

Planning for a Sustainable Nexus of Urban Land Use, Transport and Energy

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Abstract:

Land use, transport, and energy systems create demands that are transferred to ecosystems. Urban sprawl is increasing, open space and farmland are disappearing and climate change is a growing concern. Yet local, national, and EU policies on sustainable development and economic growth are often at odds with one another. A sector-by-sector approach that focuses on incremental actions precludes effective, integrated solutions.

Progress towards sustainability requires a systems-based perspective grounded in science. This paper presents a comprehensive and strategic framework to help communities (1) adopt a whole-systems view to land use, transport, and energy, (2) develop a vision to guide their actions, and (3) strategically adopt actions that close the gap between the current reality and the envisioned sustainable future. An emphasis is placed on strategies related to governance structures and strategies to secure political and public acceptance, including approaches to public participation.

Keywords:

Sustainability, Land Use, Transport, Energy, Governance, Participation, Backcasting.

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Statement of Contribution

This thesis is the fruit of our collaboration. The topic emerged from early discussions and observations that technological answers are only part of the solution to the contribution of land use, transport and energy systems to climate change. We chose to set aside the conventional emphasis on incremental and sector-specific actions, and focused instead on strategic policy approaches to addressing issues related to land use, transport networks and related energy consumption in European cities.

Antoine played a key role in establishing and managing the relationships with the partner organisation, Energie-Cités and external advisors.

Antoine and Gloria researched and refined the proposal and research questions over several iterations, prepared the generic system and vision, which formed the basis for the survey, and analysed the results of the survey. The literature review was a collective effort that continued throughout the project.

Interviews were led by Antoine and Jack, and all team members took part in most interviews and shared the task of transcribing or summarising discussions.

The writing was a collective and iterative effort, with Antoine and Gloria leading the production of the document. Jack investigated the finer details of systems thinking and indicators, and helped professionalise the flow of the document.

Karlskrona, June 2007

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Executive Summary

Despite aspirations to sustainable development, Europe is surprisingly beset by congestion, urban sprawl, unstable energy supplies, noise pollution, and transport volumes that have doubled in less than a generation. The resultant rise of atmospheric emissions, including that of greenhouse gases, has rendered the European Union's ability to meet its commitments to the Kyoto Protocol unlikely.

Urban land use, transport networks, and energy consumption all influence one another, as well as the ability of the European city—now home to three-quarters of Europe's residents—to make progress towards sustainability. However, these three elements are often addressed with isolated, short-term, and often ineffective policies. To emphasise the need to consider the integrated functions of land use, transport, and energy as components of a single system, we refer to them collectively as the *Nexus*.

Recently, the following trends have emerged:

- As much as 80% of Europe's greenhouse gas emissions are driven by the demands of land use and transport.
- The future availability of energy in the European Union is not assured.
- The EU objective of *decoupling* economic growth from transport volumes is not being met.
- Urban sprawl, the discontinuous physical expansion of urban areas at a rate surpassing that of population growth, is common throughout Europe.
- Apathy and a general lack of awareness of issues related to sustainability, particularly regarding the integration of issues and impacts of decisions, remain significant barriers to sustainable urban development.
- Investment in all three elements of the *Nexus* is considerable, yet integration and coordination of that investment is currently lacking. In many cases, the prioritisation of EU investments undermines the very mandates they are designed to fulfil.

- Despite a large amount of research on elements of the *Nexus* funded by the European Commission, awareness and implementation of “best” practices is intermittent.
- Policies are informed by interpretations of sustainability that are neither clear nor science-based.

Scope of research. Our research focused on the following questions:

Main Question

- How can local authorities improve the integration and sustainability of the urban land use, transport and energy *Nexus* in a strategic and comprehensive manner?

Secondary Questions

- What barriers prevent European cities and regions from adopting existing best practices towards an integrated and sustainable *Nexus*?
- How can local authorities use the Strategic Sustainable Development Framework to improve the integration and sustainability of the *Nexus*?
- How can national governments and the EU support local authorities in this endeavour?

The Nexus and the Strategic Sustainable Development (SSD) Framework. A strategic framework can facilitate planning and implementation of actions towards strategic sustainable development. The SSD Framework was used in our research and is recommended for use in planning towards a sustainable *Nexus*. It consists of the following levels: (1) the **system level** (the *Nexus* within the biosphere); (2) the **success level** (a *Nexus* that complies with the four basic principles of sustainability below); (3) the **strategy level**, including *backcasting* and prioritisation of actions; (4) the **action level**: strategically clustered and prioritised actions to make progress towards sustainability, and (5) the **tools level**: to facilitate, monitor and measure progress towards sustainability.

Efforts towards a more sustainable system such as the *Nexus* should begin with a clear definition of a sustainable society:

In a sustainable society, nature is not subject to systematically increasing:

I. concentrations of substances extracted from the Earth's crust

II. concentrations of substances produced by society

III. degradation by physical means

and in that society...

IV. people are not subject to conditions that systematically undermine their capacity to meet their needs.

Compliance with these four principles forms the foundation of a shared vision of a sustainable *Nexus*, and therefore a definition of future success. Using that vision as a vantage point, a community can then use *backcasting*, a method of envisioning a desired future outcome and ensuring that the chosen course of action takes the community closer to that vision and the fulfilment of sustainability principles. The gap between the current reality and the envisioned future must be closed to create a sustainable *Nexus*.

Methods - Our analysis of the *Nexus* started with the creation of a sample *system* and *vision* as outlined above, which were used in conjunction with preliminary interviews and literature review to create a survey of municipal officials from eleven European countries. Findings from the survey were then supplemented with local authority and expert interviews to prepare a set of recommendations, including the use of the SSD Framework and policy strategies.

Our analysis and recommendations are directed towards local authorities, with references to EU and national policy frameworks. The strategies were evaluated against a set of criteria from the SSD Framework to verify that the proposed measures go in the *right direction* towards sustainability, constitute a *flexible platform* for future initiatives and provide a positive *return on investment*.

The set of recommendations provides a base for local and regional authorities to build upon and to establish their own *system* and *vision*, leading to a tailored set of policy strategies (for example governance and

participation mechanisms as outlined below) and packages of concrete actions towards sustainability (for example transport infrastructure projects and land use, transport and energy policies).

Barriers to a sustainable Nexus - Through our survey, interviews and literature review, we identified key current barriers to a sustainable *Nexus*. However, local authorities need to identify their own desired vision of the future based on sustainability principles, and will have to identify their own barriers to the fulfilment of that vision when using the SSD Framework.

Experiences such as Edinburgh’s failed congestion charge proposal or Västra Götaland’s *Göteborg 2050* plan have shown that barriers can prevent even the best strategies from being implemented. Cynicism, poor communication, lack of public support, inadequate participation, and lack of information all have the potential to inhibit strategies and actions towards sustainable development.

A general lack of awareness of broad issues, as well as interrelationships and impacts of decisions and actions can create a “super-barrier” that precedes all other obstacles to success. Resistance to change, unaffordable real estate in areas with good public transport, a strong “car culture”, and poor coordination within local governments and/or with adjoining municipalities or regions are all examples of barriers identified in our research.

Proposed Approach. Our approach focuses on the use of the SSD Framework by local authorities. Through our own use of the SSD Framework supplemented with empirical data, we identified some key strategies—referred to in Section 6: *The Roadmap*—that can help local authorities progress towards a sustainable *Nexus*. These strategies need to be validated by individual cities and regions based on their unique circumstances through their own application of the SSD Framework.

Summary of Strategies

Strategy	Key Elements	Section
Adopt a whole-systems view	<ul style="list-style-type: none"> • Develop an understanding of the <i>Nexus</i> as a system and its connections to broader systems including society and the biosphere. • Consider the following dimensions: <ul style="list-style-type: none"> • Geographic and jurisdictional • Sectoral • Stakeholders • Time • Rebound effects 	5.1
Adopt and follow a vision	<ul style="list-style-type: none"> • A vision based on science-based sustainability principles and reflecting a whole-systems view. • Developed through participatory mechanisms. 	5.2
Use backcasting instead of forecasting	<ul style="list-style-type: none"> • Use the vision defined above as the desired endpoint and assess steps towards the vision instead of projecting current trends into the future. 	5.2
Prioritise actions / strategies	<p><i>By asking:</i></p> <ul style="list-style-type: none"> • Is the action going in the right direction? • Is it a flexible platform for future actions towards sustainability? • Does it provide a good return on investment? 	5.2
Shape regional governance structures strategically	<p><i>Based on the following principles:</i></p> <ul style="list-style-type: none"> • Encompass the territory that corresponds to issues being addressed • Ensure democratic legitimacy to secure participation and ultimately, acceptance • Share powers clearly among levels of government to ensure accountability • Match competencies to challenges 	6.2.1

Employ participatory approaches to local policymaking	<p><i>Key principles of participation include:</i></p> <ul style="list-style-type: none"> • Basic principles <ul style="list-style-type: none"> • Provide the opportunity for people to define solutions • Invite participants to state what they want instead of reacting to what they do not want • Agree on a shared mental model • Prepare and adopt a vision • Carefully log dissent and address it progressively • Strong leadership • Address issues that people are interested in • Bring macro issues to the micro level • Compromise on timing but not orientation or flexibility • Inclusivity • Transparency • Continuity • Accountability 	6.2.2
Keep acceptance as an end goal	<p><i>With the following principles:</i></p> <ul style="list-style-type: none"> • Effective and coherent communication • Fairness regarding payment/benefit and principle of equality • Transparency of destination of funds collected • Perception of benefit • Ensuring understanding of and agreement with the problem • Ensure the perception of effectiveness • Promote broad voter participation • Pair coercive and non-coercive measures 	6.3.2
Redesign internal processes	<p><i>With:</i></p> <ul style="list-style-type: none"> • Integrated planning • The use of indicators, including indicators of integration • Departmental restructuring • Evaluation and compensation systems that reward desirable behaviour towards sustainability and integrated thinking • Leveraging EU resources 	6.3.3
National governments have a key role to play	<p><i>For example, in:</i></p> <ul style="list-style-type: none"> • Territorial growth management • Governance structures in support of a sustainable <i>Nexus</i> • Fiscal frameworks in support of a sustainable <i>Nexus</i> • Set targets and mandating plans 	6.3.4

<p>The European Union can also assist local authorities</p>	<p><i>Through:</i></p> <ul style="list-style-type: none"> • Improved coherence and alignment between top-level policies and implementation policies. • Significant increase in capacity building and dissemination efforts • Continued investigation of innovative tools, such as improved Strategic Environmental Assessments, Environmental Management Plans and Systems, asymmetrical implementation of more proactive policies in some member states 	<p>6.3.5</p>
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Conclusions. Notwithstanding the worrisome trends that affect Europe’s urban systems, there is no lack of best practices available in the field of urban sustainability, and many regions and municipalities have made significant progress towards an integrated and sustainable *Nexus* of urban land use, transport and energy. The technological aspects of the *Nexus* have been heavily researched, and are continually in flux.

The Strategic Sustainable Development Framework can be used to fundamentally rethink policymaking with regards to the *Nexus* and to implement policies that will move the *Nexus* towards a commonly agreed-upon vision based on science-based sustainability principles and a solid understanding of interrelated systems. Policy strategies and concrete actions can then be selected, prioritised, and coordinated effectively towards the ultimate goal of a sustainable *Nexus*, as an integral part of the sustainable city.

Opportunities for further research include a validation of recommendations in real-world settings that would use the SSD Framework to plan towards the *Nexus*, including in new member states; the further exploration of innovative participatory approaches to define a vision for the *Nexus* and identify the right policies and strategies to be implemented; a study of optimal governance patterns, models and structures to effectively proceed towards sustainability.

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Glossary

Actions: Third level of the *five-level framework* and *SSD framework*. Initiatives pursued towards the fulfilment of success defined as compliance with principles of sustainability and the attainment of the agreed-upon vision.

Arnstein ladder of participation: Classic model of the hierarchy of the degree of public participation.

Backcasting: Approach that includes the identification of desirable outcomes and the development of the necessary strategies to achieve them.

Barrier: Policy, structure, or other behaviour that ultimately acts to prevent sustainability in an integrated *Nexus* of land use, transport and energy.

Blind alley: Efforts towards sustainability that do not lead to future progressive or complementary actions.

Business as usual (BAU): A projection of current trends into the future. Can be used to demonstrate a long-term problem that is difficult to grasp in the short-term.

Community Strategic Guidelines: Guidelines provided by the European Commission to member states to prepare their National Strategic Reference Frameworks (NSRF). The NSRF contain strategic priorities and planning in infrastructure and are used to allocate EU funding.

Decoupling: The ability to achieve economic growth without creating concurrent growth in undesirable indicators, e.g. resource consumption.

Downstream solution: A solution that addresses symptoms rather than causes of issues.

EMP, EMS: Environmental Management Plans (or Systems). Tools to plan, analyse, measure and address an entity's environmental impact.

Energie-Cités: Non-profit association of European municipalities focused on energy efficiency in the European context.

Five-level framework: A generic planning framework, adapted by *The Natural Step*, a Swedish NGO, as the *SSD Framework*, which is used to structure efforts towards sustainable development. The five levels are *system, success, strategy, actions, and tools*.

Flexible platform: One of three prioritisation criteria for actions towards sustainability in the *SSD Framework*. A measure that does not inhibit future complementary investments towards sustainability and can be built upon to achieve further progress.

Funnel: A metaphor used to illustrate a narrowing opportunity to act in the presence of (1) declining ability of ecosystems to sustain pressures, and (2) increasing pressures from society.

Governance: Manner in which governments operate and relate to one another.

Horizontal integration: Integrated decision-making among departments and agencies at the same level of government.

Local Authority: A generic term used to denote municipalities and agencies operating at the local level (i.e. including public transport companies or redevelopment agencies).

Nexus: The integration and interdependence of land use, transport and energy.

Operational Programme: A plan prepared by Managing Authorities (MA) in each country to secure structural funds from the European Union.

Participatory backcasting: A type of backcasting in which the ultimate vision or desired outcome is determined iteratively with public input. Also called “second-order backcasting.”

Prioritisation: Approach to establish priorities among proposed measures. The *SSD Framework*, for example, proposes three screening questions: “*is it going in the right direction?*” “*is it a flexible platform?*” and “*does it provide a good return on investment?*”

PROPOLIS: Planning and Research Of Policies for Land use and transport

for Increasing urban Sustainability. 2000—2003 EU-funded research, development, and testing of integrated land use and transport policies.

Rebound effect: Counterproductive effect of an otherwise effective measure, e.g. an improvement in energy efficiency that is absorbed by a resultant increase in energy use.

Reductionism: Oversimplification of issues, focusing on specific aspects and ignoring ramifications and possibly consequences.

Return On Investment (ROI): One of three prioritisation criteria for actions towards sustainability in the SSD Framework. Progress towards the desired outcome (*success*) over the resources invested (time, money, etc).

Right Direction: One of three prioritisation criteria for actions towards sustainability in the SSD Framework. Likely to result in progress towards sustainability and the agreed upon vision of success.

SCATTER: Sprawling Cities And Transport: from Evaluation to Recommendations 2001—2004 EU-funded study of the causes and effects of urban sprawl.

Sprawl: Expansion of built land on the periphery of an urban area at a rate greater than that of the concurrent increase in population. Often characterised by low-density development, large single-use areas, discontinuous urbanisation, and a high rate of automobile dependency.

Strategic Environmental Assessment (SEA): Environmental assessment intended to identify and assess the likely significant effects of a plan or programme on the environment, the results of which are then taken into account in the decision-making process.

Strategic Sustainable Development (SSD) Framework: Adaptation of the generic *five-level framework* to structure efforts towards strategic sustainable development.

Strategy: Third level of the *Five-level Framework* and the *SSD Framework*. Approaches to identify and implement actions that lead to *success*.

Structural funds: European Union funds intended to facilitate the

development of infrastructure in sectors and/or regions of the EU.

Subsidiarity: Principle whereby the European Union does not take action unless it is more effective than action taken at national, regional or local levels (except in the areas which fall within its exclusive competence).

Success: Second level of the *Five-level Framework* and the *SSD Framework*. The ultimate desired outcome. In this paper, success is a sustainable *Nexus* as defined locally by a principle-based vision.

System: First level of the *Five-level Framework* and the *SSD Framework*. In the *SSD framework*, the system is the biosphere, which is governed by laws of thermodynamics and principles of biogeochemical cycles. A subsystem can be defined for ease of analysis. The *Nexus* is such a subsystem.

The Natural Step (TNS): Non-governmental organisation focused on research, education and consultancy in the field of sustainable development.

Tools: The fifth level of the *Five-level framework* and the *SSD Framework*. Used to assist with the implementation of actions, measure progress, and in the case of the *SSD framework*, build capacity towards sustainability.

TRANSPLUS: Transport Planning Land Use and Sustainability. EU-funded research to identify best practices in the organisation of land use and transport measures, including the reduction of automobile dependency in Europe.

Upstream Solutions: Solutions that address root causes of issues, rather than symptoms, e.g. addressing mobility demand as opposed to the promotion of renewable fuels.

Vertical Integration: Integration of issues between levels of government, e.g. between EU, national and regional or local governments.

Vision: An element of the *success* level of the *Five-level Framework* and the *SSD Framework*. A shared definition of the future state of a given system, in which sustainable development has been achieved.

1 Introduction

1.1 The *Nexus* of Urban Land Use, Transport and Energy

Congestion, road accidents, loss of productivity, deteriorating air quality, and socio-economic inequalities are well-known aspects of urban life. Many of these problems, as well as rising energy consumption and associated greenhouse gas production, have their roots in the management of land use and transport systems.

Planners have long known that land use and transport are intertwined and correlate with energy consumption, particularly in urban areas. However, land use, transport and energy issues are too often viewed and addressed separately. As a result, opportunities to collectively address individual concerns in each sector are lost. Planning approaches are often described as adversarial or lacking in proper representation (Van Wee 2002, Litman 2005, McEldowney et al. 2005, Waddell 2007).

A systematic approach to analysing and managing urban land use, transport, and energy systems requires *systems thinking*: the evaluation of interrelated and complex systems over time (Forrester 1970b). To reflect a whole-systems perspective, we will henceforth refer to *land use, transport and energy*, when viewed as a whole in relation to urban systems, as the *Nexus*.

1.2 The *Nexus* in the European City

Climate change has become a central issue, sustainability less so. As much as 80% of Europe's greenhouse gas production is driven by the demands of land use and transport (Commission 1996, EEA 2007); in 2007, the EU committed to an unconditional 20% reduction in its greenhouse gas emissions by 2020 (Council 2007a).

The European Union (EU) and its member states have expressed their commitment to sustainable development¹, culminating in the adoption of a Sustainable Development Strategy (Council 2006c). However, our research suggests that apathy among citizens and elected officials and a lack of awareness of issues related to sustainability remain significant barriers to sustainable urban development. This particularly holds true in the integration of issues and impacts of individual decisions.

The future availability of energy in the EU is not assured. Trends and forecasts indicate that Europe's hunger for energy will not abate. With regard to oil and gas supplies in 2030, the European Commission has noted that *"it is not clear from where, and how, these supplies would come"* (Commission 2007a). The Commission has also noted that *"mechanisms to ensure solidarity between member states in the event of an energy crisis are not yet in place"* (ibid).

The transport - energy link. The following statistics paint a stark portrait of the transport-energy link:

- The transport sector consumes 31% of final energy in Europe (EEA 2006a) and 93% of transport energy use is petroleum-based (EEA 2007)
- The European Union's GDP is projected to grow up to 50% from 1998 to 2010, and the EU has emphasised that transport should not grow at the same rate as GDP, a concept known as *decoupling* (Commission 2001b).
- Freight transport volumes increased by 34% between 1991 and 2003, while GDP grew by 26%.
- Passenger transport volumes have also outpaced GDP between 1990 and 2002.
- Emissions from transport have risen by 23% between 1990 and 2003 (EEA 2007).

¹ Renewed Sustainability Development Strategy (Council 2006c,) Bristol Accord (Office of the Deputy Prime Minister 2006,) Leipzig Charter (Federal Ministry 2006,) and Thematic Strategy on the Urban Environment (Commission 2006c.)

The transport - land use link. The relationship between transport systems and land use policy in the industrialised world has been heavily researched, for example in Kenworthy and Laube (1999) and Cervero (2003). The EU-funded SCATTER research project (Gayda 2005) suggested that new rail-based public transport services actually fuel urban sprawl at the periphery of cities. Van Wee (2002) stresses the importance of seizing the potential of higher densities, mixed uses and the use of rail-based public transport to encourage public transport use and non-motorised modes of transport.

Urban sprawl in Europe is accelerating transport demand (EEA and Commission 2006). If urban expansion continues at its present rate—around 0.6% of land lost to development per year—Europe’s urban areas will double in size within a century (ibid).

The effectiveness of transport investment. Poorly chosen transport investments can compound existing issues. New roads, for example, can generate more traffic (Cervero 2003). Much of the European Union’s Structural Funds—€308 billion over the next seven years—will be spent to develop transport infrastructure in new member states. In Europe, infrastructure receives the bulk of the €125 billion spent on road transport subsidies annually (EEA 2007). SACTRA (2006) found that caution must be exercised when linking transport investment and economic growth, a frequent goal of transport investment. Furthermore, the longevity of infrastructure ensures that land and transport choices made today will dictate options for decades to come.

The land use – energy link. Newman and Kenworthy (1999) have documented a strong link between urban density and energy consumption, although the applicability of their findings has been challenged (e.g. Mindali et al 2004). The relationship between land use and the energy consumption of buildings is a relatively new field of investigation with early findings indicating that certain types of land use patterns, including urban sprawl, do affect energy consumption. Given that buildings consume 41% of energy in the EU, it is essential that this linkage be understood (Mitchell 2005).

Managing transport, land use and energy together can have advantages. Understanding the interrelationships and interdependence of land use, transport and energy can help conserve land, increase the efficiency of

transport networks and save energy. Benefits related to the controlled expansion of cities include the protection of natural areas, reduced energy consumption, and many other socio-economic and ecological benefits (EEA and Commission 2006). The PROPOLIS report quantified socio-economic benefits resulting from the adoption of a set of integrated land use and transport policies at €1,000 to €3,000 per inhabitant (Lautso 2004). Laconte (2005) cites a recent study in which it was stated that Copenhagen spends 4% of its GDP on transport, with an emphasis on public and non-motorised transport and integrated land use – transport policies, while Houston spends 14% of its GDP on transport, with an emphasis on highway construction and urban growth. Copenhagen’s approach results in greater efficiency, with more resources available to other types of expenditures.

Given the amount of energy used and emissions produced in urban areas², it is unrealistic to hope that EU, national and local policy objectives related to sustainability and climate change can be met without an integrated approach to urban development, transportation investments and mobility demands. There is ample opportunity, as well as a pressing need, to leverage an integrated approach to improving the sustainability of the *Nexus*, as a leverage point towards sustainable cities.

1.3 The *Nexus* and Strategic Sustainable Development

The European Commission, EU member states, and European cities regularly make commitments to a “sustainable future”. Varying definitions of “sustainability” exist, but they are not specific, strategic, or science-based³.

² 50% of fuel used for road transport is used in cities (European Commission – *50% energy savings by 2020*); 75% of Europeans live in cities (EEA and Commission 2006);

³ Many policy documents complement and overlap one another (e.g. the Thematic Strategy on the Urban Environment - Commission 2006b and the EU Sustainable Development Strategy - Council 2006c), but no unified framework or definition has been adopted and effectively propagated.

A tangible and comprehensive approach to planning for sustainability is needed. The *Strategic Sustainable Development Framework* (henceforth the *SSD Framework*) was developed by the Swedish Non-Governmental Organisation (NGO) *The Natural Step* in concert with a network of scientists and academic institutions to facilitate actions towards sustainability (Robèrt 2000)⁴. The SSD Framework can be used by local authorities to make progress towards an integrated and sustainable *Nexus*. The Framework has also been used in our analysis of the *Nexus* and the development of recommendations in this paper.

1.4 From Research to Implementation

The European Union's TRANSPLUS, SCATTER, and PROPOLIS projects extensively researched the interaction between land use and transportation and provided potential solutions and policy recommendations regarding land use and transport (Lautso 2004, Geerlings and Stead 2003). Other researchers found that many of the projects examined "*policy options, instruments or assessment methods*" with "*less focus on institutional, organisational or implementation issues*" and "*issues of governance are often seen as external and separate to these research projects*" (Geerlings and Stead 2003).

Despite the scope and ambition of these reports, their findings are not reflected in current EU policy or local implementation strategies. In general, two gaps remain:

- Policy recommendations are not set within a clear and scientific understanding of sustainability, actions and strategies are not clearly mapped to dimensions of sustainability and a broad systems view is not present.

⁴ "The Natural Step" is the NGO promoting the use of the Framework and providing consultancy services. The Framework is in the public domain, is used throughout the world both with and without the involvement of "The Natural Step".

- Policy recommendations emphasise ready-made policy packages rather than scalable approaches that allow local authorities to assess their own *Nexus* and its position in broader systems, specific barriers to overcome, a tailor-made vision based on principles of sustainability, and place-specific policy packages.

1.4.1 Our Emphasis

Ultimately, local and regional authorities are responsible for land use, transport and energy issues and adopting integrated approaches to urban development. Ken Livingstone, the mayor of London, has noted, “*It is in cities that the battle to tackle climate change will be won or lost*” (Barber 2007).

We propose the use of the SSD Framework, which focuses on the identification of a locally-specific *system*, *vision* and actions to reach a desired sustainable future. In this paper, a survey and interviews help identify common barriers to an integrated, sustainable *Nexus*. Strategies are identified to help local authorities overcome these barriers and create favourable circumstances to use the SSD Framework. However, a complete cluster of strategies can only be finalised by following the SSD Framework locally.

Our research questions are as follows:

Main Question

- How can local authorities improve the integration and sustainability of the urban land use, transport and energy nexus in a strategic and comprehensive manner?

Secondary Questions

- What barriers prevent European cities and regions from adopting existing best practices towards an integrated and sustainable Nexus?
- How can local authorities use the SSD Framework to improve the integration and sustainability of the Nexus?
- How can national governments and the EU support local authorities in this endeavour?

2 Conceptual Framework

The *Strategic Sustainable Development (SSD) Framework* constitutes the foundation of our proposed approach to a more integrated and sustainable *Nexus*—an approach substantiated by our survey, by interviews and literature research. Developed in Sweden in the 1990s to facilitate actions towards sustainability (Robèrt 2000), the SSD Framework is used worldwide by a range of organisations, non-governmental organisations, government agencies, consultancies and private sector companies⁵. The Framework is still evolving under development by a network of academic institutions, including the Blekinge Institute of Technology.

2.1 The Five-Level Framework

The SSD framework is an application of a generic five-level framework that provides a structure for organising analysis and strategic planning. The levels of the framework—*system*, *success*, *strategy*, *actions* and *tools*—are adapted to facilitate the analysis of complex systems and planning of progress towards sustainability:

⁵ Companies that have used the Framework include IKEA, Matsushita and Electrolux. The communities of Whistler, Canmore and Halifax in Canada have used the Framework at the municipal level.



Figure 1. The generic five level framework (Robèrt 2000, 249).

Systems Level: the understanding of the biosphere and connections to the subsystems under study—in this case the *Nexus* of land use, transport systems, and energy—ensuring that appropriate *system boundaries* are selected. Key to the understanding of the system is a common awareness of how ecological and social systems interact, including the laws of thermodynamics, conservation laws, the role of biogeochemical cycles, and interdependence and diversity in social systems (Waldron et al 2006).

The *metaphor of the funnel* has been used to explain the critical importance of action towards sustainability (Robèrt 2000). The “funnel” is formed by (1) declining availability of ecosystem services and (2) society’s increasing demands for those services. As society moves deeper into the funnel, the walls narrow, affording less opportunity for planning a sustainable society. A reversal of these trends will allow society to live within the constraints imposed by nature (ibid).

The Funnel

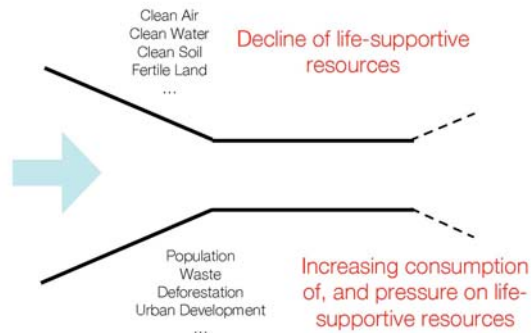


Figure 2. The funnel of narrowing opportunity

An emphasis on an *upstream* versus a *downstream* approach helps to address problems *before* they occur rather than after the fact (ibid). Upstream thinking is particularly relevant in discussing the *Nexus*, as typical downstream approaches—such as the use of renewable fuels and promotion of energy efficiency—tend to be overemphasised.

Success Level: a common vision of compliance with the four sustainability principles is necessary for a sustainable society in any subsystem, such as a city or the *Nexus*. The principles were derived from a scientific consensus process to establish a common understanding of the System (Level 1). The key characteristics of the sustainability principles are (Ny et al. 2006, 63):

1. Based on a scientifically agreed upon view of the world
2. Necessary to achieve sustainability
3. Sufficient to cover all aspects of sustainability
4. Concrete enough to guide actions and problem solving and preferably...
5. Mutually exclusive to facilitate comprehension and monitoring

And are phrased (Holmberg et al 1996, Ny et al. 2006, 64⁶):

“In the sustainable society, nature is not subject to systematically increasing

I. concentrations of substances extracted from the Earth’s crust

II. concentrations of substances produced by society

III. degradation by physical means

and, in that society...

IV. people are not subject to conditions that systematically undermine their capacity to meet their needs.”

A sustainable *Nexus* can thus be defined as a *Nexus* that does not violate the four sustainability principles.

This definition of sustainability complements the oft-quoted Brundtland definition of sustainable development: “*Sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future*” (Brundtland 1987). The latter definition requires agreement by involved parties. Once this agreement is established, the four sustainability principles provide science-based guidance towards sustainability.

The principles should be supplemented with a context-specific vision that speaks to the specific challenges and objectives of stakeholders, while acknowledging the constraints of social and ecological systems, represented by the sustainability principles. The vision should be set within the constraints of the sustainability principles. Henceforth, it will be referred to as a *principled* or *principle-based vision*.

Strategy Level: *Backcasting*, the main strategic guideline in the five-level framework, uses the principle-based vision defined at the *Success* level as a goal towards which to navigate from the present. A key advantage is the

⁶ Sustainability principle 4, as described by Holmberg et al (1996), has been updated in Ny et al (2006).

inclusion of policy choice: actions are taken towards a desired outcome, not a forecast built on potentially undesirable trends. (Robinson 2003).

Action Level: actions to move the system towards success. A key activity at this level is *prioritisation*. The following criteria can assist decision-makers select and prioritise solutions (Robèrt 2000, 246-7):

- Is the proposed action going in the *right direction* towards the principle-based vision of sustainability?
- Is the proposed action a *flexible platform* for further action, or conversely a *blind alley*, an investment in time and resources that cannot be leveraged for future actions?
- What is the proposed action's *return on investment*, or the ratio of progress towards sustainability to resources invested?

In the context of the *Nexus*, actions can include participation processes or redesigned governance structures. These help move cities and regions indirectly towards sustainability by creating favourable conditions for *concrete actions* to be adopted and implemented. *Concrete actions* are also at the *Action Level* of the five-level framework and may include the construction of infrastructure fiscal and pricing measures, and other legislation with direct impact on the *Nexus*.

Tools Level: measurement and auditing tools used to assess progress, including indicators, modelling environmental management systems, and capacity tools to build capacity among stakeholders. A key example is the ABCD approach, which can help guide the participation process by identifying problems and prioritising solutions.

- **A** – Agreement on the meaning of sustainability in general and in the Nexus.
- **B** – Identification of discrepancies between the current situation and the sustainability principles.
- **C** – Preparation of a vision for the Nexus framed by the sustainability principles. Use of backcasting from the sustainable vision to identify appropriate steps to fulfilling the vision. Participants should understand from the outset that they will be asked to contribute concrete solutions for short, medium and long-term implementation.

- **D** – Prioritisation of the options identified in step C with the guiding questions outlined in the Actions level.

The **ABCD** method is recommended for use at the local level to improve the sustainability of the *Nexus* and was used as an underlying method in the preparation of this paper.

3 Methods

3.1 Overview

This section describes our underlying methodology for identifying and analysing strategies towards sustainable cities, with an emphasis on the *Nexus*.

3.2 Phase I: Laying the Groundwork

The purpose of Phase I was to identify preliminary answers to the research questions prior to validation in Phase II.

3.2.1 Initial Interviews

Initial interviews identified main issues, potential approaches, key reports and literature, and additional individuals to interview. The main interviewees were Ronan Uhel at the European Environment Agency and Gérard Magnin at Energie-Cités, an association of European local authorities focused on energy education and advocacy in the local context.

3.2.2 Literature

A literature review was conducted to identify documents that could provide the foundation for analysis and set of recommendations. The following sources were considered:

- **European Union Documents** – Policy documents and research reports published by or commissioned by the European Commission, the Council of the European Union, and the European Environment Agency collectively provide context and direction for policies relevant to the *Nexus* in Europe. Research reports constituted a significant source of proposed policies and identified barriers to implementation, which were consolidated and submitted for feedback in Phase II.

- **Journal Articles** – Journal articles informed our discussion of the Strategic Sustainable Development Framework and of the sample formulation of a sustainable city vision, suggested approaches to addressing issues and identified barriers to implementation.

3.2.3 Preparatory Tasks

Following a preliminary literature review and initial interviews, we identified a generic *system* consisting of land use, transport, energy, their overlaps and their connections to external themes. This *system* allowed us to better understand the intricacies of the *Nexus* without city-specific content.

We prepared a generic *vision* of an integrated and sustainable *Nexus* based on the four sustainability principles for inclusion in the survey. We also established a preliminary list of barriers to an integrated and sustainable *Nexus* and an initial set of strategies, informed by interviews and the literature. Our generic vision of a sustainable *Nexus* informed our shortlist of barriers, which were submitted for evaluation by survey respondents.

3.3 Phase II: Validation

The purpose of Phase II was to validate the preparatory work conducted in Phase I and to further investigate possible strategies to address the issues and barriers identified earlier.

3.3.1 The Survey

A survey was prepared to obtain feedback from local authorities on our generic vision, issues related to the *Nexus*, barriers and potential strategies to improve the integration and sustainability of the *Nexus*. These strategies were selected based on our literature review, preliminary interviews and our expectation of their potential to overcome barriers and help cities and regions move towards a sustainable *Nexus* as defined by our generic vision. Our survey and interviews allowed us to ask questions related specifically to the *Nexus*, and receive timely answers in a rapidly shifting field.

The survey was prepared using the survey tool *surveymonkey.com*, which allows users to design a survey and collect results online. The survey consisted of:

- The vision (21 elements and 5 questions to rate the vision)
- Awareness of integration and sustainability (19 statements)
- Barriers (23 statements)
- Potential strategies (18 statements)

The survey was estimated to take twenty minutes, but actual times ranged from ten minutes to several days for those who chose to leave and return to the survey later.

Requests were sent to 27 local authorities for participation following an introduction by our partner organisation, Energie-Cités. Local authorities were selected for their successful implementation of sustainable *Nexus* policies or their strong interest in implementing best practices. Respondents were offered the choice of answering the survey online, or by e-mailing or faxing a Word document version of the survey. A summary of respondent demographics is provided below, and full details of the responses are provided in Appendix 9.1.

Sixteen survey responses were received. Most respondents provided few or no written comments, with the exception of one respondent who requested anonymity.

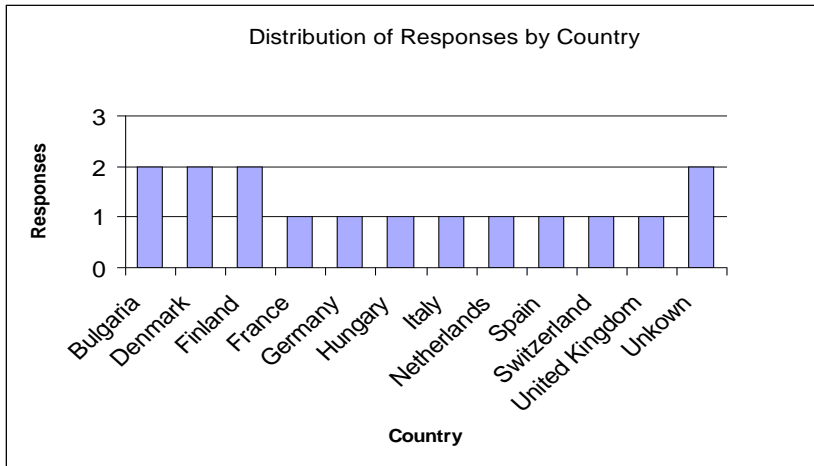


Figure 3. Distribution of Responses by Country

Not all respondents indicated their roles within their organisation. Those who did represented a variety of occupations and organisations, including elected representatives, planners, engineers and environmental experts.

3.3.2 Interviews

In the survey, local authority respondents were asked to participate in an interview. The asterisk next to each local authority respondent in Table 1 indicates a survey respondent. Other respondents were referred by their colleagues, our programme team or were identified in the literature.

Academics and researchers, selected based on the relevance of the publications they had authored, were interviewed to validate our findings and enhance our knowledge of the issue.

Interviewees included the following individuals:

Table 1. Local Authority Interviewees

Name	Title / Institution	Country
André Baillot	Urbaniste, Adjoint au chef de service, Service d'urbanisme, Ville de Lausanne	Switzerland
Ted Battiston	Sustainability Manager, Resort Municipality of Whistler	Canada
Christelle Leproust*	Responsable de la mission environnement, Ville de Rennes	France
Daniel Litzistorf	Vice-director, Planning Services, City of Lausanne, Switzerland	Switzerland
Stéphanie Petit*	Strategic Development Services, City of Lausanne, Switzerland	Switzerland
Toni Pujol Vidal*	International Affairs, Barcelona Energy Agency	Spain
Ann-Marie Ramnerö	Department of the Environment, City of Göteborg, Sweden	Sweden
Christian Vassie*	City Councillor for City of York Council, Energy Champion for the city, Chair of City Strategy	UK
Withheld*	City of Munich	Germany
Withheld	City of Munich	Germany

Table 2. Roles and organizations of expert interviewees

Name	Title / Institution	Country
Peter Ache	Professor for European Metropolitan Planning, Helsinki University of Technology (HUT)	Finland
David Banister	Professor of Transport Planning, University of London; Director of Research at the Bartlett School of Planning, University College London	UK
Thomas Fischer	Reader, Department of Civic Design, University of Liverpool	UK
Pierre Laconte	President, Foundation for the Urban Environment; President, International Society of City and Regional Planners.	Belgium
Todd Litman	Director, Victoria Transport Policy Institute, Victoria BC	Canada
David Ludlow	Senior Research Fellow, Centre for Environment and Planning, University of the West of England	UK
Ana Mafalda Madureira	Researcher, School of Technoculture, Humanities and Planning, Blekinge Institute of Technology	Sweden

G�rard Magnin (<i>phase I and II interviewee</i>)	Executive Director, Energie-Cit�s	France
Eric Markus	PhD Student, Department of Spatial Planning, Blekinge Institute of Technology	Sweden
John Robinson	Professor, Sustainable Development Research Initiative, University of British Columbia	Canada
Enid Slack	Director, Institute on Municipal Finance and Governance, University of Toronto	Canada
Aija Staffans	Acting Professor, Urban and Regional Planning, Technical University of Helsinki	Finland
Ronan Uhel (<i>phase I and II interviewee</i>)	Group Leader for Spatial Analysis, European Environment Agency	Denmark

3.3.3 Using the SSD Framework

The *ABCD* approach described earlier was used as an underlying method. After being shortlisted based on literature, interviews and survey results, strategies were validated against the prioritisation questions on *right direction, flexible platform* and *return on investment*. They are discussed in Section 6: *The Roadmap*.

3.3.4 Draft Review

In addition to review by supervisors and the peer review group, the first draft was reviewed by Dr. Enid Slack of the University of Toronto. The final draft was also reviewed by David Ludlow of the University of the West of England. Their recommendations were incorporated into the final document.

3.4 Limitations

Methodology. Our methodology emphasises the use of the SSD Framework by local and regional authorities to move the *Nexus* towards sustainability. Although the SSD Framework is a fundamental component of this paper, a further emphasis was placed on gathering empirical data from the literature, our survey and interviews to identify barriers and potential solutions.

One alternative—and a potential next step—would have been to conduct a real-world planning exercise primarily based on the SSD Framework, including backcasting from principles and prioritisation of strategies. However, such an exercise would, by necessity, be locally-specific or require significant resources. Instead, key aspects of this approach were utilised: the identification of a system; the formation of a generic vision; the identification of barriers to the vision; possible strategies rated against SSD criteria.

Proposed strategies do not constitute a comprehensive roadmap towards sustainability applicable throughout Europe. Rather, local and regional authorities should use the SSD Framework to define their own system that incorporates the *Nexus*, their own principle-based vision, a set of strategies and actions that are relevant to their system and barriers.

Urban areas. Although our discussion is focused on urban areas, the urban-rural interface, and inter-regional networks and relationships are also problematic. Our discussion also excluded trans-border areas.

The role of energy. Although the *Nexus* does encompass energy as well as land use and transport, the inclusion of energy pertains primarily to energy used in transport, as influenced by land use patterns. Although a link has been identified between land use and energy consumption (e.g. Mitchell 2005), it is not as well documented or understood as the link between land use and transport. This lesser-known connection can be understood and acted upon by analysing the *Nexus* as a system.

Literature. There are limited English-language peer-reviewed articles related to new European Union member states in the fields of integrated transport, land use and energy.

Survey. Language limited the breadth of responses to survey and interview requests, as well as by limiting literature sources primarily to English and French. Results reflect the geographic biases of the interviewees and survey respondents.

Caution is required when interpreting the results due to the small sample size coupled with limited representation.

Interviews. Language also limited the range of our interviews to countries in which English and French is commonly spoken. The geographic concentration on Northern and Western Europe reflects the bias found in the literature, coupled with a higher response to our requests from these areas.

Transferability. Results, such as observations reflecting public awareness, reflect the geographic bias of the interviewees and survey respondents. Generally, caution should be exercised when transferring or adapting narrowly defined concepts and examples. For this reason, we focused on providing principles wherever possible and provided illustrations clearly rooted in a specific context.

4 Towards Strategies: Results

This chapter focuses on two key elements of a strong foundation to planning and implementing an integrated and sustainable *Nexus*: a solid understanding of the *system* being considered—the *Nexus* within society and the biosphere—and a *vision* based on sustainability principles.

The results of our survey are discussed, including perceived barriers and attitudes regarding the integration and sustainability of the *Nexus*, as well as feedback on potential strategies. Section 6: *The Roadmap* will further build upon this foundation and discuss approaches in governance and participation to improve the integration and sustainability of the *Nexus* from the local standpoint.

4.1 The System

Defining the *system* in which we propose to intervene (the *Nexus*) creates a common understanding of the interactions between subsystems—such as land use, transport and energy—and the appropriate boundaries for planning. A better understanding of interconnections is a necessary step to prioritising strategies that received the most support from survey respondents (integration, collaboration, long range planning).

A generic *Nexus* system displayed in Figure 4 illustrates how land use, transportation and energy both affect and are affected by one another. As each community must identify its own system as a foundational element for further action, the sample system is provided for illustrative purposes only, and contains only elements of land use, transport and energy. Other representations can show the dimensions of area, jurisdiction and stakeholders with considerations for time and rebound effects as discussed in Section 2: *Methods*.

Figure 4 demonstrates the unique issues of each sector of the *Nexus*, but most often, each sector is linked with at least one other sector, as indicated by the arrows. For example, elements unique to *Land Use* are contained within the box located in the upper left corner of the figure. However, *Land Use* is also linked to *Transport* issues, to *Energy* issues and to *Nexus* issues located in the centre of the figure, where the three sectors intersect.

4.2 The Vision

A common vision based on principles allows stakeholders to define a strategic course of action through backcasting as discussed above (Ny et al 2006, 63). Ache (2007a, b) emphasises the renewed importance of a strong vision to effectively safeguard the public interest as the role of private developers grows in shaping the city through individual projects subject to less micromanagement by public entities. Several researchers stress that visioning is essential. (Banister 2007, Margerum 2005, Porter 2006, Litman 2007).

A generic vision based on sustainability principles was prepared to assess the importance of each element and the relevance of such a comprehensive vision. The vision elements were identified using the four sustainability principles as a foundation. Vision elements for land use, transport and energy based on the *system* also defined in this section are displayed by importance to respondents in Table 3. In Appendix 9.3, the vision elements are shown with detailed explanations and mapping to the four sustainability principles.

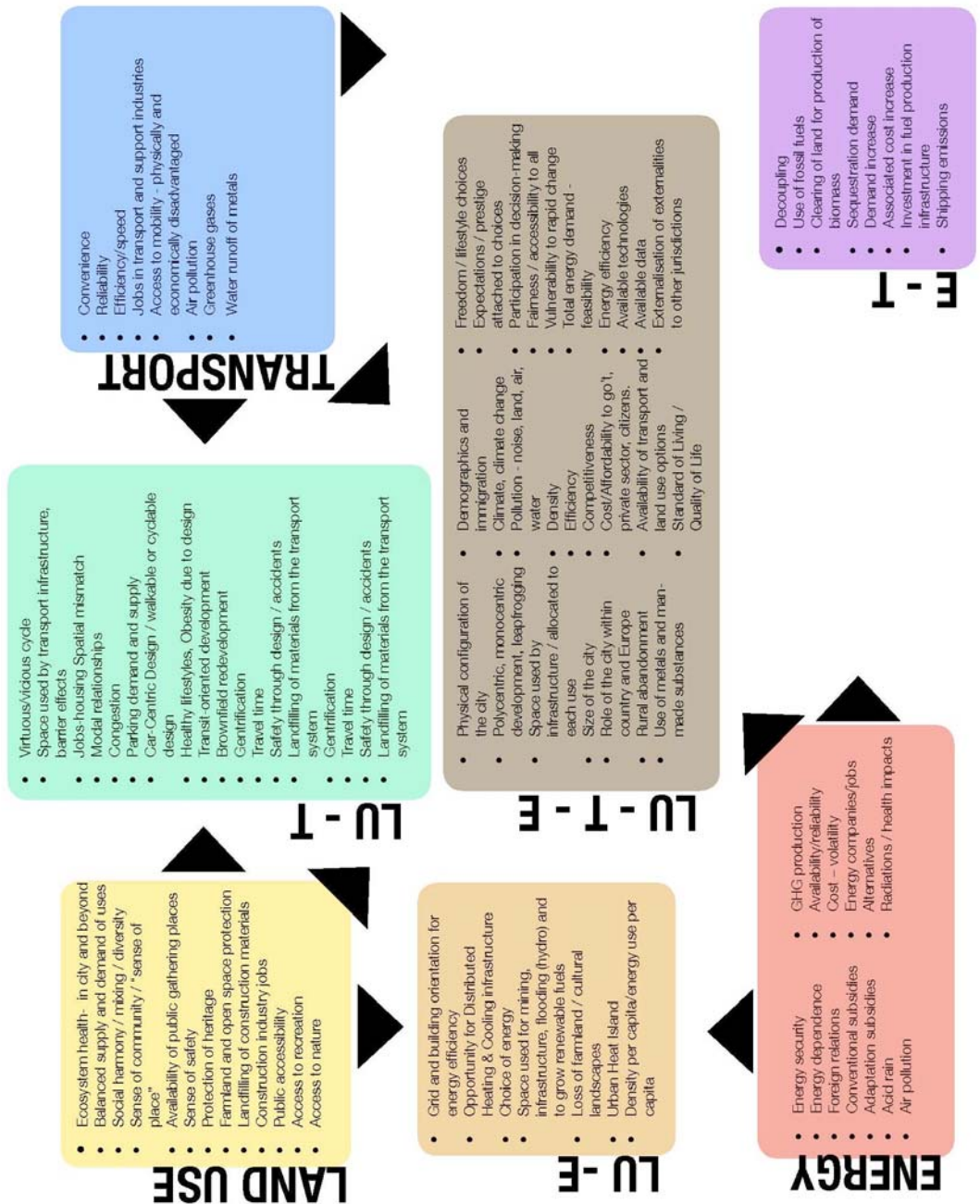


Figure 4. Generic Nexus System. This generic system illustrates potential relationships between each element of the system and the extent of the Nexus's system boundaries.

Table 3. Survey results: Generic vision elements

Sample Vision Elements	% rated Important
By design, cities (buildings transport) conserve energy	100
Eventually the city does not grow over farmland and natural features	94
The air water and soil are clean	94
Cities and their systems are designed to foster social interaction	93
Local governments are accountable for land use transport and energy decisions	93
Ecosystem functions of water courses and bodies of water are not impeded	93
Each city does not become sustainable by exporting nuisances (land uses pollution etc).	93
Urban design promotes safety and security	87
Local governments seek and incorporate input from all stakeholders	87
Local decisions are transparent and legitimate	87
Ultimately only renewable sources of energy are used and are local when available and effective	81
A range of mobility services is available for people to meet their needs; time spent in transport does not impede quality of life	80
Urban design facilitates healthy lifestyles and access to natural features	80
Construction and transport materials are based on recyclable or biodegradable materials	79
Noise light and temperature impacts do not systematically exceed damaging thresholds for people fauna and flora	79
The unique sense of place is protected and enhanced	77
Urbanised areas do not systematically increase in size	73
Construction and transport materials are sustainably harvested from renewable sources	71
There is no landfilling of waste from construction and transport materials	71
A variety of affordable land uses is available to allow people to meet their needs	67
The city does not grow at the expense of: any group in society people and places outside the city and future generations	67

All respondents agreed that cities should be designed to conserve energy. The two elements scoring lowest were “*a variety of affordable land uses is available to allow people to meet their needs*” and “*the city does not grow at the expense of any group in society, people and places outside the city and future generations.*” This appears to place a lower priority on the social aspect of a sustainable *Nexus* while absolute response rates remain high.

When queried about the completeness and likelihood of adoption of this generic vision by cities, politicians and the public, respondents withheld full support, with “maybe” as the top answer to survey questions.

4.3 Barriers to a Sustainable Nexus

4.3.1 Overview

Barriers were identified to better understand challenges faced by local authorities in implementing policies towards an integrated and sustainable *Nexus*—as defined by a generic vision based on sustainability principles.

Understanding the *Nexus* and its barriers is only part of a strategy to select and prioritise actions towards a more sustainable *Nexus*. In applying the SSD Framework, local authorities should identify their own barriers to the principle-based vision that they have established based on their unique circumstances (*the system*). They will also identify ways in which to overcome barriers by focusing on fulfilling their long-term vision. It is crucial to step away from a reductionist “*identify barrier – overcome barrier*” pattern grounded in the present, and instead focus on how to achieve a desired vision of the future based on sustainability principles.

4.3.2 Barriers in the Literature

Barriers can prevent both an integrated approach to the *Nexus* and the implementation of desirable strategies. For example, the TRANSPLUS and SCATTER reports identified sets of barriers to the integration of land use and transport (ISIS 2003) or addressing sprawl (Gayda 2005). In particular,

TRANSPLUS identified combinations of legal, institutional and financial barriers mapped to vertical and horizontal⁷ territorial and organisational conflict.

The SCATTER project focused on obstacles to addressing urban sprawl, especially organisational issues within and between authorities (Gayda 2005, 81), such as the imbalance between territory and objectives, complexity of institutions involved in metropolitan management, political representation at local and regional levels and other potential conflicts of interest, shortcomings related to available legal and fiscal tools and the difficulty of establishing regional institutions for cultural and political reasons, and low legitimacy or efficacy once established.

Based on the literature and our preliminary exercises, a list of barriers was included in the survey. Issues perceived as barriers by survey respondents are displayed below in order of importance, in Table 4.

Table 4. Survey results: Perceived barriers to implementing strategies

Survey: Perceived Barriers to a Sustainable Nexus	% Agree (N=14)
Not enough funding	60
Perceived lack of choice (e.g. rising cost of housing in centre)	60
The car as a strong symbol of freedom and status	53
Unwillingness to challenge "status quo"	50
Lack of awareness understanding or interest in integrated planning or sustainability	50
Lack of understanding / awareness / interest of issues	47
Powerful interest groups	40
Overemphasis on economic development	36
Belief in individual freedoms e.g. reluctance to impose new taxes	38
Too little or no collaboration among city departments	36
Competing vision or definitions of goals	36
No integrated plan or vision (land use transport energy and sustainability)	36

⁷ Horizontal refers to entities at the same level of government, e.g. municipal land use and transport agencies. Vertical refers to entities at different levels of governments, e.g. EU, national, regional and local agencies.

Lack of coordination with other regional governments agencies	33
Lack of coordination with national or EU policy	27
Public distrust of politicians / planners	27
Lack of democratic participation / apathy	27
Inefficient tax system and/or discourages sustainable development	27
Negative impact of national and EU policies	21
Mismatch of land use and transport administrative territories	14
Poorly designed participation approaches	14
Lack of legal powers or revenues to implement plans	14
Lack of data	13
Not enough skill and knowledge in government agencies	13

4.3.3 Key Barriers

The following barriers were selected as key barriers not only for their support in our survey and interviews, but also for their impact on our generic vision. Each community should identify its own specific barriers.

Lack of whole-systems thinking. A lack of whole-systems thinking and a resultant narrow definition of sustainability are significant barriers (Litman and Burwell 334, Litman 2007).

Lack of awareness. Research and academic interviewees mentioned a lack of awareness among municipal planners and other actors as to the benefits of integration—and to sustainability in general—as key obstacles (Magnin 2007, Slack 2007.) Others mentioned a vague awareness of issues, for example climate change, but less understanding of inter-relationships and impacts of actions or decisions (e.g. Vassie 2007, Leproust 2007). Awareness is a “super-barrier” that supersedes other barriers. This gap in understanding is reinforced by the lack of a specific, strategic, and science-based definition of sustainability.

Cynicism. Several local interviewees mentioned cynicism among citizens. People often appear unwilling to change their lifestyles despite an awareness of climate change (Baillot 2007, Leproust 2007, Vassie 2007).

Lack of choice. The survey indicated a high “*perceived lack of choice (e.g. rising cost of housing in centre).*” This was confirmed by Leproust (2007) and Baillot (2007). As land prices increase, residents often move to neighbourhoods beyond areas served by public transport.

Ineffective participation and failure to achieve acceptance. The lack of a shared vision as part of a local sustainability plan and ineffective participation can be barriers to effective decision-making and implementation (Diamantini and Zanon 2000, 302, Bickerstaff et al. 2001). Lack of acceptance may indicate a failure to involve concerned actors (Lautso 2004, 156) or to elicit interest (Diamantini and Zanon 2000).

The EU and national role. The lack of effective and concrete EU support for regional planning within its treaty mandates (e.g. Bachtler and Polverari in Faludi ed. 2007), and inadequate research in policy integration and implementation (Geerlings and Stead 2003) are significant barriers. Uhel (2007) emphasised the need for concrete support of EU and national territorial policies. In addition, cities and regions are forced into in a reactive position in which they manage their growth or decline without acknowledging their interdependence with other regions. They also lack support and incentive to act proactively within an effective continental urban policy framework.

4.3.4 Survey Results: Measuring Awareness

The survey gauged public and political awareness and understanding of problems and barriers related to the *Nexus*.

Table 5. Survey results: Public and political concerns

In my city these issues are seen as important by the public and politicians:	% Disagree	% Agree
Quality of life in general	0	100
Affordability / availability of housing	7	93
Traffic congestion	13	87
Quality of public transport services	13	87
Environmental issues or sustainability in general	13	87
Climate change	20	80
Air pollution	27	73
Physical expansion of the city (sprawl)	27	73

Table 6. Survey results: Understanding of Nexus by group

In my city decisions about land use planning transport and energy are seen as interrelated:	% Disagree	% Agree
By politicians	13	87
By city employees	53	47
By the public	67	33

Table 7. Survey results: Barriers to planning integration

In my city the effective integration of land use planning transport and energy solutions is most impeded by:	% Disagree	% Agree
Lack of awareness or interest	36	64
Internal processes at the local authority	43	57
External barriers (policies and investments of national government, EU, etc).	64	36

4.4 Potential Strategies

Table 8 shows a summary of strategies included in the survey to assess the perceived efficacy of each strategy.

Table 8. Survey Results: Perceived efficacy of strategies

Survey Responses to Helpfulness of Strategies towards a Sustainable Nexus	% Agree
Dedicated employees focused on integration	100
Focus on incentives such as better public transport or central city development	100
A coordinated mix of incentives legislation and taxes	100
Enhanced participation: working groups of citizens and stakeholders help prepare long-range plan and propose solutions	93
Use of public participation to validate ideas AND to improve the quality of decision-making	93
Long-range urban plans AND individual projects that integrate land use transport and energy	87
Greater collaboration among city departments	87
Funding of new infrastructure by new development	86
Desirable compact and central development alternatives offered to the public	86
A public education programme on integrated issues (land use transport energy sustainability)	86

User charges for transport infrastructure (e.g. road pricing parking fees)	73
Agreement by all stakeholders on basic science-based sustainability principles and challenges as well as elements of a vision as shown above	71
Focus on restrictive legislation and new taxes (e.g. on driving parking)	60
Regional collaboration without changing municipal or regional borders	57
Greater integration of local planning with national and EU planning	54
Removal of unhelpful incentives e.g. free parking etc.	53
New organisation of regional governments with sources of revenue borders and responsibilities that match planning objectives	50
Reduced dependency on new development for taxes	36

Survey responses indicated lukewarm support for restrictive measures such as taxes and limits to mobility. Local authority interviewees indicated that any measures that require personal sacrifices are generally unpopular. Researchers counter that people are more open to such measures if they see that the measures address the problem (Vassie 2007, Gaunt and Allen 2007).

Survey respondents favoured policies combining incentives and disincentives, as actions produce a synergistic effect when implemented in clusters. These combinations can be effective if implemented prudently; for example, avoiding the use of disincentives that inhibit the effectiveness of incentives while ensuring that the benefits of both are apparent to all stakeholders (Wegener and Fürst 2000, Vande Walle et al 2004).

5 A Foundation for the *Nexus*: Discussion

Our results provide a starting point for action towards a sustainable *Nexus*, but using the SSD Framework at the local level to adapt these findings is key to success. In fact, when local authorities follow the processes presented in this section, they are likely to identify strategies towards a sustainable *Nexus* and their own barriers to its achievement.

5.1 Defining the System

Without a common definition of the system and vision for its success, planners may perceive different problems and strategies can take opposing directions, making it difficult to plan towards a common goal. For example, survey respondents from the same city gave several opposing responses on the importance of vision elements, the perception of barriers and the efficacy of strategies. Disparities may be due to the focus of the survey respondents' occupations; the complexity of cities has encouraged specialisation among professionals, promoting a deep understanding of one component or sub-component of a larger system.

A comprehensive systems-view incorporates these main system dimensions:

Geographic and jurisdictional

Geographic areas and jurisdictions should correspond to the scale of activities in a given region, for example reflecting natural ecosystems, commuting patterns, single employment and real estate markets. This is covered in greater detail in Section 6: *The Roadmap*.

Sectors

Sectors that influence one another should be viewed together, starting with elements of the *Nexus* but building upon its components to include other elements such as the impacts of biofuel use on agricultural and food systems.

Stakeholders

Analysis, planning and implementation require the right stakeholders at every step: government agencies, businesses, non-governmental organisations and a broad representation of the general public. This will be covered in greater detail in Section 6: *The Roadmap*.

Time

It is essential that an urban system be regarded in the context of a time scale long enough to include the unfolding of dynamic social and ecological cycles (Boulanger and Bréchet, 2005).

Rebound effects

Effective policies with counterproductive side effects; for example, a park-and-ride lot that frees up road capacity, but eventually causes more traffic, fuelling more sprawl.

Figure 5. System Dimensions

A whole-systems view highlights the importance of accounting for the depth of each sector while retaining a broad enough view to avoid reductionism. For example, indicators such as road capacity, average vehicle speed, parking availability, or accidents-per-kilometre are often employed by transport engineers to rationalise road improvements that favour vehicular flow, when the ultimate goal should be on the satisfaction of human needs. This may involve an emphasis on approaches that include mobility services that do not adversely impact other urban systems (Litman and Burwell 2006, 336). This also demonstrates the need to consider the *Nexus* system as a subsystem of society.

Despite the potential complexity and added cost in time, taking a systems view presents the opportunity to deal with problems in an upstream fashion. The dimensions above will be further explored in the following chapter.

5.2 Backcasting from a Principled Vision of a Sustainable Nexus

Creating a vision of success. A vision of success for a sustainable *Nexus* should be based on the defined system and should be checked against the characteristics of the sustainability principles, particularly those that are necessary, sufficient and concrete (Ny et al 2006, 75).

Backcasting involves agreeing on a desirable end state, such as the fulfilment of sustainability principles and a common vision of success, and evaluating all policy proposals against *both* elements. Backcasting from science-based principles and systems thinking can help avoid incrementalism, or proceeding in what is *perceived* to be “the right direction” without the benefit of concrete goals.

Backcasting allows a community to firmly establish where it would like to be in the future, within the constraints of the sustainability principles but without the constraints of existing barriers or current trends. A backcasting approach focused on the fulfilment of a future, long-term vision, should thus take precedence over an approach based on the identification and resolution of barriers grounded in present practices and trends.

Rather than basing backcasting solely on principles determined by experts, the public should help create the vision. Through a series of exercises, participants iteratively arrive at their preferred future state. By emphasising the consequences of choices, this “second-order backcasting” or “participatory backcasting” builds public awareness (Robinson 2003). By involving the public, backcasting becomes an education tool and the resulting vision is strengthened. However, the project team should inform the public's choices by providing guidance on the four sustainability principles to ensure that the vision fits within the constraints of the sustainability principles.

Forecasting tends to overemphasise existing approaches and their limitations, and thus stifle innovation. However, forecasting can assist the visioning process through the use of business-as-usual (BAU) scenarios as “the future to be avoided”, such as traffic congestion or a dependence upon dwindling fossil fuels. In Groningen (Netherlands), for example, the community was presented with a BAU scenario that anticipated a 40% in automobile traffic by 2010 if current trends continued unabated (Energie-Cités/ADEME 1998).

Examples of Visions. A hypothetical integrated and comprehensive vision for land use, transport and energy is provided in Table 3 with additional details available in Appendix 9.3. The appropriate vision must be constructed in each community to reflect its needs and aspirations. Indeed, our survey of European municipal officials showed lukewarm support for an “off-the-shelf” vision and variation in support for each statement. One local authority interviewee warned against the adoption of a vague vision that does not lead to concrete actions. The vision must be used as a foundation for the establishment of a plan or specific project, and actions must be formulated and implemented in the short and long term to help implement the elements of the vision.

Examples of visions for London and the Resort Municipality of Whistler are provided in Appendix 9.4. Significant differences can be noted between these visions. London’s vision emerges from the city’s sustainability office, while Whistler’s vision has been applied to the entire municipality. London’s vision appears more focused on social goals.

Prioritising actions. It is important that the process not end with visioning; there must also be a strategy to prioritise actions, which include all concrete actions with direct effect on the *Nexus*, ranging from infrastructure construction to transport pricing, but also supporting strategies to get there, including governance design and participatory mechanisms discussed in Section 6: *The Roadmap*. This need is fulfilled in Whistler and demonstrated in Göteborg, where new plans had to be created at the close of the Göteborg 2050 project. The SSD Framework and subsequent research (e.g. Ny et al 2006) provide such a framework to identify actions and prioritise them:

- **Right direction:** the right direction is the direction towards the principled vision of a sustainable *Nexus*.
- **Flexible platform:** actions are also stepping-stones to future platforms. For example, policies promoting land-use patterns that include mixed use, avoid lower densities and make optimal use of rail infrastructure are flexible platforms because they pave the way to reduce automobile use in the long term (van Wee 2002).
- **Return on investment:** Actions should be weighed to establish the best ratio of sustainability benefits compared to resources invested by pursuing other actions. For example, using value capture⁸ to finance a transit line may have a beneficial effect on improving the sustainability of the *Nexus* at low or no cost to governments.

As previously mentioned, it is also important to identify a comprehensive set of barriers to the implementation of actions in each local setting, with the list of barriers identified earlier serving as a guide. This emphasises the importance of defining a unique system and vision to drive local progress towards sustainability.

5.3 Next Steps

The Roadmap. As discussed above, our survey and interviews indicate support for greater collaboration, both within and between governments, as well as the need for greater public participation to increase awareness of the issues and acceptance of governments and their policies. In the following chapter, we provide further opportunities to improve the integration and sustainability of the *Nexus* particularly in the areas of governance and stakeholder participation and acceptance.

⁸ *Value capture* is the process by which a portion of increases in land value as a result of public projects are recouped by the public sector through taxes or fees. Lincoln Institute of Land Policy. http://www.lincolninst.edu/topics/value_capture.asp accessed April 15, 2007.

6 The Roadmap

6.1 Purpose

This section builds upon the *Foundation* in Section 5 and identifies strategies that local authorities can apply to improve the sustainability of the *Nexus*. These strategies stem from the barriers and potential strategies identified through our survey, literature review and interviews, and are selected to make progress towards our generic vision. Strategies below are not intended to replace the SSD Framework but to strengthen it by creating more favourable conditions for its use. Each local authority may find unique barriers to overcome and identify the need for different strategies as they apply the SSD Framework.

6.2 Results

6.2.1 Local and Regional Level Governance Structures

Governance structures matter. As discussed in Section 5: *A Foundation for the Nexus*, the appropriate system boundaries need to be identified to address issues. Area and jurisdiction were identified as crucial system dimensions of the *Nexus*. While our survey did not indicate a strong level of interest in integrated planning with the national and EU levels or in enhanced metropolitan collaboration, respondents gave high scores to issues that may have roots outside of city boundaries, such as lack of funding and unaffordable real estate in centres leading residents to make unsustainable decisions. This is supported by our review of literature and interviews (e.g. ISIS 2003, OECD 2006 and Aalbu 2006), which emphasise the importance of vertical integration among governments and the need to build awareness for integration (Magnin 2007b). Uhel (2007) emphasised the challenge of creating demand for an integrated territorial strategy—from the EU to the local level.

Renn et al. (1998) lend strong support to the regional as an appropriate level at which to solve issues: “[...] *work within a region offers the best practical hope [...] for developing effective political agreement on a conception of sustainable development and on operations in support of that conception. A political region is large enough to include many communities and economic interests which must be reconciled; thus many of the*

challenges of sustainability will be engaged". The Organisation for Economic Cooperation and Development (OECD 2006, 200) concurs: *"It is difficult for strategic visions and shared policies for advancing a metro-region to develop without some kind of policy capacity at the level of the metro-region itself."*

Regional fragmentation is an issue. Regional fragmentation refers to the subdivision of a single economic or employment region into discrete jurisdictions. The main consequence is a lack of coordination among transport, land use and energy within a single ecosystem or economic region.

Tax competition among municipalities can also contravene careful planning, as in Rennes prior to the uniformisation of tax rates in the region (Dormois and Noël, 2002). More generally, reliance on sprawl and resulting income and property tax revenues can pit suburban against urban municipalities (OECD 2006, 158).

Best practices in governance structure exist. Switzerland recently established a strong framework to mandate integrated planning within a regional context. In Sweden, the region of Västra Götaland has combined governance structure review and integrated planning. Both case studies were prepared based on a literature review and interviews with local practitioners (respectively Baillot 2007 and Ramnerö 2007).

The Discussion section builds upon these examples with a set of principles demonstrating how governance structures can be designed to address transport and land use.

Case Study: Switzerland's criteria for transport funding

In 2004, the Swiss Federal Office for Territorial Development (ARE) issued criteria for obtaining national transport funding, starting between 2011 and 2027 (Office fédéral du développement territorial ARE 2004 and 2007). Funds will be released to metropolitan areas identified by the federal government based on statistical measures. The first step towards obtaining funding is the preparation of a metropolitan plan transport and land use plan. The plan must contain an overall evaluation of transportation in the region, linked with national transport networks and must be coordinated with canton⁹-wide plans.

Federal contributions to projects described in the plan are contingent on the fulfilment of six basic requirements:

1. A participatory approach that includes relevant agencies, governments and stakeholders
2. A single partnership entity and adequate legal framework for implementation of the proposed project and relevant measures
3. Analysis of current and future situation in transport and land use
4. Research in areas including land use planning, road infrastructure, public transport, non-motorized transport, multimodal transport
5. Cost-benefit analysis, including strategic evaluation of land use-transport interaction and efficiency criteria defined by the federal government
6. Implementation and assessment approaches including integration in canton-wide strategies and coordination with national and trans-border policies and projects.

The magnitude of the federal contribution will range between 30 and 50% of total project budget, based on the following efficiency criteria:

1. Improvement in the quality of transport systems
2. Encouragement of intensification
3. Increase in the safety of transport systems
4. Reduction in environmental impact and energy consumption

Example 1: Switzerland's criteria for transport funding

⁹ A *canton* is an administrative unit between the national government and municipalities.

Example of a Metropolitan Plan: the PALM Plan for the Morges-Lausanne region.

The metropolitan plan for the Lausanne-Morges area was released in February 2007 (Canton de Vaud 2007). According to Baillot (2007), a planner for the project, the Plan:

- Initiates discussion at the regional level;
- Guides development and will be considered in the evaluation of development proposals;
- Requires that municipal plans build upon it;
- Limits growth outside of public transport service areas;
- May give rise to the creation of a research office for the region as a first step towards creating a regional entity.

Conversely, the following potential drawbacks should be observed:

- Limited time and labour force to complete the project;
- Compromises necessary to complete the project;
- Allowance for growth in areas beyond public transport service areas;
- Potential for rising land prices and social segregation;
- Low emphasis on “soft” mobility;
- Lack of action on rapid growth in commercial and leisure (non-commuter) vehicular traffic;
- Mobility demand issues linked to socio-economic factors not addressed;
- Lack of restrictive transport demand management measures;
- Allowance of negotiations between the Canton and municipalities, for example on minimum densities, potentially contradicting goals;
- Lack of interest from the population on regional issues; no discussion on significant lifestyle changes or linkages to global challenges.

Example 2: A Metropolitan Plan: the PALM Plan for the Morges-Lausanne region.

Case Study: The Västra Götaland Region and the Göteborg 2050 Plan

Sweden is a country often characterised by poor local coordination of service delivery among national agencies and an absence of regional planning. The Greater Stockholm Region is characterised by independent municipalities, a lack of regional government structure, and mismatched central government agency districts¹⁰ (OECD 2006, 139 and Aalbu 2006). In contrast, planning functions in Skåne and Västra Götaland have been devolved to the regional government (Aalbu 2006).

The new structure facilitates integrated planning. A coalition of local actors in the Göteborg region, including the region of Västra Götaland, prepared a regional development plan based on an approach akin to the SSD Framework (Ekberg 2006 and Academy 2006). The plan covered five sectors: Energy, Transport, Urban Planning, Food and Construction and used backcasting with an emphasis on participation (Academy 2006). The process followed the ABCD approach and involved a range of partners including government, universities and utilities.

The plan has given the Region a strong vision and experience in sustainable development, which is still used today in follow-up planning. However, implementation of visions into policies remains a challenge. A key lesson is the need for strong leadership to implement the desired actions. Backcasting is perceived as problematic as used in the project by an area planner (Ramnerö 2007). Participants viewed the horizon of 2050 as irrelevant and difficult to grasp. Implementation of actions fell short because of the lack of political will or the practicality of the suggestions, possibly because participants had reached an agreement more on theory than on concrete actions.

Example 3. The Västra Götaland Region and the Göteborg 2050 Plan

6.2.2 Participation for Acceptance

Strategies for acceptance are needed. Policies with the best intentions often fail because actions are not anchored in a foundation of public participation, which can help secure acceptance for proposed policy. Strategies for enhanced participation¹¹ were highly rated by respondents.

¹⁰ Such as the rail and road administrations (Banverket and Vägverket).

¹¹ Defined in the survey as “working groups of citizens and stakeholders help prepare long-range plan and propose solutions”.

From participation to acceptance. The fields of land use and transport have a relatively short history of community involvement, with little opportunity to incorporate public feedback. In the past, involvement often followed a pattern of “decide-announce-defend.” This model of token participation restricted the public’s choice to acceptance or opposition of the measures rather than to provide an opportunity to proactively shape alternatives. This can lead to disempowerment and distrust, and can ultimately create barriers to the successful implementation of sustainable policies (Bickerstaff et al 2001, Margerum 2005).

There is a strong trend towards greater transparency and for more opportunities to participate in formulating policy through forums for public discussion and debate as well as more direct involvement by a representative sample of the population (e.g. Bickerstaff et al. 2001).

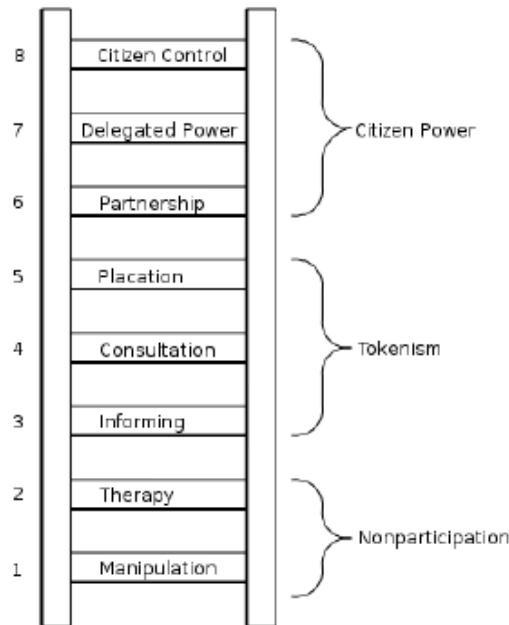
One key strategy to improve community acceptance of land use, transport and energy policies is to involve stakeholders, including members of the public who are affected by policies in the policy-making process (Diamantini and Zanon 2000, ISIS 2002b, Margerum 2005). Robinson (2003) and Robinson et al (2006) identify a strong role for participation techniques such as participatory backcasting (described in Section 5: *A Foundation for the Nexus*) to build awareness among the public towards acceptance.

Our survey of local authorities indicates that elements of participation are valued as part of a vision for the *Nexus*, with high scores for the following elements:

- Cities and their systems are designed to foster social interaction;
- Local governments seek and incorporate input from all stakeholders;
- Local decisions are transparent and legitimate, and;
- Local governments are accountable for land use, transport and energy decisions.

As a strategy to secure acceptance, participation refers to the inclusion of stakeholders in the decision making process. When implementing a participation strategy, it is important to ensure that participation moves beyond the motions to empowered participation (Arnstein 1969; Bickerstaff

et al 2001). Arnstein (1969) describes the levels of participation as a “ladder”, ranging from “manipulation” as the lowest level of non-participation to “citizen control” as the highest level of citizen power.¹² The engagement of stakeholders in the policymaking process can ultimately lead to acceptance and successful policy implementation.



*Figure 6. Arnstein’s ladder of citizen participation.
(Source: Arnstein 1969)*

Benefits of participatory approaches. Participatory strategies can help create a shared vision, which is a fundamental step towards a sustainable Nexus as discussed in Section 5. Participatory techniques also connect people to politics and governance in a meaningful way by providing the means and the relationships for people to participate in government.

¹² This model of public participation is commonly known as the *Arnstein Ladder of participation*.

“Citizens can and must play an important role in public policy and decision making. Citizens have the right to decide what is important to them and how they can best achieve their objectives” (Blomgren Bingham et al 2005).

While incorporating participation may increase the cost and implementation time of projects, the literature suggests that the advantages generally outweigh the drawbacks.

Table 9. Benefits of participation leading to acceptance

Selected Benefits of participation leading to acceptance
<ul style="list-style-type: none">• Avoidance or resolution of conflicts through early identification of issues (ISIS 2002b)• Broader support for plans improving the quality of resulting plans and their effective implementation (ISIS 2002b, Callahan 2005, Litman 2007c)• Potential for reduced costs, e.g. by avoiding extra planning or legal costs of community opposition (Porter 2006)• Positive changes in behaviour such as changes in travel patterns, (ISIS 2002b)• Increased access to local, specialized knowledge, generating alternatives that may not otherwise have been generated (Bickerstaff et al 2001, Slocum 2003, Callahan 2005, Margerum 2005).

Identifying the right issue. People react to issues when change to their immediate environment is proposed (Staffans 2007, Baillot 2007, Leproust 2007, Alió and Gallego 2002) such as intensification¹³ of their neighbourhoods, housing affordability, transport prices—for example understanding that limiting automobile use can save public and private money (Laconte 2005)—or time spent on traffic, air quality and congestion. All issues of climate change, air pollution, traffic congestion, affordability, sprawl, and quality of life obtained high ratings in our survey (see Appendix 9.1 for details).

¹³ Intensification refers to an increase in density by building taller buildings or on a greater percentage of land in a given area. The end result can be a greater intensity of residents, jobs and activity in a set area.

In the transport and land use plan for the Lausanne region, residents of suburban areas, where significant intensification was proposed, expressed greater interest in proposed plans and participation events than urban and exurban residents. In these neighbourhoods, little change to urban and built form was expected (Baillot 2007).

Leveraging awareness of climate change. Several interviewees (e.g. Pujol Vidal 2007, Petit 2007, Ludlow 2007) cited a recent shift in awareness regarding climate change, and 80% of survey respondents agreed that climate change is perceived as an issue in their area. At this stage, it appears that the impact of day-to-day actions is poorly understood, as is individual responsibility. One survey respondent aptly summarised the conundrum, “*The difficulties lie in where people’s dreams or vision for protecting the environmental and reducing CO₂ emissions clash with their other dreams and aspirations. It is then quite possible to believe that all these environmental concerns are very important and still not do anything about them.*” Channelling interest in climate change towards concrete action is an important priority for local authorities.

Participation Successes and Acceptance Breakdowns – Examples. The following examples contrast the failure of participatory approaches to secure acceptance for a congestion charge in Edinburgh with success stories elsewhere. Principles building on these experiences are proposed in the Discussion section below.

Example of Acceptance Breakdown: Congestion Charges in Edinburgh

The city of Edinburgh planned to implement a road user charge (Gaunt et al 2006, Gaunt et al 2007). Potentially significant benefits were identified, such as reduced traffic delays within and across the city, reduced vehicle traffic, and more people travelling into the city. Revenues of £760 million were anticipated, funds that would be used to fund transportation infrastructure improvements such as bus services, a tram line, road maintenance, improvements to the regional rail system, and safety.

Despite a lengthy consultation process, citizens defeated the measure with a 74% vote against it, with feedback that the charge was a burden for drivers who were already overtaxed.

The failure to engage the people in support of road user charging in Edinburgh highlights some of the key problems with ineffective participation approaches and the importance of understanding the factors that facilitate acceptance.

Example 4. Congestion charges in Edinburgh

Examples of Innovative Participation Initiatives

In 1995, **Groningen** in the Netherlands was faced with the prospect of a 40% increase in private traffic by 2005. Over a period of 18 months, working groups composed of experts, citizens and representatives of interest groups worked on four possible scenarios. In the end, Council chose one scenario and implemented it with success. (Energie-Cités/ADEME 1998).

Göteborg 2050 — the Göteborg 2050 Project used backcasting to prepare a sustainable plan for the region (see Example 3).

Whistler 2020 — This website contains Whistler’s (Canada) shared vision, strategies, goals, and story of sustainability, including lists of actions, measures of progress, news, and resources by category. It also provides links to ‘sustainability on-the-ground’ education for additional topics (Battiston 2007, www.whistler2020.ca accessed April 11, 2007)

IMAGINE — Energie-Cités’ IMAGINE project challenges communities to implement sustainable energy policies by imagining a sustainable future for energy. The project encourages local authorities, stakeholders and citizens to backcast from a sustainable vision of energy in 2030, to share success stories, and to foster exchanges of new ideas. (Magnin 2007a).

RAISE — Raising Citizens’ and Stakeholders’ Awareness, Acceptance and Use of New Regional and Urban Sustainability Approaches in Europe was funded by the European Commission to raise the awareness of and to test the acceptance and usability of EU research projects on urban sustainability. Twenty-six “average citizens” were selected to test various approaches to sustainability. (<http://www.raise-eu.org/> accessed April 11, 2007)

Example 5. Innovative Participation Initiatives

6.2.3 Internal Local Authority Processes

In our survey, “*too little or no collaboration among city departments*” and “*competing vision or definitions of goals*” were commonly identified barriers to a sustainable *Nexus*. This was confirmed by a local authority interviewee¹⁴, who described the inability of departments to communicate and collaborate on key issues. 36% of respondents rated “*No integrated*

¹⁴ Name withheld.

plan or vision (land use, transport, energy and sustainability)” as a barrier. As a strategy to move forward, “greater collaboration among city departments” and “long-range urban plans and individual projects that integrate land use, transport and energy” received a high rating in our survey, thus identifying a key role for internal authorities to align processes towards an integrated and sustainable Nexus.

Interviews and our literature review helped identify the following opportunities:

Integrated planning. Overarching plans with clear implementation responsibilities and strategies can help departments collaborate on a set of single goals. Integrated planning itself can help identify issues with collaboration and opportunities to make more integrated decisions.

The Region of Västra Götaland (Sweden) (details in Example 3) adopted a single plan for land use, transport, energy, food and construction, with follow-up implementation plans and activities, among which a “network” of actors coordinate regional projects (Academy 2006 and Ramnerö 2007).

The Resort Municipality of Whistler (Canada) created an ambitious sustainability plan, Whistler 2020. The municipality is rewriting its Official Community Plan to give the Whistler 2020 plan legal standing in the Province of British Columbia, (Battiston 2007).

The City of Växjö (Sweden) adopted a concept called “eco-budget”, in which sustainability indicators are built into the budgeting process and linked to the City’s Environmental Plan. Växjö’s financial accounting system integrates an ecological accounting system (City of Växjö 2007).

Example 6. Integrated Planning

Indicators. Many municipalities collect indicators linked to sustainability plan objectives, for example in Whistler (Battiston 2007) and Stockholm. In the latter case, indicators are presented on a sustainability web portal for citizens, with access to environmental plans and projects and maps (City of Stockholm 2007).

In France, the national *Loi sur l'air et l'utilisation rationnelle de l'énergie* provides the legal framework to establish “mobility observatories”. The City of Orléans mobility observatory is a dedicated service focused on understanding the land use – transport interaction and coordinating policy efforts at different sectoral and geographic scales (Vande Walle et al 2004, 192). Building on the Orléans experience, Vande Walle et al (2004, 185) propose the development and use of “indicators of integration” to measure and address integration itself, such as:

- Indicators measuring the integration of land-use and mobility plans
- Number of projects with both land-use and mobility department involved
- Number of integrated land-use and transport schemes implemented

Additional examples of indicators are provided in Appendix 9.5.

Integration services. The concept of “*dedicated employees focused on integration*” received unanimous support in our survey and was outlined as a key initiative by a local authority interviewee. The Orléans observatory synchronises decisions among departments and monitors the implementation of decisions, progress and efficiency. It can also propose actions to address undesirable trends (Vande Walle et al 2004). In Whistler, this function is located in the Chief Administrative Officer’s office (Resort Municipality of Whistler 2007).

Departmental Restructuring. To improve communication between departments, some local authorities have reorganised their internal structure to better reflect their challenges. Following the adoption of the Whistler 2020 plan, the municipality restructured its traditional departments to match the priorities of the Whistler 2020 plan (Resort Municipality of Whistler 2005 and 2007, Battiston 2007). Although relatively few employees were reassigned to different departments, restructuring has increased awareness of the municipal sustainability goals (Battiston 2007).

Performance evaluation and compensation. Performance evaluation and compensation should be aligned with organisational goals. In Whistler, it was recognised that embedding sustainability objectives in employee evaluation and compensation was crucial to successful implementation. The Human Resources department is working to integrate systems designed to achieve these ends (Battiston 2007).

Leadership. Leadership is essential for a sustainable *Nexus*. Travers (2006) stated “*The quality of urban leaders is probably the key determinant of effective city/city regional government.*” In New York and Bogotá, mayors have exercised strong leadership in the area of the *Nexus* (Banister 2007).

6.2.4 The National Governments’ Role

National governments play an essential support role. A systems perspective applied to a single territory demands vertical collaboration between local and regional governments and upper levels of governments such as states or national governments. While issues related to the *Nexus* are often managed at the local level, the origin of influence is often located far away, and can originate in economic (including fiscal) policy, transport, land use planning, and/or energy policies (OECD 2006, Travers 2006 and ISIS 2003).

Unlike the European Union, member states are free to devolve powers in planning, transport and energy to local authorities and set the policy framework to establish the balance of responsibilities. Member states remain sovereign, and can negotiate agreements with other states, for example on urban areas that straddle national borders.

Although the European Parliament is elected by European citizens, its council of ministers is composed of elected ministers from individual member states. These states have significant and direct influence over EU policy. Laconte (2007) sees a renewed dynamism in the council of ministers shaping policy, which may re-emphasise the importance of national policy arenas in influencing EU policy.

The power and influence of national governments and local authorities can be demonstrated through a comparison of their aggregate annual budget in 2005 (€4,908 billion¹⁵ (Dexia 2005) and €1,315 billion (ibid), respectively) to that of the European Union¹⁶ (€126.5 billion (Commission 2007c)).

Opportunities for national governments to assist local governments are provided in the Discussion section, building on the following case studies:

Sweden's 16 Environmental Goals

Sweden's environmental goals provide a consistent policy framework at the national, regional and local levels. Progress is tracked in an annual report, as measured by 70 indicators. Several goals relate directly or indirectly to the *Nexus*. (Swedish Environmental Protection Agency 2006). Municipalities are required to prepare plans that consider these goals (Commission 2005b).

France's *Loi sur l'air et l'utilisation rationnelle de l'Énergie*

France's *Loi sur l'air et l'utilisation rationnelle de l'énergie* requires the preparation of Plans de Déplacement Urbains (PDUs) for metropolitan areas with over 100,000 inhabitants (République française ND). PDUs include the establishment of an observatory of transport and land use (Vande Walle et al 2004 and Energie-Cités/ADEME 2004).

The Swiss Approach to Transport Funding

As discussed in Example 1, Switzerland promotes regional integration by tying transport funding to regional transport and land use plans.

Vision and Backcasting for UK Transport Policy (VIBAT)

The goal of this initiative funded by the UK Department for Transport is to envision the future of transportation with 60% lower emissions in 2030. Researchers compared the outcome of a BAU (Business as Usual) scenario to the envisioned future and developed two scenarios. Policy packages were developed using a visioning and backcasting approach (Banister ND).

Example 7. National Plans with Impact on the Nexus

¹⁵ Figures for 25 member states in 2005

¹⁶ Figures for 27 member states in 2007

6.2.5 The EU's Role

The EU has no direct mandate to influence land use planning (Commission 2006a). However, the EU impacts local land use planning through its investments, primarily in transport, and especially in fast-growing areas of the continent. It is expected that €40 billion will be spent on transport over the 2007-2013 period (CEE Bankwatch Network and Friends of the Earth Europe 2006) despite:

- The need to decouple transport growth from GDP growth, as emphasised in the 2001 Transport White Paper (Commission 2001b) and failure to do so in the last decade (EEA 2006).
- The EU's commitment to a minimum 20% reduction of greenhouse gas emissions from 1990 levels by 2020 (Council 2007a), following a 23% increase recorded in greenhouse gases between 1990 and 2003 (EEA 2006).
- A lack of definition of sustainability: the Community Strategic Guidelines (Council 2006a), which guide the allocation of structural funds, do not define sustainability and make no clear demands that projects be sustainable or contribute to decoupling.
- Evidence that the effects of transport subsidies on economic prosperity and the environment are not linear and gain to be understood thoroughly (EEA 2006 and 2007, SACTRA 2006) coupled with the allocation of 52% of transport funds on roads in Central and Eastern Europe. Romania, Slovenia, Slovakia and Lithuania are planning almost no funding of public transport (CEE Bankwatch and Friends of the Earth Europe 2006).
- Investment in areas with unstable administrative structures and relatively weak planning systems (ISIS 2003, 21 and Ludlow 2007a, Commission 2006b, Banister 2007, Ludlow 2007a, Bachtler and Polverari 2007, 113). ISIS (2003) also identifies language barriers.
- Unfavourable conditions for strong monitoring by civil society. For example, 34% of Latvians and Bulgarians do not think that energy production and consumption have an impact on climate change (Commission 2007b).

Example of discrepancies between top-level and implementation policy - The Romanian Sectoral Operational Programme – Transport (SOPT) (Government of Romania 2006)

The Romanian Sectoral Operational Programme was written to secure EU structural funds in transport, and is expected to follow the Community Strategic Guidelines (Council 2006a). However, the following observations highlight contradictions to high-level EU policies on sustainability, decoupling and climate change, and implementation policy.

- **Reactive or downstream approach to integrating sustainability:** “Minimise adverse effects of transport on the environment” (page 51).
- **Lack of institutional capacity:** “The number of staff currently available in the Government is insufficient to deal effectively with the implementation of the SOPT” and “The current level of training is inadequate for the effective implementation of the SOPT” (page 62).
- **Emphasis on unspecified technology:** “These operations include the introduction of efficient non-polluting/environment-friendly transport infrastructure initiatives” (page 61).
- **No mention of urban public transport funding** (with the exception of a subway to the Bucharest airport), **transportation demand management, integration with land use, territorial governance issues or public participation**, only “information and publicity” (page 63), “dissemination” (page 75) and meetings with institutional and business stakeholders (page 92).

Example 8. The Romanian Sectoral Operational Programme – Transport (SOPT)

6.2.6 Opportunities for EU Intervention

The European Union already influences urban sustainability through directives on air, water, noise, waste, and environmental assessments¹⁷. A working group mandated by the European Commission published a report on Environment Management Plans and Systems (Commission 2005c), which would assist in the integration of issues and long-range planning at the regional level, for example ensuring strategic spending of cohesion and

¹⁷ respectively 96/62/EC, 2000/60/EC, 2002/49/EC, 2006/12/EC, 85/337/EEC, 97/11/EC and 2001/42/EC 85/337/EEC, 97/11/EC and 2001/42/EC

structural funds. Interviewees stressed that political will to further this agenda is currently absent (Magnin 2007a, Banister 2007) and require resources that local authorities can ill-afford (Magnin 2007a). Work is continuing in this area, for example through the *Managing Urban Europe-25, A Sustainable Future for Cities* project¹⁸.

In councils of the UK, *European Officers* help coordinate government departments, businesses and the European Union. Although their primary role is to help secure EU funding, they can help transfer knowledge from the EU and other countries to the local community, and lobby on behalf of local authorities (Improvement and Development Agency 2007).

Further opportunities in which the EU can assist efforts towards sustainable development of the Nexus at the local level are provided in the Discussion section.

6.3 Discussion

No single governance design model is appropriate for implementation throughout Europe without local adaptation, and governance design should not be viewed as an end in itself. However, principles can help clarify the bearing of such structures on the sustainable development of the *Nexus* without prescribing a specific governance model. Most important is initiating a dialogue among local authorities on issues related to the *Nexus*. National or state governments can be instrumental in jumpstarting and facilitating these exchanges.

An overview table of proposed strategies, including key advantages of using the SSD Framework is provided in the Executive Summary. Strategies were selected based on empirical data from our survey and interviews and assessed against three prioritisation questions from the SSD Framework. These strategies are intended to be supplemented with location-specific strategies identified with the help of the SSD Framework.

¹⁸ www.mue25.net accessed May 27, 2007.

6.3.1 Regional and Local Governance Structures

With their responsibilities for land use planning, transport and energy, local authorities have a pivotal role to play towards the development of a sustainable *Nexus*. The effectiveness of local activities, however, is contingent upon the factors discussed above, including EU and national support and policy consistency and regional governance.

The following are key ways to improve the sustainability of the *Nexus* at the local level, with an emphasis on *processes* including governance structures, participation techniques and strategies to foster acceptance, and internal organisation of local authorities.

Build upon a solid foundation. As seen in Section 5, a principled vision for the *Nexus* should be at the core of local strategies. This vision should be based on the relevant system with the dimensions of area, jurisdiction, sector, stakeholders, time and rebound effect. Governance structures should flow from a systems analysis centred on the *Nexus* and allow issues to be tackled through coordination among jurisdictions and other agencies with influence on the *Nexus*. This section will further develop area and jurisdiction as key system dimensions, followed by stakeholders in Section 6.3.2.

Governance Structure Principles. We interpreted and supplemented Gayda's (2005) "institutional square" (composed of territory, democratic legitimacy, power, and competencies) to address the need of a sustainable *Nexus*.

Territory. Regional jurisdictional arrangements should allow issues related to transport and land use systems to be addressed comprehensively. Existing statistical definitions can be used to define appropriate boundaries, and can be supplemented by a systems analysis based on interrelated issues and externalities. In Switzerland for example, the federal government requires metropolitan land use and transport plans for areas determined by the Federal Statistics Office (Canton de Vaud 2007, Office federal du développement territorial 2004).

Democratic legitimacy. Any structure should be designed with high visibility among the population, which may conflict with the first principle of scale. Alió and Gallego (2002) establish parallels between the size of a

regional entity and the propensity of citizens to respond to calls for participation. Travers (2006) explains, “*Metropolitan government is not just about cohesion, efficiency and competition —it also involves the politics of identity.*”

Power. Shared powers between all governments must be clear and related to each entity’s mandate and objectives. A clearer power structure between the Scottish Executive and the City could have helped implement the Edinburgh congestion charge project successfully (Gaunt et al. 2006).

Competencies. Competencies should relate to the challenges. Fiscal revenues should be related to powers and competences to facilitate coordination, transparency and accountability. For example, the Greater London Area and Transport for London cover the same area and coordinate their decision-making (OECD 2006, 167 and 171).

Informal collaboration can also raise awareness, help establish a dialogue and serve as a foundation for a more formal institution (Gayda 2005, 12). Collaboration can be progressive over time. In Helsinki, collaboration among area municipalities has intensified since 1996, when the mayor formed a think-tank to discuss metropolitan issues. A common land use plan and a reorganisation of the public transport system are expected to follow (Karvinen 2006). Upon the completion of the plan in the Lausanne-Morges region discussed in Example 2, municipal authorities are contemplating the creation of an office to research regional issues (Baillot 2007).

Governance restructuring is not a panacea. Governance restructuring should not be solely relied upon to achieve optimal regional coordination. Continuous national involvement, ad-hoc collaboration mechanisms and strong civil society oversight remain necessary.

Even sophisticated structures cannot deliver an effective metropolitan government in a mega-city. London dominates the entire Southeast region of England, with a population of 20 million (Travers 2006). This points to the need for national or state governments to continue to facilitate exchanges at the regional level. Even in smaller regions, organising area municipalities into formal structures can fall behind evolving commuting patterns, as exemplified in Rennes, France (Dormois and Noël 2002, Leproust 2007).

A strong civil society with adequate geographic representation is necessary, even if only to mitigate concerns with the localisation of undesirable land uses (OECD 2006, 199). Strong leadership must drive the collaborative process (OECD 2006, 193, Academy 2006).

Table 10. Prioritisation questions for governance structures

Question	Assessment
Right direction?	Depends. Governance restructuring alone cannot guarantee progress towards sustainability but is a strong precursor since problems are viewed and addressed more holistically.
Flexible Platform?	Yes. Governance systems can start informally and evolve over time.
Return on Investment?	Depends. New structures and organisation models can be more expensive, but can also lead to efficiencies, particularly through integration and the elimination of redundancies and fiscal competition.

6.3.2 Participation Strategies towards a Sustainable Nexus

The principles below build on the *Foundation* outlined in Section 5, particularly the establishment of a principle-based vision for a sustainable *Nexus*, taking into account the appropriate system dimensions of area, jurisdiction, sector and time. Because each region and each city has its own set of historical, political and cultural parameters, a uniform application of participatory methods is neither likely, nor desirable.

Factors regarding the success of participation as a means towards acceptance may be organised into the categories of *leadership*, *strategy*,

inclusivity, transparency, and continuity (adapted from Bickerstaff et al 2001). Although the principles are generic and can be applied to a variety of settings, they are supplemented with *Nexus*-specific examples.

Basic Principles for Participation – foundational elements:

- Provide opportunities to define solutions; people want to address problems themselves (Uhel 2007).
- Invite participants to state what they want instead of reacting to what they do not want (Bickerstaff et al 2001)
- Agree on a shared mental model, for example the four sustainability principles.
- Prepare and adopt a vision as a critical first step of the participatory process. (Banister 2007, Margerum 2005, Porter 2006, Litman 2007)
- Instead of seeking consensus on issues as a condition to proceed, log dissent and address it progressively (Banister 2007).

Leadership: Leaders help build the foundation for success:

Real change requires strong leaders who can guide the process and help translate the vision into action (Margerum 2005, Porter 2006, Staffans 2007). Göteborg was successful in inviting participation but was less successful at translating vision to action. One possible cause was a lack of adequate leadership to prioritise the long-term actions (Academy for Sustainable Communities 2006). Strong leaders can also help secure the necessary funds for a successful outcome (RAISE, Callahan 2005, Gaunt et al 2006, Porter 2006 Staffans 2007).

Strategy: Approaches that guide the participation process:

Finding the right issue. Vague concepts like “the environment” can fail to attract participants because there is no perception of scarcity or threat¹⁹. In addition, restrictive solutions such as legislation and taxation typically lead to more effective policies than incentives alone (Vande Walle et al 2004).

¹⁹ Our observation from Alió and Gallego’s (2002) experience in Barcelona.

As a result, it is often necessary to bundle incentives, such as high-quality public transport services, with restrictive fiscal or legislative measures such as a limits on urban growth. Given this situation of scarcity and the associated potential for controversy, it becomes important to secure acceptance from politicians, the public, businesses and other stakeholders, through participation processes and other strategies aimed at securing acceptance.

Macro questions at the micro level. Building consultation strategies from the micro to the macro level can satisfy the desire of residents to be engaged in local issues while helping address regional issues. “Neighbourhood labs” in Rome have increased participation by creating direct links between institutions and citizens regarding land use and transport topics at the local level (ISIS 2003). While neighbourhood labs deal with local issues, they are coordinated at a municipal level, suggesting that it may be possible to start with neighbourhood participation, and then extrapolate from neighbourhoods to the city level. (ISIS 2003). In the Lausanne-Morges regional plan, public participation in the development of the plan was low, but area subplans linked to the regional plan garnered significantly more interest (Baillot 2007). The opportunity exists to coordinate local consultation events and then “federate” them into a large-scale project.

On compromise. Compromise can jeopardise effectiveness. Within the constraints of the Strategic Sustainable Development Framework, one can argue that compromises can be made on the pace of implementation, and perhaps on the return on investment, in the short term. However, at the prioritisation stage, *right direction* and *flexible platform* (see Section 2: *A conceptual framework*) should be safeguarded from compromises to avoid proceeding in the wrong direction and investing in *blind alleys* that will not lead to progress towards the vision (Macdonald 2005).

Inclusivity: *People involved in the process should represent all who will be affected by policies:*

- Find the right participants, both in population and geography. Decisions regarding transport, for instance, should involve both drivers and non-drivers (Litman 2006, Margerum 2005, Bickerstaff et al 2001).
- Pursue broad participation to prevent geographic inequity (OECD 2006, 199). Find participants who are not part of the professional elite

(Litman 2007, Battiston 2007). The newer people are to an area, the less they identify with it; the larger the region, the less participation (Alió and Gallego 2002). Special care must be taken in these cases to ensure these populations are appropriately represented.

- Include a mix of specialists, businesses and laypeople (Banister 2007, Battiston 2007). Open forum discussions can be balanced with smaller groups of specialists to produce more innovative ideas (Staffans 2007). In North Jutland (Denmark), experts and local innovators were carefully selected to ensure that groups would “think outside the box” (Madureira 2007).
- Invite critics to participate fully and early in the process (Banister 2007). In Groningen, organisers asked participants with opposed ideas to collaborate on finding solutions (Energie-Cités/ADEME 1998).

Transparency: *Make the process clear and accessible to the stakeholders:*

- Provide effective communication regarding the process and the issue; make the process public so people know where the process is headed and understand the role of their input (Porter 2006, Staffans 2007). In the Helsinki region, hundreds of citizens participated in Local Agenda 21 groups to create a vision of a sustainable future. However, many of the key ideas were eliminated when the mayors met to agree on a strategy (Staffans 2007).
- Set clear expectations: ensure participants know that they are expected to produce concrete short and long term solutions and towards the fulfilment of the principle-based vision (Academy for Sustainable Communities 2006).
- Provide feedback to participants regarding how their input translated to the outcome (Bickerstaff et al 2001, ISIS 2002b). Oftentimes, policies are unrecognizable from the participant input that led to the policies in the first place.

Continuity: *Timing is crucial:*

- Involvement should start early in the planning process (Bickerstaff et al 2001, Staffans 2007)
- Participation should continue throughout the process (Bickerstaff et al 2001, Callahan 2005, Porter 2006, Staffans 2007). To ensure continuity,

citizen juries or citizen panels, can be used for large-scale planning over a long period of time.²⁰

Accountability: *Participants should share responsibility in the outcomes:*

- In contrast with more open forms of public consultation, citizen juries can bring continuity and accountability to the process. However, even the most effective and diligent jury will serve little purpose if its only role is to rubber-stamp decisions made by “experts” (Kenyon 2005).
- Processes should be in place for long term monitoring & review of involvement (Bickerstaff et al 2001).

Acceptance Principles

Several basic principles for acceptance emerge from the Edinburgh congestion charge case:

- **Understanding of and agreement with the problem:** voters in Edinburgh believed that the congestion problem wasn’t serious enough to warrant a congestion charge.
- **Effective and coherent communication:** stakeholders must understand the policies and their rationale.
- **Fairness regarding payment/benefit and principle of equality** (Gärling and Schuitema 2007): in Edinburgh, although both contributed equally to the congestion problem, those who travelled into the city would have to pay, whereas those travelled within the city would not.
- **Destination of funds collected:** there needs to be trust that the revenue will be used towards better public transport.
- **Perception of benefit:** people do not want to pay for services when they perceive no added benefit.

²⁰ Juries recruit groups of individuals to answer policy questions. Juries are, or become well-informed about an issue; they build trust through their representation, and they facilitate communication among stakeholders. (Kenyon 2005)

- **Perception of effectiveness** (Gärling and Schuitema 2007): citizens must believe that policies will help solve existing problems. Although public opinion of a toll ring in Oslo was low when it opened in 1990 (Odeck & Bråthen, 1997), the level of acceptance improved when traffic congestion decreased (Odeck & Bråthen, 2002).
- **Voter participation:** In Edinburgh, a vote analysis revealed that primarily drivers (over non-drivers) voted on the congestion charge referendum, and the majority of drivers voted against the charge while most non-drivers voted for the charge.
- **Pairing coercive and non-coercive measures:** sole reliance on coercive measures may be effective on paper, but may fail to gain acceptance in practice (Gärling and Schuitema 2007). This was reinforced in our survey, with low support for coercive measures alone and high support for a coordinated basket of measures.

In practice. As discussed in Section 2 - *A Conceptual Framework*, the **ABCD**²¹ backcasting process constitutes an effective tool to guide the participation process by identifying problems and the relevant *system*, building a principled *vision* and prioritising solutions.

²¹ A: Form a shared mental model of sustainability; B: Identify the sustainability challenge; C: Envision a sustainable future; D: Prioritise the options identified in step C.

Table 11. Prioritisation questions for participation strategies

Question	Assessment
Right direction?	Depends. Increased participation does not guarantee progress towards sustainability, but approaches such as participatory backcasting are at the core of SSD. Strategies for acceptance maximise the chance of success of proposed policies, which should result in greater sustainability.
Flexible Platform?	Yes. More participation and new techniques can always be introduced.
Return on Investment?	No/Yes. Increased participation may raise short-term costs but can be expected to reduce costs in the long-term as policies are successfully implemented and do not need significant revision or abandonment.

6.3.3 Improving Internal Processes

The integration of municipal functions related to the *Nexus*, as well as the measurement of success and the implementation of adequate financial incentives can help improve the integration and sustainability of the *Nexus*. Building on the opportunities identified in Sub-Section 6.2: *Results*, local and regional authorities should consider the following:

Integrated plans. Integrated plans constitute the overarching strategy for local and regional authorities to plan towards an integrated and sustainable *Nexus*, and to adopt and implement policies in that direction. The approach to preparing and adopting a plan leverages several concepts outlined throughout this paper, starting with the identification of the appropriate *system* to ensure a comprehensive approach, the adoption of a vision based on principles and innovative participation techniques with an eye on ultimate acceptance.

Indicators and integration. Local authorities should strategically focus on indicators that measure progress towards the principled vision as well as indicators that measure administrative integration. The opportunity also exists to expand the role of the service that gathers indicators to identify “integration breakdowns” and provide solutions.

Departmental Restructuring. A redesigned organisational structure centred on the fulfilment of the sustainability vision can be instrumental in building awareness and breaking down existing barriers. Realigned

departments can also facilitate coordination with upper levels of governments, other agencies or local authorities.

Change evaluation and compensation systems. Employee evaluation and compensation should progressively be aligned with the fulfilment of the vision and key indicators measuring progress. At a minimum, disincentives to achieve these goals should be identified and removed.

Leveraging available EU resources. Local authorities and the general public should avail themselves of existing research and funding opportunities and continue to seek progress in this area, through their European Officers, European members of parliament, and national ministers.

Table 12. Prioritisation questions for internal processes

Question	Assessment
Right direction?	Depends. Internal changes do not guarantee progress but can be instrumental in enabling the adoption of strategic planning and implementation approaches, supporting the use of the SSD Framework.
Flexible Platform?	Yes. Internal processes can always be fine-tuned.
Return on Investment?	Depends. Changes can be costly and disruptive in the short-term but can lead to more effective policymaking, better understanding of the effect of policies and increased employee satisfaction.

6.3.4 The National Governments' Role

National or state governments should provide adequate and consistent sets of legislative and fiscal tools, and provide a policy framework to assist with jurisdictional collaboration and integrated problem solving. While they need to continually monitor the adequacy of regional governance and fiscal structures, they should also be ready to assist in areas that cannot practically be integrated. The SSD Framework can be used to inform a national strategy for the *Nexus* and relationships with local authorities.

Territorial growth management. Member states have the key responsibility to pursue a proactive territorial strategy, i.e. to pursue policies to allocate

growth spatially for the whole country, or mitigate the effects of decline and growth. Our survey identified the impact of housing affordability on the *Nexus*—pushing people to seek housing further and become car-dependent. National governments can balance growth pressures across their territory through policy tools.

Governance structures in support of a sustainable Nexus. Although local authorities can initiate informal collaboration, it is the responsibility of the national or state government to enact the relevant legislation to allow the creation of formal structures. Where collaboration is not feasible, the national government (or state) must coordinate regional actors and facilitate progress towards an integrated and sustainable *Nexus*.

Fiscal frameworks in support of a sustainable Nexus. Local authorities should have adequate resources to carry out their responsibilities. Fiscal tools should be aligned with the goals of a sustainable *Nexus* and perverse effects of taxation removed. National governments are often responsible for fiscal tools, including those with redistributive effects or which influence individual behaviour. As a result, national governments should study their fiscal impact on the *Nexus*. Stead and Banister (2001) stress the impact of national fiscal policies on transport, including the growing interest in “tax shifting”, i.e. shifting taxation from labour taxes to environmental taxes. Gaunt et al. (2006 and 2007) point to the responsibility of central government to address revenue neutrality as a result of schemes like congestion charges²².

Accountability and transparency of taxation are crucial to facilitate actions related to the *Nexus* (Banister 2007). Citizens want their contributions—for example from congestion charges or parking fees—to result in tangible improvements.

²² *Revenue neutrality* refers to fully offsetting revenue from a congestion charge or increased fuel taxes, for example by lowering taxes in other areas, for example income tax or employer contributions.

Setting targets and mandating plans. Member states have the power to require regions and local authorities to create land use, transport or energy plans with some degree of integration, which is an important step towards a more sustainable *Nexus* (Litman 2005, 6). National governments and states can set standards for the integration of issues, make funding conditional upon integration and public participation, or require Environmental Management Plans and Systems. They can establish national schemes, e.g. on congestion charges, and coordinate norms in the area, as in the United Kingdom (Department for Transport 2007).

National governments should remove obstacles that prevent local authorities from planning towards a sustainable *Nexus*. One example is the inability of UK councils outside of London to coordinate bus services (Gaunt et al. 2006, Commission for Integrated Transport 2004).

Table 13. Prioritisation questions for the national role

Question	Assessment
Right direction?	Depends. Governance changes are supportive strategies that allow for policies towards sustainability to be implemented.
Flexible Platform?	Yes. Structures can be fine-tuned.
Return on Investment?	Depends. Changes can be costly in the short-term (e.g. reorganisation, cost of plans) but can result in long-term cost-savings, for example as growth is better managed at the territorial scale and governance structures better fit the needs of the <i>Nexus</i> . Fiscal measures can remove disincentives to investment and work, and discourage waste and imports of energy.

6.3.5 The EU's Role

Key opportunities for the EU to support local and regional authorities towards a sustainable *Nexus* have been identified:

Policy Coherence. Implementation policies, particularly those that govern investments, need to better reflect top-level policies of the EU, especially as related to climate change and sustainability.

Capacity Building and Dissemination. The evidence from the Romanian Operational Programme in Example 8 as well as evidence uncovered in the literature spell the need for increased capacity building at the local level, particularly in relation to the 2007-2013 structural funds.

Leveraging existing Tools. Strategic Environmental Assessments mandated by the EU (Council 2001) require evaluation of environmental impacts of plans and programmes in specific areas including transport and urban planning. SEAs can be strengthened to better ensure the contribution of projects to sustainability (Hildén et al 2004, Fischer 2007 and Markus 2007). Appropriate resources should be provided, and tools should be applied at the appropriate level of analysis: the region. In the longer term, environmental management plans and systems could be required or encouraged, perhaps in conjunction with SEAs and in areas that receive EU funding.

All progress need not take place throughout Europe simultaneously. The Treaty of European Union (Commission 2006a) includes the concept of “enhanced cooperation” to allow a minimum of eight countries to proceed with policies without EU-wide adoption. The SSD Framework could also be used to inform a Europe-wide strategy for the *Nexus* and relationships with member states and local authorities.

Table 14. Prioritisation questions for the EU role

Question	Assessment
Right direction?	Yes/Depends. More strategic investments in line with high-level policies can directly influence the sustainability of the <i>Nexus</i> . Structural changes can indirectly assist local authorities in adopting and implementing actions towards sustainability.
Flexible Platform?	Yes. More strategic investments can themselves be more resilient in the face of rising and volatile fuel costs. Other proposed strategies can evolve over time.
Return on Investment?	Likely. Focusing on decoupling infrastructure investment and emissions from economic growth can result in substantial savings. Capacity building constitutes only a small percentage of overall infrastructure spending.

7 Conclusions

In their current form, land use, transport, and energy systems are significant drivers of global warming and unliveable cities. Politicians and citizens alike are increasingly calling for action; as this paper was being written, London, Los Angeles, New York and Toronto unveiled comprehensive plans to address such issues.

Survey respondents also emphasised long-term, comprehensive, collaborative and participatory approaches as the most effective strategies to improve the integration and sustainability of the *Nexus*. The definition and elaboration of such strategies calls for a framework to help guide planning, decision-making and implementation activities.

The SSD Framework can be used to organise planning, decision-making and implementation of policies in complex systems such as the *Nexus* of urban land use, transport and energy. Key foundation elements of such an approach include a deep awareness of systems and their relationships at various scales, participatory visioning within the constraints of sustainability principles, and proactively designed governance structures. With these elements in place, policies, initiatives and investments can be identified, prioritised and coordinated effectively towards the ultimate goal of a sustainable *Nexus*, as an integral part of the sustainable city.

Although “*integration of local, national and EU planning*” were not generally viewed as significant barriers to a sustainable *Nexus*, the oft-mentioned barrier of “*lack of choice related to affordability*” indicates that greater forces are shaping the *Nexus*, including territorial and fiscal strategies that emanate from higher levels of government. Interviews with experts in the field confirmed the need for local authorities to grow their awareness of linkages to broader issues.

It is only through the tailored application of the SSD Framework that local authorities can identify a comprehensive and strategic set of strategies for their unique circumstances, which will reflect their own understanding of the *Nexus* and its interrelationships, as well as their own principle-based vision of a desired outcome. Policy strategies and concrete actions towards sustainability should be prioritised using a set of three questions to establish

right direction, flexibility for future initiatives and a positive return on investment.

A vision-oriented approach to policymaking grounded in sustainability principles can empower cities and regions to step away from an emphasis on existing barriers, current trends and solutions to focus on novel approaches to shape a desired future with the participation of all their stakeholders.

7.1 Opportunities for Further Research

Investigations of the following can supplement the existing body of research on urban planning, transport, energy policy, and public policy.

Validation

- Further validation of recommendations with a larger and more representative survey sample size, as well as assessment of real-world implementation.

Participatory approaches

- Strategies to **“federate” participation** by engaging people at a micro-local level prior to expanding the scope of consultation to discuss region-wide issues related to the *Nexus*.
- Strategies to **engage a representative sample** of the population.
- **Leveraging concern for climate change** into greater interest in regional land use, transport and energy issues.

Governance structures and systems

- **A study of optimal governance structures and mechanisms** to address the sustainability of the *Nexus*. Development of generic models and principles that can be applied in a variety of political systems.
- **A study of organisational mechanisms** that help local authorities tackle issues related to the *Nexus* including the adoption and use of Environmental Management Plans and Systems and administrative organisation; the appropriate distribution of tasks among local authorities, regional structures and national or state governments—specifically to effect a sustainable *Nexus*.

- **A country-by-country evaluation of the national role in facilitating local action** in areas of the *Nexus*, including the pursuit of a national territorial strategy, the creation of relevant governance structures and the provision of fiscal tools that match responsibilities.
- **A formal longitudinal study of EU structural and cohesion fund investments** from environmental, economic and social standpoints, based on a set of indicators of progress towards sustainable development.
- **A formal inventory of gaps in skills and implementation capacity** in areas that receive EU funding, as well as strategies to address such gaps in a timely fashion.

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9 Appendices

9.1 Survey Respondents

Occupations and organizations represented by survey respondents

Occupation	Organization
Head of Int. Office	Dept. of Culture and Urban Development
Project Manager	Department of Health and Environment
International Affairs Coordinator	Energy Agency
Responsable de la mission environnement	Ville de Rennes
Head of the Environmental Department	City Department
Head of department	Environmental Department
Mayor	Town of Belene
---	Industrial Services
---	Municipality of Gabrovo
City Councillor for City of York Council, Energy Champion for the City, Chair of City Strategy	Liberal Democrat
Director	Transportation and Traffic Planning Division, City Planning Division
Environmental Expert	Public Works Department
Councillor	City Council
Energy Manager	Environment Department

9.2 Survey Results

The following statements form a proposed vision for an integrated approach to land use, transport, and energy issues based on a survey of literature and existing urban sustainability visions.

The vision is based on basic sustainability principles and can be used to guide future actions, strategies and investments towards sustainability.

How important do you think each statement in achieving sustainability?

	1 - Not Important	2	3	4 - Very Important	Response Average
Urban and Built Form					
Urbanised areas do not systematically increase in size	1	3	4	7	3.13
Eventually the city does not grow over farmland and natural features	0	1	8	7	3.38
Total Respondents	16				
(skipped this question)	0				
Energy					
By design cities (buildings transport) conserve energy	0	0	4	10	3.71
Ultimately only renewable sources of energy are used and are local when available and effective	1	2	7	6	3.13
Total Respondents	16				
(skipped this question)	0				
Materials					
Construction and transport materials are sustainably harvested from renewable sources	0	4	6	4	3
Or they are based on recyclable or biodegradable materials	2	1	8	3	2.86
There is no landfilling of waste from construction and transport materials	0	4	5	5	3.07
Total Respondents	14				
(skipped this question)	2				

	1 - Not Important	2	3	4 - Very Important	Response Average
Ecology					
The air water and soil are clean	0	1	5	10	3.56
Ecosystem functions of water courses and bodies of water are not impeded	0	1	9	4	3.21
Noise light and temperature impacts do not systematically exceed damaging thresholds for people fauna and flora	0	3	6	5	3.14
Total Respondents	16				
(skipped this question)	0				
	1 - Not Important	2	3	4 - Very Important	Response Average
Quality of Life					
A range of mobility services is available for people to meet their needs; time spent in transport does not impede quality of life	0	3	6	6	3.2
A variety of affordable land uses is available to allow people to meet their needs	1	4	7	3	2.8
The city does not grow at the expense of: any group in society people and places outside the city and future generations	2	2	2	6	3
Each city does not become sustainable by exporting nuisances (land uses pollution etc).	0	1	8	5	3.29
The unique sense of place is protected and enhanced	2	1	6	4	2.92
Urban design facilitates healthy lifestyles and access to natural features	0	3	3	9	3.4
Urban design promotes safety and security	0	2	4	9	3.47
Total Respondents	15				
(skipped this question)	1				
	1 - Not Important	2	3	4 - Very Important	Response Average
Participation					
Cities and their systems are designed to foster social interaction	0	1	9	5	3.27

Local governments seek and incorporate input from all stakeholders	0	2	7	6	3.27
Local decisions are transparent and legitimate	0	2	3	10	3.53
Local governments are accountable for land use transport and energy decisions	1	0	5	9	3.47
Total Respondents	15				
(skipped this question)	1				

What do you think about this vision?	No	M	Yes	Response Total
Do you think this vision is complete regarding land use transport and their impact on energy use?	2	10	3	15
If given the choice would you or your city adopt this vision?	1	10	3	14
Do you think planners would adopt it?	1	8	6	15
Do you think politicians would support it?	1	11	3	15
Do you think the public would support it?	1	9	5	15
Total Respondents	15			
(skipped this question)	1			

Below you will find a series of statements that relate to the way transport, land use and energy are viewed. Please rate them as they relate to your city, from 1 to 4, with 1 meaning "strongly disagree" and 4 meaning "strongly agree."

The word "city" is used to imply the local authority for which you work or in which you operate.

In my city these issues are seen as important by the public and politicians (in the media public discussions letters to the city etc):	1 - Strongly Disagree	2	3	4 - Strongly Agree	Response Average
Climate change	2	1	6	6	3.07
Air pollution	1	3	3	8	3.2
Traffic congestion	0	2	5	8	3.4
Quality of public transport services	1	1	3	10	3.47
Affordability / availability of housing	0	1	3	11	3.67

Physical expansion of the city (sprawl)	0	4	7	4	3
Quality of life in general	0	0	6	9	3.6
Environmental issues or sustainability in general	0	2	7	6	3.27
Other (please specify)	0	1	3	1	3

Total Respondents 15
(skipped this question) 1

In my city decisions about land use planning transport and energy are seen as interrelated:

	1 - Strongly Disagree	2	3	4 - Strongly Agree	Response Average
By city employees	2	6	5	2	2.47
By politicians	0	2	10	3	3.07
By the public	3	7	4	1	2.2

Total Respondents 15
(skipped this question) 1

In my city the effective integration of land use planning transport and energy solutions is most impeded by:

	1 - Strongly Disagree	2	3	4 - Strongly Agree	Response Average
Lack of awareness or interest	1	4	5	4	2.86
Internal processes at the local authority	2	4	8	0	2.43
External barriers (policies and investments of national government EU etc).	2	7	5	0	2.21
Other (please specify)	0	0	1	1	3.5

Total Respondents 14
(skipped this question) 2

In my city or region the following EU research projects on land use and transport are being used as a source of information:

	No	Yes a little	Yes a lot	Don't know	Response Average
TRANSPLUS	10	1	0	5	2
SCATTER	11	1	0	4	1.81
PROPOLIS	11	1	0	4	1.81

Total Respondents 16
(skipped this question) 0

Are any of the following barriers to decision-making relevant to your local authority and its greater region?

Internal Barriers - Within the local authority or related to its operations

	Not a barrier	Ntrl	Yes a barrier	Response Average
No integrated plan or vision (land use transport energy and sustainability)	6	3	5	1.93
Too little or no collaboration among city departments	4	5	5	2.07
Competing vision or definitions of goals	4	5	5	2.07
Overemphasis on economic development	2	7	5	2.21
Lack of legal powers or revenues to implement plans	6	6	2	1.71
Not enough funding	2	4	9	2.47
Inefficient tax system and/or discourages sustainable development	7	4	4	1.8
Not enough skill and knowledge in government agencies	8	5	2	1.6
Lack of data	7	6	2	1.67

Total Respondents 15

(skipped this question) 1

Political Barriers

	Not a barrier	Neutrl	Yes a barrier	Response Average
Lack of awareness understanding or interest in integrated planning or sustainability	4	3	7	2.21
Unwillingness to challenge "status quo"	2	5	7	2.36
Belief in individual freedoms e.g. reluctance to impose new taxes	3	5	5	2.15

Total Respondents 14

(skipped this question) 2

External Barriers - Other governments and outside forces

	Not a barrier	Neutrl	Yes a barrier	Response Average
Lack of coordination with national or EU policy	5	6	4	1.93
Negative impact of national and EU policies	6	5	3	1.79

Lack of coordination with other regional governments agencies	7	3	5	1.87
Mismatch of land use and transport administrative territories	3	9	2	1.93
Total Respondents	15			
(skipped this question)	1			

External Barriers - Public acceptance	Not a barrier	Neutrl	Yes a barrier	Response Average
Lack of understanding / awareness / interest of issues	1	7	7	2.4
Public distrust of politicians / planners	5	6	4	1.93
Poorly designed participation approaches	4	8	2	1.86
Lack of democratic participation / apathy	5	6	4	1.93
Perceived lack of choice (e.g. rising cost of housing in centre)	3	3	9	2.4
The car as a strong symbol of freedom and status	1	6	8	2.47
Powerful interest groups	2	7	6	2.27
Total Respondents	15			
(skipped this question)	1			

Please tell us if the following strategies are helpful in improving progress in this area:

Internal	1 - Not Helpful	2	3	4 - Very Helpful	Response Average
Long-range urban plans AND individual projects that integrate land use transport and energy	0	2	4	9	3.47
Dedicated employees focused on integration	0	0	10	5	3.33
Greater collaboration among city departments	0	2	4	9	3.47
Reduced dependency on new development for taxes	1	8	3	2	2.43
Removal of unhelpful incentives e.g. free parking etc.	0	7	2	6	2.93
Funding of new infrastructure by new development	0	2	8	4	3.14

User charges for transport infrastructure (e.g. road pricing parking fees)	0	4	8	3	2.93
Total Respondents	15				
(skipped this question)	1				
External - Other governments and external forces	1 - Not Helpful	2	3	4 - Very Helpful	Response Average
Greater integration of local planning with national and EU planning	0	6	2	5	2.92
Regional collaboration without changing municipal or regional borders	0	6	6	2	2.71
New organisation of regional governments with sources of revenue borders and responsibilities that match planning objectives	1	6	4	3	2.64
Total Respondents	14				
(skipped this question)	2				
External - Public and political acceptance	1 - Not Helpful	2	3	4 - Very Helpful	Response Average
Agreement by all stakeholders on basic science-based sustainability principles and challenges as well as elements of a vision as shown above	0	4	4	6	3.14
Focus on incentives such as better public transport or central city development	0	0	8	7	3.47
Focus on restrictive legislation and new taxes (e.g on driving parking)	0	6	6	3	2.8
A coordinated mix of incentives legislation and taxes	0	0	4	10	3.71
Desirable compact and central development alternatives offered to the public	1	1	10	2	2.93
Use of public participation to validate ideas AND to improve the quality of decision-making	0	1	7	6	3.36

Enhanced participation: working groups of citizens and stakeholders help prepare long-range plan and propose solutions	0	1	8	6	3.33
A public education programme on integrated issues (land use transport energy sustainability)	0	2	8	4	3.14
Total Respondents	15				
(skipped this question)	1				

Country	Response Total
Bulgaria	2
Denmark	2
Finland	2
France	1
Germany	1
Hungary	1
Italy	1
Netherlands	1
Spain	1
Switzerland	1
United Kingdom	1
Total Respondents	14
(skipped this question)	2

I agree to be contacted for a short interview (English / français)	Response Total
Yes	7
No	6
Total Respondents	13
(skipped this question)	3

9.3 Sample Principled Vision

References indicate where concurrence can be found in the literature or where this element or a similar one has been used before (e.g. Whistler). Columns SP1 to SP4 indicate correspondence with one of the sustainability principles covered in Section 2: Conceptual Framework.

	SP1	SP2	SP3	SP4
Urban and Built Form				
<p>Urbanised areas do not systematically increase in size. (Bertolini 1999) (Speck and Waldron 2003)</p> <ul style="list-style-type: none"> • By maintaining its footprint constant, the city does not lead to a systematic increase in physical degradation of nature. • Although compactness is not a guarantee of sustainability, it provides the potential, along with a mix of uses, to reduce distances and thus mobility demands. • The city is continually optimized for efficiency and desirability. 			X	X
<p>Eventually, the city does not grow over farmland or natural features (Gayda 2005) (ISIS 2003) (EEA 2001) (Speck and Waldron 2003)</p> <ul style="list-style-type: none"> • In addition to limiting the growth of the urban footprint, farmland and natural features are protected from growth to maintain ecosystems, safeguard local agricultural production, as well as recreational amenities. • Detrimental effects of city expansion are recognized and halted. 			X	

Energy				
<p>By design, cities (buildings, transport) conserve energy (Lautso 2004) (Mitchell 2005)</p> <ul style="list-style-type: none"> • Buildings, neighbourhoods and transport systems are designed to be energy-efficient AND to discourage rebound effects: design is integrated. • Energy efficiency is an important precondition to the use of renewable sources of energy. • Modelling can be used to understand the long-term impact of transport and land use decisions on energy use. 	X			X
<p>Ultimately, only renewable sources of energy are used and are local when available and effective (Speck and Waldron 2003)</p> <ul style="list-style-type: none"> • The use of non-renewable energy is problematic as long as concentrations of mined substances increase in the biosphere. • Renewable sources are used instead, but potential negative consequences, for example deforestation are acknowledged. The use of local sources minimises potential issues and minimise transportation impacts. 	X	X		
Materials				
<p>Construction and transport materials are sustainably harvested from renewable sources... (also 2, 4) (Council 2006b) (Speck and Waldron 2003)</p> <ul style="list-style-type: none"> • Renewable sources do not create issues of increased concentration of mined or man-made substances. • Impacts of cultivation, harvesting and transportation are acknowledged. 	X	X	X	

<p>...or they are based on recyclable or biodegradable materials. (also 2) (Azar 1996) (Speck and Waldron 2003)</p> <ul style="list-style-type: none"> Mined and man-made materials are likely unavoidable, at least in the short-term. Materials can be selected to be reused and reusable in a closed loop, and/or assimilate easily in the environment. 	X	X		
<p>There is no landfilling of waste from construction and transport materials. (Speck and Waldron 2003) (Council 1999)</p> <ul style="list-style-type: none"> Landfilling is a waste of resources and embodied energy and takes up space - locally undermining ecosystems. Potential landfill waste is addressed upstream; what's left is recycled, rather than deposited. 			X	
Ecology				
<p>The air, water and soil are clean (Speck and Waldron 2003) (Giorgetta 2002)</p> <ul style="list-style-type: none"> Ecosystem functions and human/animal health are not impeded. Anthropogenic emissions do not exceed the ability of ecosystems to assimilate them. 	X	X	X	X
<p>Ecosystem functions of water courses and bodies of water are not impeded (Gayda 2005) (Sarvan 2006)</p> <ul style="list-style-type: none"> The city adapts to natural water systems rather than adapting them to the city. Water is allowed to permeate the ground at the point of precipitation. 			X	
<p>Noise, light and temperature impacts do not systematically exceed damaging thresholds for people, flora, and fauna (Council 2005)</p> <ul style="list-style-type: none"> Temporary impacts are part of city life. It is permanent exposure that can be damaging. 			X	X

Quality of Life				
<p>A range of mobility services is available for people to meet their needs (Vande Walle et al 2004); time spent in transport does not impede quality of life (Litman and Burwell 2006) van de Coevering and Schwanen 2006)</p> <ul style="list-style-type: none"> • It is not unlimited desire for mobility that is accommodated but access to employment and social or leisure venues to allow people to fulfill their basic needs. 				X
<p>A variety of affordable land uses is available to allow people to meet their needs (Speck and Waldron 2003)</p> <ul style="list-style-type: none"> • Affordable housing but also space for industry, commerce, institution, public space, etc. Unaffordability can promote unsustainable choices. • The needs of the city's inhabitants and users are not undermined by the efforts they must make to secure reasonable access to land uses. 				X
<p>The city does not grow at the expense of: any group in society, people and places outside the city, and future generations (also 1,2,3) (Speck and Waldron 2003) (Lautso 2005) (Vold 2005)</p> <ul style="list-style-type: none"> • Benefits and impacts arising from urban development and transport systems are allocated fairly among groups within society. • Externalities are not unduly imposed on future generations or communities beyond city boundaries. 				X

<p>Each city does not become sustainable by exporting nuisances (land uses, pollution, etc) (Vande Walle et al 2004)</p> <ul style="list-style-type: none"> Exports of externalities can happen from neighbourhood to neighbourhood or to other communities. Cities and regions must consider their impacts upon the world outside their boundaries, and ensure that its own sustainability does not undermine the ability of other areas to achieve sustainability. 				X
<p>The unique sense of place is protected and enhanced (Speck and Waldron 2003)</p> <ul style="list-style-type: none"> The uniqueness, attractiveness and desirability of neighbourhoods, including built form and open space, to maintain the population base and create a strong sense of belonging. 				X
<p>Urban design facilitates healthy lifestyles (Speck and Waldron 2003) (Council 2005) and access to natural features (Sarvan 2006) (Speck and Waldron 2003)</p> <ul style="list-style-type: none"> Life in the city encourages physical movement, for example by facilitating walking and cycling through urban design. Stress is also addressed by minimising time spent in transportation. 				X
<p>Urban design promotes safety and security (Commission 2001a) (Speck and Waldron 2003)</p> <ul style="list-style-type: none"> The built environment and transport systems are proactively designed to minimise death and injury (e.g. traffic accidents, physical aggression). 				X
Participation				
<p>Cities and their systems are designed to foster social interaction. (Gayda 2005) (Speck and Waldron 2003)</p> <ul style="list-style-type: none"> Social isolation is prevented and addressed. Public spaces and urban design in general encourage humans to relate to one another, for example with enhanced walkability. 				X

<p>Local governments seek and incorporate input from all stakeholders (ISIS 2003) (Speck and Waldron 2003) (Litman and Burwell 2006) (Baiocchi 2001)</p> <ul style="list-style-type: none"> Local governments recognize that citizens can help improve decision-making. Input is sought from a broad variety of stakeholders. 				X
<p>Local decisions are transparent and legitimate (Lautso 2005) (Blomgren Bingham et al. 2005)</p> <ul style="list-style-type: none"> There are many ways to proceed towards sustainability. An important aspect is the broad transparency and legitimacy of decisions. 				X
<p>Local governments are accountable for land use, transport, and energy decisions (see above)</p> <ul style="list-style-type: none"> Along with transparency and legitimacy, accountability will improve the quality of decision-making and encourage stakeholder participation. 				X

9.4 Examples of Visions

The Whistler 2020 Vision (Resort Municipality of Whistler 2005).

Whistler has spent considerable effort developing a detailed, structured vision. The following are the vision and related elements that guide Whistler's actions towards sustainability:

Our Values

- **A sustainable community** – where social and ecological systems are sustainable and supported by a healthy economy, today and in the future.
- **A strong, healthy community** – where the needs of residents are met, where community life and individual well-being are fostered, where the diversity of people is celebrated, and where social interaction, recreation, culture, health services and life-long learning are accessible.

- **A well-planned community** – where growth and development are managed and controlled.
- **Our natural environment** – and our role as responsible stewards of it, respecting and protecting the health of natural systems today and for generations to come.
- **A strong tourism economy** – where a healthy, diversified tourism economy is sustainable through thoughtful, long-range planning, strategic marketing and business partnerships.
- **A safe community** – where diverse residents and guests are comfortable and secure
- **The people who live, work and play here** – our families, children, neighbours, colleagues and friends.
- **Our guests** – and our desire to provide exceptional service in all we do.
- **Our partners** – and the positive, co-operative relationships that recognize the values of all the communities in the corridor.

Our Principles

Whistler uses the Sustainability Principles discussed in Section 1.0 – Introduction.

Our Vision

- Whistler will be the premier mountain resort as we move towards sustainability.
- We are committed to achieving social and environmental sustainability and a healthy economy.
- We will continue to build a thriving resort community that houses 75% of the workforce in Whistler.
- We will continue to offer world-class recreational and cultural opportunities for our visitors and residents.
- We will foster sustained prosperity in our local tourism economy and retain our local businesses.

- We will continue to strive to protect the ecological integrity of our natural environment.
- We will meet the social, health and learning needs of residents and visitors.
- We will be a safe community that provides peaceful enjoyment of our activities and places.
- We will foster cooperation between regional communities and the provincial government on initiatives to expand prosperity and well-being for all.
- We will monitor our performance at achieving Whistler's vision and report back to the community on an ongoing basis.

Our Priorities and Directions

- Enriching Community Life

Directions:

- The community is vibrant and attractive; there is a sense of community pride and spirit
 - The resort community is affordable and liveable to both permanent and short-term residents and employees
 - Social, spiritual and physical health programs meet the diverse needs of groups and individuals within the resort community
 - Land use and infrastructure systems are integrated to protect biodiversity and meet basic needs
- Enhancing the Resort Experience

Directions:

- The sense of place that makes the resort community experience special and unique is respected and enhanced
- Visitors are offered a resort experience that exceeds their expectations

- The seamless journey to and within the resort is an important part of the visitor experience

- Protecting the Environment

Directions:

- The resort community recognizes and manages the natural environment as one of its most important assets
- The resort community protects its air quality, natural waterways, scenic and recreational areas.

- Ensuring Economic Viability

Directions:

- The resort community integrates its economic health with the economic viability of the resort
- The tourism economy is diversified and proactively adapts to the changing needs of the marketplace
- The community recognizes recreation and leisure as cornerstone attractions
- Entrepreneurial spirit is recognized as an important component of community vitality and is encouraged to flourish

- Partnering for Success

Directions:

- Residents, taxpayers, business and local government hold a shared vision for the resort community and work in partnership to achieve that vision
- The community accepts responsibility for, and has the interest and capacity to work towards, social, economic and environmental sustainability
- Regional, provincial and federal governments understand and support the tourism economy, and the role destination resorts play

*The Greater London Authority Sustainability Vision – “The Framework”
(London Sustainable Development Commission ND).*

Overall objective

We will achieve environmental, social and economic development simultaneously; the improvement of one will not be to the detriment of another. Where trade-offs between competing objectives are unavoidable, these will be transparent and minimised.

Taking responsibility

Responsibility

1. As citizens of a world city, we will be aware of the impact of our actions on the rest of the UK and beyond, and will take a responsible world leadership role which contributes to the planet’s sustainability.

Capability

2. All of us – individuals, households, businesses, local and regional government, and voluntary groups – will have the information, knowledge, motivation and support to help us to take both short and longer-term decisions that will make us and our city more sustainable.

Creativity

3. We will seek new and creative ways to overcome the constraints of time and money that prevent us from taking effective decisions. We will ensure that these decisions are informed by a long-term perspective.

Ownership

4. We will build and sustain a powerful sense of ownership and responsibility for our city, with civic participation as the norm.

Developing respect

Fulfilment

5. Our city will have a culture of fairness and respect for people and the environment. The right of all London’s citizens and communities to pursue fulfilment will be assured, so long as this does not infringe on the rights of others.

Diversity

6. We will celebrate the unique ethnic and cultural diversity of London's citizens as London's key strength. We will be a society free from inequality and discrimination, striving for greater equality of opportunity for all, actively opposing and challenging racism. We will consider unacceptable all forms of discrimination and prejudice as a result of a person's race, gender, disability, age, sexuality, faith, HIV status, or place of residence.

Safety

7. Our city will be a place where everyone feels at ease and is able to enjoy life. All who work, live and play in the city will be able to pursue their objectives in peace, free from the threat of crime, violence or intrusion.

Vibrancy

8. Our communities will be dynamic, stable, adaptable, innovative, progressive – creating a city in which conflicts will be resolved as part of a transparent and participatory process.

Managing resources

Environment

9. We will protect and improve the city's natural ecosystems, its biodiversity, its open spaces and its built environment. We will help to protect the wider regional, national and international environments with which London has links.

Resources

10. We will limit and deal with our pollution, and use energy and material resources prudently, efficiently and effectively, including re-using and recycling our residual waste.

Getting results

Progress

11. We will make consistent economic progress – not necessarily always growth – to enable wider economic, social and environmental objectives to be pursued both in London and beyond. Business transactions in London will be conducted to high ethical standards.

Innovation

12. All the different parts of our economy will consistently invest in new technologies, new solutions, new plans and new ideas that contribute to achieving social, economic and environmental objectives simultaneously.

Esteem

13. All forms of work will be recognised and valued. Paid employment will be plentiful.

Access

14. We will be healthy and fulfilled – through living in good housing, with wide opportunities to develop as individuals and communities, through access to services, good quality food, green space and cultural, sporting and leisure activities.

9.5 Examples of Indicators

This list is not exhaustive. Indicators should be developed to assess progress towards the vision developed for each region or town.

Indicators: land use

- Amount of urbanised land per capita
- Ratio of development on already urbanised land vs. “virgin” land (or “greenfield”)
- Net and gross density of development by type (commercial, industrial, institutional, employment and residential)
- Affordability of real estate (key land uses)
- Degree of mixing of uses

Indicators: transport

- Percentage of GDP invested in transport, overall and by mode
- Percentage of household income spent on transport
- Travel per capita, in kilometres and hours per day
- Modal split of passenger travel
- Average speed of public transport

- Percentage of public transport capacity used
- Daily capacity of public transport
- Amount of parking spaces, total per job and per capita
- Investment in walking/cycling/public transport

Indicators: energy

- Total amount of energy used by city or region and per capita
- Percentage of energy sourced from renewables
- Amount of energy produced within city or region's borders
- Emissions and concentrations of key pollutants

Integration indicators

- Number of integrated policies adopted
- Performance of integrated policies
- Number of trans-departmental projects undertaken
- Percentage of land occupied by transport and energy infrastructure
- Percentage of development within walking distance of public transport stop
- Percentage of development close to cycling path or lane
- Premature deaths and days of incapacity attributed to traffic accidents, obesity and air pollution