

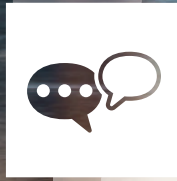
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CITY LAB PRAGUE – EXECUTIVE SUMMARY

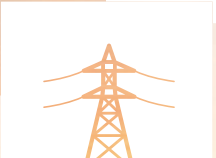
MARCH 2016



Morgenstadt
City of the Future



PRA	HA
PRA	GUE
PRA	GA
PRA	G





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1 INTRODUCTION

Today Prague is standing at a crossroad. Prague has the potential for a bright and strong future, but it has not yet defined the strategic pathways of transition. Prague has not yet developed a clear vision for the future and it has not quantified goals for development. However, the city is currently pushing for the re-development of a strategic plan and it is in the middle of the process of developing the new Masterplan (Metropolitan Plan).

This combined with the city's obvious economic strength and its rich history and attractiveness for people worldwide creates a large potential for a focused, smart, and sustainable urban development. This was the reason why Prague was selected as the first winner of the Morgenstadt City Challenge in June 2014.

The in-depth analysis of Prague was carried out based on the Morgenstadt assessment framework for sustainable urban development. This framework is structured into three levels of analysis, which in sum are designed to understand the current sustainability performance of cities and come to coherent strategies and an integrated roadmap for development. A mixture of quantitative benchmarks and qualitative data analyses certifies that an objective performance profile of Prague can be generated, while at the same time respecting the individual factors of the city that make a direct comparison with other cities difficult. This points towards an individual strategy for Prague.

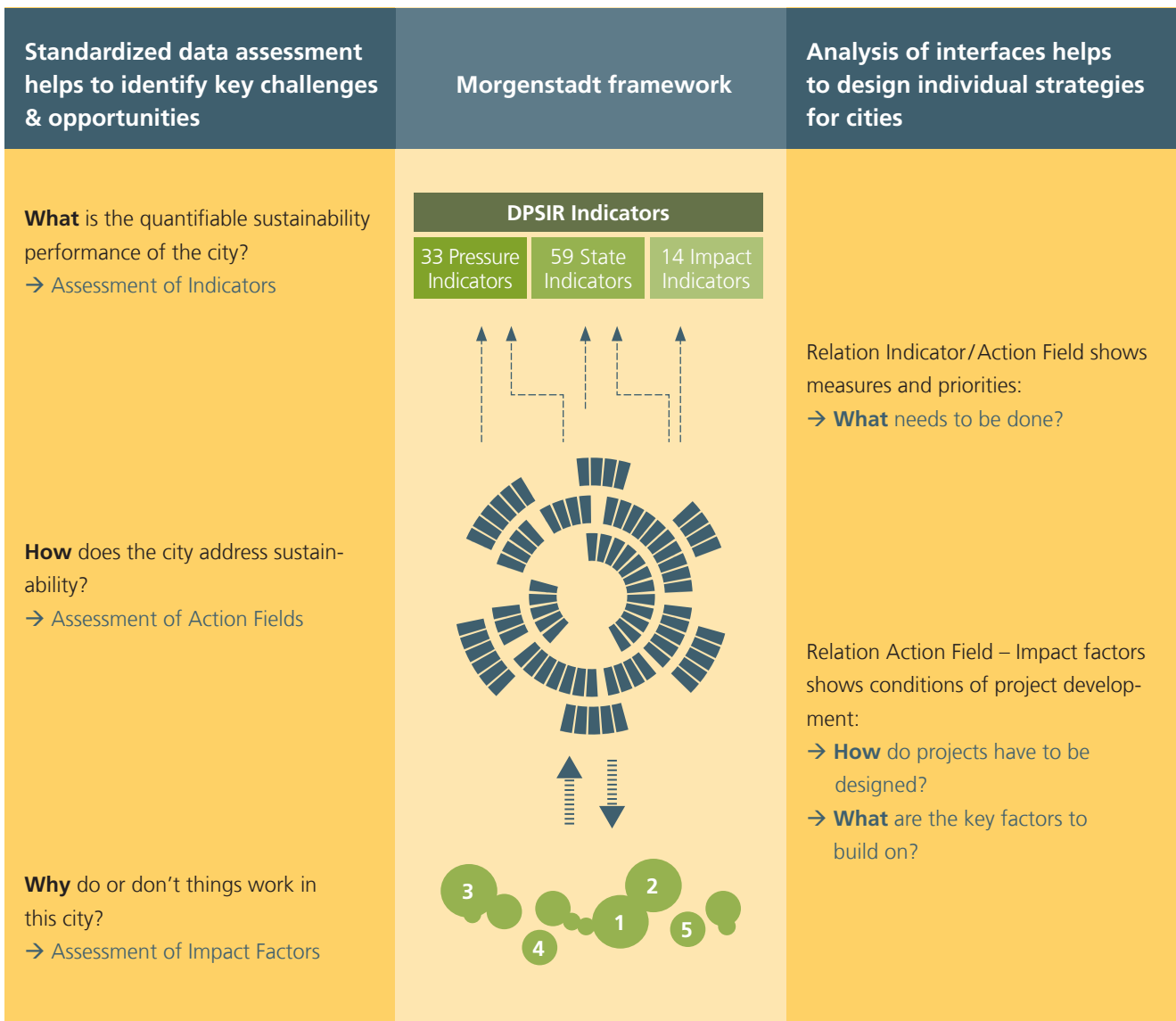


Figure 1

The purpose of the Morgenstadt City Lab Prague was to identify the strengths and weaknesses of the city across several sectors and action fields for a smart and future-proof development. It was also intended to identify main future opportunities, current barriers that need to be overcome, and to show possible trajectories for a sustainable development of Prague.



Prague wins Morgenstadt City Challenge



City Team



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Benchmarking of Prague

Comparison of Indicators with Morgenstadt benchmarks

Prague Impact Factors

Identification of challenges, opportunities, barriers, and ideas for action by means of semi-structured interviews

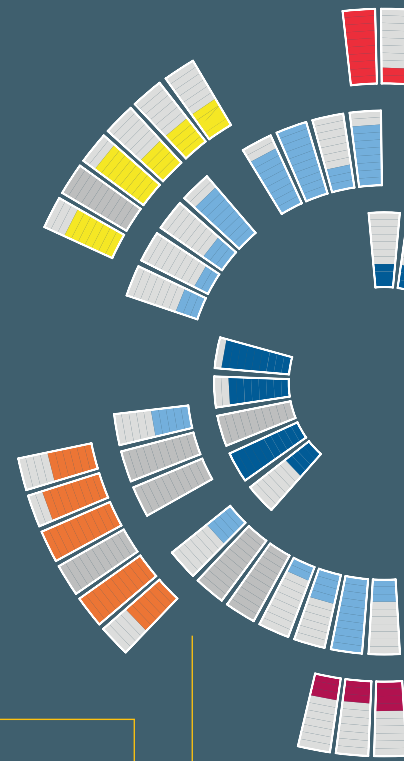
57 Interviews with local stakeholders and experts on the most important urban factors

Prague Indicators

- Assessment of 106 indicators for Prague
- Pressures on the city system
- State of the city system
- Impact on the city system

Prague Action Fields

Assessment of 83 Action Fields for smart & sustainable development of Prague



March

April

May

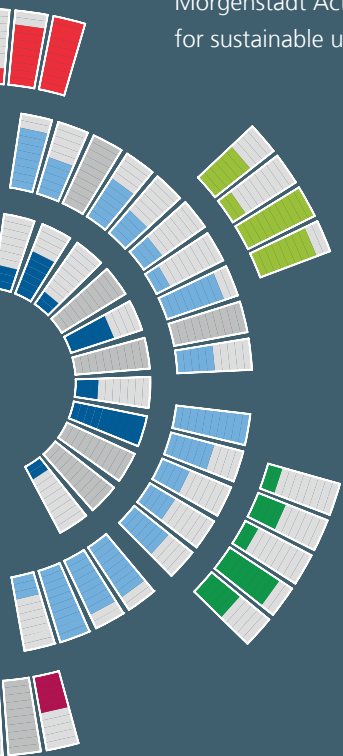
June

July

August

2 PRAGUE CITY LAB PROCESS

Profiling of Prague with the Morgenstadt Action & Response Model for sustainable urban development



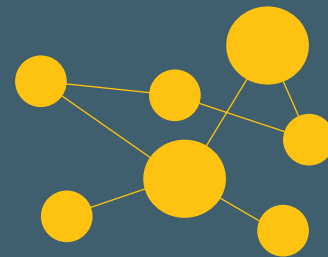
Creation of Prague systems models based on most important impact factors

Measures & Ideas for Action

- Development of 10-15 measures and ideas for action that support and accelerate smart and sustainable development of Prague
- Workshops with local stakeholders for developing the measures and initiating first projects
- Involvement of Morgenstadt Partners as experts for technologies, infrastructures, and smart city solutions

Prague Roadmap

- Definition of details (costs, timeframe, funding opportunities, stakeholders, etc.) for each project
- Integration of measures, projects, and actions into a coherent roadmap
- Maximization of synergies between projects



Final conference: April 6, 2016

- Presentation & handover of Roadmap
- Kick off: first projects

September

October

November

April



3 CITY PROFILE

Governance

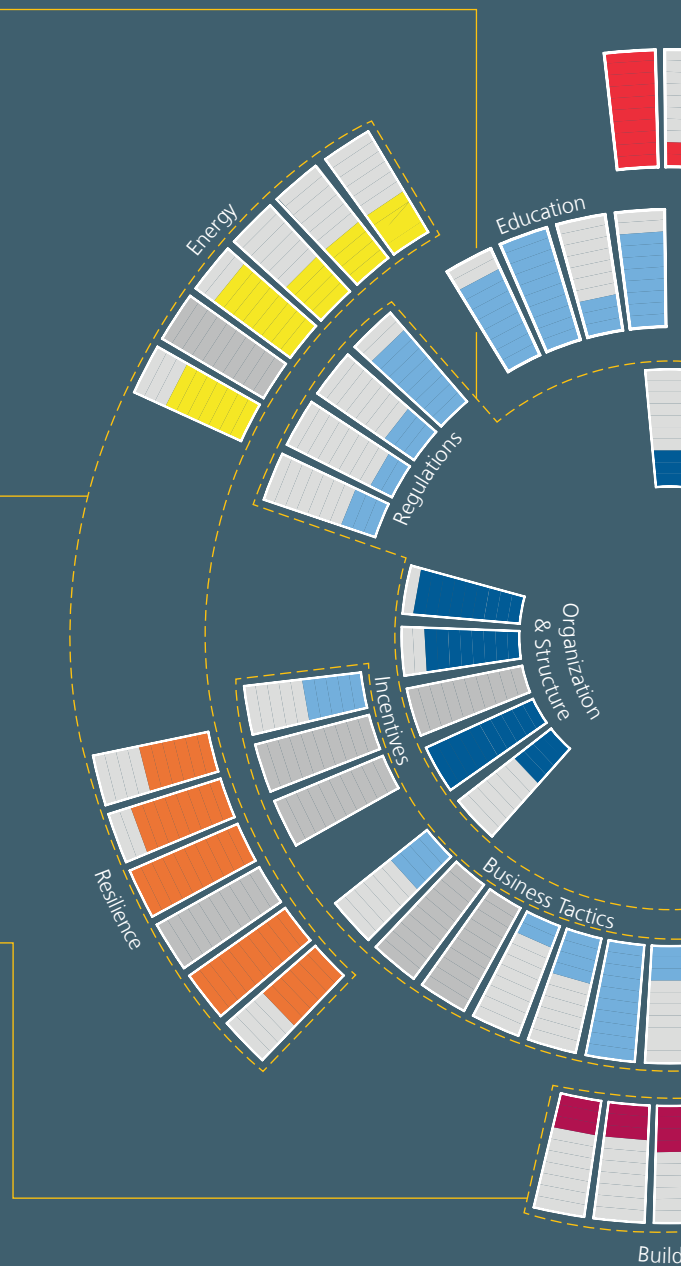
- Strategic development topics not on political agenda
- New partnership with private sector necessary
- Strong need for "Smart Governance"
- Need for integrated management approach
- Lack of clear vision for future-proof urban development
- Lack of coherent development strategy with measurable goals

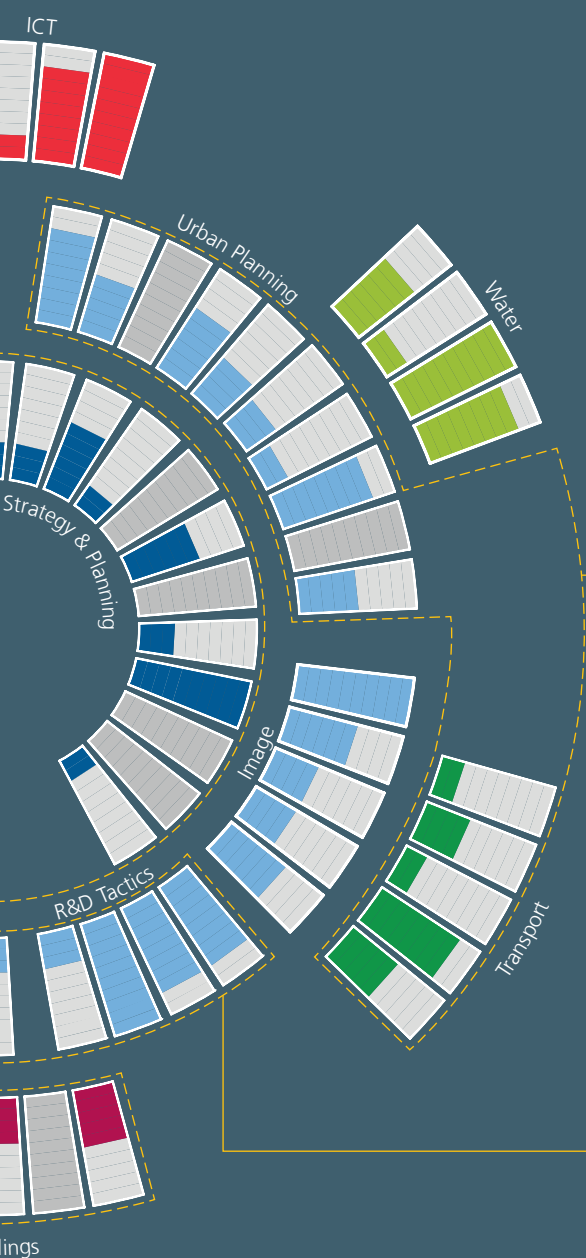
Energy System

- High demand for energy and electricity
- Potential for renewable energy use is not well exploited
- Various barriers for the use of renewable energy sources
- Incentives for energy efficient industries are needed

Buildings

- Lack of crucial information on energy performance of Prague's building stock
- Collection of data on energy performance requires political will as it is associated with high upfront and operational costs
- Modernization rate of the building stock is low
- Strong need for a new Building Code containing clear regulations





Space, Planning & Mobility

- Urban sprawl has resulted in road congestion and air pollution
- A reduction in car traffic has not been achieved despite significant investments
- Prague has no soft mobility systems (P&R, B&R, car-sharing, mobility hubs)
- Use of private cars is still perceived as more attractive than public transportation
- Little collaboration between City of Prague's and Prague Region's transportation systems

Economy & Innovation

- Promising innovation landscape
- Entrepreneurship hindered by risk-averse conservative mentality
- Spatial distance to main technological hubs
- Lack of cooperation in R&D
- Businesses relocate away from Prague in search of tax reduction benefits and lower living costs
- Established tradition of excellent technical and mathematical education
- Potential to become an international a hub for IT, creativity and culture

3.1 Governance System

The current leadership and governance system of Prague is facing a range of challenges that need to be tackled in the coming years in order to transform the traditional city administration into a strategic and transparent management unit for the entire city.

Strong need for “Smart Governance”

There are numerous examples of impressive development projects in Prague that show good results and support healthy and equitable development of the city. The well-developed public transportation system and the extensive flood protection system are two examples of this. Yet the Prague City Hall does not follow an integrated management approach to pursue smart and sustainable urban development, which creates a vacuum of strategic management across the city administration (when it comes to strategies, projects, and measures that need to be tackled in collaboration by several departments and offices) and it creates additional costs, since measures and interventions are not coordinated across the departments.

The lack of a clear vision for the future development of Prague and the lack of measurable goals certainly represents the strongest barrier to a focused sustainable long-term development of Prague at the moment, since no security for planning and investment is given. In sum this lack of a coherent development strategy has led to a range of expensive infrastructure projects and to delayed and discarded projects. At the same time, important industrial players are hesitant to invest into innovations and R&D in Prague because of the city's missing commitment towards achieving strategic sustainability goals

With concepts like “Smart Prague 2014 – 2020” or the “Implementation Programme of the Prague Strategic Plan” Prague demonstrates the will to take the necessary steps towards becoming a Smart City and suggests to focus on strengthening research and innovation, promoting social inclusion, and investing into sustainable mobility and energy. Yet the Prague governance system as of today is not adequate for managing a “Smart City”. There is a strong need for action on the organizational, strategic, and structural scale in order to make the strategic management system of Prague fit for the challenges of today and coming decades.

New partnership with private sector necessary

Often it is the private companies that design solutions for sustainable cities, that create new districts or refurbish houses and that operate the urban systems. Even municipal companies usually operate based on the rules of the private economy. Prague has made negative experiences with expensive public-private-partnerships in the past and is now hesitant to collaborate with the private sector. However, it is necessary to improve the relationship between the City Hall and the private sector. This should be done based on the principles of transparency and



equal treatment of all parties. The goal should be to activate private sector innovation and entrepreneurship for supporting sustainable development goals of the city. Examples for adequate instruments that support this goal are:

- A clear building code for Prague that incentivizes a green and socially balanced real-estate market.
- Innovation based procurement tools like competitive dialogues or innovation partnerships.
- A continuous dialogue with the private sector on strategic development topics of Prague (e.g. facilitated through a think tank).
- Incentive systems that encourage private stakeholders (start-ups, citizens, SMEs etc.) to contribute to a positive development of the city.

3.2 Economy & Innovation System

The innovation landscape of Prague with its dynamic start-up scene demonstrates an immense potential. Many highly innovative industries are present in Prague, such as the pharmaceutical and automotive industries, ICT, financial services, and consulting. However, one of the biggest challenges for entrepreneurship and innovations in the Central Eastern region is the (still) rather risk-averse conservative mentality. Another difficulty is posed by the spatial distance to the main technological hubs, such as London, Berlin, Hamburg, Munich, etc. These technological hubs offer high added value resources (investors, clients, mentors, consultants), which help start-ups develop products better and faster, while at the same time increases their market value.

Challenges: Changes in economic pattern & lack of structures

The processing industry is showing a gradual shift towards hi-tech production due to activities of multinational enterprises. On the other hand, companies are relocating their businesses into the suburbs and into other Czech cities that offer a lower cost of living as well as various incentives for businesses, e.g. tax reduction. In this situation, a lack of cooperation in R&D functions between the actors has been identified. It is vital to acknowledge that the low level of cooperation can be an obstacle on the path to strengthening Prague's innovative competitiveness.

Opportunity: Prague's future as a hub for IT, creativity, and culture

The Czech Republic is nowadays one of top locations for outsourcing and offshoring IT-related services and software design. The main reason for this is the established tradition of excellent technical and mathematical education coupled with the still quite inexpensive workforce and low operational costs when compared to the Western EU-countries, despite the Czech Republic being member of the EU for over 10 years. Also, with its location at the heart of Central Europe, Prague is ideal for building trade links. The IT field is very vibrant and students of Czech

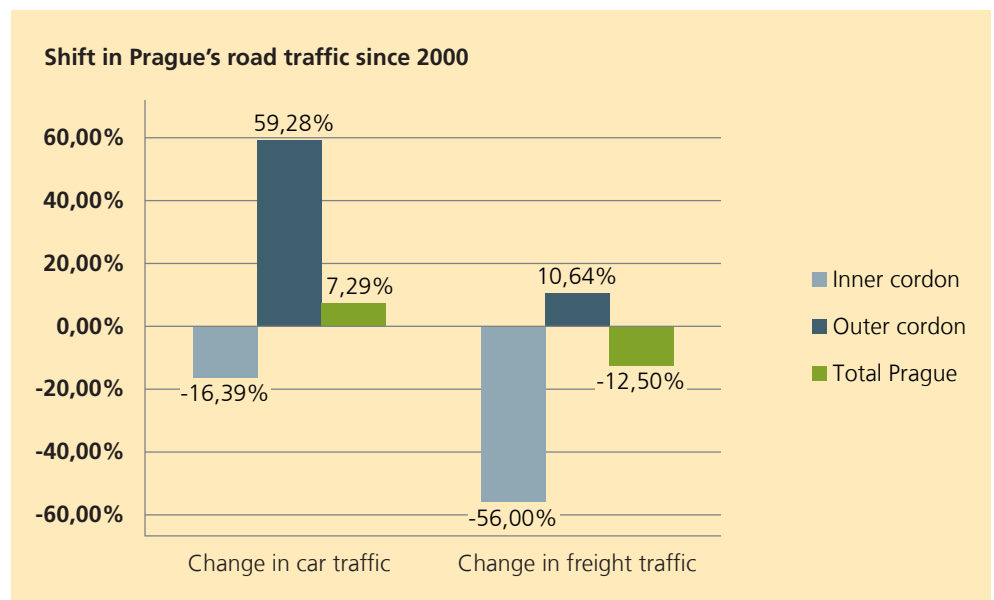
universities are active at setting up medium and small companies and start-ups, many of which become successful. Examples of renowned software brands include AVG technologies and Alwil (AVAST), which are both specializing in online security and antivirus products.

3.3 Space, Planning & Mobility

Prague takes pride in its very well-developed public transportation system. With almost 30 % of the overall budget spending, the public transportation system represents the largest portion in the overall budget of Prague. The current figures show that this continuous investment into developing, operating, and maintaining the public transportation network has made it one of the largest success stories of Prague.

A key issue to be addressed in Prague today is the impact of the urban sprawl on the traffic situation within the city and its suburbs. The urban sprawl almost solely refers to residential suburbanization; the work places of most suburban dwellers remain located within the City of Prague. Since the Metro line does not reach the outer areas and it is not integrated with a regional transportation concept, the new suburbanites have to commute to Prague by car. As a result some areas in Prague have witnessed explosive growth in traffic volume in the past 15 years. In total, the increase of vehicles on the roads of Prague has been rather modest (approx. 6 % since 2000). However, the traffic on the outer roads has increased by 53 %, while the inner-road traffic has decreased by almost 18 %.

Figure 4
Shift in Prague's road traffic since 2000.



This development explains why the significant investments into the transportation system of Prague have not been able to achieve a reduction of car traffic so far.

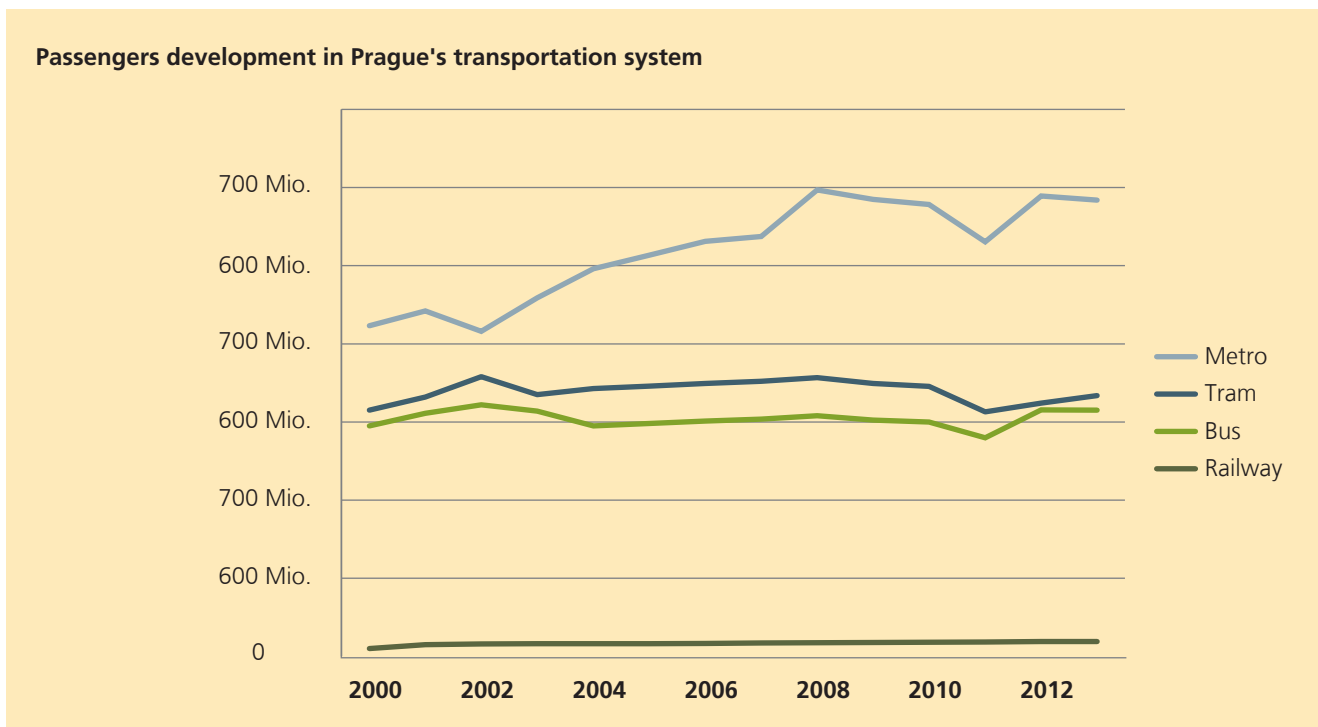


Figure 5: Development of passenger volumes in Prague.

A key reason for this is that Prague has not focused its heavy investments into the roads and the public transportation through soft mobility systems (e. g., park and ride hubs, bike & ride, car-sharing opportunities) that are linked to mobility hubs, a comprehensive bicycle lane network, or incentives to make use of more environmentally friendly modes of transportation. Prague has also refrained from introducing regulatory measures to make car-usage within the city less attractive (reduction of parking slots, congestion charges, low emission zones, high parking costs etc.). A second reason is that there is no, or only little collaboration between Prague and the Regional Transportation system, which would coordinate an improved public transport on the regional level. Upgrading the sequence of regional trains and their transportation capacity is an action field that needs strong attention in the upcoming years.

3.4 Buildings

There is a lack of information on the energy efficiency of Prague's building stock, on the number of deep renovations and on the quality of building envelopes and HVAC-systems. This results from the data of energy performance assessments, which are carried out after major renovations, not being systematically collected by the city Building Department. Currently it is planned to collect the data from the Energy Performance Certificates until 2016 by the Ministry of Industry and Trade, however, it takes political will to push this project forward as it is associated with high upfront and operating costs. As of now, only incomplete data exists for the territory of Prague, however, it is assumed that about 20 % of Prague's building stock has undergone energetic refurbishment within the last decade. Derived from this, with an estimated average spending of € 12 million per year for the energetic refurbishment of buildings and an estimated refurbishment rate of 2 %, the progress in modernizing the building stock of Prague is rather slow.

At the same time, there is a high amount of vacant buildings in the inner city, leaving high untapped potential for a real estate market focussed on sustainable buildings. It is therefore essential to assess the energetic quality of Prague's complete building stock and to develop a clear strategy for the refurbishment of the building stock.

Demand for clear regulations of local building standards

There are little regulations in place that incentivize private investments into a sustainable development of Prague. The cost-benefit analysis demonstrates that by means of adopting a clear building code, the city will ensure that all urban development planning procedures follow the same principles with regard to financing and social and ecological standards.

Essential aspects to be considered in the new building code are:

- Refinancing of city services
- Investments into social infrastructure
- Subsidized housing
- Energy requirements
- Realization of urban functions:
- Proportion of housing and a mix of different living space sizes



3.5 Energy System

Prague has an unproportionally high demand for energy and electricity, which needs to be tackled via a bundle of measures.

Only 3.6 % of Prague's energy demand is covered by energy produced within the city. Nearly the same value (3.5 %) is the current amount of renewable energy sources in the overall energy production in Prague. The solar, biological, and wind energy potential within Prague and its region is not well exploited. With € 0,128/kwh the energy price is remarkably low and leaves room for investments. The average global median for residential electricity is € 0,335/kwh.

Increase the use of renewable energy sources

Prague needs to expand the use of renewable energy sources and launch pilot projects in the field of smart energy grids. However, the existing constraints need to be taken into account. First of all, due to a large part of the Old Town being part of UNESCO World Heritage, only limited use of solar panels is possible. Regarding wind energy use, due to high buildings density only small turbines on the rooftops of the buildings in suburbs are feasible. Moreover, biomass use in Prague faces lot of barriers as emissions are relatively high compared to natural gas/district heating used in Prague. There is also considerable need for additional storage space and additional transport, which will add to the emissions. Finally, burning biomass produces large dust particles.

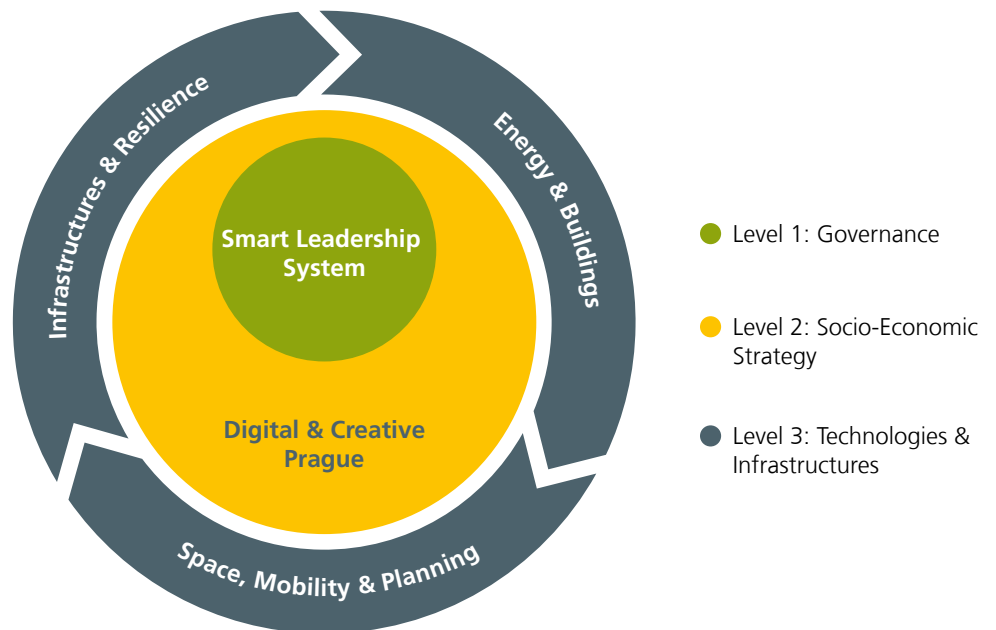
Introduce incentives for energy efficient industries

The share of the industry sector in energy consumption in Prague is assumed to be only about 10 %, mostly due to the decline of some energy demanding industry sectors. However, there is a lack of incentives for energy efficient industry within the Czech Republic, like subsidies or tax reliefs for energy efficiency measures.

4 STRATEGY & SUGGESTED MEASURES

Based on the in-depth analysis of over 120 indicators and more than 80 action fields in Prague, it is suggested to base the strategy for a smart and sustainable development of Prague on three main levels as shown in the figure below:

Figure 6
Levels of action for a sustainable development of Prague.



A cross-integration of all levels of analysis of the Prague city lab and a set of discussions and workshops with more than 80 stakeholders in Prague has produced a comprehensive list of 25 high-priority measures that are allocated to the three levels of activity.




All measures are interconnected with each other and should be developed and organized in a way that respects the systemic character of the suggested roadmap. There are causal interrelations, but also interrelations based on time, resources, stakeholders, and technologies to be deployed during implementation. The roadmap, as suggested below, should therefore be closely discussed in relation to an overarching strategic management of a sustainable development of Prague.

5 SUGGESTED MEASURES

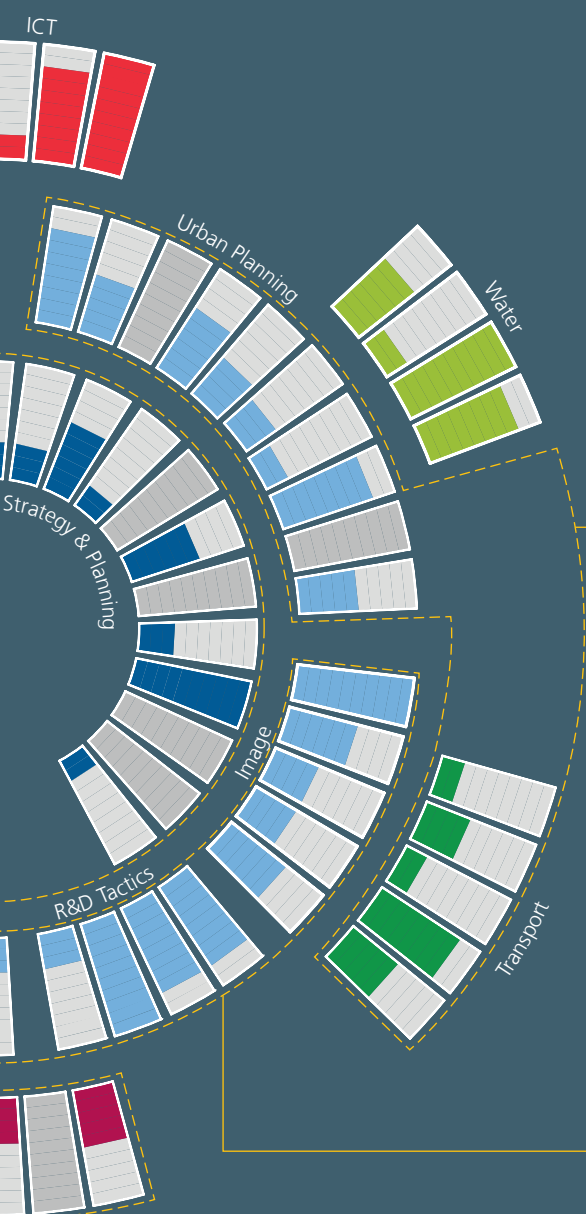
Leadership System & Governance

-  Vision and measurable goals for Prague 2050
-  Cross-sectoral management unit within Prague City Hall
-  Smart City Innovation Fund

Energy & Buildings

-  Energy atlas
-  Lighthouse energetic refurbishment of public buildings
-  Virtual power plant





Space, Planning & Mobility



Innovation district



Network of multimodal transportation hubs



Sustainable redevelopment of Venceslav Square

Digital & Creative Prague



Smartification of the historic city centre



Smart City think tank



Open Data platform with analytics centre + new value added services

5.1 Leadership System & Governance

The governance and strategic management of a long-term development of Prague has been identified as the strongest lever for a sustainable and prosperous development. Governing the transition towards a creative, sustainable, and digital city needs not only a stern leadership, but also a set of clearly defined tools and strategic measures that support a long-term management of complex urban systems.

A small bundle of strategic actions is therefore necessary to make the governance system of Prague fit for a long-term management of interdependent development tasks:

NEED FOR ACTION

A clear vision for steering the long-term development is lacking. Unclear priorities.



SOLUTION

Definition of clear and measurable development goals.

Suggested Measures

1. Vision and measurable goals for Prague 2050

Clearly defined and measurable goals are necessary to steer the development of Prague. They serve as guideline for the subsequent strategic development process of Prague and help to prioritize investments and decisions. A long term perspective (e. g. 2050) helps to focus and to address urban development projects as well as social- and economic strategy. The vision needs to be rooted in Prague’s society.

2. Cross-sectoral management unit within Prague City Hall

Prague increasingly has to manage complex development projects that require the collaboration of various departments of the City Hall and several municipal companies. A cross-sectoral management unit within the administration helps bring together the multiple municipal stakeholders and break the silo-thinking within city administrations. It should be endowed with strategic long-term planning and with managing cross-cutting (smart city) projects. Ideally, it will report directly to the mayor. ICT-based management tools and a KPI-based monitoring system are required to enable this unit to strategically manage the development process of Prague. In order to function properly it will also need to serve as a showcase and catalyst for all sustainability measures of the city externally. It should increase the reputation and visibility of the operational offices, not undermine them

NEED FOR ACTION

Measures and interventions are not coordinated across departments.



SOLUTION

Installation of cross-sectoral management unit.

NEED FOR ACTION

Activate Prague’s society to support a creative and sustainable development.



SOLUTION

Setup a Smart City Innovation Fund Prague.

3. Smart City Innovation Fund

A Smart City Innovation Fund gives grants or loans to start-ups, university groups, SMEs or companies for realizing innovative ideas that support the development goals of the city. It helps to leverage the creative potential of Prague’s society and to link it to the development of the city. At the same time it spurs co-investments by the private sector into the development of Prague. This fund could be financed by earmarking revenues from municipal companies and by a co-financing scheme with the private sector and/or state funds.



5.2 Digital & Creative Prague

Prague is in quest of a new identity. The old business model, which is based on tourism and cultural heritage, does not provide for prosperous and sustainable development of the city in the 21st Century. Therefore the “Digital and Creative Prague” suggests a set of integrated measures that together have the potential to create a new identity of Prague as a creative and thriving city at the core of the European digital economy.

Suggested Measures

1. Smartification of the historic city centre

As a first tangible lighthouse project, it is suggested to improve the experience of visiting, living, and working within the historic city centre. A set of smart technologies combined with smartphone-based services has the potential to better guide tourists and local citizens to existing cultural assets of Prague, as well as to integrate local shops, museums, restaurants, businesses, etc., in an overarching story of a smart and creative city. It is suggested to include the infrastructure of the city centre into this process – e. g. via smart waste bins, intelligent lighting systems, smart city logistics based on electric vehicles, etc.

NEED FOR ACTION

*Integration of existing cultural assets;
Redistribution of tourists' flows*

SOLUTION

Smart applications and technologies in the historic centre.

NEED FOR ACTION

High amount of data needed to optimize urban processes.

SOLUTION

*Open Data platform;
Data analytics centre;
Online marketplace*

2. Open Data platform with analytics centre + new value added services

As the necessity for processing data in Prague increases exponentially (e. g. from traffic monitoring, citizen-based applications, urban sensors etc.), a data analytics centre for Prague becomes a necessity. Only with information flows and datasets bundled together in one place, city authorities and local companies will have the opportunity to improve the efficiency of city services, and to develop new value-added services that improve the liveability of the city and support the digital economy. Many services can be built on top of an open platform and a data analytics centre. We suggest initially focusing on an online platform for mapping and connecting the creative industries of Prague, a smart digital welcoming program for international employees and students, and an upgraded online marketplace for local and international companies.

NEED FOR ACTION

*Scattered research landscape
Lack in R&D;
Need for cross-cutting R&D solutions;
Attraction of well-educated employees*

SOLUTION

Smart City think tank

3. Smart City think tank

A Smart City Think Tank is a necessary facilitator for connecting Prague's Universities, local companies, and the city administration. It can enable the elaboration and implementation of the proposed measures and projects as well as help attract private and international funds. Given Prague's location at the heart of Europe, it is essential that the Think Tank offers high quality research and gains international recognition (e. g. via partnerships with MIT/Fraunhofer etc.).

NEED FOR ACTION

Create a showcase for the creative and digital economy of Prague in the 21st Century.
Attract international companies.
Retain skilled workers.



SOLUTION

Develop Prague innovation district.

NEED FOR ACTION

Reduce car traffic, improve parking and reduce emissions from the transport sector.



SOLUTION

Create a network of multimodal transportation hubs.

NEED FOR ACTION

Make city centre an attractive place for citizens .



SOLUTION

Redevelop Venceslav Square & connect Namesti Winstona Churchilla with a bridge.

5.3 Space, Planning & Mobility

The development of the urban space, the planning of city development projects, and the transportation sector are strongly linked with each other. Therefore suggested projects and measures that relate to these areas are linked together for the Roadmap of Prague. The core of this area focusses on the goal to upgrade and modernize the built environment of Prague by at the same time making public spaces more attractive and liveable for Prague’s citizens and for visitors.

Suggested Measures

1. Innovation district

Prague needs a lighthouse district that shows the creative, environmental, social, and economic potential of Prague in one spot, relating it to modern architecture and to appealing design. It is therefore suggested to develop a new innovation district on one of the many existing brown-fields of Prague (e.g. Holesovice or Zizkov). An innovation district will not only re-integrate working and living, it has the potential to attract young families and reverse suburbanization, to better link industry and research, and to attract creative industries and research-oriented companies to Prague. In order to make sure that this district is developed in a socially viable way, it is recommended to base parts of the development process in a participatory process of co-creation through the citizens of Prague.

2. Network of multimodal transportation hubs

A network of multimodal transportation hubs will support the city in reducing private vehicles in the city center and shifting mobility further to public transportation and sustainable alternatives like car- and bike-sharing. One intermodal mobility hub can easily be integrated into the planning process of the innovation district, providing an innovative mobility solution for future residents and local employees. An easy use of intermodal mobility services will only be possible if intelligent digital services are provided to plan individual trips through Prague across different modes of transport

3. Sustainable redevelopment of Venceslav Square

The city centre of Prague needs to be upgraded to become attractive and energetically appealing for Prague’s citizens. There is the danger to only focus on tourists. This is the reason for a suggested sustainable redevelopment of Venceslav Square and the creation of a green and liveable bridge across the main station, connecting Namesti Republiky and Namesti Winstona Churchilla for pedestrians and bike riders.



5.4 Energy & Buildings

In the light of binding EU goals on renewable energy use, energy efficiency and GHG emissions, the fields of energy and buildings in Prague need urgent attention.

Suggested Measures

1. Energy atlas

Given the difficulty of managing the assets with little credible information about their state and quality, the development of a comprehensive Energy Atlas of Prague's building stock needs to be the first step towards a city-based programme for energy efficiency and reduction of carbon emissions.

NEED FOR ACTION

Missing information on energy performance of Prague's building stock.

SOLUTION

Energy atlas

2. Lighthouse energetic refurbishment of public buildings

In order to convince local building owners of the potential return on investment from the refurbishment of buildings, it is suggested that the city invests into 1 or 2 lighthouse projects that combine energetic refurbishment of public buildings with the reduction of their maintenance and operating costs.

NEED FOR ACTION

Energetic refurbishment of Prague's building stock.

SOLUTION

Lighthouse energetic refurbishment of public buildings.

3. Virtual power plant

Currently Prague has no back-up power plan to supply critical infrastructures in a case of a black-out event. A virtual power plant that combines multiple sources of energy, including conventional (natural gas for a natural gas fired CHP) as well as renewable ones such as solar, biogas, hydropower, and wind energy is suggested as an additional measure for enhancing the energy security of Prague and creating a lighthouse project for the use of renewable energy sources. This possible stand-by facility could not only be useful for the city in case of black-outs, but also in times of peak consumption. Despite limited return on investment, a back-up power plant is essential for strengthening Prague's energy security.

NEED FOR ACTION

Prague lacks a back-up energy source for emergency situations.

SOLUTION

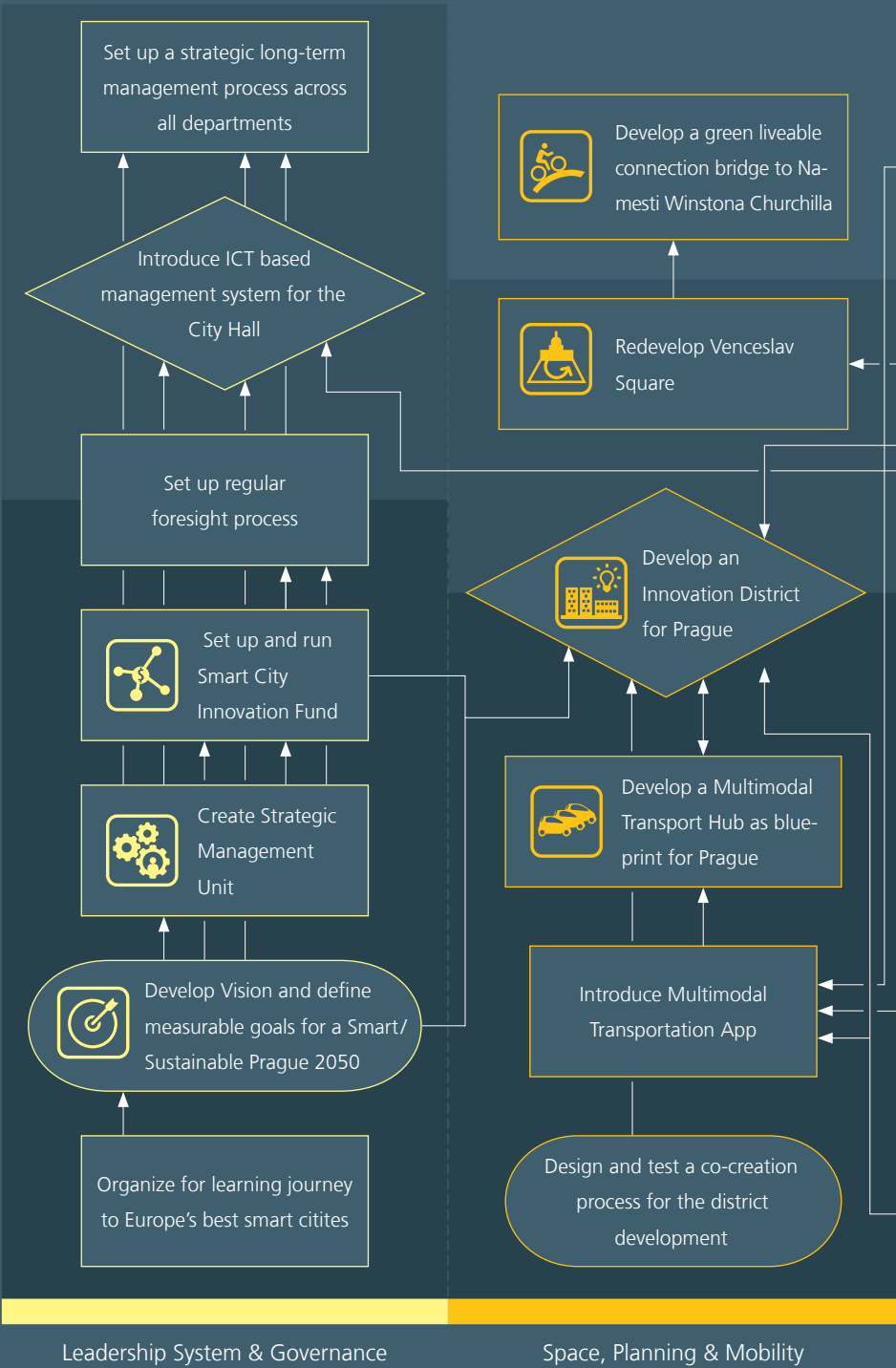
Virtual power plant

6 ROADMAP: PRAGUE DEVELOPMENT SYSTEM

○ 2018

● 2017

● 2016





Smart & Creative Prague

Energy & Buildings

Resilience & Infrastructure

7 CONCLUSION

The Morgenstadt City Lab generated an in-depth analysis of the City of Prague. It shows strengths and weaknesses of the current development process of Prague and suggests an integrated roadmap for pushing Prague into the league of leading cities in Europe. This roadmap builds on measures and projects across three main levels of a sustainable urban development which have close interrelations: the governance level, the socio-economic level and the technology and infrastructure level.

At the core of the analysis there is the insight that Prague needs to put an innovation-based management approach to work within the public administration and at the leadership level of the city. This approach will serve to facilitate cross-departmental collaboration and investments, to organise collaboration with the private sector and to spur a maximum uptake of data-driven and ICT-based solutions to deliver public services in an efficient way. Starting from here, Prague has the potential to become a leading city in Europe with regards to creativity, culture and a digital economy.

The roadmap includes 25 measures. Not all of them have been described in the Executive Summary. The final report of the City Lab Prague contains the full analysis of the city and a detailed description of all measures. It will be made available to the City Hall during spring 2016.

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