COMPACT CITY DEVELOPMENT AND THE CHALLENGE OF ENVIRONMENTAL POLICY INTEGRATION

A multi-level governance perspective

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Abstract

Sustainable urban development entails integration of environmental interests into decision-making at the local level. In order to achieve this, higher tiers of government, may compel municipalities to explicitly consider environmental objectives or even prioritize them by demanding compliance with national standards, thus, at least theoretically, restricting local government's room to manoeuvre in balancing all relevant interests. This paper explores the extent to which national standards narrow the range of local options and what this means for sustainable urban development. Adopting a multi-level governance perspective to three cases of inner-city redevelopment, we find that environmental standards are either not problematically restrictive or, if they are, sectoral policy offers ways to circumvent them. From a sustainability perspective, this may lead to undesirable outcomes. A combination of approaches may solve this predicament.

1. Introduction

Over a period of some twenty-five years now, since the publication of 'Our common future' (WCED, 1987), the concept of sustainable development has attracted the attention of scholars. Researchers, especially in Europe, have amassed a large body of literature on a particular aspect of sustainable development, namely the integration of environmental policy into other policy sectors (Jordan and Lenschow, 2010; Jordan, 2008; Persson, 2004; Nilsson and Persson, 2003). This concept, known as 'environmental policy integration' or EPI, is wholeheartedly accepted at the (supra)national level and there is much political commitment to it, especially in the EU. However, at lower levels of government, its implementation in everyday decision-making still faces many challenges (Jordan and Lenschow, 2010). As 'Our common future' explicitly mentioned cities as the focus points for sustainable development, it is

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interesting to look at the implementation of EPI at the municipal level, the outcome of which must be sustainable urban development.

In their study of the urban politics of climate change, Bulkeley and Betsill (2005) drew attention to the fact that local authority's aspirations for sustainable development cannot be understood in isolation. Instead, using a multi-level governance perspective (Hooghe and Marks, 2001), they demonstrated that local sustainability policy can be greatly affected by the circumstance that authority is shared among different, state and non-state, actors and institutions. It appears that this multi-level governance character of EPI can, in part, explain the observed 'implementation gap' (Nilsson et al., 2009). The growing body of literature on EPI, however, rarely offers analyses of policy implementation at the local level (Watson et al., 2008); insofar as it does address the multi-level governance characteristics of EPI, the literature concentrates mainly on the national and supra-national level (Nykvist, 2008; Catenacci and Sgobbi, 2007). There are, however, several recent accounts indicating that the pursuit of sustainability objectives by regional or local authorities can be severely hampered by other governing institutions at different levels of the state (Bulkeley and Betsill, 2005; Alahuhta et al., 2010).

By contrast, it can be argued (e.g. Newig and Fritsch, 2009; Bradshaw, 2003) that higher authorities can best safeguard relatively weak interests, such as the quality of the environment. Indeed, the European Union (EU) and many countries outside Europe have adopted a system of quality standards that regulate environmental aspects such as air and water quality and/or energy performance of buildings. Such regulations, in principle, constrain local authority's room to manoeuvre in making trade-offs between social, economical and ecological interests, which, according to Campbell (1996), comprise the essence of planning for sustainable urban development. In the Netherlands, where there are many land-use claims in urban areas – partly as a consequence of national land-use policy, geared to save green and open space – professionals involved in urban area development have indeed claimed that national environmental standards unnecessarily complicate and restrict local development (OTB, 2011; De Zeeuw et al, 2009).

This paper addresses two questions: How and to what extent is local room to manoeuvre restricted by sectoral regulations from higher tiers of government? And how do these restrictions influence the outcome in terms of sustainable urban development? We tackle these questions by analyzing how environmental interests are balanced with other, social and economic, interests. We do so in particularly complex cases, namely inner-city redevelopment near railways, that we deem characteristic for many highly burdened, high-density developments worldwide.

The rest of this article is structured as follows: First, we present an analytical framework, describing the multi-level governance aspect of EPI in cases of urban redevelopment. Second, we look at the role of EPI in the type of urban redevelopment discussed here. Then, after going briefly into the research method used, we give an

overview of the indicators of EPI that are relevant in this type of case study and of the national and provincial requirements that are set with respect to each of these indicators. Next, we present the three cases and the ways in which the most relevant aspects of sustainability have been weighed in each case. Finally, we discuss the findings in the light of our analytical framework and present our conclusions.

2. Environmental policy integration from a multi-level governance perspective

EPI 'refers to the integration of environmental aspects and policy objectives into sector policies' (Persson, 2004). This entails weighing those consequences as well as measures to prevent or mitigate them against other competing interests. Although many authors (for an overview, see Hamdouch and Depret, 2010) have shown 'win-win' situations to exist, trade-offs between environmental objectives and sectoral goals are inevitable (Jordan, 2008; Lafferty and Hovden, 2003). Adopting a normative perspective, the question has been raised regarding the relative weight of environmental considerations in these trade-offs (Jordan and Lenschow, 2010).

Conceptions of EPI appear to vary from 'weak', where environmental consequences are merely *considered* (Schout and Jordan, 2007), to 'strong', where environmental objectives are given 'principled priority'(Lafferty and Hovden, 2003). Moreover, from an analytical perspective, questions have been addressed as to where EPI occurs and which factors are conducive to EPI or, conversely, hinder efficient integration of environmental objectives into sector policies. With respect to the former, EPI literature distinguishes between horizontal and vertical environmental policy integration (Lafferty and Hovden, 2003). Horizontal EPI pertains to an overarching strategy for EPI by some central governmental authority, whereas vertical EPI concerns integration of environmental objectives throughout a particular ministry's sectoral policy. With respect to the latter type of questions, as to what types of measures and strategies may lead to EPI, Persson (2004) distinguishes normative, organizational and procedural factors. Among the normative factors are political commitment, societal backing and fundamental changes in political paradigms. Organizational factors are those pertaining to the architecture of government and non-government institutions. Procedural factors are tools that enable consideration of environmental consequences in decision-making, such as environmental impact analysis (EIA) and strategic environmental analysis (SEA) (Sheate and Partidario, 2010; Nilsson and Dalkmann, 2009), action plans and consultation procedures. Weber et al. (2010) essentially use the same categories.

Although little research has been done into the actual outcome of EPI in day-to-day decision-making, several authors identify an 'implementation gap' (Nilsson et al., 2009) between political rhetoric at the (supra-)national level and policy outcome 'on the ground'. In Finland for instance, integration of river basin planning and land-use planning was reported at the highest governmental tier, but practical implementation at regional and local levels was deemed to need further development (Alahuhta et al., 2010). In Great Britain, local climate policy was hampered by economic development

policy at the regional level (Bulkeley and Betsill, 2005). Conversely, European and national intentions for greening municipal waste policy were severely hindered by local dynamics of the sector in Great Britain (Watson et al., 2008) and Sweden (Nilsson, 2005). In analyzing EPI it is, therefore, necessary to take into account the mutual influence of distinct levels of government (Bulkeley and Betsill, 2005). A particularly useful framework to do so is the concept of multi-level governance, the 'reallocation of authority upward, downward, and sideways from central states' (Hooghe and Marks, 2003). Hooghe and Marks (2003) distinguish two types of multi-level governance: Type I concerns multiple tiers of government, whereas Type II is about the distribution of authority over different state and non-state actors and institutions. Nykvist (2008) terms this vertical and horizontal integration, respectively. Vertical integration in this sense is, however, not quite the same as the vertical dimension of EPI distinguished by Lafferty and Hovden (2003), which does not explicitly include multiple tiers of governance (Steurer, 2008).

A multi-level governance perspective might help understand how the existence and functioning of multiple tiers of government influences EPI at the local level. Such influence may be more profound when the amount of local autonomy, which varies between dimensions of sustainable development and policy sectors (Bulkeley, 2010), is high to start with.

3. EPI in compact urban development

Traditionally, local autonomy in the field of urban development is high. Local authorities are best placed to weigh local interests (De Roo, 2000) and therefore resolve the conflicts between economy, environment and social justice (Campbell, 1996). Campbell suggests that planning for sustainable cities amounts to negotiating three interconnected conflicts: between equity and economic growth, between environmental protection and economic growth and between equity and environmental protection. Clearly, solving the latter two conflicts can be regarded as EPI. In Campbell's view, it is in negotiating these conflicts that the road toward a sustainable city is thought to emerge. This would amount to a 'weak' mode of EPI, because it implies that environmental interests could 'lose'. Many countries have, however, adopted a far more 'strong' mode of EPI in that they have, at the national or, in Europe, at the supra-national level, put in place a system of environmental quality standards to be observed in urban planning, thus principally prioritizing environmental interests.

Many scholars and practitioners hold the view that the concept of the 'compact city' can contribute to achieving sustainable urban development. The term 'compact' does not merely refer to building in high densities (dwellings or workplaces) but rather encompasses intensive use of urban space characterized by: a mix of functions (living, working, leisure, amenities) in, indeed, high densities; a relatively small grain; and the proximity of nodes of (public) transport (Neuman, 2005). The 'compact city' concept could be helpful in preventing urban sprawl (Breheny and Archer, 1998; Breheny,

1997), as it has been in the United States' growth management (Janssen-Jansen, 2005). Compactness, however, also entails the risk of deteriorating environmental and spatial quality (Janssen-Jansen, 2005) and of exposing large numbers of people to natural and industrial risks. This has become known as the 'compact city dilemma' (De Roo, 2000; 1998; Bartelds and De Roo, 1995). The dilemma could be resolved by either relaxing national standards or by allowing local authorities, under certain conditions, to deviate from those standards (De Roo, 2000; Glasbergen, 2005), so as to negotiate a state of what is perceived locally to be 'sustainable', much as envisaged by Campbell (1996).

How do local authorities solve this type of dilemma? And how much freedom to manoeuvre is left to them by higher tiers of government? To answer these questions, one should investigate how each of the relevant interests plays a role in local decision-making and how national or regional regulations may influence the outcome of balancing these interests.

Assuming that EPI is more problematic in complex situations, we examined three cases of inner-city redevelopment near railways. Many comparable situations exist in the Netherlands and elsewhere, and the complexity is comparable to that of brownfield redevelopment, which is receiving attention worldwide as a contribution to sustainable urban development (Raco and Henderson, 2006). Characteristic properties of these urban sites are the coexistence of sources of noise and risk – due to the transportation of dangerous substances and a history of industrial land-use – to which large numbers of people are being exposed. Often, road traffic is intense, aggravating the environmental problems mentioned and adding a powerful source of air pollution.

4. Method

First, we derived from scientific literature those indicators of sustainable urban development which are relevant to EPI in the cases studied. For each of these indicators, we then identified regulations and requirements, set by European, national and provincial governments. Next, of each case, we analyzed the land-use plan, as we perceive it to be the codification of a decision-making process among stakeholders. In addition, we studied the underlying documents, such as ambition statements and preliminary designs. For each of the indicators identified, we established each municipality's objectives, as well as the consequences for decision-making of the restrictions imposed by higher tiers of government. In each of the three cases, we interviewed stakeholders, who could inform us about the way all interests were weighed: the alderman responsible for the project, the municipality's project leader, the project's environmental advisor and a representative of the developing company. These interviews were semi-structured. First, respondents were asked in what way 'sustainability' was made operational in each particular case. Next, for each operational aspect, those interviewed were asked in which way and to what extent they felt helped or hampered by provincial, national or even European government. The relevant indicators (section 5) were used as a checklist during the interview. All

interviews were electronically recorded, typed up and slightly edited, after which transcripts were sent back to the interviewees for comment. The results were used to elaborate our analysis of the land-use plans and underlying documents. We selected developments in three Dutch cities, namely Tilburg, Woerden and Zutphen. We chose cases that were well-documented, where land-use plans were recently finalized, in medium-sized cities (where integration appears not to be hindered by the sheer complexity of the administration). Furthermore, in order to be comparable with respect to the interests being balanced, developments must be mixed-function, within existing city limits and situated near railways on which both passengers and dangerous substances are transported. The cases are representative of many similar situations in the Netherlands and elsewhere.

5. Indicators of sustainable urban development

What are the indicators of urban sustainability and which of those are indicative of EPI? Several authors have suggested sets of indicators (Shane and Graedel, 2000; Shmelev and Shmeleva, 2009), ranging from air quality, energy consumption and resource use to liveability, health and preservation of cultural heritage. The European Commission's guidelines on integrated environmental management (EC, 2007) list a somewhat similar, although not exhaustive, set, which adds local governance and land-use planning. Finally, many Dutch municipalities use a location's sustainability profile consisting of 24 indicators, including the use of resources; local environmental quality; nuisance from noise and odour; safety and security; quality of amenities; access to public transport; green space; urban and residential quality; social cohesion; work; diversity; and IT infrastructure in the area (Nielsen and Jensen, 2010).

Clearly, not all of these indicators are helpful in studying EPI. Neither are all of them relevant to the type of development studied here. From the suggestions above we selected only those that are related to environmental interests and therefore indicative of EPI. Furthermore, we only included in our analysis those that are directly influenced by the redevelopment itself. We propose the following set of indicators: energy efficiency and clean energy production; building materials and waste; water management; urban transport; quality of air and soil; noise; risk; and green space.

Energy efficiency and clean energy production are obvious indicators mentioned by many scholars studying urban sustainability and are directly affected by urban design. A second obvious set are building materials and waste, also mentioned in all of the literature cited above. In our view, however, these are restricted to the development phase itself – hence the explicit term '*building* materials'. Water management, here, is about water *quantity*: allocation of space for infiltration and storage of rain-water put a direct claim on land-use; the collection of sewage and the quality of surface and ground water are regulated on the scale of the water system as a whole and therefore not of direct concern here. Since our objects of study are in close proximity to railway stations, it would be trivial to assess the dimension 'urban transport' by measuring distance to public transport. Instead, we look at urban design that favours transport by

bike and on foot, discourages local car traffic and stimulates the use of rental cars instead of private car ownership. Indicators for local environmental quality are also mentioned frequently in the literature cited: soil and air pollution, noise and industrial risks. These are deemed relevant because of busy road and rail traffic and former or possibly remaining industrial activities. The amount and quality of green and open space is a further obvious indicator, mentioned by many of the authors mentioned above. Density and the mixing of functions are a characteristic of the objects of study and therefore not discriminating. Biodiversity, which in itself is an important aspect of sustainable development, is deemed irrelevant in the case of inner-city redevelopment projects.

6. Regulations and requirements

For each of the sustainability indicators identified in section 5, we now turn to the restrictions imposed by European, national and regional tiers of government. These are summarized in Table 1.

Energy efficiency and clean energy production
The EU Energy Performance of Buildings Directive (EC, 2010) has been implemented in national legislation for new buildings, setting a minimum requirement for energy performance (EPC), which will be tightened over time (BZK, 2011).

Regarding the use of energy from renewable sources, the EU (2009) merely requires national action plans stimulating renewable energy sources..

Building materials and waste
The European Directive on Waste (EC, 2006a), does not specifically cover building materials. Dutch building regulations demand that emission of greenhouse gasses (during use) and depletion of resources are quantified (BZK, 2011), but no requirements are set.

Water management
At the European level, water management is governed through the Water Framework Directive (EC, 2000). At the national level, implementation resulted in a set of water quality standards and the obligations for municipalities, during the preparation of land-use plans, to identify the effects on water flow and quality and consult the regional Water Board on measures to mitigate these effects.

Urban transport
There are no requirements for urban transport at the European or national level.

Air quality
The EU Directive on ambient air quality and cleaner air for Europe (EC, 2008) has been implemented in national legislation, requiring municipalities to assess a development's contribution to ambient concentrations of certain air pollutants. European standards must be observed, although, temporarily, exceptions have been made possible.

Soil quality

The European Commission has put forward a proposal for a framework Directive (EC, 2006). The Dutch national legal framework consists of the Soil Protection Act and concomitant regulations, including standards for a range of pollutants.

Noise

The European Environmental Noise Directive (EC, 2002) aims at comparable methods for measuring noise in all member states and at informing the population about noise levels in their environment, but does not actually set noise standards. The Dutch Noise Abatement Act, however, does provide such standards, specified for particular types of noise. The legal framework contains a targeted noise level maximum and a range of exceptions, mostly for inner-city locations in the vicinity of railways and highways. Since the law was found to be inflexible in intensively used urban areas, local government was allowed to deviate from national standards, taking the so-called City and Environment approach in which nuisance by noise must be compensated by other qualities of the environment (Weber and Driessen, 2010). As a last resort, constructional measures can be taken to limit exposure to noise inside the buildings; these include the so-called 'deaf façade' – which has no windows or doors which can be opened – and a design situating living rooms and bedrooms on the quiet side of the building.

Risk

There is a strict norm for the probability of death due to a calamity involving use and transport of dangerous substances, which must be complied with in decision-making on urban plans. Moreover, a guidance value for societal risk[4] exists, exceeding which compels local government to account for the risk in relation to the societal benefits of the proposed development and the measures taken to reduce the risk and abate possible effects. In order to put an end to recurring conflicts between safety and urban development, national government has established transportation ceilings for most of the transport routes, including those influencing the developments studied here.

Green space

National spatial policy aims to guarantee a basic level of spatial quality (VROM, 2006), which includes issues covered by legislation on nature and environment. With respect to the amount of green space, a target value for new developments (of 75 m^2 per dwelling) is set.

[4] i.e. the probability that a group of people is killed as a direct consequence of a calamity, as a function of the size of that group.

	Regulations	Tilburg	Woerden	Zutphen
Energy efficiency and clean energy production	National EPC standard for new buildings. Experiments with GSHPs* enabled by CRA*. Provincial subsidy for sustainable energy.	PPP* sets EPC* lower than national requirement. Land-use plan enables GSHPs. PPS initiates local sustainable energy supply..	EPC as nationally required. Land-use plan enables GSHPs.	EPC lower than national requirement through CRA. Land-use plan enables GSHPs. Local sustainable energy supply commissioned.
Building materials and waste	No requirements.	PPP sets high targets for GPR* scores.	No explicit targets. Use of GPR is encouraged. GPR-score is high.	No explicit targets. Developer takes voluntary measures.
Water management	Water quality standards and obligation to consult regional water authorities.	Comply with national requirements.	Comply with national requirements.	Comply with national requirements.
Air quality	Air quality standards and possibility to temporarily circumvent these through national action program	Comply with national requirements Prevention of street canyons Limited increase near sensitive forms of land-use.	Comply with national requirements.	Comply with national requirements.
Soil quality	Soil quality standards. National and provincial subsidies.	Comply with national requirements. Remediation and experiments with GSHPs facilitated through CRA.	Comply with national requirements.	Comply with national requirements.
Noise	Ambient noise level standards and possibility to give exemption. Standards do not apply when certain constructive measures are taken at building level.	Comply with national requirements, including exemption and constructive measures at building level.	Comply with national requirements, including exemption and constructive measures at building level.	Comply with national requirements, including exemption. Support from Ministry in re-establishing industrial noise limits.
Risk	Standard for individual risk. Orientation value for societal risk.	Comply with national requirement for individual risk. Strong lobby for national measures to reduce societal risk, but still above orientation value.	Comply with national requirements. Societal risk accepted in view of national transport ceilings and local measures.	Comply with national requirements. Societal risk accepted in view of national transport ceilings and local measures.
Urban transport	No requirements. Guidelines for stimulating transport by bike and foot	New underpasses. Follow national guidelines. Stimulate rental cars.	Follow national guidelines.	New underpasses. Follow national guidelines.
Green space	Target value for green space.	Green public space. No quantitative targets.	Green public and private space. No quantitative targets.	Green public space. No quantitative targets.

* EPC = energy performance coefficient; CRA = Crisis and Recuperation Act; GPR: see text; GSHPs = ground source heat pumps; PoR = program of requirements; PPP = public-private partnership

7. Case studies

7.1. Tilburg

In Tilburg, with just over 180,000 inhabitants (CBS, 2008), an elongated strip of land along the railway adjacent to the city centre, is now being redeveloped into an area of metropolitan character. Plans feature transformation of the formerly industrial site into a high density mix of functions: offices and apartment buildings, some of them high-rise, as well as higher education, leisure and a conference venue. From the start, ambitions for quality and sustainability have been high. Tilburg municipality acquired the central part of the area at considerable cost and, in a public-private partnership (PPP) with a real estate developer, must now fit several functions into a patch of ground that is highly burdened by the railway.

Accomplishment of Tilburg's high ambitions for sustainable energy, building materials and urban quality, reflected in high targets for sustainability score GPR[5], is left fully to the discretion of the PPP. Other dimensions of sustainability require Tilburg to comply with national standards, as can be seen in Table 1, depicting the municipality's room to manoeuvre. Balancing high densities, which are consistent with metropolitan characteristics and necessary for commercial viability, with acceptable levels of societal risk and railway noise is posing a particular challenge. National transport policy, contributing to sustainable development from its own perspective, aims to intensify rail transport, both of passengers and goods. The expected increase in noise levels would complicate the projection of housing directly along the railway, as would the increase of societal risk caused by rail transport of dangerous substances. Planning for office space directly along the railway could

[5] GPR (gemeentelijke praktijkrichtlijn = municipal practical guideline) is a method for assessing the level of sustainability of buildings.

reduce noise levels in the remaining area and would reduce societal risk, but meets with poor market expectations. The volume of shops, leisure and amenities is simply not sufficient to fill out the portion of land that is most heavily burdened by noise. A key to solving the noise problem would be to create a university campus, which is desirable to both the PPP and the university, but would again influence societal risk. Furthermore, this option depends on the university's selling its current buildings at a reasonable price.

In view of the importance of rail transport of dangerous goods to societal risk, Tilburg and other cities along the railway have organized an intensive lobby for lowering transport intensities; this has resulted in transport ceiling values that national government, the province and the municipalities involved have now agreed upon. After completion of the development, however, societal risk will still exceed the guidance value by a factor of more than five. Tilburg municipality balances this risk by taking extra construction measures and incorporating safety features in the urban design. A considerable part of the dwellings realized are exposed to noise levels above the maximum exemption value and requires constructive measures to ensure adequate levels inside.

Those interviewed indicate that soil remediation is facilitated by allowing an area based approach (instead of a case based one). However, as little as possible soil will be removed that, due to national requirements and at considerable cost, would have to be treated before disposal or re-use. This, of course, restricts building design.

7.2. Woerden

Woerden has a population of about 33,000 (CBS, 2008). Along the railway, a city-owned strip of land was initially intended for building offices, partly to shield the existing residential area from railway noise. However, due to projected congestion on the incoming roads, the plan was abandoned. Instead, starting in 2007, when the market for office space had dwindled, a new land-use plan was made, providing space for compact urban dwellings, mixed with a small proportion of other functions. In its intended form, the plan could comply with national requirements on railway noise only by introducing a large, uninterrupted building block parallel to the railway tracks, entailing, however, an increase in societal risk, albeit below the guidance value.

The city council only recently realized that comparable initiatives had been simultaneously launched along the railway, thus providing too many apartments for the local market. The plan was again halted. A former military complex, across the railway and situated farther away from it, is currently being developed after a European procurement procedure. The original program goals included high ambitions regarding energy performance, GPR-score and noise. However, in the course of detailing and implementation, many goals were dropped, likely due to the unexpectedly high cost of soil remediation, retaining only the low energy performance coefficient. Interviews in this case suggest that the province's requirements for soil remediation are too strict and that more of the original sustainability ambitions could

have been accomplished if a longer period of time would have been allowed to accomplish the intended level of soil quality. The municipality's room to manoeuvre is being perceived as limited, although Table 1 shows that it is comparable to that of Tilburg.

7.3. Zutphen

Zutphen has about 43,000 inhabitants (CBS, 2008) and is situated along the river IJssel. Across the railway, which runs along the historic city centre, a large industrial area was established in the 1930's, originally hosting relatively heavy types of industry. In more recent times, some industrial companies have moved out of the area to make room for amenities such as a cinema, large-scale retail and an indoor children's playground. Part of the area is now newly parcelled out for commerce and industry, whereas the most southern part, 'Noorderhaven', situated between the railway, the remaining industry and the river, is reallocated for residential and mixed use. The plan entails medium-rise offices along the railway (as a shield against railway noise), as well as reduction of industrial noise. Part of an old harbour, now filled, will be restored and two new underpasses will connect the new quarter with the city centre, just across the railway.

Analysis of the land-use plan and underlying impact assessments reveals that only national noise regulations pose serious restrictions. Interviewees termed all other environmental issues 'business as usual'. Noise can, within national regulations, be dealt with in the urban design: closed building blocks and a row of office buildings facing the railway. Industrial noise is being reduced and zoning is re-established so as not to overlap Noorderhaven. Furthermore, road traffic noise will be limited by using silent materials and setting a low speed limit. Interviews revealed that development is being hampered by uncertainty regarding the plans of national authorities on the frequency of future passenger and freight trains. To a much lesser extent, the effect of the national plans on the risk caused by transport of dangerous substances by rail also posed uncertainty.

Zutphen has the ambition for the whole of the area to be CO_2-neutral. For Noorderhaven, specifically, an energy performance amounting to 75% of the value demanded by Dutch building regulations was laid down in the Crisis and Recuperation Act. The municipality has commissioned energy supply of Noorderhaven to a private consortium. The land-use plan provides for the use of GSHP's. National regulations regarding air, water and soil quality do not pose serious restrictions on Zutphen's autonomy to develop Noorderhaven, as is shown in Table 1.

7.4. Overall findings

Contrary to our initial assumption (see section 1 and 2), our findings do not indicate that implementing EPI through national standards is problematically restricting the room for municipalities to manoeuvre in balancing interests, with the exception of the very complex situation in Tilburg. Compliance with most national requirements can be accomplished in a 'business as usual' manner. Regulations on noise and risk do pose

restrictions that can, however, be dealt with in the urban design. This workability is a result of policy change with regard to those aspects of sustainability that the past has shown to be problematic: either national standards have been relaxed or authority has been devolved to municipalities, for discretionary implementation (De Roo, 2000; Miller and De Roo, 2004). For example:

- Prior to 1997, Dutch soil quality standards were aimed at achieving natural background values; since 1997, a certain amount of pollution is accepted, varying with the planned land-use (Boekhold, 2008).

- In 1989, societal risk was defined as a limit value , whereas in the late 1990's the limit was transformed into a guidance value (De Roo, 2004).

- Air quality near roads is no longer assessed at the kerbside, but at a point that is representative for a stretch of space along the road, maximally ten meters from the side of the road. Furthermore, if air quality standards will be exceeded as a result of a development, compensation in other areas or temporary exceptions are allowed.

- Until 2007, exemption values for noise had to be established by the province upon request, whereas a municipality can now itself set the value (Weber et al,.2011).

In both Tilburg and Zutphen, SEA was performed, but did not perceivably lead to weighing environmental interests with social and economic interests in decision-making. Rather, SEA seems to be a summation of sectoral impact studies, the main purpose of which is to ascertain that intentions are indeed feasible. Surprisingly, no use has been made of instruments such as LOGO[6] (Simeonova and Van der Valk, 2010; Simeonova, 2006) and MILO[7] (Runhaar et al., 2009; Weber and Driessen, 2010), that have been developed for supporting integration of environmental policy in the early stages of spatial planning.

Instead, prices of and demand for real estate appear to greatly determine the outcome of negotiations within Campbell's (1996) triangle. If, in the Tilburg case, for instance, it will turn out not be financially feasible for the university to trade its current property for a new campus in the Spoorzone area, either more dwellings will be built which will be exposed to undesirable levels of noise and risk or less real estate will be realized, possibly causing a considerable financial loss. By the same token, in the Woerden case the plan was halted altogether as a result of market expectations in the real estate sector. This dependency on the property market is also reflected in the explicit wish to maintain flexibility in land-use plans, leaving space for the developers to adapt the actual layouts – and thus the number of dwellings – to housing demand.

In all cases, uncertainty about restrictions was deemed more troublesome than the actual restrictions themselves. Rail transport intensities, determined at the national level, have long been uncertain, as well as the outcome of societal risk assessments.

[6] Locale Geiedstypologie en Omgevingskwaliteit = local area typology and environmental quality.
[7] Milieu In de LeefOmgeving = Environmental conditions in the living environment.

8. Conclusions and discussion

The aim of this paper was to explore how and to what extent a municipality's room to manoeuvre in local decision-making is restricted by sectoral regulations from higher tiers of government and how these restrictions influence the resulting land-use plans in terms of sustainable development. Our analysis suggests that requirements imposed by higher tiers of government do indeed ensure that environmental aspects are given 'principled priority' (Lafferty and Hovden, 2003), thereby narrowing the range of options in local decision making. The extent to which this restriction of local discretion is problematic, however, was found to depend upon the dimension of sustainability considered. For some types of environmental impact, standards are established that must be strictly observed and that, in practice, can be fully complied with. For other types, regulations are – or have been made – less strict or can be circumvented. These impacts, clearly, are being *considered*, but do not essentially alter the plans. As a consequence of merely marginal consideration of the standards, potentially unhealthy and dangerous situations are being accepted; this was found previously in the case of noise (Weber and Driessen, 2010) and that of risk (Ale, 2005).

Thus, looking at the normative meaning of EPI, a Type I multi-level governance perspective reveals that a national environmental quality standard, which can be regarded as a 'strong' normative interpretation of EPI, at the local level is principally treated as a boundary condition. If requirements are relaxed, allowing local government more freedom, the resulting room for manoeuvre appears to be used to support other than environmental interests. Such a normatively 'weak' interpretation of EPI, resulting from the perception that a 'strong' reading would be too restrictive, is not helpful in promoting sustainable urban development.

A further conclusion is that the concept of multi-level governance allows us to mark distinct differences between tiers of government in the normative, organizational and procedural factors distinguished by Persson (2004). In addition to differences in objectives between tiers of government (Bulkeley and Betsill, 2005; Nilsson et al., 2009; Watson et al., 2008), differences appear to exist in conceptions of norms and procedures. We found political and administrative support for national noise regulations, for instance, to be quite low at the local level. This is not to say that noise is not considered. Rather, it is considered to contribute to a rather vague conception of 'quality' of the living environment. Thus, instead of making an explicit trade-off between noise levels and other interests, balancing interests is done implicitly. This reveals another difference, namely that, at the local level, tools and procedures, specifically intended to facilitate explicit trade-offs (such as the City and Environment approach mentioned in section 6) or to formulate ambitions for environmental quality in the early stages of planning (such as LOGO/MILO, see section 7.4), in practice do not live up to the expectations with which they were conceived at the national level (see also Runhaar et al., 2009). The merely marginal way in which SEA is found to be used here – and elsewhere (Bina, 2008)– also indicates that, between distinct levels of

government, substantial differences exist in appreciation of impact analysis as a support for decision making. One could argue that this lack of integration is precisely the *effect* of the existence of national standards, as they are being perceived to be boundary conditions. In that case, however, it is hard to understand why, in the cases examined, no use has been made of tools that specifically create room for manoeuvre in situations where standards cannot be met. These observations confirm earlier findings that procedural measures are not very successful in bringing about EPI (Nilsson et al., 2009).

Lastly, we conclude that consultation with higher tiers of government, as on societal risk in the Tilburg case, is a key for municipalities to be able to treat environmental issues as an interest, rather than a boundary condition. In a comparable setting in Sweden, however (Polk, 2011), it was found that a network of civil servants, linking across governance levels, increased institutional problem-solving capacity in sustainable urban planning, but that radical solutions, including absolute standards, were not put into practice in the actual planning context.

What does all of this mean for achieving EPI? It could be argued (PBL, 2011) that non-negotiable, centrally established, norms should be abandoned in favour of an integral balancing of the quality of the living environment at the local level, while maintaining or even improving environmental quality. The evidence presented here suggests that this is unlikely. A combination of 1) centrally established norms, safeguarding a minimal environmental quality and 2) procedures to assess what level of quality above this bare minimum can be achieved and at what cost could overcome the pitfalls of relying solely on either approach.

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