementation of a new resource policy would certainly accelerate the ongoing structural change as well as the eco-efficiency revolution in Germany. In every periode of rapid structural change there will be winners and loosers, which causes specific challenges for the willingness and capabilities of governments and politics to take the lead. But on the other hand for Germany there is much evidence that at the long run raising resource productivity is a win-win-win option, causing (net) benefits of the privat sector, creating new „green“ business fields and jobs and reduce environmental impacts and social tensions from resource extraxtion.

In the long run it aims to change the direction of the technical progress fostering resource productivity at least with the same intensity like the increase of labour productivity. The ultimate socioeconomic goal should be a new labour augmenting and nature saving pattern of social and technological progress on the way to sustainable development. This can be a strong argument why in times of financial and economic crisis an „Innovation Program for Ecological Modernisation“ should be implemented as an integrated part of so called „Konjunkturprogramme“ which so far aim only at short term macroeconomic effects (based on a traditional Keynesian rationale).

A world wide revolutionary ecological modernisation process cannot be driven by autonomous technological progress, unregulated markets and maximising short-run profit margins of companies as mainstream economics believed for two decades. Instead, national governments and worldwide governance under the guidance of the UN must take the lead. A comprehensive policy mix, combining (re)regulation with innovative market instruments, and global with specific sector and target group instrument bundles are needed. In spite of many remaining uncertainties, the general idea of increasing energy and material productivity seems to be a robust and necessary first step towards sustainability.

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