

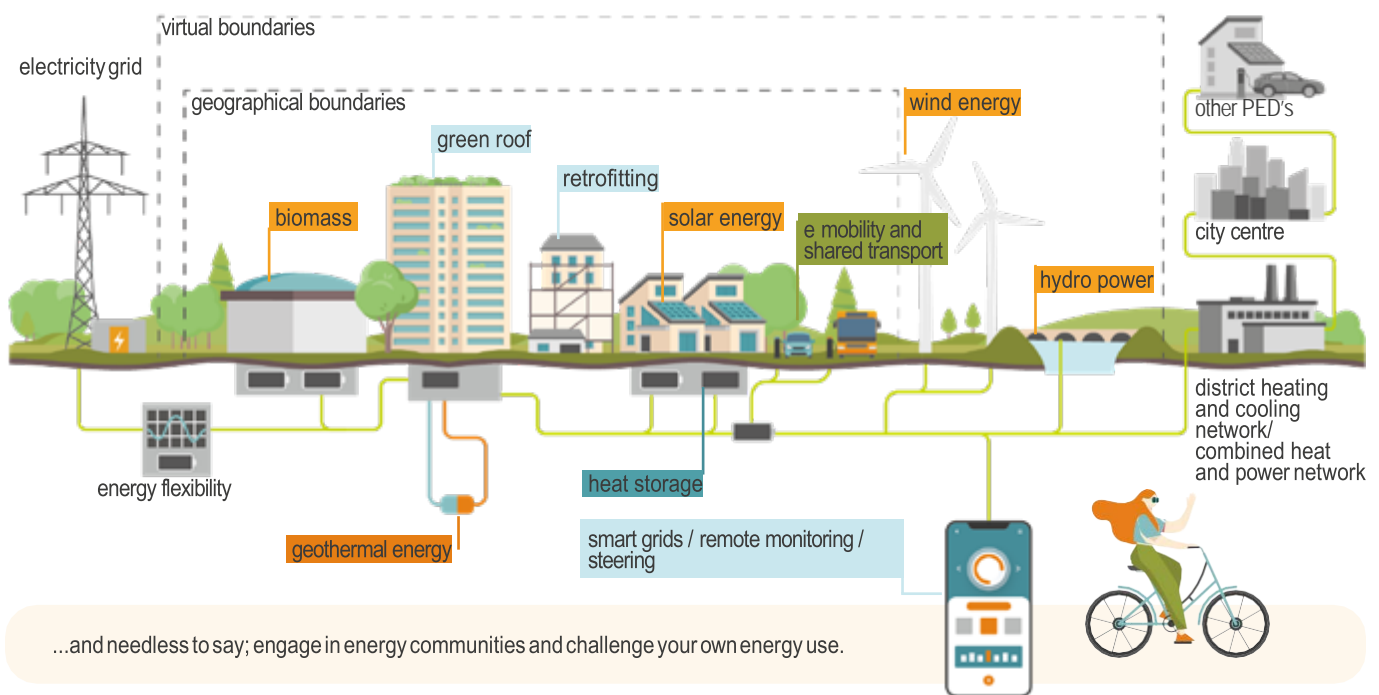


Smart-BEEjs

Human-Centric Energy Districts: Smart Value Generation by Building Efficiency and Energy Justice for Sustainable Living

Input for Policy Impact

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■ network: electricity/heating and cooling ■ producing ■ technology ■ mobility ■ storage ■ conversion

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Positive Energy Districts:

Policy Guidance for Human-Centric Urban Developments

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Executive Summary

Positive Energy Districts (PEDs) are developments where newly-built or retrofitted buildings, collectively, generate more renewable energy than they consume. This requires boosting renewable energy generation, whilst reducing energy demand. In addition, equity considerations demand that all citizens have a good quality of life and that energy poverty is eliminated. Thus policies designed to promote PEDs must not only promote the construction or retrofitting of energy efficient developments, but also embed economic and social accessibility into these developments.

The multiple dimensions in the promotion of such developments results in a complex set of policy challenges that must be addressed, if PEDs are to become both widespread and accessible to all. This report summarises key policy findings from the Smart-BEEJS Project, setting out clear principles for the design of policies aimed at promoting the development of socially-just PEDs and beyond, to the development of positive life cities.

Key Findings and Recommendations

- Socially-inclusive PED development must accommodate four dimensions: the building stock; the energy system; sustainable mobility; and stakeholder participation.
- In so doing, PED development might encounter multiple challenges.
- We present a novel framework for policy design that identifies policy ends, policy means, and policy challenges, each split into meta, meso and micro levels.
- Within this research, place-based specificities have emerged as being critical to policy design success: silo-thinking; inclusivity; policy and funding for long-term visibility and stability; and local culture.
- We have identified five potential sources of silo thinking that can block effective policy design: disciplinary silos; administrative silos; institutional silos; silos of representation; and silos of context.
- Of these empirical investigation has found three to be of particular significance in our case study cities: administrative silos; institutional silos; and silos of representation.
- An analysis of transportation needs in small, medium and large city contexts identifies distinct needs for each, categorised using the Avoid-Shift-Improve framework.
- Common elements of transport needs across all cases were the need for long-term policy consistency and a funding system that provides stability and visibility in the long-term horizon.
- Cultural variation influences how stakeholders engage and interact with different policymaking styles.

- The key dimensions of culture we identify are citizens' perceptions and acceptance of their social status in relation to policymakers (Power Distance); and the extent to which citizens feel threatened by ambiguous or unknown situations (Uncertainty Avoidance).
- From this, we identify four distinct cultural configurations that will influence the extent of policy effectiveness, beyond the substantive detail of policy content.
- Thus, getting the policy right is only part of the story: how the policy is developed needs also to be considered for policy acceptance.
- We show, reflecting on policy ends, policy means, and policy challenges, a pathway to PED policy design that can transform urban (re)developments to deliver Positive Life Cities.

Background

In 2018, the European Union (EU) laid down a target to have 100 PEDs planned, deployed and replicated by 2025, as a key part of sustainable urbanisation within the Strategic Energy Technology (SET) Plan [1]. A 2020 review of PED developments across 19 EU and non-EU countries (including Norway, Switzerland and Turkey) [2], however, found just two in operation, 19 at the implementation stage, and a further eight being planned. They did, however, also identify a further 32 developments that contained features of PEDs. These figures give an indication of just how demanding the development of a truly *positive* energy district can be, whilst confirming an emerging commitment to developing PEDs or, at the very least, developments with key PED-like features incorporated into them.

In the last four years, research undertaken by members of the Marie-Sklodowska-Curie Innovative Training Network project "[*Smart-BEEJS: Human-Centric Energy Districts – Smart Value Generation by Building Efficiency and Energy Justice for Sustainable Living*](#)" [3] has analysed in detail many aspects of the benefits and challenges arising from the plan to boost significantly the number of PEDs in Europe. This document presents the main policy findings and recommendations from this research.

A Framework for Positive Energy District Design

A framework of analysis for developing PEDs requires, in the first instance, setting the targets on energy and climate action at the local level and reflection on four dimensions (Figure 1: [4]):

- **The building stock.** Whether new-build or retrofits, the energy consumption of buildings, and the energy generation-potential of buildings, are key variables;
- **The energy system.** This addresses both the generation of renewable energy, and the usability of appropriate renewable energy technologies by the consumer;
- **Sustainable mobility.** With transportation a major source of emissions, a balanced and comprehensive response requires a shift in the power-source of motorised private transport, combined with a shift to active mobility, and to emissions-free shared mobility.
- **Stakeholder participation.** Successful implementation requires stakeholders' buy-in. This dimension cuts horizontally across the three dimensions above, defining the full range of stakeholders relevant to PED development – including those who will live and/or work in them. Buy-in is best achieved through active participation at key stages in the PED development process.

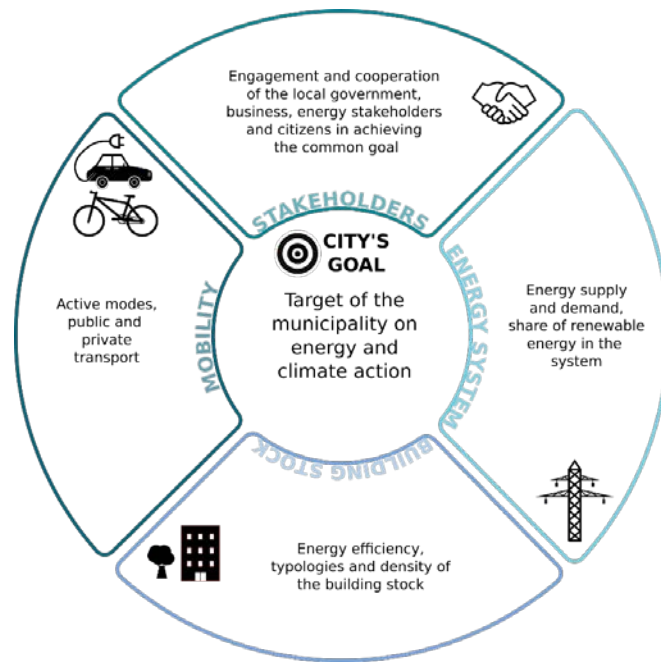


Figure 1. Dimensions embedded in the development of PEDs

Our research, however, demonstrates that targets on energy and climate action set at the local level must be supported by policies that incorporate not only environmental related issues but also social goals. These social aspects include for example, inclusivity in the transition, the effect of gentrification as a consequence of local redevelopment, the impacts at the personal level and the empowerment of the whole community. Some of these policy challenges are summarised in **Table 1**.

From these, a targeted policy response can then be designed. In reviewing policy for the promotion of PEDs, we draw on the Principles of Policy Consideration framework illustrated in **Table 2**. This represents a novel extension of an established framework for disaggregating and analysing that which we call ‘policy’ [5]. The original version of this framework splits ‘policy’ into policy ends – what the policy is trying to achieve – and policy means – how policy is trying to achieve those ends. Further, each of these is disaggregated into three levels, from a high degree of abstraction (Governance Mode), through the operationalisation of ‘policy’ (Policy Regime), to the finer details (Programme Settings). As a result, in looking at a particular policy, this provides a magnified picture of both what the policy is trying to achieve, and how it is going about that task. Recent work at analysing critical policy challenges around the climate crisis, at different geographical scales of policy action [5, 6], utilised this framework to explore how a policy might then be reformed to move from the *status quo ante* to a new and more desirable policy position.

Our novel addition to this framework allows us to take this process further, by adding explicit reflection on the challenges that policymakers might face in developing policy in this way. Specifically, the Systemic Challenges that are faced with the Governance Mode, the Processual Challenges faced at the Policy Regime level and the Technical Challenges that are faced at the Programme Setting Level. It therefore follows logically that, when using the framework for forward-looking policy design, policy challenges can and should also be embedded explicitly into the Principles of Policy Consideration framework.

Table 1. Examples of Policy design Challenges to consider in human-centric PED development

	Policy Design Factor	Setting for Policy Design	Specific Problem Setting	Strategies and Actions, Examples
Challenges for Policy Design Aims (Policy Ends)	1 Positive impact redevelopment versus gentrification	<ul style="list-style-type: none"> Different districts will face differing levels of energy poverty 	<ul style="list-style-type: none"> How do we avoid retrofitting leading to gentrification? 	<ul style="list-style-type: none"> % of homes for social housing Rental controls Property tax rebates Tenant protection
	2. Fair and inclusive financing for retrofitting of existing districts	<ul style="list-style-type: none"> Those living in energy poverty often in homes that are worst in terms of energy efficiency 	<ul style="list-style-type: none"> Who pays for Retrofitting? How to avoid “locking in” to substandard retrofits? How to avoid cherry-picking districts for PEDs? 	<ul style="list-style-type: none"> Community financing Support linked to property, not person. Better access to financing,
	3 Empowerment of local energy communities by novel ownership models	<ul style="list-style-type: none"> Ensure everyone, including the energy-poor, have access to Citizen Energy Communities (CEC) 	<ul style="list-style-type: none"> How do we ensure ownership of renewable energy technologies (RET) is equitable? Where is the RET located? How to balance energy generated by different RET? 	<ul style="list-style-type: none"> Locate RET in public buildings Ensure the energy poor are part of CECs Community energy storage
	4 Inclusive and sustainable mobility	<ul style="list-style-type: none"> A section of the community is in transport poverty Those in energy poverty often struggle with access to transport 	<ul style="list-style-type: none"> How can we ensure that transportation is evaluated based on need and access? 	<ul style="list-style-type: none"> Applying accessibility metrics in planning decisions [8] Increase green public transportation
Challenges for How Policy is Implemented (Policy Means)	5. Personalised energy advice to target energy poverty and promote energy flexibility	<ul style="list-style-type: none"> ICT alone does not reduce energy poverty Flexibility may mean vulnerable people suffer more- financial and non-financial impacts [9] 	<ul style="list-style-type: none"> How to ensure the technology is of use to the consumer? How to connect local people suffering from energy poverty with advice on energy poverty? How to ensure energy flexibility does not have a negative impact on those in energy poverty? 	<ul style="list-style-type: none"> Ensure training/information prior to, during, and after installation Create energy advice centres Hold energy advice days
	6 Shifts in individuals’ energy consumption behaviour	<ul style="list-style-type: none"> Changing energy consumption behaviour can have a greater impact on those in energy poverty 	<ul style="list-style-type: none"> How to ensure that such policy changes positively benefit those in energy poverty 	<ul style="list-style-type: none"> Means-test behaviour change potential, and design policy accordingly

Source: Adapted from [7], Page 39, where further details on all aspects of this framework can be found.

Table 2. Principles of policy consideration – the macro, meso and micro scales

Policy Level				
		<i>Governance Mode</i>	<i>Policy Regime</i>	<i>Programme Settings</i>
		<i>Meta-level</i>	<i>Meso-level</i>	<i>Micro-level</i>
		<i>High-level abstraction</i>	<i>Programme-level operationalisation</i>	<i>Specific on-the-ground measures</i>
Policy Component	Policy Ends	Goals: abstract general policy aims	Objectives: operationalisable policy objectives	Setting: Specific policy targets
		The most general macro-level statement of govt aims and ambitions in a specific policy area	The specific meso-level areas that policies are expected to address in order to achieve policy aims	The specific on-the-ground micro-requirements necessary to attain policy objectives
	Policy Means	Instrument Logic: general policy implementation preferences	Mechanisms/Instruments: Policy tool choices	Calibrations: Specific policy tool calibrations
		The long-term preferences of govt in terms of the types of organisational devices to be used in addressing policy aims	The specific types of governing instruments to be used to address programme-level objectives	The specific ‘settings’ of policy tools required to attain policy targets
	Policy Challenges	Systemic: System-level barriers to policy design and delivery	Processual: Practical barriers to policy design and delivery	Technical: Barriers that affect specific aspects of policy
		Challenges at the broadest level of policymaking	Barriers that arise in the practical process of policymaking	Challenges that arise because of problems with the fine-grained detail of policy

Setting the PED Policy Goal – Responding to Silo-Thinking at Governance Mode

Setting the policy target of developing Inclusive PEDs requires construction, technologies, end-users, investors and public authorities to come together, to tackle challenges around renewable energy generation, energy consumption and mobility, whilst ensuring equal access to all citizens. As a result, effective policymaking must unite stakeholders in a shared vision and a systems thinking instrumental logic. Such collaboration can only succeed if silo-thinking is avoided.

In our research, five distinct types of silo have been identified; and examples of positive responses identified, which respond to the three policy levels of our Principles of Policy Configuration framework (Table 3) [8].

Table 3. Socio-psychological and structural drivers and counter-drivers of different types of silos

Disciplinary Silos: Status gap between technological and social sciences		
Drivers	Examples of Responses	
<ul style="list-style-type: none"> • Cost of coordination • Lack of prior experience in collaborating • Beliefs and ideologies 	<i>Gov Mode</i>	Social-Challenges Themed Policy: Establish thematic policy bodies to coordinate cross-disciplinary work, connected to high-level authority. Liaise with network of recognised expertise in different disciplines
	<i>Pol Regime</i>	Systems-Thinking at Mid-Management Level: Action-based, systems thinking professional training to empower dialogue and standardise practice
	<i>Prog Sett</i>	Challenge-Based Research Agenda: Systematic work to change the cultural norms through education
Administrative Silos: Reluctance to collaborate among government departments		
<ul style="list-style-type: none"> • Lack of prior experience in collaborating • Cost of coordination • Divergent goals 	<i>Gov Mode</i>	Think Big: Each government department understands its interdependence to others and sets a common goal
	<i>Pol Regime</i>	Mission-Oriented Governance: Bring together expertise from different departments through horizontal and vertical coordination
	<i>Prog Sett</i>	Pilot, Scale-Up, and Transfer of Skills: Learn from previous experience, pilots, and peers
Institutional Silos: Barriers between public authorities, NGOs and business collaborations		
<ul style="list-style-type: none"> • Aversion to risk • Place insensitivity • Competitive mindset 	<i>Gov Mode</i>	Energy Ecosystems Facilitation: Enable cooperation, trust and exchange of activities among different agents of the system (at city and national levels)
	<i>Pol Regime</i>	Innovative R&D Thinking Facilitation: Incentivise government to collaborate with innovative niche technology and projects' work ethos and practices
	<i>Prog Sett</i>	Network Facilitation: Enable or collaborate with networks of niche activities and SMEs – improve awareness level of non-mainstream solutions and activate network effects
Silos of Representation: Barriers to Public Authority-Citizen Collaborations		
<ul style="list-style-type: none"> • Misconceptions and prejudice • Beliefs and ideologies 	<i>Gov Mode</i>	Understand NIMBYism: Research to inform policymakers about citizens' expectations towards PEDs
	<i>Pol Regime</i>	Activate Participation: Promote active citizenship and inclusive consultations
	<i>Prog Sett</i>	Empower Community: Mediate the power relations between stakeholders, to give voice to all
Silos of Context		
<ul style="list-style-type: none"> • Beliefs and ideologies • Place insensitivity 	<i>Gov Mode</i>	Human-Centric Evaluation: Ethical human-centric values based on culture, history and political context
	<i>Pol Regime</i>	City-City Partnership: Create platform for mutual knowledge exchange between cities
	<i>Prog Sett</i>	Experimental Governance: Urban living lab as a test base for technological and social interventions

Source: Adapted from [10], where further details of this research can be found.

This proposition was tested at the Programme Setting level, through stakeholder interviews in three locations across Europe (Amsterdam, Lisbon and Canary Islands). On this occasion, only three of the five silo types were found to be significant [11]. This does not rule out the other types of silo being of importance in other locations, however. Table 4 summarises the findings from the three locations and provides an example of how Table 3 can be used as a basis for analysing and seeking to overcome silos and silo-thinking in any given location.

Table 4. Place-based practices to overcome silos at programme setting level

	Amsterdam		Lisbon		Canary Islands	
	Identification of silo	Best practices from participants	Identification of silo	Best practices from participants	Identification of silo	Best practices from participants
Institutional Silo	<ul style="list-style-type: none"> • Difficulty of involving citizens • Regulations causing obstacles for local energy initiatives • Divergent goals of citizens and businesses 	<ul style="list-style-type: none"> • Companies get in personal contact with potential citizens and snowballing from there (IC) 	<ul style="list-style-type: none"> • Supply chain market disruption in the retrofitting market • Lack of knowledge from intermediary actors 	<ul style="list-style-type: none"> • One-stop shop for retrofit information (IP) • Municipality as champion in engaging different sectors and stakeholders (IC) 	<ul style="list-style-type: none"> • Monopoly obstructs collaboration with big company to facilitate change 	<ul style="list-style-type: none"> • Build culture of collaboration not competition (IC) • Research institute as coordinator between stakeholders (IP)
Silo of representation	<ul style="list-style-type: none"> • Negative connotation of big energy companies • Citizens' lack of commitment • Citizens' lack of information and expertise 	<ul style="list-style-type: none"> • Municipality as mediator and connector (IP) • Local government subsidises energy consultation (PF) 	<ul style="list-style-type: none"> • Negative connotation of big energy companies 		<ul style="list-style-type: none"> • Citizens' lack of means and financial resources to become active consumers/prosumers • Local government bureaucratic 	<ul style="list-style-type: none"> • Provide new resources and means of participation for citizens (PF) • Transparent information and training for citizens (IC)
Administrative silo	<ul style="list-style-type: none"> • Absence of government departments to relevant local consultations 		<ul style="list-style-type: none"> • Disconnect from municipality departments that could be involved in PEDs 	<ul style="list-style-type: none"> • Dedicate housing department as coordinator (IP) 	<ul style="list-style-type: none"> • Disconnection of energy from water, food management 	<ul style="list-style-type: none"> • Changing mindset of government and citizens on energy matters (IC)

Source: Adapted from [11], where further details on this research can be found.

Notes: Participants' best practice tips are classified as relating to either Policies and Frameworks (PF), Intermediary Practices (IP), or Intergroup Communications (IC)

Setting Policy for the Dimensions of the PED Framework – a place-based configuration at the Policy Regime and Programme Setting levels

Focusing on the individual dimensions of the PED Framework (Figure 1), our research took a closer look at platform level operationalisation (Policy Regime) and at the specifics on-the-ground measures (Programme Settings). Drawing on the detailed work that was commissioned by The Independent Transport Commission, London, UK, our research designed and proposed a guiding framework at the urban level for transport decarbonisation [14] (Table 6). The guiding framework considered three different cases, a small-sized city, a medium-sized city, and a metropolitan type of city (**Table 5**), learning from the different contexts.

Table 5. Cases of the mobility transition study

Characteristics of cases		
<i>Small-sized City – Durham</i>	<i>Medium-sized City – Nottingham</i>	<i>Metropolitan City – London</i>
The locality and history of the city complicate the introduction of sustainable mobility. Social and sustainability priorities are pressing.	The local authority makes it a social priority to decarbonise the transportation sector. Municipal governance is interconnected with a nexus of businesses.	The transportation mix is complex, with a diverse nexus of stakeholders' priorities. A critical mass is required for large scale interventions.

The proposed framework highlights three pillars for urban mobility transformation: avoid, shift, improve. These should be considered in parallel and in the context of local initial conditions. Nonetheless, the analysis demonstrates three key challenges across all city types:

- **Planning system.** Place-based solutions will be key for the prioritisation, acceptance, and the realistic and balanced implementation of the decarbonisation of urban surface transport strategies leading to different pathways for avoiding, shifting, and improving infrastructure. Thus, local authorities need to be given more powers and flexibility to achieve their local goals.
- **Funding system.** Initial capital investment is significant, and its sustainable source has not yet been resolved, with the private sector not adding significant amounts of investment. A clear signal is required by the central government to synchronise public and private investment and guide the alternative and sustainable financial streams for local authorities.
- **Inclusiveness and social coherence during the transition.** Cities face internally different levels of income deprivation, requiring efforts for generating engagement and public acceptance to any change. Moreover, efforts are required to keep citizens connected to the narrative of the transformation and ensure the quality of life and economic growth in the long term. Inclusiveness, social coherence, and awareness require behavioural changes in the citizens but, most importantly, mindset changes in the policy and implementation actors that design the planning strategies of the local authorities.

The sustainable urban mobility guiding framework can possibly be used as a tool for policy planning, and transparency at programme setting level in accordance with the local goal setting. This framework enables local authorities to capture the complexity of their local urban surface transport network and to identify initiatives, infrastructure, and salient investment priorities needed for the transformation towards net-zero transportation while ensuring inclusiveness and social coherence.

Table 6. Key recommendations for achieving zero-carbon urban transport [14]

Avoid	Shift	Improve
<p>Replace the need for travel through:</p> <ul style="list-style-type: none"> Local solutions beyond transport City planning and place-based planning. 15-min Neighbourhood and polycentric city concepts. Consistent and clear messaging across planning and communication actions. 	<p>Shift trips away from private cars and direct towards active, public, and shared transport through:</p> <ul style="list-style-type: none"> Walking and cycling infrastructure and promotion. Accessible and affordable public transport network. Multi-modal travel and integrated ticketing. Car & bike sharing, and mobility hubs. Changing road design and effective car parks way from city centres and towards integrating them with public transport. Consistent and clear messaging across planning and communication actions. 	<p>Any trips that still need to be done by car; they should be made by improved technology:</p> <ul style="list-style-type: none"> Low carbon vehicles (private, public, business). Sustainable alternative fuels (electricity, hydrogen, biofuel). The uptake needs to be encouraged through incentives, attractive refuelling infrastructure, and sustainable energy supply.
Funding Needs:		
<p>Leveraging public and private investments as a tool to overcome funding challenges that are set by the governmental structure and possible lack of powers:</p> <ul style="list-style-type: none"> Focus beyond road schemes and direct funding towards avoid, shift, and improve according to city needs. Establish partnerships between public and private sector for increased clarity, communication, and cooperation between the two parties. Support private investors who are already interested to fund charging infrastructure that is economically attractive, while public funding could be used for social equity, inclusiveness, and affordability of infrastructure Counteract grant-driven behaviour which creates funding and time constraints, through additional revenue streams such as the Workplace Parking Levy scheme can help local authorities Long term visibility of funding. Testbed of new technologies with clear scale-up funding options. Pathway for raising funds at city level through a Green Investment Bank. Achieve a level of flexibility and long-term planning and receive revenue for continues improvement of the infrastructure. 		
Inclusiveness:		
<p>inclusiveness and social coherence are the underlining notion of all avoid, shift, and improve initiatives, infrastructure improvements, and investment decisions for the transition to net zero urban surface transport:</p> <ul style="list-style-type: none"> Identify struggles e.g., high level of households with no car ownership, high need of connectivity, or complexity of the transport system, to target them, Be aware of effect of transformation on multitude of individuals (residents, commuters, tourists) with different needs, Ensure affordability and accessibility during the transforming process and in the future, Move away from “traditional habits” towards creating a future proof liveable, attractive, urban environment with provision of inclusive transport opportunities, Improve infrastructure in a way that it is inclusive, increase quality of life, but not give reason for transport poverty. 		

Policy Means – prioritisation and interpretation is a matter of culture

A placed-based and social-coherence-focused policy design, as set out above, raises a further issue examined in our research: the influence of the local **culture**. Sociological research on aspects of acceptance of policy implementation [13] offers insights into how people might respond to how policy measures are designed and implemented, based on two key society-level constructs:

- **Power Distance**, defined as the degree to which those with little societal status accept this situation as a natural state of affairs [13]. Power distance can thus create status asymmetry: in a culture with small Power Distance, subordinates feel able to approach and challenge those in authority, and those in authority accept it; whereas in a culture with large Power Distance, citizens believe it is natural to please and obey those “higher up”, whilst the latter expect to rule unquestioned. The motivation of citizens to take part in energy transition initiatives may differ depending on Power Distance, as people will have different preferences or expectations as to who should initiate the changes required to realise the transition (see also [14]). For example, in societies with large Power Distance, people may not feel empowered to take the initiative, nor seek to engage in, tackling social challenges such as the energy transition. In this situation, a top-down or paternalistic approach to policymaking may be most effective.
- **Uncertainty Avoidance** of a society, is defined as the “extent to which the members of a culture feel threatened by ambiguous or unknown situations” [13: p. 187]. Again, this is not individual-level neuroticism; there is a correlation at the country level [15]. Nor does it relate to economic risk. Rather, it pertains to a generalised sense that the unpredictable is disturbing, should be met with caution, and should be combated by ritual. The changes needing to be made by stakeholders with the development of PEDs for example, such as changing habits, investing in or engaging with new technology, and collaborating with new partners, involve much unpredictability. The anxiety of strong uncertainty avoidance is also associated with distrust in impersonal relationships, such as with institutions, finding comfort instead in familiar, well-scripted ritual. Uncertainty avoidance can affect the acceptability of different types of intervention. For example, uncertainty-avoiding cultures show a preference for specialist knowledge, wielded by people with diplomas and titles, while uncertainty-tolerant cultures tend to believe in common sense, delivered by generalists. It has been suggested that a country with a strong Uncertainty Avoidance tendency will at first be less accepting of new technology [16,17], possibly requiring endorsement from experts. Once principles and methods are in place, however, an uncertainty-avoiding society can catch up.

A recent study from the Smart-BEEjS project team [18], builds on Smart-BEEjS project Deliverables [19,20] and uses the two key society-level constructs above, to develop four cultural configurations that are developed from their interactions: market, family, machine and pyramid¹. Each of these cultural configurations has implications for policy design, depending on how local cultural norms determine societal engagement and interaction with policy means at all policy levels.

¹ The Family cultural configuration is most widely seen in Africa and Asia. European cities are characterised in general at the other three dimensions. A detailed map can be found in [13].

Table 7. Cultural Configurations in the Energy Transition

		Power Distance The degree to which those with little societal status accept this situation as a natural state of affairs	
		Small	Large
Uncertainty Avoidance: The extent to which the members of a culture feel threatened by ambiguous or unknown situations	Weak	Market The goal of energy transition will rely on market and consumer pressure and adaptation of business practices	Family Communities take innovative steps towards energy transition goals, if they see the need or benefit of the goals at community level
	Strong	Machine Change that clearly originates from participatory mechanisms that have been detailed and operationalised by experts, is expected to work in these cultures	Pyramid Actions promoting the energy transition should be specified by central authorities via detailed and specific directives or regulations

Applying these principles to three distinct cases – Amsterdam, Vienna and Lisbon – that are categorised into three different cultural configurations – Market, Machine and Pyramid respectively – our research demonstrates the implications on the calibration of specific tools or instruments and their prioritisation as policy setting [18]. Choosing four key instruments (participation and collaboration between stakeholders, techno-economic utilisation, business models, equity and energy poverty), our research demonstrates the different prioritisations and interpretations in the three cases (Figure 2)

A key finding from this research is that, given the different cultural configurations that policy means require, different priorities should be given to the ways in which policies for PEDs are implemented. More broadly, this research has shown that in any policy domain where government needs to steer industries and markets, important barriers to successful policy adoption, implementation and acceptance can be overcome by reflecting on the specific cultural context of the interventions. This will not guarantee policy success, but it will reduce the potential barriers to success.

Culture-based Decarbonisation Policy Configurations

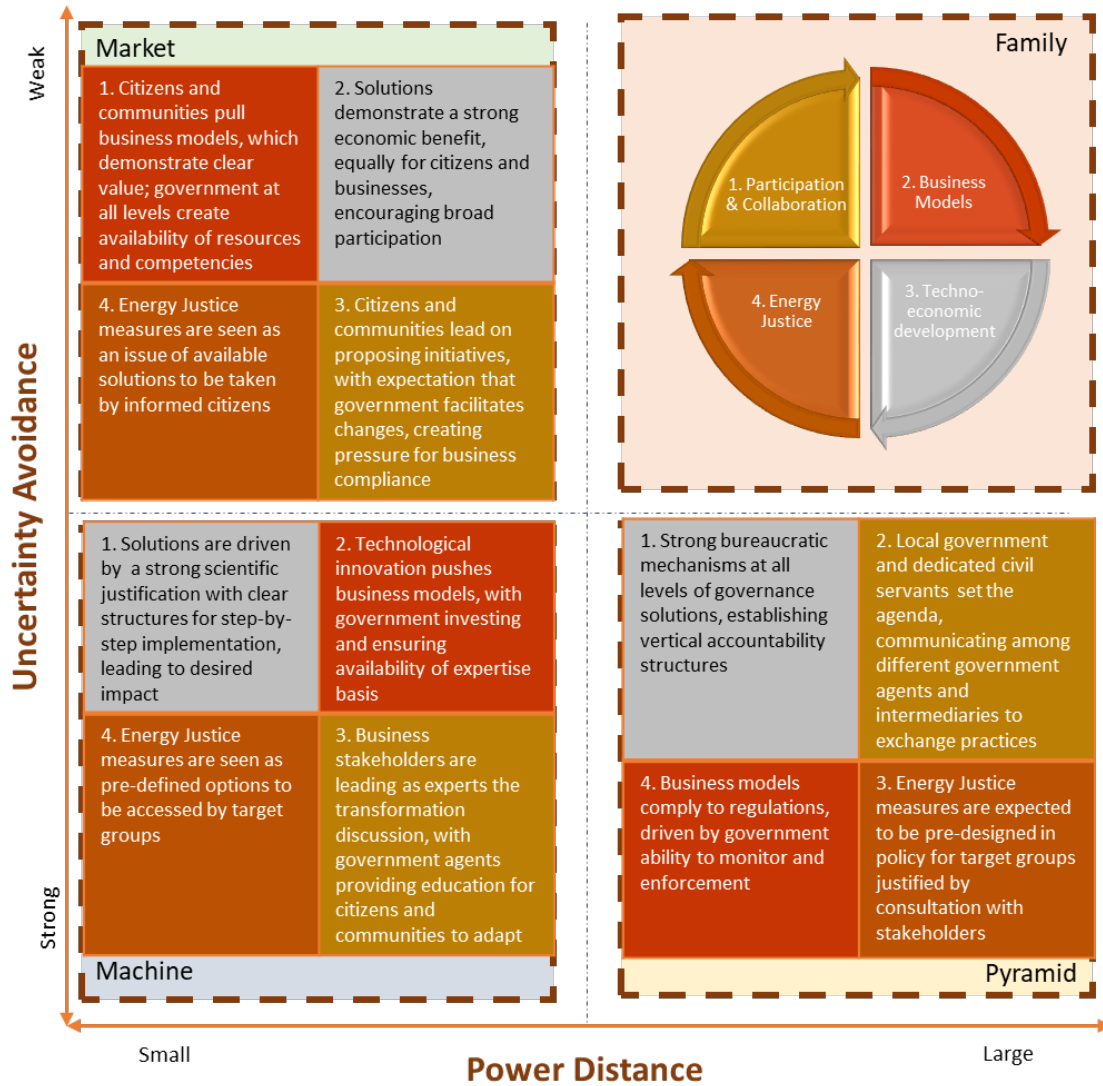


Figure 2. Policy perspectives for PEDs, accounting for configurations of culture

Policymaking in Practice – Policy Means, Ends, and Challenges

In this report, we have shown that the design of policies for developing and initiating PEDs requires systemic thinking, first, at the Governance Mode. Our research suggests that the policy goals for PED development and, by extension, the most recent declared goal from the EU for Intelligent Positive Energy Cities, need to address a balanced mix of environmental and socioeconomic aims. The instruments of implementation therefore need to follow a systemic and mission-oriented logic. Their mission is to achieve decarbonisation of districts and cities by raising standards of living for all socioeconomic groups living in the districts and the city, in order to reduce inequality. Their challenge is to confront the multidimensional silos across city and national bureaucratic institutions, as well as to broker between stakeholders, and to broker policy instruments. Therefore, our proposition is for cities to create mission-oriented instruments of implementation, which can navigate across different regulatory and legal constructs, provide a one stop service for civil society, and broker across the

network of stakeholders. Similarly, at regional or national levels, governance can represent the mission orientation by connecting regional and local development policy instruments. This can be achieved, for example, by setting monitoring and accountability mechanisms that connect the environmental targets with socioeconomic targets (Table 8).

Moving to the operationalisation mode, the policy regime requires specific objectives to be set that, at the same time, reflect and accommodate both national ambition and local context. Therefore, the objective needs to align with the socioeconomic and environmental aims, for example by setting as an objective the achievement of a socioeconomically and environmentally just city. This requires considering planning regulations at national level that are directly connected to the mission of positive life districts and cities. This has implications for regulations regarding, for example, new buildings, retrofitted buildings, transportation, and energy generation. Such a transition will also create distinct pressures for different socioeconomic groups in the population. This must be mitigated at the national and local levels, in order to create a social care system that targets the elimination of energy and transportation poverty. The change towards positive life cities is a long-term aim and thus requires clear platforms for public-private collaboration and public-cocreation. The former requires clear financial and accountability mechanisms, whilst the latter requires clear, equitable and consistent participation and brokerage mechanisms. The implementation plan and the collaboration and cocreation mechanisms are then required to be set using the local context as a baseline. This context provides the baseline of the technical implementation, evaluating and evolving the local path of change that has been created by previous efforts. Furthermore, it provides a reality check for prioritisation of efforts tailored to the local framework, setting the conditions of implementation, the cost implications, and the expectations of impact on social, economic and environmental targets.

Finally, setting specific ground-level tools for implementation requires skills relating to change management. Environmental or transportation officers at the local level manage the socioeconomic change of their city. They need to ensure that they create and maintain socioeconomically diverse districts, transforming cities into polycentric environments that accommodate multiple functions (from family to business life) and do not exclude sections of the population. Our research suggests that the tools of implementation need also to be adjusted to the local political culture. There is no specific tool that is inherently superior, but there are tools that fit better the local culture. All aspects of implementation are required to be considered in parallel in a transparent strategic plan, which provides continuity, long term visibility and coherence.

The above discussion across the different modes of policy design and implementation are summarised in Table 8. This is the final policy recommendation from the Smart-BEEJS project for PED policy design. With the EU already looking to extend the concept of the Positive Energy District to the city-level, we suggest that this ambition is better conceptualised as a Positive Life District and City. This language captures more explicitly the need to go beyond an environmental and energy oriented Positive Energy District and city, to embody social equity goals from the outset and to ensure that all members of society can benefit from the policy process that we have laid out.

Table 8. Positive Energy Districts: Policy Design Principles Framework for Positive Life

Policy Level				
		<i>Governance Mode</i>	<i>Policy Regime</i>	<i>Programme Settings</i>
Policy Component	Policy Ends	Goals of PED Policy	PED Objectives	PED Setting
		The development of Positive Life Districts and Cities: <ul style="list-style-type: none"> Decarbonised districts that maintain a representative socioeconomic mix of population and activities, reducing inequality. 	Socioeconomic and Environmental Just City: <ul style="list-style-type: none"> Low-energy and passive new-build developments Retrofit developments targeting energy poverty Maximise renewable energy production and utilisation of district's circular energy economy Decarbonised and life-centred transportation planning 	Positive Life Districts and Cities: <ul style="list-style-type: none"> Socioeconomic diverse districts Poli-centric cities (multiple-function districts and cities)
	Policy Means	Instrument Logic for PED Policy	Mechanisms/Instrument for PED Operationalisation	Calibrations Tools
		Mission oriented governance <ul style="list-style-type: none"> Multi-stakeholder participatory governance Culturally-sensitive policymaking styles 	Mission-fit Regulation at national level: <ul style="list-style-type: none"> Positive Life Regional Development Secretariat Stable, long-term regulation setting energy production, new building, building retrofitting and transport efficiency standards Mission connected regional and city planning regulation Socioeconomic universal care at national level: <ul style="list-style-type: none"> Energy and transport poverty targeted mitigation and elimination instruments Public-Private cooperation instruments at local level: <ul style="list-style-type: none"> Strategic Plan Instrument for implementation and innovation Co-creation initiatives at local level: <ul style="list-style-type: none"> Community Platform for dialogue and brokerage Evolution of plan and pushing ambition of socioeconomic and environment impact to higher levels Positive Life City Office 	Political Culture led application: <ul style="list-style-type: none"> Technological solutions suitable to risk acceptance levels of local population and institutions Business model tools range from citizen-led cooperative solutions to company-led profit driven solutions Social support network range from state-led, or city led social building and social transport initiatives to individual private insurance-led solutions Cooperation and brokerage mechanisms varied from hierarchical level of governance to decentralised cooperative energy communities Communication varies from information and awareness setting to education and behaviour and mindset change
	Policy Challenges	Systemic Challenge for PED Policy	Processual, Practical Barriers for PEDs	Technical Administration
		Inclusive policy for all socioeconomic groups: <ul style="list-style-type: none"> Monitor in parallel and be accountable to environmental and social impact of implementation instruments A multidepartment and multidimensional collaboration: <ul style="list-style-type: none"> Break Silos: <ul style="list-style-type: none"> Across local stakeholder collaborations In internal official structures at local and national levels Of representation 	Adapting to local context – geographical, historical, socioeconomic, cultural, infrastructure path – sets the baseline: <ul style="list-style-type: none"> Mission-led Strategic Plan Instrument that focuses on the socioeconomic impact in parallel with the environmental impact Urgency of implementation and prioritisation connected to the local, socioeconomic and historical context 	Management of Change in an evolving political context: <ul style="list-style-type: none"> Mitigating transition effects across socioeconomic groups Strategic Plan Instrument that: <ul style="list-style-type: none"> Demonstrates continuity with past, valuing and building on and expanding previous efforts as well as introducing new directions Provides long-term visibility and accountability of financial commitments and technical implementation for the future Provides clear and consistent communication, mediation and brokering mechanisms

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