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**Governing Environmental
Flows: The Need to
Reinvent the Nation State**

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Introduction

The management of *environmental flows* needs new concepts of governance. What is the role of government in this context? And what is the role of the nation state? The fact that *environmental flows* are typically of global nature leads to the question whether the nation state is still able to fulfill its relevant functions in times of economic and political globalization. Before turning to these main questions, I would like to briefly introduce and discuss the concepts of '*environmental flows*' and '*environmental state*'.

The cleaning and reduction of environmental flows

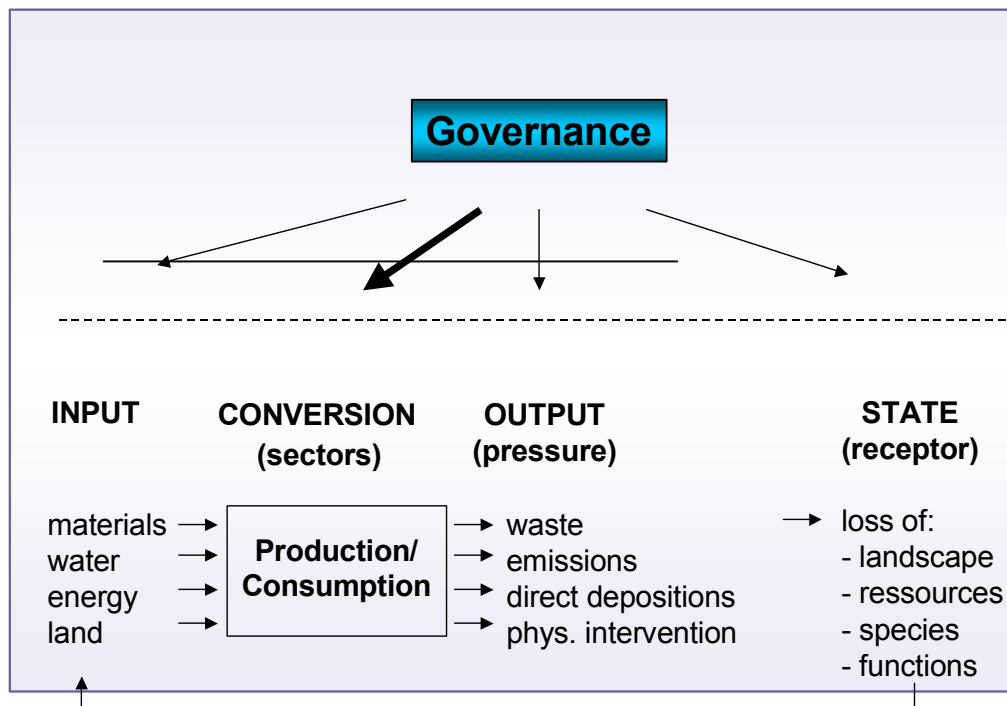
The concept of *environmental flows* was introduced by Mol and Spaargaren (2003). Using their concept, they focus on both the "changing material flows in products and environmental goods" and the "social relations and networks that give origin to, or accompany" such flows (Mol et al., 2003: 5-6). This concept may be more relevant in theory than in empirical research or in the field of policy consultation. As a theoretical concept, it is innovative and seems to have a high heuristic potential. It may be useful to identify different institutional contexts that frame the environmentally relevant material flows (Adriaanse et al., 1997). By adopting this broader approach rather than focusing on a single emission, product or sector, one can enlarge and possibly optimize the spectrum of intervention. This includes the identification of the main veto players in the chain of *environmental flows* (Jacob, 2003; Tsebelis, 2002).

Without discussing the concept in detail, I would however propose to first focus the concept on material flows in terms of their environmental impacts, and then analyze the societal conditions that influence the flows in a second step. Material flows in terms of their environmental impacts are complex in their own right! They include not only movements of matter within space (e.g., as basic materials, goods, or emissions) but also several changes in their environmental impacts as well as different combinations with other material flows. As *environmental flows* they, indeed, also have a societal dimension because they are both essentially influenced by the system of consumption and production and relevant as far as the human environment and health is concerned.

At the Free University of Berlin we have so far used the concept of ‘material flows’ in connection with a model of policy intervention (Jänicke, 1995; Jänicke and Zieschank, 2004). For many good reasons, the scientific debate has come to trace environmental impacts back to material flows. But it makes sense to use the more comprehensive concept of *environmental flows* to denominate both the material flows and the possible disturbing processes within the environment. The concept of *environmental flows*—if conceived as material flows in terms of their environmental impacts—could prevent us from using a too simplistic concept of material use leading to undifferentiated postulates like ‘factor 10’ or ‘factor 4’.¹ This is often restricted to a ‘tonnage ideology’, which has little to say about the various kinds of environmental impacts which tend to be quite different and therefore require different forms of observation and control.

Instead of ‘factor 10’ postulates, I suggest a postulate that I call the *cleaning and reduction of material flows* (see below). ‘Cleaning of environmental flows’ (e. g. by substitution of dangerous substances) seems to be even more important than their ‘reduction’. The paradigm for this postulate could be the new ‘REACH system’ of the EU Commission, or also the field of climate protection, where the reduction of energy consumption is of course a precondition for any success, but the cleansing of the energy mix from fossil and nuclear energies is even more important. For a long time, the paradigm for de-materialization and ‘factor 10’ (or 4) has been the area of waste management and recycling. However, this area comprises a segment of environmental flows that is too small (less than 10 per cent) and should not be overburdened by the general task of resource management.

Figure 1 provides a schematic model of the governance of environmental flows. As noted in Figure 1, environmental flows typically involve four stages: (1) the *input* of environmental resources; (2) the *conversion* process of production and consumption (constituting the ‘driving forces’ in terms of the well-known OECD model (<http://www.oecd.org/dataoecd/0/52/1933638.pdf>); (3) the *output* of negative environmental effects (the ‘pressures’ of the OECD model) and (4) the resulting environmental *state* of the landscape, resources, species, or ecological functions (leading to final ‘impacts’).

Figure 1. Governance of Environmental Flows

Source: Jänicke and Zieschank (2004)

One can similarly distinguish four stages in the development of environmental policy: The starting point is the visibly bad state of the environment. The main approach was reparation and management of environmental damages, combined with some insufficient reactive interventions like the dilution of pollution ('high chimney policy'). The next step consists of attempts to reduce the level of environmental pressure. Here, the main policy approach was the use of technical prescriptions for emissions and waste, typically leading to add-on technologies. The basic idea was to separate the system of production and consumption from the environment as far as possible, essentially by technical means and technical prescriptions. For various reasons, this proved to be possible only to a certain degree. The limits to this approach can be observed, for example, in the field of agriculture or regarding dissipative losses of all kind. In the third stage, which occurred primarily in the 1990s, environmental policy has therefore turned to bring about a conversion process within the system of production and consumption. Here, the general governance approach has so far been the broadest. The policy orientation has changed from technical standards (related to specified environmental impacts) to sectoral strategies, based on dialogue and cooperation. The debate on modern environmental governance is essentially a debate

about the governance of conversion processes. The final stage could possibly be the reduction of the input of material flows, since there is almost no environmental pressure without material flows. The taxation of the input to stimulate efficient resource use, including recycling, could be a plausible instrument for such preventive strategies. However, the ex-ante reduction of material flows necessarily leads to a reduced importance of powerful sectors such as mining, energy, basic industries or construction (reduced input of land). For many reasons, which cannot be discussed here, this approach has proven to be extremely difficult. Beyond the taxation of mineral oil, only a few input taxes exist in OECD countries.

Therefore, the *environmental flows* within the system of production and consumption currently are—and remain—the central challenge to modern environmental governance. This development of the environmental policy discourse has led to several proposals. The most important is the proposed ‘framework programme on sustainable production and consumption patterns’, developed by the UN Johannesburg Summit. Trying to implement the latter, the EU Commission has launched an initiative on the sustainable use of natural resources.

The sphere of production and consumption is the most important field for a strategic ‘cleaning and reduction’ of *environmental flows*. Governance of *environmental flows* is necessarily multi-stakeholder, multi-sector and multi-level governance (see Figure 2). The traditional instruments of environmental state intervention (both standards and taxes) are still important, e.g., in the field of climate protection (obligatory feed-in tariffs, or energy-efficiency standards like the Japanese ‘Top Runner Programme’). But at the same time, additional approaches for making better use of the existing motivation and innovation potential within society and the business sector are necessary. Therefore, all kinds of modern cooperative governance have gained importance, not least to avoid complicated decision-making processes by negotiating ‘in the shadow of hierarchy’ (Scharpf, 1998). This includes sectoral strategies and environmental policy integration.

As a result of the Rio Process and the experiences with environmental policy reform after 1992, patterns of governance have become more and more differentiated and complex. This is a process of trial and error, which is still going on.

The environmental state

The concept of the “green state” (Dryzek et al., 2003) or *environmental state* (Mol / Buttel, 2002, Mol et al., 2003) may be useful in this context. It has been invented and re-invented several times since the late 1980s (Kloepfer, 1989). Today, it is a possible formula for the ecological dimension of modern governance in terms of the three-pillar approach of sustainable development. Beyond this, the *environmental state* relates to one of the three cross-sectoral meta functions or “core interests” (Dryzek et al., 2003) that can be attributed to modern government in general—the economic, social and ecological meta function, which determine more than one policy field (see also Jänicke, 1990: 8-9):

- The *economic meta function*—which is historically the oldest—to provide the necessary regulatory framework and infrastructure for economic development and growth. Relevant policy fields (beyond economic affairs) include energy, transport, agriculture, housing, finance and research and education. Main political proponents are industrial organizations, liberal and conservative parties.
- The *social meta function* comprising the provision of social security and redistribution (‘welfare state’). Relevant policy fields include social affairs, labor market, health, education, housing, (public) transport and consumer protection. Main political proponents are trade-unions, welfare organizations, churches and left-wing parties.
- The *ecological meta function* to assure the protection of the environment (‘*environmental state*’). Relevant policy fields (beyond environmental protection) include research and education, consumer protection and especially the environmental divisions of all those policy sectors responsible for environmentally-intensive production sectors. Main political proponents are environmental NGOs, parts of the media and the scientific community as well as green (and partly other) parties.

Already in the late 1980s, Kloepfer, Forsthoff and Hofmann have used the concept of the *environmental state* (‘Umweltstaat’) in the context of the basic objectives of the constitutional law. They distinguished the ecological functions of the modern state from the functions of “state under the rule of law”, “industrial state” and ‘welfare state’

(Kloepfer, 1989, see also Callies, 2001). Later on, Bruno Dente conceived the 'ecological state' as 'a broker' playing with all the involved actors "a complex set of games with the idea of decreasing resource consumption at all levels" (Dente, 1998: 11). This notion is very close to an understanding of the *environmental state* as the core of governing *environmental flows* (Mol et al., 2003). Typically the *environmental (ecological, green) state* is also defined in the context of global governance.

The following relationships between *environmental flows* and the *environmental state* may be especially relevant: First, *environmental flows* do not only have different effects on environmental media such as air, water, or soil, but also differ from one sector to the other, for example, from energy production to the chemical industry or from agriculture to construction. As far as their environmental impacts are concerned, the management of *environmental flows* has therefore to deal with the inherent logic of each sector. Environmental policy integration and sectoral environmental strategies are an indispensable part of cleansing and reducing *environmental flows*. If one takes into consideration the cross sectoral importance of environmental issues, the concept of *environmental state* proves to be analytically useful.

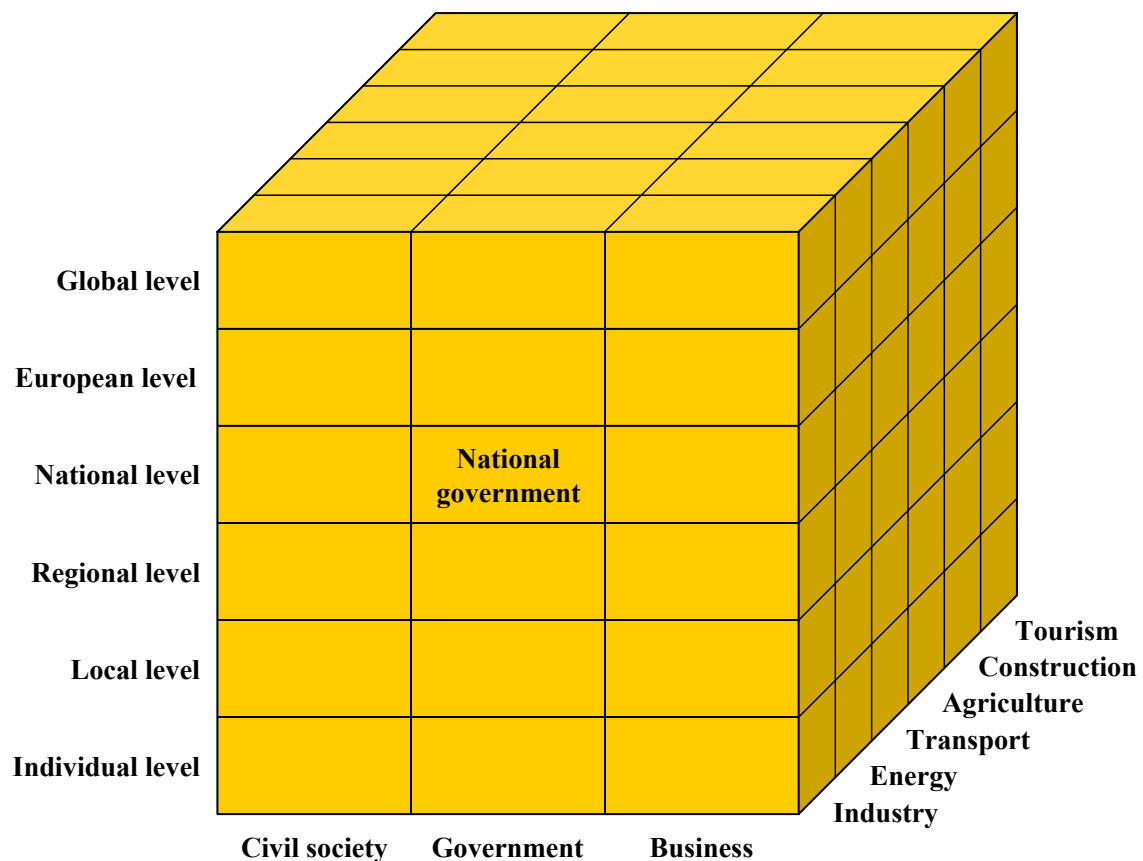
Second, the management of *environmental flows* within the system of production and consumption is impossible without giving a strong role and responsibility to those actors that cause and influence such flows. Compared to governments who act in a narrower legal framework with many veto players in the decision-making process, retailers or companies are often in a better position to end the use of substances or products causing environmental stress. Also, the innovation potential of industrial actors can be activated and used better if there is a close and cooperative relationship between government and the target group. The network could be broadened and strengthened by including environmental scientists, NGOs or other civil society actors. The governance of *environmental flows* is therefore commonly achieved by public and private actors.

Finally, in a similar manner, governance of *environmental flows* means reaching beyond the nation state. The flows of raw materials, (semi-)goods, emissions, or waste often cross national borders. Their management, therefore, cannot be restricted to national policies. Consequently, the governance of *environmental flows* must be conceived as multi-level governance and governing beyond the nation-state.

This is why Dente and Kloepfer stressed the role of the ecological state within the global context.

All this leads to a highly complex picture of modern multi-sectoral, multi-stakeholder and multi-level environmental governance. Figure 2 aims to portray this complexity by showing graphically the different dimensions of environmental governance: political levels (individual- to global-level), social actors (civil society, government, and business), and environmentally sensitive economic sectors (industry, energy, transport, and so on). The situation can be even more complex, if we bear in mind that the relationship between the actors involved can range from one-sided government influence on industry (as in the beginning of environmental policy), to strong business influence on government (even as capture!) or to various forms of cooperation between the two sides.

Figure 2. Dimensions of Environmental Governance



Source: Jänicke (2003).

Reinventing government

There are three main challenges to the role of government and the nation–state, all of which seem to contradict the postulate of a strong and more effective *environmental state*. The first key challenge is that of *environmental governance*: Today, environmental goods are produced by a large number of public and/or private actors. This leads to utterly complex actor-constellations across sectors and levels and has given rise to the concept of governance, often conceived as a substitute to ‘government’. *Political globalization*—the globalization of policies (and especially that of environmental policy) which is said to reduce the role of the sovereign nation-state—is the second key challenge. Finally there is the challenge of *economic globalization*; the role of international markets and multinational corporations is said to put pressure on the scope of action of the nation-state.

Before turning to the role of the nation-state in the process of political and economic globalization, it is worth mentioning that in the context of environmental governance the role of government in general needs to be reinvented. Even if voluntary agreements were a general solution, someone would have to make sure that the ultimate goal is finally reached (OECD, 2003). These soft instruments do not work without the final say of governments, which includes the ultimate option of hard regulatory interventions (‘negotiation in the shadow of hierarchy’). In addition, participation, ‘voluntarisation’ and consensus need to be complemented by competent moderation and professional public management. Due to market failure, environmental innovation and its diffusion also needs governmental support. Sectoral strategies and the transition management of dirty industries need a strong role of government policies. The Government is the main address, if there are problems such as flooding or BSE. In the late 1990s, almost 80 per cent of the EU directives and regulations were still of the ‘command-and-control’ variety (Holzinger et al., 2003).

In this context, it should also be underlined that cooperative approaches to governance need additional government capacities. The total administrative load that is required to develop such modes of government can be ‘surprisingly high’ (Jordan et al., 2003: 222). The UK environment ministry, for example, recently devoted 17 people to negotiating 42 voluntary agreements.

There is no doubt that government as a bureaucratic rulemaking machine—with its inherent tendency to expand its regulatory activity—has reached its limits. There is also a relevant potential of activated environmental self-regulation in the sphere of production and consumption. This private potential of action was the starting point of the debate on modern governance and steering beyond government. Modern governance is especially important if we turn to the difficult task of influencing *environmental flows* in the business sector, e.g., flows along the chain of production and the life cycle of a product. However, in the growing complexity of environmental governance the question of *final responsibility* for solving the relevant environmental problems has become crucial. If everybody is responsible, nobody will be responsible. In this regard there is no functional equivalent to national government. Its role has changed, but not diminished.

The environmental state and the internationalization of policies

As regards the nation-state and national government, we are faced with similar questions: Their role has changed, and there is without any doubt a loss of national sovereignty in the context of global governance. But is this equivalent to a general withering away of the *environmental state*? Or has the loss in sovereignty been compensated by a new potential of collective government action? Are environmental policy and the governance of environmental flows different from other policies that have come under high pressure in the context of globalization?

There are, indeed, several restrictions on national environmental policy: restrictions by WTO regulations, by EU internal market regulations or by the present role of the USA in the global environmental policy arena. But the fear of a general weakening of the nation-state has so far not been confirmed by empirical research.

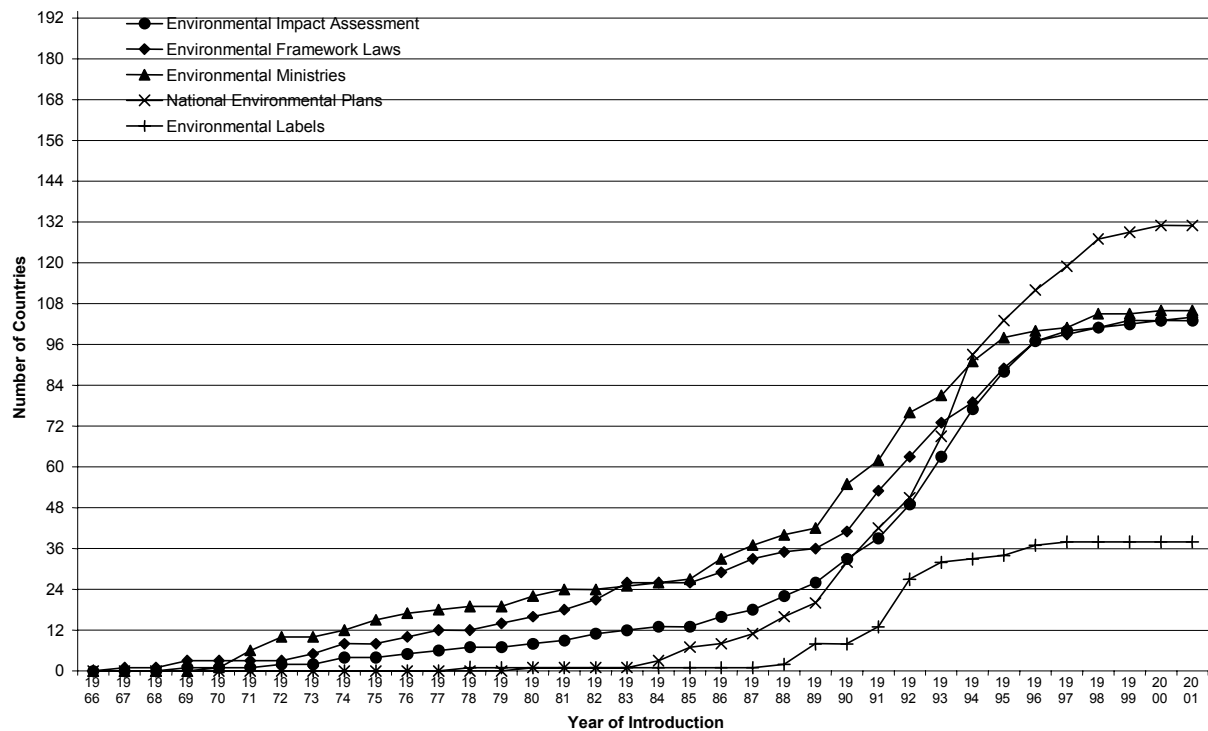
Regarding the role of national governments in global environmental governance, I would like to present some theses, based on different empirical studies.

Thesis 1. Globalization has created a policy arena for pioneer countries, at least in environmental policy. And pioneer countries play an important role in the development of global environmental governance. Pioneering environmental policy of certain (highly developed) countries has always been possible since 1970. The influence of small innovative countries in global policy has never before been as important as to-

day in the field of environmental policy (Andersen and Liefferink, 1997; Jänicke and Weidner, 1997; Jänicke and Jacob, 2001; Andersson and Mol, 2002). This influence is especially important with respect to the development of global environmental governance as observed in Rio de Janeiro (1992) and Johannesburg (2002). Political globalization has created a policy arena for political competition, wherein the pioneer roles of countries are relevant (Meyer et al., 1997). International institutions like the OECD or the UNEP, but also global networks of all kinds, provide a basis for benchmarking and competition in global environmental policy. Regulatory competition gives support to domestic innovative industries or protects the 'national regulatory culture' against pressures to adapt to policy innovation from abroad. The present regulatory competition regarding fuel-efficient products shows signs of 'green protectionism', if we take the 'Top Runner Programme' of Japan's Ministry of Economy, Trade, and Industry (METI) as a far-reaching example.

Thesis 2. The nation state is both the subject and object of global environmental policy learning and lesson-drawing. The national government is the subject of policy learning on how to solve environmental problems. At the same time national governments are looking for best practice, observing other governments (Rose, 1993; Bennett, 1991; Kern et al., 2001; Tews et al., 2003). Thereby, successful environmental policy innovations—the introduction of new institutions, instruments, or strategies—are often adopted by other governments. This improvement by imitation can be conceived as *horizontal policy learning*. It is an important mechanism of global environmental policy development and policy convergence. International institutions such as the OECD, UNEP or special regimes play an important role as agents for the diffusion of environmental policy innovations. This role seems to be more important than the creation of policy innovations by the international institutions themselves. Figure 3 provides some examples for the process of diffusion of environmental policy innovations (such as environmental ministries or green plans) from pioneer countries to the rest of the world. The speed of diffusion increased in the 1990s, apparently due to the fact that the mobilization prior to and after Rio greatly affected the process of environmental policy diffusion. This may imply capacity building at the national level, even if the divergence of capacities (behind the convergent policy patterns) remains high.

**Figure 3. The Global Diffusion of Environmental Policy Innovations:
The example of five policy innovations**



Source: Busch and Jörgens (2004)

Thesis 3. Globalization has very different effects on policy areas. The international pressure on wages as well as on taxes on mobile sources or social security provisions is a reality in times of globalization (Scharpf, 1998). But environmental (as well as health or security) standards have their own rules (e.g., WTO) and their own logic in international regulatory competition. It seems that the conditions for concerted actions of environmental ministers in the global arena are at least not adverse, if compared with other policies. Environmental policy has demonstrated considerable competence in using the opportunity structure of multi-level governance.

Thesis 4. Environmental policy innovation as well as environmental policy regression is primarily caused at the national level. In an expert inquiry for 20 different countries, we sought to identify the main sectors with environmental problems and restrictions. According to our survey, it is the energy sector, followed by road traffic, agriculture and construction, that faces the most persistent environmental restrictions (Jänicke and Weidner, 1997). Interestingly, these sectors do not generally face fierce global competition, and, in fact, the contrary—for example, the fact that agriculture and the power and construction industries strongly depend upon domestic demand—is

largely the case. Again, it is often that the nation state (typically influenced by domestic polluting industries) that resists international regulation: Countries such as the USA, Japan, the UK or, more recently, Denmark are examples of the double option of being either an innovator or a laggard in environmental policy. This range of options, at least for the highly developed countries, once again contradicts the argument of a general weakening of the nation state.

Thesis 5. Global environmental governance strongly depends on both the competence and creativity of national governments, and on the international system as a complex mechanism of policy diffusion and coordination. Of course this ('horizontal') view on the role of national governments is no alternative to the ('vertical') view on international institutions. The transformation of the nation state is a transformation *within* the context of international policy networks and institutions. And the international system is an indispensable mechanism of policy diffusion and coordination. Moreover, the international system provides the policy arena, which is important for pioneer roles and pioneering alliances in environmental policy.

The interesting question is whether international regulation or the competitive role of pioneer countries represents the main engine for global environmental policy development. At the Johannesburg Summit, the EU (strongly influenced by the German government) has for the first time gone beyond the (often minimalist) global consensus by stressing its pioneer role. Together with a large group of about 90 countries, the EU is going to follow an ambitious policy to support renewable energies (Johannesburg Renewable Energy Coalition). This is a new orientation focusing more on horizontal mechanisms of innovation/diffusion and competitive pressure than on global consensus at any price.

Thesis 6: There is no substitute for the nation state in multi-level environmental governance as regards financial resources, professional competence, coercive power, or pressure for legitimation. The manpower of national governments is significantly higher than e. g. that of the secretariats of international regimes (US-EPA: 18.000 employees vs. some hundred in international organisations). As a rule, the state is also the most complex nexus of relationships, being part of highly differentiated global and domestic expert networks (French, 2002: 141). Generally, it has the highest visibility and is the 'first address' in case of complaints (Willke, 1992). There is no comparable public pressure on political actors in Brussels or even on the global

level. Finally, it is the national innovation system and the national lead market that play the most important role in the process of global ecological modernization.

The *environmental state* in the global economy

The most pessimistic arguments regarding the capacity of the nation state focus on the presumably restrictive role of the global economy. The most popular argument is the 'race-to-the-bottom' (RTB) hypothesis of a regulatory downward-competition between countries, in which the positions of governments in fields like environmental policy deteriorate.

Thesis 7. There is no 'race to the bottom' in environmental policy—but why? Several empirical cross-national studies have rejected the RTB-hypothesis. This discussion was extremely important and has provided many insights into the role of environmental policy in the competition between national economies. Many arguments against the RTB-hypothesis are well known today (Vogel, 2001; Wheeler, 2001; Drezner, 2001): Countries and companies that trade with countries with strict regulations tends to have stricter policies themselves (Eliste and Fredricksson, 1998; Foljanty-Jost, 1997)—the largest markets are rather strictly regulated. The globalization of environmental policy has partly changed the framework conditions of the world market (Jänicke and Weidner, 1997; Weidner and Jänicke, 2002; Vogel, 2001). Regulatory competition with respect to the environment often creates first-mover advantages for national economies. This is part of the larger pattern of global competition (Porter and Van der Linde, 1995; Wallace, 1995) and is essential for the development of 'environmental lead markets' (Jänicke and Jacob, 2001). Multinationals tend to use the same standards everywhere (Wheeler, 2000). Differences in environmental standards therefore tend to decrease; generally they are less important than differences in, for example, labor costs or taxes.

In addition to the preceding observations in the recent literature that cautions against the RTB hypothesis, I would like to add three arguments: First, the environmental issue has, to a certain degree, become a dimension of general technological progress. Forty percent of technological innovations in 2010 are anticipated to be relevant for environmental improvement (Faucheux, 2000). Second, the environmental issue has become important in the light of international competition for inno-

vation. Finally, strict environmental regulations (within limits) remain a possibility to protect or support national industries. There has been some complaint about 'green protectionism'—for example when the EU commission proposed a comprehensive regulation for chemical substances (REACH) in 2003. The ambitious 'Top Runner Programme' of the Japanese METI noted above, which is to increase the energy efficiency even of imported products, has been prompted by similar protests in USA administration about a violation of WTO rules (which interestingly did not prevent the METI from extending the program!). All three arguments are extremely important for convincing (at least) some OECD governments to regulate *environmental flows* by assuming a pioneer role that may also influence other countries.

Thesis 8. Pioneer countries in environmental policy are highly competitive. The Global Competitiveness Report shows a remarkably high correlation ($R^2 = 0.89$) between the ambitiousness of environmental policy and the competitiveness of a country (World Economic Forum, 2000). Other studies have revealed a similar relationship (Sturm et al., 2000). These correlations, of course, do not constitute causal proof. The causal relations can go in both directions, and third factors (e.g., the GNP per capita) may be important in explaining both competitiveness and the ambitiousness of environmental policy. But in the light of such a sizable correlation, one can no longer insist on the traditional economic argument of an immanent contradiction between competitiveness and an ambitious environmental policy. The strong intercorrelation of the 'third factor' GNP with environmental policy and economic competitiveness can be explained by the following formula: Highly developed countries are characterized by both high perceived environmental pressure and high capacity to react to that pressure. The interplay of both factors is the main driving force for environmental innovation.

Thesis 9. The open ('globalized') national economy is characterized by strong government, both in size and scope. The fear of a general economic pressure, linked to the globalization process, which would reduce the role of governments, especially in open, globalized national economies, has not been supported by empirical research. Cross-national studies have shown, for example, that public expenditures in open economies in the OECD tend to be relatively higher (see Cameron, 1978; Garret, 1998; Bernauer, 2000). It seems plausible to assume that countries that are highly integrated into the international economy tend to have large governments and a lar-

ger scope of government activities. Open economies (1) need a well developed infrastructure for successful international competition, which in turn means more money and more public activities in fields such as education, R&D or transport; (2) require that there be compensational, distributional and other effects of rapid structural changes connected, for example, with a low degree of protection of domestic industries; and (3) need more regulatory activities of all kinds that are necessary to adapt to international developments such as global standards.

Thesis 10. New environmental technologies are created within national 'lead markets', which are induced by government support. The governance of *environmental flows* at the global level as well as the ecological modernization of the world market depends on the existence of national lead markets for environmental innovations (Jänicke and Jacob, 2001; Beise, 2001). The U.S. as lead market for the Internet, Japan as lead market for the fax machine, or Finland as lead market for mobile phones are well known examples. Empirically, lead markets are characterized by, for example, high per capita incomes, demanding and innovative buyers, high quality standards and pressures for further innovation (see also F. Meyer-Krahmer, 1999).

Lead markets for *environmental* technologies, however, are characterized by two additional factors: First, environmental innovations relate to global environmental needs. This means that there is a global market potential. The possibility of global market potential may help us to understand why the environmental issue is not in a hopeless situation in the global economy. Second, lead markets for environmental innovations are typically not only stimulated by higher environmental preferences of consumers in that country. Due to market failures, lead markets also depend on special promotion measures (sometimes by NGOs), or by political intervention in the market. To cite an expert on car industry: "...a complex interplay has begun between regulation and competition. The regulatory drive to push down...emissions has forced companies to compete against each other on environmental criteria" (McLauchlin, 2004).

Here again, the role of the highly developed nation state and of pioneer countries is crucial: In times of economic globalization, multinational enterprises are still in need of both production locations where the risky take-off of a new environmental technology finds public support, and of innovative buyers who are willing to pay a higher price and accept initial technological problems until the innovation becomes

cheap and sophisticated enough to succeed on global markets. Regulators in Denmark and Germany created favorable market conditions, and energy consumers in both countries were willing to bear the initially high price for wind power technology until it became competitive and profitable on the global market. Needless to say, that the strengthening of wind power results in a reduction of problematic *environmental flows*, e.g., from fossil fuels or nuclear energy.

Reservations

The foregoing arguments should not, however, be misunderstood as an overly optimistic picture of the role of the *environmental state* in the global arena. In general, we are not very successful in the field of environmental protection. And the task of governing *environmental flows* within the system of production and consumption has proven to be even more difficult. So far the volume of material flows has steadily increased, while at the same time the environmental quality of these flows has not been significantly improved. The question is, however, whether globalization is really the main obstacle to - or also an opportunity for - far-reaching environmental progress.

Two important reservations need to be stressed. First of all, so far it is only the highly developed nation state which has preserved or even increased its environmental capacity in the context of globalization. The situation of the less developed countries is still very different. The second caveat is even more important in our context: Pioneer policy in the field of the environment has so far proven to be successful mainly with a 'technology-based' policy approach of ecological modernisation (Jänicke, 1985, Mol 2001). We must acknowledge that structural solutions—changes in the structure of industrial branches or in lifestyles—are much more difficult to achieve. In this case, the mechanisms of the market system and those related to the competition for innovation cannot be used, which limits the range of policy options.

Conclusion

Bearing in mind these reservations, I come to the following conclusions:

The (theoretical) concept of the *environmental state* seems to be useful to describe the role of government in a more comprehensive approach to ecological modernization here being understood as cleaning and reducing *environmental* flows within the system of production and consumption. This approach requires multi-level, multi-sectoral and multi-stakeholder governance. In this context, the *environmental state* may be conceived as the core of environmental governance.

There are, however, three empirical challenges to the *environmental state*: The first is the new role of government within the complex set of actor constellations, referred to as 'environmental governance.' The second is the role of the nation-state in the context of political globalization. Finally, there is the role of the nation state in the context of economic globalization.

The role of government has changed in the context of globalization. But neither the increased importance of global markets nor that of global governance have weakened the role of national governments in environmental policy. The scope of action of individual states has sometimes been reduced, but 'governments in concert' have expanded and coordinated their regulatory powers. Pioneer policies, regulatory competition, and technological competition initiated by advanced industrial countries play an important role in the development of global environmental governance.

Beyond traditional forms of regulation, the governance of *environmental flows* in the sphere of production and consumption needs goal-oriented, cooperative and participative approaches of all kind. But to stress my point once again, the role of government has changed, not diminished. New management capacities are necessary to make the cooperative approaches more effective. Today, regulatory policy has often a rather latent than manifest function. But the importance of regulatory policy has not been reduced. On the contrary, currently new intelligent and more flexible regulatory instruments have been introduced (top-runner approach, feed-in tariffs, emission trading). There is no substitute for elected governments on different political levels when it comes to final responsibilities. It is their role to give the guarantee that the

most pressing environmental problems—from climate change to the dissipation of toxic substances—are finally solved.

There is also no substitute for the nation state in multi-level environmental governance as regards financial resources, professional competence, manpower, coercive power, or public pressure. As a rule, the state is also part of highly differentiated global and domestic expert networks. It has the highest visibility and is the ‘first address’ in case of complaints.

There is no doubt that even in pioneer countries, there is no reason to be satisfied with national environmental policies. But an ambitious approach to manage *environmental flows* should start from the existing national best practices. And if there is no substitute to government and to the nation-state, we should finally start improving their role and capacity in environmental governance on different levels.

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Notes

¹ Factor 4 and Factor 10 are closely related doctrines regarding environmental protection in which the case is made that mere pollution control is inadequate; Factor 4/10 proponents argue that true environmental progress requires very substantial dematerialization of production. Factor 4 and Factor 10 refer to different goals for dematerialization. *Factor Four* is the title of a book by von Weizsäcker, Lovins, and Lovins (1998) in which the authors made the case that a 75 percent reduction of material throughput in production is necessary. Factor 10 is a more lofty goal for dematerialization; Factor 10 has two assumptions: first, there is a need to reduce materials consumption globally by at least 50 percent; and second, for equity reasons—because 20 percent of the world's population consumes 80 percent of the world's natural resources—the advanced countries should aim for a 10-fold improvement in resource efficiency.