

# **eco@work**

Sustainable reading from the Öko-Institut



## Infrastructure of the future

What are the real  
barriers to progress?

### Keeping pace

Upgrading the infrastructure for sustainable energy - how do we clear the hurdles?

### Voicing concerns

Public involvement as a success strategy for planning schemes?

## Energy switchover now?!

In 1980 the Oeko-Institut published the agenda-setting book „Towards sustainable energy – growth and affluence without petroleum and uranium“, which highlighted alternatives to relying on nuclear power and fossil fuels for energy generation and use. Thanks to the climate change debate, these ideas are back in the public eye – with controversial overtones in the wake of Fukushima. After the German federal government's decision to phase out nuclear power, a new direction in energy policy is now within reach.

Yet on the way to a genuine switchover to sustainable energy, which implies a sustainable and emission-free economy and way of life, many questions remain unanswered. How are the policy framework conditions defined for the energy industry and other economic sectors? Which areas of life offer hidden potential for more energy efficiency? What can people do as individuals towards the energy switchover? Researchers at the Oeko-Institut have spent many years working on proposals and ideas to address this very issue. In our „Investigating“ sec-

tion you will find information on our new website [www.energiewende.de](http://www.energiewende.de), which presents selected research findings on this complex of issues.

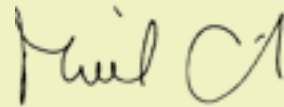
This issue of eco@work focuses on one central question arising from the switchover to sustainable energy – the challenge of initiating the necessary infrastructure schemes in good time. The aim is clear: renewable energies must be better integrated into existing electricity grids. Only this enables us to phase out nuclear and coal-fired power and successfully switch to renewables. Issues surrounding the state regulation of electricity networks require comprehensive rethinking, and new concepts for energy storage and intelligent management of new power plants are called for.

But our articles on the infrastructure of the future also look beyond the switchover to sustainable energy. Our experts extend the question “how?” to other infrastructure projects as well: how to plan infrastructure projects of national importance when regional planning is currently a regional-state

(Land) responsibility in Germany; how to involve citizens in the planning process; how to ensure the timely, transparent and comprehensible communication of political decisions.

The articles in this issue grouped under “Big ideas” give you a glimpse into many fields of research touching on infrastructure planning and the statutory framework in which it is embedded. Beyond this, recent news from our research programmes can be found as ever in the sections “Fresh action” and “Investigating”.

Wishing you an enjoyable read,



Michael Sailer  
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## "Involvement" A success strategy for consensus-based realisation of infrastructure projects?

The example of Frankfurt Airport



**A guest commentary by Thomas Jühe, Mayor of Raunheim**

After eleven years of involvement in the mediation process that accompanied the planning and implementation of the expansion of Frankfurt Airport, robust assessments are possible on the effectiveness of involvement strategies. The conclusions can be summarised concisely and to the point:

1. Participation is essential wherever statutory regulations give insufficient protection against interventions likely to damage the natural environment and harm human health or quality of life.
2. Involvement attracts droves of critics but few supporters.

Sometimes more protection is necessary than is afforded by the statutory rules for the realisation of large infrastructure expansion schemes. In that case, people initially resort to the usual democratic instruments such as demonstrations, petitions or lawsuits, aimed at overturning schemes, minimising interventions or achieving enhanced protective measures.

In our liberal democratic constitutional system, these forms of resistance fail more often than not, because the harmful fall-out of infrastructure development projects seems to affect only a very contained geographical locality. A relatively small group of affected people is offset by a distinctly larger group of people who are not only unaffected but in some cases net beneficiaries.

A groundswell of sustained mass activism on a large enough scale to make a political impact is unlikely to emerge in these circumstances.

Consequently, the only remaining option for the group of affected stakeholders is to engage voluntarily in a public involvement process at the invitation of policymakers. Yet such procedures make it extremely difficult to bring about unanimous solutions. On the one hand, this is because the realisation of the infrastructure scheme is already predetermined as the outcome. The only motivation behind stakeholder involvement is to establish the level of compensation arrangements that will bring about sufficient political acceptance.

The roles and status of the stakeholders involved can also interfere with the consensus process, because normally they are not free agents but delegates nominated by their own local authority or their stakeholder group. This structural unfreeness adds to the difficulty of achieving consensus on acceptable outcomes. Many delegates feel they run too high a risk of being cast as a "traitor" and dismissed from the very function that underpinned their involvement in the first place.

The local authority or the stakeholder group – at some distance from the process – demands the attainment of maximal objectives. Meanwhile the involvement process makes the delegate-turned-insider increasingly aware that due to statutory


and legal constraints or existing power relations, the maximal objectives envisaged by their stakeholders are unattainable. At the same time he sees the potential of the involvement process – and this alone – to achieve additional protection and improvements for the welfare of stakeholders. In the face of high expectations or pressure from their delegating bodies, it takes delegates with special courage or a certain "standing" to "salvage" what is possible in the given circumstances.

Another factor puts a strain on involvement processes: the more critical the public discussion of the interim results of work, the weaker the negotiating position of delegates. After all, scheme developers embark on involvement in the ultimate expectation of generating greater political acceptance, not additional criticism. If it fails to change people's minds and some sections of the population continue to voice criticism, then the infrastructure development side begins to feel unwilling to concede any more than it is legally obliged to. These are the key structural pressures that affect public involvement processes. Now for some conclusions, which may be surprising:

1. Involvement is necessary as a means of counterbalancing, at least in part, any shortfalls in the statutory and/or legal protection afforded to people and the natural world.
2. Successful involvement needs courageous delegates.
3. Successful involvement needs honest initiators.
4. Successful involvement needs intelligent and responsible delegating bodies.

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*As the mayor of the municipality of Raunheim and the head of the Commission to reduce noise from aviation at the Frankfurt airport (Frankfurter Fluglärmkommission) Thomas Jühe has been involved in the mediation process that accompanied the expansion of Frankfurt Airport since the year 2000.*



# No sustainability-orientation, fragmented responsibilities and patchy financing

Many factors impede the development of our infrastructure. But these are not addressed by the current debate

The question is not *if* but *how*: we want to ensure our future sustainability, so we must reconfigure and extend our infrastructure. This is not just the cross-party consensus. Other groups in society share the same assessment, including environmental organisations, industry representatives and academics. But we are not yet equipped to say exactly how. And instead of tackling the real barriers to progress, the public debate implies that public resistance is the greatest problem. Why is this the wrong outlook, and how will we really achieve our objectives? Regine Barth, expert in environmental law at the Oeko-Institut sets out her position – looking squarely towards the target of sustainability.

Infrastructure that supports public services, the running of the economy and the life of society, is something that we cannot do without. Nevertheless, reconfiguration and expansion proposals run up against numerous barriers, not least because infrastructure development is expensive, and often not financially profitable, at least not in the short-term or at lucrative rates of return.

Yet infrastructure development does not flounder on costs alone. There is also a fundamental question of policy: what kind

of infrastructure should it be? What infrastructure do we need in the fields of energy supply, mobility, resource management, communication, housing, trade and industry? And how should it be linked up? When it comes to these aspects, a clear vision has not yet been formulated. Without that vision, no consistent, long-term and integrated planning has materialised. Nor is there a sound understanding of the ecological, economic and social criteria to be taken into account and how these interrelate. Isolated strands of development are pursued instead. And what kind of decision-making processes will guarantee that the most appropriate plans are brought to fruition in sufficient time, and preferably without causing a social outcry?

Currently, the ideal of overarching objectives, integrated determination of needs and coordination of related planning processes is completely and utterly thwarted by the fragmentation of responsibilities. For these are carved up – depending on subject matter – between federal, regional and municipal governments, and between ministries within these governments. In some cases, little or no state planning is taking place; instead, private project agencies are de facto taking sole decisions on which particular infrastructure projects, if any, to put forward for approval in which locations.

Target:  
Sustainability

But the public discourse seems to be fixated on quite different barriers to progress. The debate is much more influenced by the fact that the upgrading of infrastructure flounders mainly because of resistance and incomprehension on the part of adversely affected citizens. In fact, in the draft bill for an “Act to standardise and accelerate plan determination procedures” (“Gesetz zur Vereinheitlichung und Beschleunigung von Planfeststellungsverfahren”) introduced by the Federal Ministry of the Interior in January 2011, the German federal government seeks to curtail involvement rights even further. It is agreed that decisions on infrastructure development should ideally be taken in consensus, and if not, then it is necessary to ensure that decisions are at least

transparent and comprehensible for those affected. That is an argument in favour of MORE involvement, not less. Involvement procedures must not be misused or viewed as an obstacle, but should be understood as an opportunity to uncover potential planning errors, to pre-empt potential conflicts and to develop solutions. The essential thing is to communicate transparently why a project is necessary in the interests of the common good.

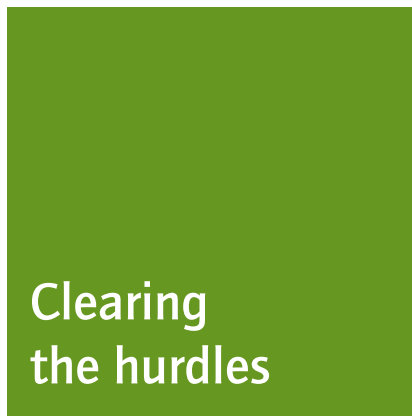
It is also the case that the upgrading and reconfiguration of infrastructure almost always results in losers who want to block the project even if it is well planned, necessary for sustainable development, and has been approved with all due process. A forward-looking debate should seek proactive solutions for this scenario by pursuing an even balance of state enforcement powers and state fairness.

If we want to overcome barriers on the way to a sustainable infrastructure for the future, the first key step we must take is to formulate and agree upon long-term goals and scenarios which we view as sustainable and appropriate to needs. We must also determine which boundaries and criteria should be adhered to as restricting conditions, in relation to environmental conservation or social cohesion, for example. From this it is possible to derive what infrastructure is required in any given case, where and how it can be realised most cost-effectively and sustainably, and whether there are synergies with infrastructure in other sectors. Part of this process is to map out the means and strategies for the financing.

The parameters of an integrated and sustainable system of infrastructure planning



should be developed across ministries and successively throughout the federal government in discourse with research, societal groups, business and the public sphere. Clearly defined, transparently reasoned and broadly supported aims, time schedules and priorities are a vital key to gaining understanding in an affected region when it comes to the concrete implementation of projects.



So far, the responsibility for regional planning has rested with the regional states.

Only in certain cases can the federal government formulate rules which the regional states must conform to. For many infrastructure areas, which require national – and in some cases even international – integration, as yet no approaches exist for strategic planning at federal government level. One example worth citing is the development of regional airports, frequently based not on need but on competition between regions. Thought must be given to a new orientation here. Higher-level plans directed towards sustainability objectives should be drafted at federal level in future, with powers to impose them even in the face of opposition based on purely political considerations at regional state level.

In order to finance our future infrastructure, public budgets must set priorities. In view of the indebtedness of federal and regional governments, the financing will not be affordable from public funds alone; on the contrary, Models are called for whereby infrastructure can be planned and operated in the public interest whilst at the same time remaining attractive to private investors willing to take a long-term perspective.

This means that instruments must be developed or elaborated which stimulate the interest of private investors to invest in infrastructure projects and their operation, even when these serve the interests of the common good. The mobilisation of capital in the coming decades, with a fair distribution of risk between the state and private investors, will be a fundamental precondition and should be pursued with vigour. Without decisive impetus in this area we will not create the necessary preconditions to achieve our sustainability goals. And finally, even the procedural law



governing the approval of schemes must be adapted to meet current requirements. As part of this, long and short-term economic aspects should be included in submissions, and given material consideration. If disadvantages accrue to stakeholders from an infrastructure project – for example, if exposure to higher noise levels reduces people's quality of life or the value of their property – as things stand they simply have to put up with it. The law makes no further provision, other than in exceptional cases to avoid breaches of constitutional rights. The only option remaining for those affected is then to reject the scheme completely, i.e. to attempt to thwart it politically or in court. The resulting costs and upheaval should be avoided by introducing binding instruments for the equitable reconciliation of interests, such as compensation arrangements, from the very outset.

## Fundamental overhaul of planning law





The formal planning and approval procedures for the upgrading of infrastructure were developed many decades ago and have long ceased to meet the requirements of the modern day. This is particularly problematic against the backdrop of the numerous planning decisions to be faced in the course of effecting the switchover to sustainable energy systems. The current bill for an "Act on measures to accelerate the expansion of the electricity grids" ("Gesetz über Maßnahmen zur Beschleunigung des Netzausbaus Elektrizitätsnetze") now at least sets out a stringent approach by the federal government, and contains no further restrictions on public involvement in comparison to past regional planning and plan determination procedures. Nevertheless, a series of crucial problems remain in current procedural law.

It is not embedded along with other planning matters into an overriding system of objectives in the sense of an integrated

system of sustainability planning. Instead, the synergies with other areas of infrastructure are only examined as a secondary consideration on the impact side. No attempt is made to define how and with what legal force the results of informal involvement procedures can be fed into the process. Nor are instruments created which would enable the plan determination authorities to provide for a fair reconciliation of interests for adversely affected individuals or communities. Under the legal system, their interests have so little protection that when they are weighed against the achievement of the law's objectives, they have to be treated as negligible. Once again, those affected can only resort to the „all or nothing“ strategy, i.e. contesting schemes instead of being able to negotiate them in a procedure to arrive at fair compensation for the disadvantages. In which case, further conflicts are pre-programmed.

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## Transparency in practice: The example of Atdorf

Trouble is afoot on the edge of the Southern Black Forest. Because the energy supplier Schluchseewerk AG is planning to build a pumped storage power plant – undeniably a drastic intervention in the natural environment, at odds with the supra-regional public interest in a climate friendly electricity supply. Amid this controversy, the affected districts of Bad Säckingen, Herrischried, Rickenbach and Wehr seized the initiative to have the approval process independently monitored, and commissioned the Oeko-Institut to

design and coordinate this during the regional planning procedure.

The aim: to create a neutral basis of information so that affected parties can form their own opinion on the planned construction. At the same time, the public should have the opportunity to discuss important questions – with expert consultants, for example – since no provision is made for this in the formal regional planning procedure.

[www.informationen-psw-atdorf.de](http://www.informationen-psw-atdorf.de)

# Energy supply of the future

Caught in a dilemma between research needs and cost efficiency

**All the signals indicate change. But a few hurdles remain to be cleared before a new era of sustainable energy can begin. They relate just as much to the appropriate preparation and implementation of forthcoming planning decisions as to technical questions. But an infrastructure project on this scale also calls for scrutiny of the regulating framework conditions. This is demonstrated by the necessary re-configuration and upgrading of the electricity grid, which poses a challenge not only for the operators but also for the Federal Network Agency. According to the findings of the Oeko-Institut, its role needs to be redefined.**

Since 2005 the German power grid has been supervised by the Federal Network Agency as the regulatory authority. Its job is to ensure the continuing development of the country's electricity infrastructure. Until now this happened mainly under one premise: to make grid operators reduce ongoing operating costs and thereby achieve low prices for the end-user. However, this is an aim in which companies were only moderately interested since it gained them no advantages over their competitors in a regulated market.

In 2009 the authority therefore introduced the "incentive regulation" approach. Since then the prices and revenues of grid operators have been capped, and are reduced every year by a fixed percentage rate. Furthermore, all grid operators must be benchmarked against the most cost-efficient company in the sector, and must succeed in

working just as economically within a pre-determined period of time. But does this form of regulation do any good in a period of transition towards sustainable energy systems?

"No," says Dierk Bauknecht, energy sector expert at the Oeko-Institut. "We face the task of integrating more energy than ever before from solar, wind and other sources into our transmission and distribution networks. This task is not limited to deciding how many new power lines will be needed in future and where. We have to solve quite fundamental technical problems and develop new network concepts." Here the scientist is referring to the concept of "smart grids": intelligent electronic integration, dispatching and communication between new power plant technologies, storage facilities, electricity grids and energy consumers.

## Research for smart grids

And he goes on: "With a sole focus on cost efficiency we will not succeed in gearing up

our energy infrastructure for the future. We need committed grid operators who also invest in innovations to pave the way for smart grids." But this is where the problem lies: "The current framework conditions offer the companies little incentive to do so." Experts even assume that the current style of regulation by the Federal Network Agency could actually hamper any such commitment to progress.

For any grid operator that invests in research and innovation incurs higher costs, at least in the short term, and takes the risk that new technologies may not bring the envisaged success in the long term. Insufficient attention has been paid to this aspect so far in the context of incentive regulation. In other words, companies run a risk of laying out research costs and then being left high and dry. But even if an innovation is successful, a grid operator can only reap the benefits to a limited extent on its own account. Instead it is required to lower network charges for customers. Within this framework, it is even less appealing to grid operators to drive forward innovations, because if these mainly support the integration of renewable energies they are primarily for the benefit of third parties.

It seems that grid regulation and innovation get in each other's way. "The Federal Network Agency must take on a new role. It is facing a paradigm shift, because its mission for the future is efficient grid operation plus expansion and integration of renewable energies," Dierk Bauknecht believes. But how can these two objectives be com-



## Components of a modern energy supply

- Appropriate and modern planning procedures which take account of acceptance, supply security, environmental and nature conservation and affordability
- An expedient economic regulatory framework
- Construction of new, decentralised power plants based particularly on renewable energies
- Reconfiguration and upgrading of distribution networks in readiness for the connection of numerous new decentralised plants
- Reconfiguration and upgrading of transmission networks to carry surplus electricity to distant centres of consumption
- Development and implementation of new electricity storage technologies
- Development of intelligent network concepts known as "smart grids" for better electronic communication and dispatching in the networks, and between energy producers, storage facilities and consumers; for example, to combine individual power plants and consumers into virtual power plants, manage load flows more effectively, keep more precise track of capacity limits in real time, or react better to fluctuating generation volumes

costs and risks are incurred. It is absolutely fundamental that the Federal Network Agency recognises this and clearly articulates to the companies that their innovations are wanted. And to facilitate the politically desired switch to sustainable energies, they are also desperately needed.

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bined? The Oeko-Institut is pursuing this question with other cooperation partners in the research project "Innovative regulation for intelligent networks" ("Innovative Regulierung für intelligente Netze", IRIN).

## Regulation and promotion

Experts see great potential in the possibility of strategically complementing incentive regulation with incentives for innovation, and taking explicit account of research and development costs as part of regulation. This means that the regulator allows network operators to pass on this type of expenditure directly to customers. The cost risk would then be transferred to the network customers, although they also stand to benefit from the innovations. Alternatively the companies could also be rewarded solely for their success; in other words, for the actual outcomes of their research. On the strength of successful innovations, network operators would then be permitted to raise their network charges. All the more incentive to carry out research as efficiently as possible.

Regulation, which has previously tended to hamper innovation, is also capable of providing a sophisticated range of instruments to enable network operators to be not only more efficient but also more innovative. "Nevertheless, we doubt that it will be enough to prepare the grids for renewable energies and the infrastructure for the switchover to sustainable energy systems," says Dierk Bauknecht critically. And why should network customers who happen to be connected to the grid of an innovative company be required to fund the costs of smart grids?

For Dierk Bauknecht, this raises the question of whether innovations should not also be dealt with outside of the incentive regulation regime. For example, by means of a "Low Carbon Network" like the recent initiative operated in Great Britain. All network operators there can apply for the funding of innovation projects from one fund to which all network users contribute. The regulator participates in the decision on which projects are selected, which depends quite significantly on the extent to which they contribute to the implementation of political objectives.

"The most attractive way forward appears to be a combination of both options: Every company receives a limited budget for network innovations. Anyone who wishes to exceed it must apply to a fund," as Dierk Bauknecht assesses the situation. Whichever mix of instruments ultimately proves to be most effective in practice – one thing is certain: Where innovations are developed,