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The Planning System and its impact on sustainable urban form and energy demand

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Abstract
The Dutch physical planning system is at a turning point. Recently the Government proposed a new institutional framework for spatial planning. Theoretically, existing planning hierarchy suggests that planning in the Netherlands is conducted systematically, including a strong notion of integrated rationality and definition of goals. Theoretically, energy efficiency might be such a goal and hence, energy efficiency could be served by the planning system.

In practice, the planning process is discursive and decisions are usually made through concerted action based on negotiations. At first sight, the intention to change the planning system is rationally oriented. However, the main lines of the proposal deviate from the insights into planning sustainability. Balanced decision-making and 'governance' may be affected. This is not likely to be favourable to energy efficiency, because these aspects are usually recognised as crucial to planning sustainability. Land use planning, planning policy and planning implementation introduce constraints for energy efficiency in consumption as well as for implementation of renewable options.

The current trends in the planning system will be discussed with respect to the principles of sustainability and the consequences in the energy domain. The focus will be on the way knowledge of local conditions ('situated knowledge') is used in planning, which will be illustrated with examples of the significance of using such knowledge. If a planning process is closed as in the proposed 'funnel model', specific knowledge forms and value systems (experiential, local, tacit) are excluded.

Urban form and planning principles
Planning is significant for energy efficiency. Although there is no doubt about that, this relation is rather complex. Is there a potential for spatial adjustments in response of issues of energy efficiency? This question is often answered positive. However, on the interdependence of energy generation, distribution and consumption on the hand, and spatial planning and environmental planning on the other hand, consensus hardly exists. There is not really an answer to the question what the spatial responses to energy constraints are. Seventeen years ago Owens (1986) tried to answer the question and she obviously succeeded in showing the relevance of spatial planning for energy efficiency. In her analysis she already recognised the fact that the characteristics of energy efficient spatial planning diverged for efficient transport, for efficient heat and power supply, and for the exploitation of solar power (Owens, 1986: 61).

COMPACT CITIES
In the following decade a broad discussion emerged about this subject and visions started to diverge. The question of energy efficiency was framed in a discourse on sustainable development, in the first place. Furthermore, the concept of the *compact city* became dominant in the discourse on sustainable urban form (Newman, 1992). Compactness and mixed land use would allow economically feasible energy efficient systems, such as CHP and decentralised application of renewable energy sources. Furthermore, compact-

ness and integrated land use would allow clustering of trip ends, creating better potential for public transport and non-motorised mobility. The discussion on sustainable urban form has been narrowed by Newman and Kenworthy (1989) to a discussion about urban density and energy consumption for transport. Their global analysis of large cities concluded that lack of density is the main cause for high levels of energy use. This conclusion has been criticized because in their analysis cities all over the world were included, whereas the major explaining variable for car use would be the economic wealth. As wealth was statistically strongly (negatively) related with density, the correlation between density and car use would become spurious. Nevertheless, they reinforced their conclusion ten years later with new data. Density, nor car use, would be significantly correlated to wealth at the level of cities. They stressed, "that density is the dominant explanatory variable for the level of transport energy use." (Newman and Kenworthy, 2000: 113).

In the Netherlands, the concept of the compact city was introduced by the National Planning Agency (RPD, RijksPlanologische Dienst) in 1985, and it has been dominant in spatial planning in the Netherlands during the last decade. Within the sustained system of central planning it still is, although the concept of the network-city has been added to official policy goals. National policy, as formulated in the Fourth (1989) as well as the Fifth Physical Planning Memorandum (2001), continues to aims at compact urban development. A discussion has emerged, however, whether the claim that compact urban development is serving sustainability. The so-called "paradox of the compact city" has emerged. While high densities are supposed to serve energy efficiency, particularly the limitation of (car) mobility and energy consumption for heating, some adverse effects also occur. Adverse environmental impact may occur due to high densities of activities and people. By concentrating many activities in a limited amount of space, nuisance like annoyance from noise, stench, and air pollution, as well as risk from hazardous industrial activities increase. They are concentrated and stacked.

The relation between spatial characteristics and energy consumption is now entangled with different features of sustainability. The question now is not only whether high density is related with low energy consumption levels, but also whether high density is sustainable in a much wider sense. This is also a matter of acceptability of such high densities and of reasonable ways to achieve them (Breheny, 1997). If high density is creating better conditions for low energy levels in the first place, high densities might create negative experiences as well. In reaction to those experiences, new developments may bereinforced that create adverse effects. In case of concentrated environmental impact within cities, people will try to leave the cities, either for living in the countryside or on vacation. As quality of life is negatively influenced by compact cities, the effect may be an increase of leisure time trips outside the city or a further reinforcement of urban sprawl because people try to fly away from the concentrated compact annoying town.

RESEARCH QUESTION

An underestimated factor in the discussion about urban form and sustainability is *who* has to conduct the planning, *how* it should be done, and *what* will be the effects of that planning. Some planning principles may be environmentally sound, but in practice they may be enforced in a way that they eventually create adverse effects. This paper will deal with some views about the way environmentally sound planning should be carried out, and it will also review three cases of practices in the field of energy.

These views about environmentally sound planning will be confronted with some major characteristics of the Dutch planning system and particular with a major trend in it. *The key question is whether or not the current pattern in planning and the institutional conditions for planning are favourable for sustainability, in particular energy efficiency.* This question will be answered as far as planning for direct energy use. There are two main achievements concerning energy efficiency and spatial planning: more efficient direct energy use at on locations, including sustainable supply, and efficient energy use indirectly caused by spatial planning. The three cases that will be discussed are all on the direct energy use: sustainable building, implementation of PV in urban districts, and implementation of wind power. Energy use indirectly caused by spatial characteristics is not discussed here, although it certainly is not less important, as it is mainly energy used for transport.

Environmentally respectful planning

There are some different approaches in how to achieve environmentally respectful policy programmes. These approaches may take a theoretical starting point, they may be based on generally (or officially, which is not exactly the same) accepted principles, and they may be primarily empirically founded. From all three types I will review an example and then I compare them.

THE SUSTAINABILITY DISCOURSE

Obviously, the concept of sustainability is significant here. We will not discuss different definitions of sustainability, although it should be noted that these tend to show an increasing deviation. For sustainability as such there still exist claims that it is an objective concept (Hueting and Reijnders, 1998) but it is usually part of sustainable development, a concept that by definition contains a normative component. Let us define Sustainable Development as all types of economic and social development that protect and enhance the natural environment and social equity. This definition avoids trade-offs between the natural environment and economy. Rather it accepts any type of social or economic development that meets the environmental as well as social constraints. It recognizes the importance of equity within the same generation and allows a broader concept of development than that specified by growth in GDP. Defined this way, sustainability has more than one dimension: economic, environmental, social and technical. Economic sustainability involves the concepts of productive, allocative and dynamic efficiency. It considers the long-term economic viability of households, communities, countries and global human society. It requires investment in material resources to improve sustainability, but also in human resources.

Environmental sustainability includes specific issues ranging from local (e.g. local traffic air pollution or noise) to regional (e.g. power generation emissions) to global (e.g. diffusion of nuclear materials or climate change) and also encompasses the maintenance of entire ecosystems. Technical sustainability involves using best practice products, services, work practices and institutional arrangements. It also concerns more social aspects, such as fostering appropriate innovation in hardware, software and institutional framework that creates opportunities for implementation of such innovations.

Sustainable development strategies are cyclical processes of planning and action in which the emphasis is on managing progress towards sustainability goals rather than producing a "plan" or end product (Carew-Reid et al., 1994). Hence, planning is important, but a "plan", which has a tendency towards technocratic rationality, is not the objective. It is the direction and the strategy that count. Within the sustainability discourse the social dimension of sustainability has become more and more significant. Started as a compromise between the mere ecologically based concept of carrying capacity and the politically predominant endeavour for (economic) growth, the social dimension of sustainability has become a condition for achieving improvements in ecological sustainability. "Perfect" sustainability is not a practical goal, neither is consensus between all stakeholders. Rather, trade-offs must be made that allow communities to improve all aspects of sustainability through time. The approaches to SD generally agree on the following principles, with varying priorities:

- Future perspective, linked with a precautionary principle;
- Care for the environment;
- Quality of life;
- Fairness and equity;
- Participation and partnership.

Social sustainability involves quality of life, equity, human knowledge, educational development and ingenuity, and social skills. These are all needed to serve and to create or maintain a society; hence these are needed for achieving ecological and technological sustainability even more. Monitoring, evaluation and learning from experience are keys to a successful SD strategy, and must be an integral part of the process (Pretty and Chamber, 1993). Professional biases of planners and professionals should be overcome. Professionals must be turned from "experts" to facilitators. For the way planning towards sustainability is carried out, these principles have some significant consequences: "openness" and "stakeholder participation".

- *Openness* refers to processes, arenas and knowledge: within the planning process all judgments, assumptions, and uncertainties should be made explicit, all methods and data that are used should be accessible to all.
- *Stakeholder participation* means involvement of all stakeholders, according to the openness criterion, no stakeholders that feel involved should be excluded. Particularly important is a broad representation of key actors to ensure recognition of diverse and changing values: professional, technical, and social groups, including youth, women, and indigenous people. At the same time, the participation of decision-makers to secure a firm link to adopted policies and resulting action should be ensured.

ECOLOGICAL MODERNISATION

A second approach, less policy oriented and according to some authors a more structural theoretical one (Mol & Spaargaren, 1992) is the perspective of ecological modernisation (EM). This sociological and political science based theory has more analytical rigour than sustainable development, claims Dryzek (1997), although he still considers it a discourse rather than a theory. EM has emerged as a reaction on the basic conservative, anti-modernist features of environmentalism in the seventies and eighties. Initially it focused upon new technology and the options of turning technology development in a direction that it would the industrial society towards an ecologically rational economy. This "techno-corporatist" interpretation (Hajer, 1995) still emphasises on expert knowledge and rigorous centralised decision-making. However, soon a second interpretation developed that stressed that altering the processes of production and consumption can only be achieved when principles of redistribution, social justice and democratic decision-making are incorporated.

The environmental capacity of a society could be developed by modernisation (Jänicke, 1997). Central institutions of the society can be modernised and transformed in order to improve the environmental capacity. In his comparative studies on environmental capacity of nations, Jänicke found a few factors that are favourable for the development of this capacity. He repeatedly pointed at the Netherlands as a nation that was relatively successful with its environmental policy, because the country scores particularly high on one of the main success factors. From way back it has a political and social culture that is strongly directed at consensus building. In the policy domain of land use planning this phenomenon can be recognised, because in practise the planning process is discursive and decisions are usually made through concerted action based on negotiations by authorities an public agencies from different levels (Hajer and Zonneveld, 2000). Ecological modernisation is the process of incremental progressive modernisation of society by sectoral macro-economic shifts, supported at the micro-level by the application of new clean technology by individual firms and consumers. The theory would also be applicable to, for example, the macro shift from energy intensive towards energy extensive sectors, and from energy inefficient (fossil fuel based) energy technology towards energy efficient and renewable based technology at the micro level. We will focus upon the question about what conditions would support it, as far as it concerns the way energy relevant planning is concerned.

The two interpretations of EM are usually described as "weak" and "strong" ecological modernisation. Gibbs (2000) summarises the key characteristics of both (Table 2). It is important, however, to recognise that the strong interpretation could develop because the initial, weak interpretation existed. From that perspective, the emphasis on participation is significant and it is different from the per-

Table 1. Characteristics of weak and strong ecological modernisation (Gibbs, 2000: 13).

Weak ecological modernisation	Strong ecological modernisation
• Technological solutions to environmental problems	• Broad changes in institutions and economic structure of society, incorporating environmental concerns
• Technocratic/corporatist styles • Policy making by scientific, economic and political elites	• Open, democratic decision-making • Participation and involvement
• Restricted to developed nations • Used to consolidate global economic advantages	• Concerned with the international dimensions of the environment and development
• Imposed a single, closed-ended framework on political and economic development	• Open ended approach with no single view • Multiple possibilities with and EM providing orientation

spective within the sustainable development discourse. Openness in decision-making and participation are not only consequences of a normative choice, they have also become more instrumental to the transition towards environmentally sound production and consumption. The implementation of modern clean technology is simply hardly possible without them, or it will lead to adverse effects eventually. Openness and participation are needed for learning and these are described here as an escape from technocratic and corporatist styles of planning, carried out by economic, scientific and political elites.

Sustainable building

As a part of the change in environmental policy towards the sustainability paradigm (Weale, 1992) a new policy line on "sustainable building" was officially started. The White Paper on sustainable building was published as an appendix to the National Environmental Policy Plan Plus in 1989. This policy focuses on three lines: impact of materials (applying chain management), quality stimulation (including health impact and installations), and energy efficiency (reducing energy demand and optimisation of sustainable source use). The energy line is rooted in the measurement directed at energy efficient housing construction, that had started in the seventies for economical reasons (oil crises).

Sustainable building is supposed to be more than low-energy building only, because attention was also given to other environmental themes, such as use of materials, water consumption and waste water, indoor climate, materials (use), waste, flexibility, safety, nature and the landscape.The changed objectives as well as change of strategy towards the inclusion of "target groups" in the strategy of environmental policy (Weale, 1992) lead to the establishment of the Building Industry Environmental Council. In this body the Dutch national government and the organisations within the building industry co-operated to work on a structured approach to sustainable building. Government policy is development in co-operation with the building industry and trade. Only a minimum amount of sustainable building has been included in legislation and regulations, as regulations are considered inflexible and often a barriers for taking opportunities. Hence, the guiding principle is that parties should voluntary build in a sustainable way on a basis. Since 1993 voluntary environmental agreements are usually applied to implement sustainable building. Most of the agreements concerned municipalities and housing associations, however, housing associations generally have not made much progress in sustainable building and management.

Several demonstration projects (called Dubo projects; Duurzaam Bouwen = Sustainable Building) for individual houses or small housing districts were started. At the end of 1995, the ministry thought it was time for shift from experiments towards application in the mainstream of building. Sustainable building was proposed to be the standard in the process of planning, designing, implementation and management. The government developed a new policy line of harmonisation: an effort to create consensus about what exactly is meant by sustainable building and how this can be implemented. With the objective of standardising measures, so called National Sustainable Building Packages were developed, among those a package for urban development (NDC, 1999).

For the energy line in sustainable building, specific regulation is applied. The regulation for the housing sector (although similar instruments are developed for other buildings) involves the Energy Performance Standard (EPN, Energie Prestatie Norm) in which the Energy Performance Coefficient is applied (EPC). This energy efficiency standard must result in a reduction of primary energy consumption. The simultaneous effects of all kinds of energy efficiency are calculated and the result has to fit the standard. This leaves the actual combination of measures tot the developers and designer of the building. Furthermore, a system of Energy Performance Advise is developed, that is linked with the Energy Premium Regulation (a subsidy) for specific measures, particularly for existing houses. For newly built houses the standard is mandatory, for the existing housing stock it is voluntary. In the latter case, a similar instrument in Denmark, is mandatory as well when the house is sold, and it is much more effective than in the Netherlands (Gilijamse and Jablonska, 2002).

The EPN generally is considered a moderately successful tool. Technical innovation continuous leads to an adaptation of the standard (lowering), because the application of the standard is reasonably flexible. Developers may select there own options for achieving the performance level. However, the EPN only tells something about the (assumed) energy consumption in the building itself. It offers little help with decisions regarding the energy infrastructure as a whole. A new complementary tool Energy Performance on Location (EPL) tries to looks beyond the individual building. This instrument is to be applied for new housing districts, and here some major spatial planning characteristics are involved.

Density of housing, south orientation (passive solar energy) and distance towards energy infrastructure are some spatial characteristics that are part of the energy efficiency of districts. The EPL supports local authorities in energy policy for new building locations, whereby the EPL, similar to the EPN, is not only a measure for fuel savings, but for entire new building locations, including the energy facilities that have been installed in the district. EPL is calculated before the process of building has started, as specific behaviour of the inhabitants is assumed. Again, here is one of the most striking problems of the instrument. The other issue is, that as soon as the energy performance of entire districts is assessed, the transport flows that are linked to the characteristics of the district and its location should be taken into account. There is no solution to that problem so far.

The policy line of sustainable building is generally considered as moderately successful, but for improving the performance, the focus should be widened. A shift towards broad urban planning is needed and the involvement of the users of buildings is needed. Remarkably, for example, in spite of the collaborative approach that defined the building industry and the municipalities as "target groups" that were involved in planning sustainable building, the consumers were not involved systematically. While the early experiments and demonstration projects sometimes originally were started as citizen initiatives, the fundamental policy line was hardly directed at the involvement of the (future) inhabitant. Only recently, in the Sustainable building policy programme 2000-2004, consumers were designated as a main target. The result of top-down planning in building projects has frequently resulted in adverse effects (Hertz, 1996). Technical designs often suppose certain behaviour of the people that are the users of appliances or specific features in buildings, a kind of behaviour that often simply is not existent. While the usual reaction of planners is that this behaviour can be changed to fit the assumptions that are implicitly incorporated within the design, by informing and educating consumers, the assumptions often lack realism. Hertz (1996) gives a striking energy example of sun lounges that turned into badly insulated walls because the owners discarded the wall between the room and the sun lounge. The proposed involvement of users is the development of sustainable building projects is mainly meant to avoid this kind of adverse effects. The consequence is that the supposed "rationality" planning should be abandoned.

This becomes even more significant, because the energy regulation of housing is moving towards spatial planning. As Tjallingii stated for the sustainable building "creating carrying conditions precedes planning for results." (Tjallingii, 2000 p.82). The rationality of planning should be shifted towards the rationality of decision-making. Although the standards, such as the EPN have been moderately successful, it could only be so at the level of the individual building. Including the spatial planning component creates the need for a shift from limiting conditions (standards) toward carrying conditions. As Tjallingii notes, quoting Hajer (1995) "from environmental protection towards ecological modernisation." (Tjallingii, 2000 p.83).

Implementing Renewables

Beside energy efficient generation and efficient consumption, power generation without the use of fossil fuel and without the creation of hazardous emissions or waste (either chemical or nuclear) may be considered sustainable. Usually these techniques are called renewable. However, some renewable sources may not be considered sustainable for reasons of generating waste, generating different types of risk and destroying other kinds of valuable natural and societal resources. Examples are most large-scale hydro power stations, and some biomass applications, in particular certain organic-waste-to-energy plants. It is well known that grid-connected wind, biomass and hydro projects generally have lower direct costs than grid connected Photovoltaic electricity generation (PV). However a much higher fraction of their external costs appears during installation and use.

The costs are likely to be externalities from the perspective of the project developers. They have to be borne by other stakeholders, thus they may manifest themselves as stakeholder resistance to renewable energy projects. These externalities have to be considered when projects containing renewable options are planned. Stakeholder resistance may translate into unanticipated direct costs to the project developers. From an investor's perspective, they may cause delays in project approval or construction, or they stress the need for modifications to project design, reduced operating life etc. It may also translate into generalised social resistance to a technology that then impacts on future projects, even if they are more benign in terms of their external impacts than the project that created the initial problems. Risks of this kind are best managed by implementing an appropriate planning framework.

IMPLEMENTATION OF WIND POWER

Wind power is a renewable energy source that has become successful in some countries (German, Denmark, Spain), but that has failed to develop as quickly as officially proposed in some other countries (UK, Netherlands). In the Netherlands, for example, the official policy target from 1985 until 2000 was 1000 MW installed capacity. Only slightly more than 400 MW was realised, however. This failure could be predicted because of significant factors in the institutional framework (Wolsink, 1996):

- An early national policy choice for energy utilities as the prime investors and for large scale application;
- A national policy choice for subsidies on capital investment instead of energy yield;
- Above all, a failing siting policy.

The first two factor are problems of central planning. The choice of policy instruments focuses on primarily economic incentives, but these are always directed at typices market actors. The question is whether these actors dor really matter for the development of new technology and the application in real life. According to Enzensberger et al. (2002) most of the typically proposed and applied criteria catalogues still neglect the interests and requirements of important stakeholder groups. Eventually, in practice the third factor becomes the most significant one. Many studies in the main wind power countries showed that demand-side policies are

needed to encourage not only diffusion of wind energy, but innovation in the technology itself. There must be a market for wind power to enhance the development of the technology (c.f. Loiter & Bohm, 1999, who studied this in the US). Weak demand-side policies for wind energy risks wasting the expenditure of public resources on research programs aimed at technological innovation. The creation of demand for wind turbines is mainly a question of developing sites, which is a question of spatial planning. The main problems according to successful siting policy, however, are related to the fundamental issue in the first two factors. That is the idea that at the central level, at the ministries but also in QUANGO's such as energy utilities, NOVEM etc. one is able to determine the exact content of projects. The policy choice for subsidies in capital investment, for example, was based on the generating capacity of wind turbines. The result was that **Dutch manufacturers to artificially boosted the kilowatt rating of their turbines to maximize subsidies.** Eventually, these machines could not compete on the international market (Gipe, 1995). Space making for wind turbines and wind farms also relied upon top-down planning. It was highly regulated and created impediments for collaborative approaches to wind power projects. All problems with siting wind turbines were approached as caused by not-in-my-backyard attitudes among locals that should be overruled by even more top down regulation (Wolsink, 1994).

In the UK, 1 154 MW Declared Net Capacity (DCP) of wind power was contracted under the Non-Fossil Fuel Obligation (NFFO) scheme during its existence. However by mid 2001, only 164 MW DNC had actually been installed. One of the reasons for the low success rate was that the structure of NFFO made life difficult for developers. UK view to the issue of planning contrasts with countries such as Germany and Denmark. In Germany planning and discussions about wind farms were preceded by a discussion, which areas would and which would not be suitable for development. Hence, developers could move forward with projects in confidence that permission would not be refused, within reason. Furthermore, the model of support in these countries, a simple fixed tariff, also enabled many wind turbines to be co-operatively owned by local residents. This was an important factor in building a constituency of support that facilitated the granting of planning permission. In the UK the complex NFFO bidding process was only really accessible to professional developers, so local communities were effectively excluded from the process (Edge, 2002). The lack of success was not due to a lower level of support for application of wind power in general among the public (Walker, 1995).

In Denmark the wind energy industry began as a community- based industry that constructed, installed and operated small, distributed wind farms on rural properties, with substantial local participation in manufacture, installation and ownership, typically of both wind farm and site. This process automatically built institutional capital and selected sites that had low visual impact on stakeholders who were not otherwise connected to the project. It was a collaborative approach to planning achieved largely by informal means (Krohn, 2002). In 1992 systematic planning procedures were developed with directives for local authorities. An executive order from the Minister of the Environment and Energy ordered municipalities to find suitable sites for wind turbines throughout the country. This was "prior planning" with public hearings in advance of actual wind power applications. These prior discussions helped the acceptance of subsequent siting of wind turbines in concrete projects considerably.

The problems faced in processes of decision-making on siting wind turbines are usually (by planners and decision-makers) referred to as mere "communication problems". These are likely to occur due to the abstract nature of important externalities. For example, it may be difficult for project developers to convince stakeholders that wind energy is as sensitive to site selection as they claim it to be. Likewise, project developers may be sceptical about stakeholder estimates of the societal cost of visual impacts. Therefore it is important to have impartial intermediaries who are respected by all stakeholders and who can facilitate a negotiated outcome. The best way to facilitate the development of appropriate wind farms is to build institutional capital (knowledge resources, relational resources and the capacity for mobilisation) through collaborative approaches to planning: Policy actors and wind-power developers should direct themselves towards building up institutional capital for wind power and other renewable resources, instead of complaining about public attitudes (Wolsink, 2000: 63). This need for a collaborative approach in making wind power implementation effective is now internationally recognised by researchers investigating the implementation process. "The success of wind power depends on how well the wind industry learns to incorporate the public into decisions, both for the opportunities this allows for broader dissemination of information about wind power and for the suggestions the public can bring to the discussion about their concerns and how to accommodate them" (Pasqualetti, 2002: 169).

The research on public perceptions, on planning wind projects, and the lack of success in implementation in some countries, all indicate that in the problems bad communication may always play a role, but the key question always is why there is bad communication. This is mostly caused by the way decision-making is framed. In wind power implementation, neither specific nor "top-down" imposed decision-making is likely to be as efficacious as a collaborative approach. It is a perfect example of the need for openness in the process; avoiding technocratic and corporatist based elite decision-making. It is not simply clean technology that only has to be implemented. Before it will be a successful example of a step towards energy efficiency, the key characteristics of strong ecological modernisation should be applied. When these are not applied, the implementation process stagnates. However, the question is why the planning systems so often impede these principles. In the case of wind power the most significant system is that of spatial planning.

PV IN URBAN DISTRICTS

Wind power may not be economically feasible in all conditions, as it mostly still needs support from measures shaping favourable conditions, such as supporting taxation and green electricity schemes. Nevertheless, it is in a stage of real application. Although there still are pilot projects experiment-

ing with new types of wind, such as wind farms offshore, most of the wind power application is longer experimental. This is a large difference with the implementation of solar power, in particular PV. Whereas wind power accounted for about 430 MW installed capacity in the Netherlands in 2000, PV reached a level of 13 MW, and 4 MW was not grid connected. PV is only in a very early stage, and as a matter of fact the technology still has to be developed fundamentally. Nevertheless, application is real life situations is a major factor in the development.

Van Mierlo (2002) investigated the impact of pilot projects for PV in urban districts on the transformation of electricity generation. These projects were realised from 1991 to 1999 all over the Netherlands. Overall, the general strategy of the Government of setting conditions in the long term for the development of the technology and the implementation appears significant (Van Mierlo, 2002, p.246). That is, the general conditions framing the general playing field of market parties and other actors are very important. These conditions have to be stimulating, but even more important they have to be stable. Actors must have confidence that the conditions will not change all the time.

The other side is Government intervention in a way that they try to influence the development in certain directions. According to Van Mierlo, this is not very likely to succeed. In the pilot projects that she investigated, the most import factor is learning by participants: energy utilities, architects, construction companies, housing companies, municipalities, residents and future residents, PV manufactures etc. Hence, she concludes that the Government should focus upon facilitation, rather than prescribing directions and defining wanted results. The Government has two tasks here.

- First, the Government and its agencies should become informed about learning experiences of problems local actors in pilot projects recognise with legal impediments and barriers. They should translate these experiences in adaptations of the legal and regulating framework.
- Second, national public agencies (or QUANGO's such as NOVEM) should merely act as process managers or facilitators. They should pay attention to the conditions for other parties, making these optimal for learning in interactive processes. Their task is *not* primarily to try to influence the development in certain directions, but they should focus upon learning processes, network building, information exchange en mediating in situations of diverging interests (Van Mierlo, 2002, p.253).

Hence, the Government has to create an optimal framework in planning implementation of PV in urban districts, they must be sensible for the problems that the local actors are facing, and they should not try to steer the local developments in concrete projects in any policy defined direction. The learning takes place at the local level, and that learning should be translated from that level to the national level for adapting general conditions.

Essential collaborative planning

Comparing the experiences of planning sustainable and energy efficient building, wind power, and PV in the residential sector, some outcomes seem to be similar. Moreover, they largely reinforce the derived consequences of sustainable development principles (openness and stakeholder participation), as well as relevant characteristics of strong ecological modernisation (open democratic decision-making and participation and involvement). The crucial factor is that developing and implementing new technologies many societal changes are needed. What these changes are has to be found out in complex processes, and parties claiming that they already know how to do may frustrate the process of learning. Learning is the crucial factor, learning by all actors, including central authorities and planning organisations.

Institution settings that are favourable to learning are needed, in the planning literature referred to as 'institutional capacity' (Healey, 1998). Within the domain of spatial planning such institutional capacity is generally associated with collaborative approaches to planning. The trouble is that the institutional setting of decision-making is, to say the least, not always favourable for open, participative and collaborative approaches to planning. Even in planning sustainable policy options, such as energy efficiency and the development and application of renewables, a technocratic elitist approach is rather common. There is a focus upon technological solutions with a tendency to concentrate decision-making powers in economic and scientific elites and in central authorities.

Existing institutional settings are often not favourable to collaborative planning. Therefore, the strong interpretation of EM emphasises the need for broad changes in institutional settings. For example, for wind power Edge (2002) identifies the same issue in the UK as Wolsink (1996, 2000) in the Netherlands, which is the absence of a policy framework that implements a collaborative approach to planning. The planning institutions contain inherent consequent failures to build institutional capital. In solar energy, spatial planning is also relevant (sun orientation; avoidance of shadow etc.) but here it is more linked to other types of land use. Nevertheless, learning is equally important here, as the PV pilot projects study showed. It focused upon the significance of changes in regimes for successful further technology development and implementation, which is more than only spatial planning. Nevertheless, about the impact of Government intervention some interesting conclusions were drawn. Pilot project may contribute to implementation when learning effects "trickle-up", that is when external actors follow learning effects generated in a "niche". They can carry through general and structural changes. Governmental bodies and public authorities are such external actors, so they could have a role in applying things that have been learned by local actors in pilot projects. These learning effects concern impediments and barriers local actors are facing, and they also may concern the need for the establishment of innovation-diffusion networks (Van Mierlo, 2002: 272).

The general conclusion obviously is that to develop and implement sustainable projects, all relevant stakeholders should be involved from the commencement of project planning. The planning system should encourage and facilitate such stakeholder involvement. Barriers for stakeholders to enter the arena should not be created. Impediments for open decision-making should be avoided. All biased fil-

tering of knowledge, views and information should be avoided. Progress towards sustainability, also in the energy domain, can be assured by clearly assigning responsibilities, by and providing ongoing support in the decision-making process at the level these decisions are actually taken. The EPN is an example of a general norm that leaves the way open to decide how the building will meet the standard. Knowledge about the numerous options for achieving energy efficiency is made available for all involved in the building process, but the actual choices have to be made at the local level. The serious problem at that level is how to include the knowledge of the users of the building.

Summarising: the top-down task in achieving sustainability, and energy efficiency as well, is to establish an appropriate process rather than to impose an outcome. The latter may be done in terms of long-term policy targets, but not in comprehensive planning and even less in prescribing of the content of concrete projects. These approaches usually frustrate the process of learning and eventually lead to adverse effects. Planning institutions must be shaped in which:

- The framing of decisions is the most important issue, as they often do not stimulate learning processes;
- Planning institutions are directed at or prescribing the outcome of projects;
- Planning processes are open ended, not reflecting any single view;
- Collaborative planning approaches are stimulated, and the planning system encourages participation;
- Stakeholder involvement is common, and no barriers exist for stakeholder to enter the arena;
- No authorities or other stakeholders have the ability to exclude certain others.

Current trend

Although most of the approaches, particularly the principles of sustainability, are supported in official policy, current trends in planning do not always point in the same direction. As most implementation of environmental protection takes place at the local level, the efficiency of central planning is usually overestimated (Lake, 1994).

The strongest contradiction can be found between the planning principles and the trend in the Dutch spatial planning system. We already described the relevance of spatial planning for some significant energy options, but obviously spatial planning is a key factor in all energy issues that are linked to sustainable urban form. All transport issues, for example, and also all decisions on infrastructure, whether it is for energy supply, waste management, ICT, transport etc. The framing of decisions by the regulation and procedures in spatial planning system is highly significant for the development of new energy options. Therefore, we will analyse recent and proposed changes in this framework.

After a decade of growing discontent with the planning system, the Dutch Government proposed a new institutional framework. However, despite the revealed need for learning in planning processes, the draft for a new Spatial Planning Act shows a strong tendency towards forcibly simplifying the complex and conflicting character of spatial planning decisions. The strategy to counteract this is to reinforce the hierarchy once again, after several recent changes that already have been made in that direction.

NEW SPATIAL PLANNING SYSTEM

In the current system, the only binding plan for land use, the municipality, which represents the local level in the Netherlands, lays down the zoning scheme. In the proposed system, that authority shifts to regional and national government (Figure 1). The new zoning schemes can also be drawn up by provinces and by the Ministry. "Direct changes in zoning schemes will be used if the province or the Government want to determine the land use of an area directly and in a legally binding manner, in response to provincial, national or international interests" (VROM, 2001 page115). Moreover, they themselves will determine the cases in which they can use that power. In Figure 1 several changes, that all represent a shift of competences and decision-making power upward, are indicated. These changes are proposed, but the proposal is only a next step in a trend that is going on now for about a decade.

More hierarchy

The process of institutionalising hierarchy started long ago. Historically, the system grew from mere local planning of land use by municipalities towards a system in which governing agencies at higher levels gradually became involved (Faludi and vanderValk, 1994). A fundamental hierarchy of planning instruments was pursued, from the national 'Key Spatial Planning Decision' (PKB; *Planologische Kernbeslissing*) through the provinces' 'Regional Plan' (*Streekplan*), to the municipal 'Zoning Scheme' (*Bestemmingsplan*). Nevertheless, the only binding power for land use is laid down in the Zoning Scheme and that decision is still taken at the local level. Officially, the Dutch policy view is that spatial planning has to serve basic principles such as spatial cohesion, spatial hierarchy, spatial differentiation, spatial justice and concentration of urbanisation. However, in the last two decades a practice has emerged of overwhelming attention and priority given to infrastructure (Hajer and Zonneveld, 2000). The realisation of new infrastructure is put first and then fits it into existing spatial distribution. Furthermore, spatial policy became focused upon the time consuming decision-making processes. An advice of the Scientific Council for Government Policy (WRR) revealed the new trend in the last decade. The WRR recommended that the Government's procedural and hierarchical grasp on infrastructure decision-making should be strengthened (WRR 1994). A 'Large Projects Bill' was proposed for acceleration of the decision-making process for new infrastructure, because of the observed obstruction of creating infrastructure considered necessary for economic developments.

Speed-up regulation

The heavily regulated proposed Large Projects procedure was meant to set aside existing planning and it was as an extension of *speed-up legislation* that was implemented two years before to strengthen the hierarchy in cases of local decisions (Wolsink, 1994). The Bill of Trajectories (Tracéwet) signalled a new procedure for line infrastructure: a special

PKB, binding for all actors, lays out one single line. This was in conflict with the development of several alternatives, something which was the ultimate idea of proper spatial planning and that is essential in Environmental Impact Assessment (EIA) (Lawrence, 2000). A second speed-up bill, usually called the Nimby Bill (Nimby Wet; nimby stands for not-in-my-backyard), gives the Minister and the provincial government the authority to impose concrete land uses to be set out by the municipality in its Zoning Scheme. The use of this 'nimby instrument' is limited by the restriction that there must be a 'higher' or national interest involved, however, what falls under higher interest is also left to the better judgement of the authority using this instrument. This 'nimby' instrument was designed for a specific occasion as it was intended to force decisions on locations for waste facilities. Together, the Bill of Trajectories and the nimby Bill make up 'not in my backyard policy', which was supposed to act with the new Excavation Act (Ontgrondingenwet) to provide a solution for slow decision-making.

The arguments for this legislation were mainly based upon strong assumptions about the nature of resistance in local communities to infrastructure developments. In policy-making, nimby-ism among residents and communities is considered common knowledge. The syndrome is blamed for virtually all our failures to solve social problems, like housing, traffic congestion, health care, environmental problems etc. However, in the nineties, scholars started to question the simplicity of this kind of explanation for opposition. Analyses of the concept clarified that the roots of opposition are far more complex than the nimby-label suggests (Dear, 1992). Rather than functioning as a well-defined concept, useful in the analytical understanding of opposition to infrastructure facilities, it is often used as a means to discredit opposition (McAvoy, 1998). This criticism fits with the increasing rejection of the entire nimby concept in the literature on the decision-making processes of physical infrastructure, that increasingly views simple nimby explanations of local resistance to facilities as outdated (Freudenburg & Pastor, 1992; Wolsink, 1994; Hunter & Leyden, 1995; Lake, 1996; Luloff et al., 1998; Burningham, 2000). The same holds true for social infrastructure, such as housing projects (Pendall, 1999; Piat, 2000) and mental health facilities (Repper & Brooker, 1995).

The speed-up legislation strengthened the tendency toward top-down planning and centralisation, specifically on behalf of infrastructure: "Centralisation of powers seems an obvious measure for guaranteeing unity and coherence in decision-making." (WRR, 1994: 85). Conflicting interests should be weighed in an early stage of the process and a definite decision on the principle should be taken and enforced by public law. The Council therefore proposed an entirely new procedure consisting of three stages: the starting decision, the principal decision and the implementation decision. This was designed to act as a funnel: from broad to narrow, top-down, and from general to detailed.

Infrastructure approach

The dominant trends in spatial planning were analysed again by the Scientific Council for Government Policy a few years later. Now the current practice was heavily criticized, because the Council recognised that decision-making on infrastructure is not the only consideration of crucial significance. Moreover, the Council concluded that the current practice in Dutch physical planning has become strongly characterised by an 'Infrastructure Approach', which runs counter to the basic ideas of the planning system and as such must be replaced by an approach that fosters the basic principles of spatial planning (WRR, 1999: 57). The WRR observed that the dominant approach in spatial planning has shifted towards mere alignment with economic interests. Making space for infrastructure facilities dominates spatial planning, but there is insufficient deliberation context for this 'infrastructure approach'. A comparison of the characteristics of spatial planning and the 'infrastructure approach' produces a long list of crucial differences, such as the planning versus the project-based approach and the weighing of priorities versus the 'fitting everything in' system (Table 2). "In its present form, the infrastructure approach is unable to provide an adequate basis for a balanced spatial policy" (WRR, 1999: 59). Shortcomings include the dubious relations between many infrastructure projects and economic development, inadequate social considerations and the one-sided emphasis on identification, and the mobilisation of environmental elements to increase economic value.

The critics on the trend in planning practice as well as in the institutional conditions for planning focused upon the results of planning: in particular the strain on ecological values was considered undesirable. Obviously, in many cases of infrastructure, for example for transportation, these values also concern energy issues. The focus on infrastructure and speed was a phenomenon that did not arise initially from spatial principles, but came out of the emergence of an alignment with mainly economic instruments (Hajer and Zonneveld, 2000). Hence, spatial planning became too much a matter of one-dimensional economic policy and ecological objectives were more and more neglected. The summarised characteristics of desired spatial planning, as confronted with the infrastructure approach (Table 2) reveal a certain similarity to the principles that are summarised in the section "Essential Collaborative Planning". In the infrastructure approach the top-down tendency as well as the technocratic tendency can easily be recognised.

Even more hierarchy

Although the WRR study was carried out as an orientation on a new spatial planning system, the proposal for that system does not reflect the critics. It rather reinforces the criticised tendency. Ultimately, the proposal for an entire new planning system means a very drastic extension of the NIMBY policy (Figure 1).

The proposal states that this change is in line with the Bill of Trajectories. That model, meant for infrastructure, now will become an instrument that can be used for all sorts of land use. The current NIMBY instrument, involves a simple instruction to the municipality to include a specified land use in the zoning scheme, with the option of the Government doing so itself if the municipality refuses. That instrument is replaced by the much wider and stronger competence of giving instructions or project related assignments for specified land use in zoning schemes (Figure 1). The municipality and de facto all the actors that manifest themselves on the local level can now be bypassed on grounds presented at higher levels.

Table 2. Distinct differences between the infrastructure approach and spatial planning (WRR 1999).

	Spatial Planning	Infrastructure Approach
Organizational principles	plan-based, area oriented prioritisation of claims communication oriented	project-based, infrastructure oriented fitting-in facilities (adapting areas) investment orientated
organisational structure	comprehensiveness as aim decentralized orientation	sectoral goals, economical dominance central orientation
core programme/ paradigm	substantive orientation spatial quality as a goal	strengthening economic structure spatial quality as establishment factor
policy legitimacy	balanced procedures involvement by participation carefulness takes time	instrumental; duration decision; involvement aimed at creating support process "not dynamic"
policy effectiveness	primarily persuasion and negotiation; communication and concept formulation	primarily by distribution of resources financial instruments project based intervention

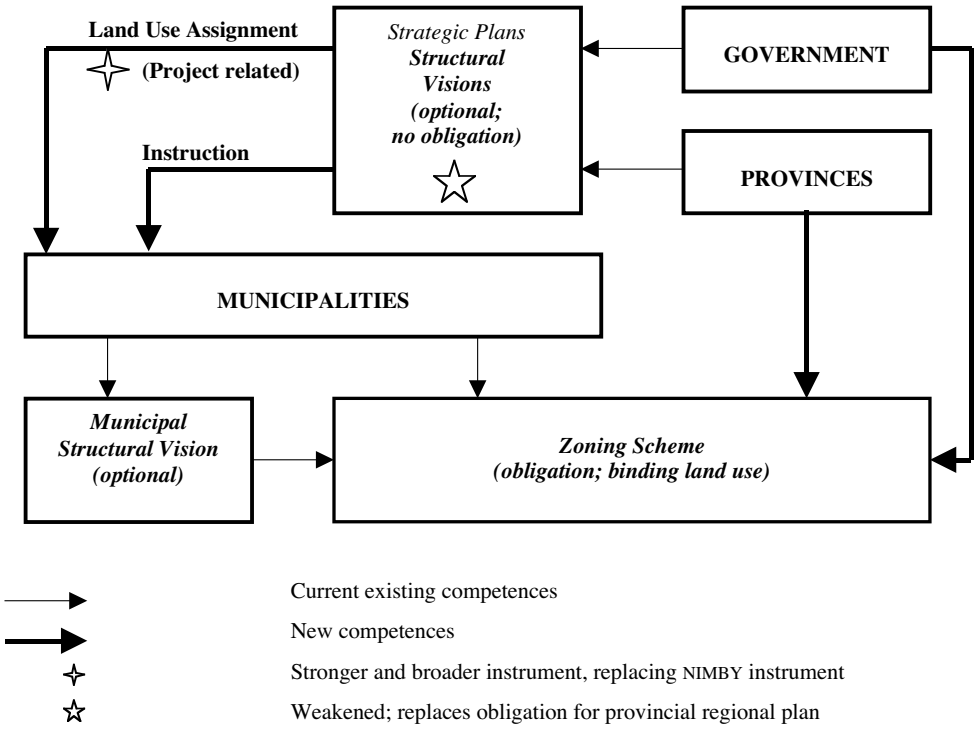

Figure 1. *Direct and indirect competences of Government and provinces for determining land use in the proposed Spatial Planning Act (Wolsink, 2003).*

In current practice, the PKB and the Regional Plan are influencing zoning schemes as they give general indications. These larger-scale plans are spatially strategic. In contrast, the new system has a strong tendency towards centralisation, incorporating powers that are in real danger of being used strategically in a political sense (process-oriented). The new system introduces a large number of generally applicable powers for higher levels of government, without obligations to make a reference to strategic spatial plans (Figure 1). These powers will be used ad hoc for infrastructure projects, but very probably also for other projects.

Conclusion

The idea that the powers would not be used strategically is extremely naive, as political theory tells us. Which authority will be able to resist the temptation of using this power of decision in problematic discussions and complex negotiations with actors that represent different views? For example, as Schattschneider formulated it: all political organization has a bias in favour of the exploitation of certain kinds of conflicts and the suppression of others. "Organization is the mobilization of bias. Some issues are organized into politics while others are organized out" (Schattschneider 1960: 71). Creating options for organizing issues in or out of planning entails creating powers that will be used strategically instead of in a balanced manner. These options will rather be used as instruments and, as a result, many aspects will only play a role in fitting in facilities. The main point here is that it frustrates stakeholder participation and open decision-making processes. Top-down planning is not stimulating open ended decision making either. The new system will establish an even stronger tendency of central authorities and public agencies defining the exact content of

projects at the local level. Social learning, the key factor in sustainable development and ecological modernisation, will be the victim.

Of course, the example that was presented here only concerns spatial planning, but this an essential domain in planning energy efficiency. In the cases analysed in this paper, the interfering effects of central planning also become evident in other policy domains, for example in general economic instruments applied for technology develeopment (Loiter and Bohm, 1999). The Dutch changes in the spatial planning system are an example of new Government policy that is reinforcing a trend in planning that runs counter to principles that are officially supported by the same Government. The Dutch Government officially supports sustainable development and has signed all objective of the Rio and Kyoto conferences. Consequently, they also officially support the principles on participation and openness in decision-making. In the meantime, the new proposal on spatial planning creates new conditions that reinforce top-down planning. The principles formulated at the end of the section "Essential Collaborative Planning", which are essential to implementation and development of sustainable energy options, are frustrated.

The danger of acting from a unilateral perspective (van Eeten, 2001) is stimulated, because options are created for dominating the process with a limited coalition. In spatial planning, representatives of social views who are excluded are already increasingly focusing on the strategic use of procedures (Healey, 1998). This trend is very damaging for collaborative approaches that are needed for planning sustainability. Hence they are also damaging for learning processes that are crucial to development and implementation of energy efficient and clean energy options.

Abbreviations & acronyms

CHP	Cogeneration of Heat & Power
Dubo	Duurzaam Bouwen (sustainable building)
DNC	Declared Net Capacity (UK)
EIA	Environmental Impact Assessment
EPN	Energy performance standard
EPL	Energy Performance on Location
EM	Ecological Modernisation
NFFO	Non-Fossil Fuel Obligation (UK)
NIABY	Not in anyone's backyard
NIMBY	Not in my backyard
NOVEM	Netherlands Organisation for Energy and Environment
PKB	Plannning key decision
PV	Photo - Voltaics
QUANGO	Quasi Autonomous Non Governmental Organisation
RPD	National Planning Agency (RijksPlanologische Dienst)
SD	Sustainable Development
WRR	(Netherlands) Scientific Council for Government Policy

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