14th European Forum on Eco-innovation

Into clean air...

Delivering innovative solutions for mobility, energy and ICT in cities

Recommendations and summary of the event

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Introduction

Innovation can deliver cleaner air and better quality of life in cities

Clean air is the European Commission’s top environmental priority for 2013. It is essential to our health and environment and while much has been achieved in past decades, air pollution remains the number one environment-related health threat in Europe, killing ten times as many people as traffic accidents every year (i.e. nearly half a million premature deaths). It is a particularly urban problem and cities, hotspots for harmful pollutants, are today also emerging as hotbeds for innovations that promise a better quality of life.

Promoting innovation, and opening up opportunities for European business in pollution abatement technologies and services around those, is one of four explicit goals of the European Commission’s current air policy review. This is due for completion in autumn. The other objectives are: ensuring full compliance with existing air quality targets, setting new targets for after 2020, and devising measures to achieve these targets, including a review of the National Emission Ceilings (NEC) directive and source control proposals, notably for shipping, agriculture and small-scale combustion.

Innovation is also the goal of the new European Innovation Partnership (EIP) on Smart Cities and Communities, a public-private partnership launched in July 2012 that aims to “catalyse” developments in areas where energy, mobility and ICT cross over to reduce energy use, resource consumption and pollution while improving services. The 14th European Forum on Eco-Innovation in Prague, the Czech Republic, brought together key players from policy, business, academia and civil society to debate these inter-related fields through the lens of improving air quality in cities. The result was a series of draft recommendations for a strategic implementation plan for the EIP in autumn.

The Prague Forum was organised by the European Commission’s Directorate-General for the Environment, the Ministry of Environment of the Czech Republic with the support of the Ministry of Industry and Trade, the Technology Agency of the Czech Republic and the National Technical Museum.
Executive Summary

Recommendations for taking smart cities forward:

1. Seducing the citizen – motivation, ownership, and knowledge sharing

Convinced and pro-active people are needed for innovation to unleash its potential. Citizens need to understand their role and should be involved from the start in any urban planning process, using referenda if necessary. The complexity of decision-makers’ tasks can only be overcome with complete ownership by citizens because innovation requires a new way of thinking. Solutions like car sharing, alternative mobility, energy-efficient buildings, ICT-based applications for data collection and lifestyle adaptation will not work if citizens are not convinced.

Without a robust democratic acknowledgement of innovative solutions, decisions are doomed to produce only mitigated results, if any.

2. Creating new business value – open data and new services

Eco-innovation translates into growth and jobs if new services are developed. In this respect the availability of more and new types of data has been pinpointed as a driver of new business opportunities. Innovative ICT solutions have been created in other parts of the world simply by granting access to data. Air quality data exists in the public domain, but traffic data, for example, is often trapped in proprietary systems. Regional and municipal authorities need to consider this knowledge gap with a view to filling it.

An open-data approach will secure returns from the ICT community (e.g. applications targeted at solving traffic and energy efficiency problems), improving air quality and health as well as increasing revenue streams.

3. Financing eco-innovation in tough economic times – getting the ball rolling

Innovation needs a more integrated approach to financing, focused not only on sectoral budgets (transportation vs. energy vs. ICT) but reflecting a comprehensive strategic urban planning strategy. Public procurement should be used more as a way of getting new products and services off the ground, because it provides the critical mass needed to make a difference in terms of availability and costs. Strategic use of European Regional Development Funds could compensate for risk taking and help overcome mental barriers which, for innovations, are often as important as financing barriers. Low-emission zone fees, lower infrastructure costs by rewarding virtuous behaviours (e.g. transport credits if buying local), crowd sourcing, etc. provide a substantial multiplier effect.

Eco-innovative funding solutions avoid the financial instability of depending exclusively on public subsidies and they let citizens engage more proactively with the quality of life in their city, improving air quality and health as well as increasing revenue streams.

4. Planning and governance – integrated approach and city leadership

If citizens are the base for change, city institutions must be the repository of leadership. A clear, shared vision on community planning is necessary. Municipalities are encouraged to “get their priorities straight” in making cities a better place to live. Policymaker support is vital to get companies to move. Once priorities are agreed upon, municipalities need to be consistent: cyclists and pedestrians must each receive enough space; reliable alternatives to the private car must be offered and parking policies adapted; a public vehicle-fleet renewal must be foreseen.

The key messages from stakeholders to public authorities are to develop a long-term vision and ensure policy continuity.
The Czech perspective: air quality has been a priority for the country, with notable improvements in the last decades, but challenges remain.

Quality of life is one of the long-term priorities of the Czech environment ministry, said Martin Frélich, deputy minister at the Ministry of Environment of the Czech Republic. In the early 1990s, the Czech Republic counted some of the most polluted areas in Europe. Now it boasts cities as clean as Copenhagen. Yet the challenge is far from over: despite significant improvements, some areas of the country are actually getting worse again. A good example is the Moravian-Silesian Region, where the situation is becoming “critical”, he said. Frélich blames traffic, local heating and major industrial polluters for the rising levels of pollution.

The Czech government is taking action: the environment ministry has approved low-emission zones (LEZs) and allocated CZK100m to grants for low-emission boilers. Czech cities can now choose to install LEZs (e.g. Prague is doing so) and share experiences via a common platform. Boiler subsidies are being extended beyond the original Moravian-Silesian Region. Pavel Soč, deputy minister for energy and Industry at the Ministry of Industry and Trade of the Czech Republic, added that energy savings, renewables, innovation support (also through a new “Seed Fund” for entrepreneurs) and information exchange are priorities for the Ministry of Industry and Trade.

Meanwhile, in Brussels, eco-innovation is being integrated into the next EU budget for 2014-20, national economic reform programmes (European Semester), international outreach and issue-specific European Innovation Partnerships (EIPs).

The European Commission’s eco-innovation director Timo Makela linked air quality to the innovation, growth and jobs agenda, emphasising that this is an issue on which EU environment commissioner Janez Potočnik is working closely with EU enterprise commissioner Antonio Tajani. The Commission will unveil a package of measures reviewing EU air policies – including how to strike a balance between the EU, national and local levels of governance – in autumn. There is a steady flow of Chinese experts coming to Brussels to learn how to deal with air quality, Makela added.

“I greatly welcome the urban focus. Cities must be the real triggers of transformation... if we want to create a more pleasant environment for all of us.”

Martin Frélich
First Deputy Minister and Director of the Economics and Environmental Policy Section, Ministry of the Environment, Czech Republic

“I wonder how many of you know that about half a million European have a premature death annually due to poor air quality.”

Timo Makela
Director, International Affairs, LIFE & Eco-innovation Unit, Directorate-General Environment, European Commission
Four developments are adding weight to eco-innovation at the EU level. First, there seems to be a common wish among member states to put more emphasis on innovation in the next EU budget for 2014-20, Makela said. Second, the Commission is looking to bring eco-innovation into national economic restructuring plans (the European Semester or coordinated economic and fiscal policy within the EU). Third, the EU wants to promote EU business abroad and in this context the next EU Eco-Innovation Forum will be held in Vietnam in November. Fourth, European Innovation Partnerships (EIPs) are taking forward specific issues: health, sustainable raw materials, agriculture, ageing, water and indeed smart cities. The point of this Forum is to set the agenda for the latter.

The scientific perspective: the EU continues to suffer from poor air quality, especially for particulate matter and ozone. But emission reduction policies are working, and better air measurements and modelling are helping policymakers. Every human inhales 14kg of air, drinks 2kg of water and eats 1.5kg of food in a day, said Vincent-Henri Peuch from the European Centre for Medium-Range Weather Forecasts (ECMWF) – air should be higher up on the agenda! The composition of our air has changed dramatically in the last century: ozone concentrations measured at high-altitude sites in Europe show that background levels have multiplied by five in the 20th century! But some things have improved too: particulate matter levels in Paris today are much lower than they were in the 1950s. Development and pollution are not necessarily linked.

The best guide to the EU’s air quality status is the annual European Environment Agency report on air. This shows that the EU has big problems with particulate matter and ozone in particular. The consequence is lowered life expectancy: the Aphekom project estimates that European compliance with World Health Organisation standards on particulate matter would avoid 19,000 premature deaths per year and save €31.5bn. Ozone is very weather-dependent so it’s difficult to pinpoint a trend. There has been some improvement in exposure to NOx in the last decade, but less than hoped for also because newer diesel cars sometimes emit less particulate matter at the expense of more NOx.

Air quality data is better than it used to be because surface data is today complemented by satellite data and modelling. The models can help untangle the effects of climate change, local pollution and pollution from further afield, plus from natural sources. The EU will revise its National Emission Ceilings (NEC) directive this year in line with a revision to the Gothenburg protocol last year. Well-targeted policies on non-methane volatile organic compounds (NMVOC) in particular could pay off, Peuch suggested. Targeted policies are better than simply cutting down on traffic for example.

The EU perspective: the EU has defined what it means by “smart cities”, identified priorities to make them a reality and started drafting operational objectives under the “European Innovation Partnership (EIP) on Smart Cities and Communities.”

### Indicators of smart city success:
- better quality of life (e.g. less congestion, life expectancy up)
- lower greenhouse gas emissions and environmental footprint
- better public services
- more attractive business environment
- draws in new money
There are two classic routes to smart city development, explained Henriette van Eijl, policy officer at the Commission’s Directorate for Transport and Mobility and coordinator of the Commission’s work on smart cities: technology-driven with lots of R&D, big demonstration projects and relatively little citizen engagement, or user/city driven, where the starting point is building local partnerships and relatively little new research is needed.

The EIP attempts to map out a third way. It starts with a societal challenge – in this case better quality of life and lower emissions – and it brings together different actors in the energy, mobility and ICT fields. A high-level advisory group for the EIP met for the first time on 14 May 2013 and aims to adopt a strategic implementation plan for the EIP by October for implementation from 2014.

So far the high-level group has raised the following priorities:

**Communication** – need to “seduce” the citizen

**Open data** – data from telecoms, meteorology etc. needs to be shared; this could lead to new services

**Baselines** – what is happening in the city now? What can you expect from investing in a certain technology?

**Standards** – need a common language to bring different infrastructures together

**Procurement and financing** – technological lock-in must be prevented, fair prices offered

**Knowledge sharing** – cities can learn from one another; e.g., Prague has learned from others how to set up Low-Emission Zones

**Integrated planning and management** – need to integrate infrastructures and way of working (e.g. between different municipal departments)

**Business models** – it needs to be clear who pays, who earns and how to attract financing

The following operational objectives are emerging for the EIP:

- More tools for **knowledge sharing** e.g. around congestion; local partnerships (“smart city boards”) uniting municipalities, businesses, researchers and community organisations; cross-border exchange.

- **Pilots** – demonstration projects (and tools for efficient replication of solutions that work)

- Pilot **procurement schemes**, or bringing together procurers with similar desires

- Living labs or “**innovation zones**” to experiment with new standards, regulations, partnerships, permitting and social innovation

- **data platforms** to make information available to third parties on energy and traffic flows, from the public and private sector
The Commission invites stakeholders to identify the possible targets and achievements of the EIP on Smart Cities and how it could deliver for citizens and businesses.

The city perspective: cities are at once the easiest and most difficult places to launch the transition to greater sustainability because of their closeness to both environmental problems and citizens. They have the potential to shift the market, are starting to collaborate, and are tackling the challenges (e.g. political cycles, unwilling public) to get smarter.

Cities face two main challenges to becoming smarter: one, since municipal authorities are the policymakers closest to citizens they really depend on their support and two, cities must share more information (historically they have not for fear of citizens using it against them).

“It’s actually more difficult to deal with these [quality of life] issues at local level – it’s where a lot of the problems are but it’s also where the direct contact with citizens is. You have to get them on board as stakeholders—communities do not like change.”

Mark Hidson
Deputy Regional Director,
ICLEI-Local Governments for Sustainability/Director,
ICLEI’s Global Sustainable Procurement Centre

Cities can be an engine for change towards sustainability, however, said Hidson. Many of the challenges facing society today have a direct impact at the city level and spur innovative solutions there. Europe’s five biggest cities have a combined population of 18 million, larger than 20 member states. Public authorities spend some €2 trillion a year, or 19% of EU GDP. They have 5-15% market share for most goods and services. They are big local fleet owners and fuel producers, and they can offer (tax) incentives, buy transport and provide independent information. Cities have the potential to shift the market when they get together.

How are cities getting together? Through fora like the Prague Forum (though it’s hard to get cities to attend), networks (such as ICLEI), projects (e.g. FP7), specific initiatives (e.g. Air Quality Initiative of Regions), increasingly online fora, exchange programmes (quite rare) and at the regional level (e.g. in Gothenburg) municipalities have pooled their purchasing power.

What’s holding cities back?

Legal and policy framework – overwhelming, not aligned at different governance levels
Infrastructure – they were built 80-100 years ago
Geographical position – e.g. Prague is surrounded by hills – bad for air quality
Governance – political, departmental
Risks – legal, fear of failure. Cities are facing 10-30% budget cuts. How do you justify higher upfront expenditure? If long-term savings do not pay off, how do you deal with that?
Budget constraints/financing options – more savings, capacity cuts required; partnering with energy saving companies too long-term and difficult to access if smaller
Market constraints – perceived lack of alternatives
Awareness – citizens have to be brought on board as stakeholders

The answer to these challenges consists of initiatives like demonstration projects, cost-benefit analyses, training at senior management level, adopting a life-cycle approach and updating budgetary rules to accommodate this, getting different departments to work together e.g. on procurement, engaging more with businesses and suppliers so they understand what city authorities want, and more intelligent use of data.

“San Francisco released all its transport data and 6-9 months later there were apps for car-sharing, how to get to work quicker, you name it.”

Mark Hidson

The key characteristics of success are almost impossible to identify, Hidson says, but they include strong leadership from the local council, a long-term vision (e.g. 30 years ahead) combined with an incremental approach starts to deliver in 2-3 years (to cope with the political cycle), risk management, collaboration between departments and with external stakeholders, getting community support and establishing indicators to measure progress (to build and keep that support).

New website launching this summer:
www.innovation-procurement.org
Improving air quality through strategic urban planning

An architect shows that asking people what kind of city they want to live in, not whether they want to stop driving their car, is the best way of mobilising a city to support a shift to sustainability.

Gehl Architects aspires to “make places for people.” It pioneered Brighton’s New Road, the UK’s first shared-surface multimodal non-residential street, which lets motorists and pedestrians share the same space. It won the Nykredits Architecture Prize in 2013 for bettering people’s quality of life in cities.

Air quality may be about modes [of transport] Simon Goddard from Gehl Architects told the Forum, but behaviour is about people.

“Speaking about “modes [of transport]” is not quite framing the problem correctly. While air quality is a function of modes, it’s the individuals behind them that are important because in the end they choose which mode to use. Their behaviour is what we’re trying to target.”

Simon Goddard
Project Manager, Architect, Gehl Architects

How do you create a cycling culture of the kind that exists in Copenhagen? There, 80% of people continue to cycle in winter because it’s fast, convenient, cheap and healthy – not because they care about air quality. It also reduces noise and congestion, more things that people care about. The Institute of Transportation and Development Policy has set out 10 principles for transport in urban life. The key message to convey is that what’s good for the planet can also be good for citizens.

Three success stories from Goddard’s work:
- Red Deer in Alberta, Canada, has a 90% modal split in favour of cars but when you ask people what they care about they say 1) quality of life 2) active living and recreation and 3) the economy (including employment and affordability). Acting on these priorities will create a very different kind of city with much better air quality.
- After an earthquake demolished much of Christchurch, New Zealand’s second biggest city, in 2011, local authorities asked citizens to “share an idea” for the city centre. They received more than 100,000 responses from a city of under 1 million people. It turned out that people wanted more green spaces, people- and pedestrian-friendly areas, and trees; they wanted less cars, traffic, concrete, and buses. Putting people first will deliver better air quality.
- In New York, individual projects such as creating a protected bike lane show positive metrics: injuries down, retail sales up, better travel times etc. Better air quality means a safer, more efficient, more profitable city.

“If you ask, do you want to stop driving your car to work, the answer will be no. If you ask, what kind of city do you want, it’s framed in a way that’s politically palatable.”

Simon Goddard
Nantes won the European Green Capital award in 2013 for its pioneering efforts in environmentally friendly urban living.

The jury recognised its progressive policies on transport, climate, biodiversity and water, explained Vice President of Nantes Métropole Jean-François Retière. It has a climate plan under the Covenant of Mayors that aims to reduce greenhouse gas emissions by 30% per capita by 2020 (versus a 2003 baseline). Transport is critical, because it accounts for nearly a third of these emissions. The municipality is leading by example, with contributions from hospitals and other services, ten different public policy areas, and 70,000 civil servants signing up for more sustainable travel.

One of the main goals of Nantes’ Strategic Urban Mobility Plan (SUMP) is to change the modal split between cars, bikes, etc. This will largely determine the plan’s ultimate environmental impact, Retière said. Today the city already boasts France’s first tram rehabilitation, 120 million public transport trips per year (in a city of 600,000) and 440 km of cycle lanes.

“It's not just about convincing people to use public transport, but also about improving city space. Giving more space to green and pedestrian zones, cycling lanes, etc.”

Jean-François Retière
Vice President of Nantes Métropole in charge of Commuting and Transportation, Nantes Métropole

The Mobility Plan is due to be fully implemented by 2030. A survey in 2012 showed that the proportion of car trips has gone down since 2008, while walking, cycling and the use of public transport has gone up. The city is already exceeding its 2015 mobility goals.
Changing mindsets and behaviours

Eighteen case studies showcased innovative projects at European, national and city levels that are delivering cleaner air through changes in energy, mobility and ICT. The focus was on changing the mindsets of organisations and individuals.

1. Ticket Kyoto: Mobilising to reduce CO2 emissions in public transport, **Jean-Luc de Wilde d’Estmael**, Head of Strategic Planning and European Projects, STIB (Urban Public Transport in Brussels)
2. Enabling Everyday Mobility and dynamic decision support for commuters and travellers alike, **David Volpe**, Senior Product Manager, HERE Transit, Nokia
3. A breeze of fresh air in European Cities (Clean Air Project), **Heiko Balsmeyer**, Project Coordinator LIFE+ Clean Air, Verkehrsclub Deutschland e.V. (VCD)
4. Electric Vehicles in Czech Republic, **Jaromir Marusinec**, Chairman, Czech electric cars Industry Association (ASEP)
5. Supporting sustainable development of Prague region through advanced modelling tools for air quality, **Vladislav Bízek**, Senior Consultant, Environment Centre, Charles University and Jan Mertl, Twinning project leader from the beneficiary side, Czech Environmental Information Agency (CENIA)
6. Delivering a Sustainable Urban Mobility Plan in Aberdeen, the Oil Capital of Europe, **Louise Napier**, Senior Planner, Aberdeen City Council
7. Reduction of black carbon emission and concentration by adaptive traffic management CARBOTRAF, **Martin Litzenberger**, Senior Engineer, Department Safety & Security Business Unit New Sensor Technologies, AIT Austrian Institute of Technology GmbH
8. Road pricing measures for urban mobility. Milano Area C experience, **Pierfrancesco Maran**, Milan Councillor for Environment and Transport, Comune di Milano
9. New methods for quantifying emission sources in relation to transport, **Jiří Juzlík**, Head of the Research department of Transport and Environment, Transport Research Centre (CDV)-Ministry of Transport of the Czech Republic
10. The trust between citizens and the authorities enhanced through information sharing and mobility dialogue (Zagreb), **Tihana Damjanovic**, Project Associate, ODRAZ-Sustainable Community Development
11. Restart of CNG (Compressed Natural Gas) in Europe, **Václav Král**, Director, MOTOR JIKOV
12. How to enhance the mobility management innovation process in CEEC, **Martin Hajek**, Center Director, RODOS Center for the Development of Transportation Systems
13. City-VITALity-Sustainability—Soft policy approaches towards achieving international targets, **Jerome Simpson**, Senior Expert (Green Transport), Environmental Policy Directorate, Regional Environmental Center (CIVITAS)
14. beAgueda—the electrical bicycle of Águeda for free usage, **Célia Laranjeira**, Coordinator of Local Sustainable Development Programs and Environmental Management, Câmara Municipal de Águeda
15. Cooperatively planning your city: a model of the governance process, **Paolo Pissarello**, Vice-President, Genova Smart City Association (Vice-Mayor)
16. Almada’s approach to smarter and eco-efficient mobility, **Catarina Freitas**, Head of Department, Sustainable Environmental Management and Planning Department, City Council of Almada
17. Good practice—from theory to practice (Cluster Cooperation Green Technology), **Jan Rakusan**, Chairman of the Board, Centre for Research and Innovation (CVVI)
18. “Mobility challenge”: an incentive for alternative modes of transport, **Jean-François Retière**, Vice President of Nantes Métropole in charge of Commuting and Transportation, Nantes Métropole
Feedback from all the case studies fed into the general lessons learned and recommendations (see pages 16-18).

Two academics, two entrepreneurs and three city representatives describe innovative approaches to tackling the air quality problem, from new ways of thinking and regulating to new technologies and business models.

Academics
Urban greening efforts are to be applauded – they reduce noise, improve air quality, allow recreation and reduce the heat island effect. However, most plants emit biogenic volatile organic compounds (BVOCs) that react with NOx to form ground-level ozone, warned Galina Churkina from the Institute for Advanced Sustainability Studies in Potsdam, Germany. Mannmade VOCs and NOx have lowered in recent years due to air control policies. Now greening efforts may reverse these results. BVOCs can be three times more reactive than man-made VOCs. Not all plants are high emitters but some are such as poplar, oak and plane trees. Churkina argues that ozone reduction should target limiting BVOCs and we must recognise that urban nature is chemically active too.

The key to tackling air quality is finding a balanced instrument mix, said Vladislav Bízek from Charles University in Prague. In a talk entitled "Making sense of complexity", he argued that there is no single universal solution to air pollution from cars, for example. Policymakers must aim for a mix of technical solutions such as NOx and PM emission standards for diesel cars, infrastructure restrictions (e.g. LEZs), traffic optimisation (with ICT) and a reduction in car demand, awareness-raising and eco-driving. Innovation is an optimised complex solution. Modelling can help understand the complexity.

Entrepreneurs
Cities can be re-thought and re-designed to incorporate new air purification technologies, said Giuseppe Santo, CEO of Is TECH. His company has patented an air pollution abatement technology that can trap and eliminate fine particulate matter and the pollution stemming from urban smog. It effectively reproduces the rain's natural cycle with no chemicals or polluting waste products. Santo imagines the purifier being installed in everything from street lamps and car parks to tube stations and shopping malls. TECH has been testing it all over Europe and has interest from Brazil, the United Arab Emirates and California.

More efficient waste removal is an extremely effective route to cutting air pollution, said Paul Dubsky, director of up TAXI. A garbage truck produces lots of pollution, and collecting waste is expensive, unsightly and damaging to roads. The problem is you don’t know when bins are full. But technology can help. BigBelly Solar installs a solar panel on the lid of a bin which powers a battery for a sim card, PC and motor that drives down a press. The result is a bin that can take the volume of four bins and is only emptied once it’s communicated it’s full. This can cut the number of collections by 85%. The technology is being deployed throughout the US and EU and moving into Asia, and won "best product" at the Annual World Smart Cities Awards 2012.

City representatives
Meanwhile in Litoměřice, energy manager Jaroslav Klusák says the city has drawn up a strategic plan for 2030 that includes cleaning the air through energy management. Litoměřice is a town of 24,000 people northwest of Prague. It was the most polluted city in the Czech Republic in 2000, mainly because it derived over a third of its energy,36%, from coal. The new action plan, finished in 2012, has a pillar dedicated to energy. This includes grants for solar systems of €25,000 per household, a geothermal project, and an energy management initiative. A plan for municipal buildings is due this year. Question for next steps: In what creative and low-cost way can we motivate municipal organisations (citizens) to make more energy savings in their buildings?

The city of Plzen is seeking to maintain and further develop a long history of electrified public transport. In the city centre, trams and trolley buses dominate so that 84% of public transport has zero local emissions. But Plzen's great history is also its weakness, says transport manager Jiří Kohout; today people complain that overhead modes are outdated and more expensive than the diesel alternative. The city authorities can promote electricity by giving trams priority at crossroads, for example, but to be effective this needs to be combined with restrictions for private cars, he says. Question for next steps: How to get the political will to shift towards electromobility?

Finally, the Czech Republic’s second largest city Brno wants to set up low emission zones (LEZs), said Iva Machalová, transport specialist at the municipality. It is a city with almost 400,000 inhabitants, 30% cars and 54% public transport. An LEZ feasibility study is under way.

Question for next steps: How to ensure LEZs are successful?
Financing action in tough economic times

A city usually gets its money from the state, currently there is a shortage of public funding. Architects do not always tell us how much the dreams cost, said Robert Stussi, Mobility Consultant for CIVITAS. Oftentimes, energy and pollution costs are often excluded from the business case.

Where to put the money? Who decides? What is the right price? Are people prepared to pay? The answers are not always obvious – France wanted cleaner cars and promoted small diesel cars that turned out to be good for CO₂ but bad for other pollution! In general, people are not prepared to pay extra for clean transport and there are institutional barriers. A change in mind-set is needed.

“Transport has a marginal cost. Co-financing, for example getting back used tickets, could be used not to compete with paying customers but as a social policy means.”

Robert Stussi
Mobility Consultant, CIVITAS

A corporate electric car sharing business demonstrates the power of combining new technologies, business models and behavioural trends. It’s about making the most of a precious asset.

Personal mobility has increased 10 times faster than GDP in the last 200 years. But sustainable mobility is possible. R&D partnerships can create technological innovation (e.g. from ICT) and PPPs new business models (including Pay As You Drive, PAYD).

“I think we have to move from products to services. We have to find new financing models and we have to find new models of mobility.”

Jan-Olaf Willums
Chairman and Founder, InSpire Invest

Norway has the highest density of EVs in the world, more than 10,000. This is thanks to government investment in infrastructure, incentives and good collaboration between the public and private sector. Jan-Olaf Willums introduced Move About, a corporate electric car sharing initiative. It allows 200 people to use 5 cars with 96% access. His rationale is that if an EV comes with a high upfront cost and an under-utilised asset is a bad investment. Charging stations need to be co-financed however, by cities, industry with government support, or commercial players. Car sharing could be part of office rental.

Clever charging strategies can extend the life of the EV. Charging only to the point needed (e.g. 70% full if you know the car won’t need more that day) will extend the calendar life of the battery. Delaying the charging process to after midnight will also preserve battery life.

Other best practices include providing a publicly available database of charging stations and their data (for new services), non-financial incentives such as prime parking spaces, and listening to users to decide where to put charging points.

Over 4 years, the DNV company saved NOK1.45m (€180,000) with its five Move About cars, said Willums. He sees car sharing as a growing trend among young people.
Cities need to invest more in making green public transport attractive and easy, said Heather Allen from the Transport Research Laboratory (TRL).

The European public sector represents €3 trillion or 19% of GDP – more of this could be used to green transport, argued Allen. Stockholm is a leader. Its vision is for an alternatively fuelled public transport fleet. It has already achieved this in the town centre with ethanol and biogas buses and trams, promotion of cycling, car sharing, and congestion charging. A per capita CO2 budget has helped them focus on where to put their money.

“We do not just need to make the bus clean, we need to make it beautiful.”

Heather Allen
Programme Director Sustainable Transport, TRL

It costs €6-7000 extra per bus to make it sexy, says Allen. This is not a lot when the whole bus costs around €100,000. But very few bus-builders invest in designers. This needs to change. Buses should be fun and bus stations should be appealing.

Barriers: The problem is that bus builders see buses as a small part of their market. Market leader Daimler sold 32,000 buses in 2011 (~19% on the year before) versus 462,000 trucks (+9%). The majority of public transport incentives go to personal not public transport. There is inertia from engine manufacturers to change. There is a lot of EV competition from Asia. Different technical specifications per region can make group procurement difficult and using different energy sources requires different maintenance capabilities. PPPs need management. Municipalities always need an overarching vision.

Free public transport has proved a viable model in Tallinn, Estonia, where it is financed by higher revenues from personal income tax.

Free public transport for Tallinners costs the city €12m a year, said Allan Alaküla, Head of Tallinn’s EU Office. The municipality introduced the idea in 2012 after cost became the number one reason for people not to use public transport. Three-quarters of the public voted in favour of making public transport free in a referendum in March 2013. This provided the authorities with a powerful public mandate. By involving the community in the decision the governing council could not easily reverse the vote.

There is a clear economic rationale for the concept: as well as providing labour mobility, it encourages people to register and pay personal income tax. In practice, the registered population has grown by some 10,000 people (~2.4%) since January 2012. Every 1000 residents brings about €1m revenue to the city, so the cost of the scheme is almost balanced by increased income tax revenue. The city estimates there are another 30,000 residents who might yet sign up.

There has also been a significant modal shift: between November 2012 and April 2013, the use of public transport increased by 13% to two-thirds modal share. Car use dropped by 9% to under a quarter. In the city centre it dropped by almost twice that in the centre. Surprisingly, walking and cycling also dropped – the authorities speculate that people were travelling on foot or by bike before because they could not afford other modes of transport.

Despite the referendum, free public transport continued to face strong opposition in the council until even autumn 2012. However, after successful implementation there was wide political consensus and today no party opposes it. Tallinn is working with Aubagne (Fr) and Hasselt (Be) to build a European network of cities with free public transport. It is also in talks with China, where Chengdu has been testing the concept since October 2012 combining it with restrictions on cars. Tallinn has won a Chinese award for urban innovation. It hopes to become European Green Capital of the year in 2018.
Making the right connections

Networks and partnerships are essential for cities to get people involved and to learn from one another, ensuring cities reap the benefits of new technologies for environmental, social and economic gain.

In the Po Valley in Italy, air pollution is a health emergency affecting >20 million people every autumn and winter. Mobility is one of the key causes and since 2003 all cars rated Euro 0-3 are stopped on Thursdays during this time. The city authorities of Reggio Emilia are trying to change mobility patterns, said Deputy Mayor Paolo Gandolfi, but there are many obstacles such as national government, coordination issues, funding challenges, public transport funds dropped by 40% drop in Italy in the last four years, the challenge of getting citizens involved and the lack of on-the-ground experts. Each city is unique and needs a unique solution!

Reggio Emilia sees networking around Europe as a way to combat isolation from policy-making, funding, and research. It also views it as a way to share good practice. Examples of networks include EU mobility week, EU-funded research projects, CIVITAS, Eurotowns, Urbact and Interreg. Networking also gets people involved. More specific projects include ID4EV (Intelligent Dynamics for Fully Electric Vehicles), Creative clusters in low density urban areas, Mmove (Mobility Management Over Europe), Mobility 2.0, and INVOLVE (Involving the private sector in mobility management.

“Networking is a useful alternative when the national and/or regional levels do not or cannot help the municipality. It gives the city a vision that real change is possible.”

Paolo Gandolfi
Deputy Mayor, Municipality of Reggio Emilia

Tym described an innovative partnership based on systematic work with citizens and other partners such as local businesses and associations. In Litoměřice today, the outputs of public debates are systematically incorporated into the municipality’s decision-making process. Priority problems are confirmed by a public survey, approved by the city council then monitored and evaluated. But to really unite the decision-making process and community planning requires citizens to have influence on the budget.

“If you give people the chance to express themselves on the budget that creates an innovative partnership, people believe they have real influence.”

Antonin Tym
Geothermal project manager, City of Litoměřice

Vision for 2013/14 is part of a new project funded by EU structural funds that includes community planning as part of the budgetary process. Enhanced public involvement in this way can facilitate larger investments, through co-financing, for example.

Amsterdam wants to be Europe’s smartest city. The challenge is working with what already exists. Amsterdam is a firm believer in open innovation, open infrastructures and open data, explained Ger Baron. It was the richest city in the world in the 17th century because all the world’s trading information was available to everyone in a 400m² space. It has been investing in smart grids and because the energy sector is unbundled, a whole eco-system of partners is involved, from techno-start-ups to banks to universities to city authorities.

People start to see mobility as an application. “We Go”, where people rent their car out, is an application that is only possible when you start to provide data and insights.

“Smart cities are about collaboration: it’s about 2000 not 2 people shaking hands. You need connectivity.”

Ger Baron
Project Manager ICT, Amsterdam Innovation Motor
Suggestions for action on smart cities

A final panel discussed four key messages and suggestions for action that emerged from the Prague Forum for a strategic implementation plan for the EIP on Smart Cities and Communities in October. This represents the commitment and contribution of eco-innovation to the larger debate of improving life in cities.

1. Seducing the citizen – motivation, ownership, and knowledge sharing

Without robust democratic acknowledgement of innovative solutions, decisions are doomed to produce only mitigated results, if any.

Suggestions for implementation:

- Build political will through participation. More participation, less imposition – it’s about citizens’ needs. Involve people from the beginning. People need to feel ownership.
- Create a smart community with commitment. Local authorities must re-frame the air quality question: ask citizens what kind of a city they want to live in. Communicate about better quality of life; air quality will be a secondary benefit. You won’t have a vibrant city without an efficient transport system.
- Be reliable and trustworthy with communication, so it’s not just a green label. Demonstrate you’re delivering real value for money on issues people care about.
- Be concrete – talk to people about time and money saved. Provide facts and figures – how to describe or measure the success of best practice cases; people want to understand the costs and benefits, the technology and how it works.
- Provide quick wins: they motivate people.
- Address the right problems. In electromobility people are hesitant due to doubts about the range and long charging times as well as cost. Think of electric cars as a replacement for ageing vehicles; introduce renting solutions first.
- Look for very simple solutions – encourage people to walk or cycle more, for example, or simply ask them what kind of a city they want. This can in turn put pressure on politicians to act.
- Use networking and EU projects to name and shame. Share experiences with other cities.
- Highlight the positives - electric cars are quiet, clean and cheaper.
- Choose a target group (e.g. parents of primary school children, local shops) and your tools (social media for young people) and what kind of information (e.g. evidence of sales up with pedestrian zones for local shops).
- Train city employees in the process of dialogue with citizens, this may require a mind-set change, for example engineers taking part in a forum.
- Communicate. Use the tools at your disposal: practical demonstrations (e.g. thermography on building facades), expert evaluation, simple language, evidence of best practice (e.g. through comparison).
- Address the right problems. In electromobility people are hesitant due to doubts about the range and long charging times as well as cost. Think of electric cars as a replacement for ageing vehicles; introduce renting solutions first.
- Provide support. It’s not enough to put people in contact with one another to enforce car-sharing; you also need dedicated parking, a website, etc.
- Provide convenience and incentives.
- Provide data/information on air quality, on the reliability of public transport to encourage people to think and act. Promote smart meters. Use competition to encourage action – labels and social incentives which fits with social media age.
2. Creating new business value – open data and new services

An open-data approach will secure returns from the ICT community (e.g. applications targeted at solving traffic and energy efficiency problems), improving air quality and health as well as increasing revenue streams.

Suggestions for implementation:
- Follow the San Francisco example – make the data available and innovators will use it. Currently, there is an open data debate in the Czech Republic.
- Make more and new data available – air quality data often is, but not traffic data which is trapped in proprietary systems and cannot be used for analyses.
- Extend the application of new software programmes, for example new methods of quantifying emission sources in relation to transport – extend to health assessment.
- Encourage better integration of traffic management systems.
- Encourage behavioural change using new services such as connected navigation, private information services, online shopping etc.
- Develop strategic implementation plans at regional and city levels for traffic management.
- Exploit car-sharing possibilities.

3. Financing eco-innovation in tough economic times

Eco-innovative funding solutions avoid the financial instability of depending exclusively on public subsidies and they let citizens engage more proactively with the quality of life in their city.

Suggestions for implementation:
- Adopt a more integrated approach to financing, not only using transportation budgets based on the polluter-pays principle.
- Be consistent and justify financial support, subsidy instability puts people off; the public sector should lead with best practice.
- Make better use of EU funding to see projects through to the end, or to enable risk taking (it can help overcome awareness barriers too, often just as important as financing barriers).
- Apply new air quality modelling tools to provide air quality with an economic value
- Redistribute the “value” of clean air back to citizens creating “clean air euros” to spend in local shops/services. Important to find a way to translate costs/financing back into public benefits.
- Divert resources from the construction of roads (infrastructure for cars) to support for voluntary greening programmes, for example a Nantes-type programme of incentives for public employees and/or use funds dedicated to environmental goals.
- Use public procurement to provide critical mass and get new products and services off the ground. Cooperation across borders can improve procurement by peer review of the specifications and comparison of the results. Integrate life-cycle analysis.
- Stimulate creative financing solutions e.g. crowd funding, where anybody can contribute and has the option of using the service, or get a share in the project or facilitate voluntary donations. Revenues, such as smarter tolls, from LEZ could be used to finance charging infrastructure in the zone.
- Make the most of an asset e.g. car-sharing for electric vehicles, which have a high upfront cost. The owner of the vehicle can manage charging, making it off-peak to minimise costs and increase returns. Car sharing could also be included in the rent of an office.
- Encourage agreements between city, business and households to motivate households to adhere to sustainable consumption criteria and obtain credit from local enterprises for buying their goods.
- Make transport as efficient as possible: this must include public and private mobility. The way to do it is via ICT to manage the system. Efficient public transport is efficient for users, society, the city and the environment).
- Follow Tallinn in free public transport and on involvement of the public; use EU funds to stimulate free public transport; organise an EU contest in this vein; offer free transport to students, children; link free public transport to park & ride; stimulate commerce with free public transport and discounts in-city for restaurants, nightlife etc.
- Set up university and corporate programmes to subsidise and obtain more tax residency registrations – and therefore more revenue.
- Look to CIVITAS – the CIVITAS Forum in 2013 will focus on doing more with less (financing).
4. Planning and governance – integrated approach and city leadership

The key messages from stakeholders to public authorities are to develop a long-term vision and ensure policy continuity.

Suggestions for implementation:

- Have a clear, shared vision and better community planning in connection to urban planning.
- Provide a more robust policy framework and support to all parties involved: it is vital to get companies involved – air quality and CO₂ are not the core business of a public transport company for example.
- Look for cross-cutting opportunities. Use the connections between air quality and climate change to make smart policy (and avoid progress in one being detrimental to the other); use a new tram line as a way to develop local green infrastructure.
- Be holistic: don’t forget the infrastructure e.g. charging points for electric cars, e-bikes and even e-wheelchairs. Remember that this takes time and money and is unique to each city. Also remember that vehicle emissions are more than exhaust gases.
- Communicate better: municipal departments (and different institutions) must communicate with one another – too often this still doesn’t happen.
- City authorities need indicators too (not the same as for the public!), e.g. modal share
- Promote open living labs (e.g. electric bicycle project).
- Look for EU guidance on sustainable urban mobility plans / sustainable urban development plans. Think about how to get city leaders, employees, schools and young people, and companies involved in a city’s transition i.e. smart governance.
- Look to change behavioural patterns e.g. more working from home.
- Do not search for solutions to energy, mobility and ICT independently.
- Select your priority policies. Parking policy has an important role to play in modal shift and it can help improves connections between private car and public transport use. It can also be used to promote EVs
- Be consistent – cyclists and pedestrians must receive enough space in order not to be in conflict; offer reliable alternative modes of transport to the private car e.g. efficient and accessible public transport system; support construction of pedestrian zones and cycling lanes, support car fleet renewal (also in conjunction with LEZs), adapt your parking policy.
- Reach out to companies, better communicate with suppliers and local businesses so these understand what the city’s needs are; citizens in turn can put pressure on politicians by spelling out their needs.
- Reach out beyond the city’s borders for expertise and knowledge exchange because non-local emissions play a part.
- Help people and businesses take up innovation (subsidies and incentives, standardisation).
- Think through the value chain – energy savings in buildings always costs – who will pay and who will benefit?
- Get your priorities straight – make cities a better place to live.
- Use the tools at your disposal e.g. building codes to improve buildings; promote energy service companies (and help aggregate your municipal buildings, citizens); offer subsidies, incentives (e.g. reward municipal employees as truck drivers are rewarded for saved fuel); ban coal burning; provide information; set green procurement rules and standards; enforce laws e.g. on parking.
- Benchmark yourself against other local authorities, show this to politicians and put them under pressure.
- Assess the impacts on local jobs and the local economy.
- Be smart – deal pragmatically with exceptions for LEZs.
Speakers and panellists

Martin Frélich,
First Deputy Minister and Director of the Economics and Environmental Policy Section, Ministry of the Environment, CZ

Pavel Šolc,
Deputy Minister for Energy and Industry, Ministry of Industry and Trade, CZ

Timo Makela,
Director, International Affairs, LIFE & Eco-innovation Unit, Directorate-General Environment, European Commission, BE

Vincent-Henri Peuch,
Head of the Atmospheric Composition Division, MACC-II Project Co-ordinator, European Centre for Medium-Range Weather Forecasts (ECMWF), UK

Henriette van Eijl,
Policy officer, DG Mobility and Transport, European Commission (and coordinator of the European Innovation Partnership on Smart Cities and Communities), BE

Mark Hidson,
Deputy Regional Director, ICLEI-Local Governments for Sustainability/Director, ICLEI’s Global Sustainable Procurement Centre, DE

Simon Goddard,
Project Manager, Architect, Gehl Architects, DK

Jean-François Retière,
Vice President of Nantes Métropole in charge of Commuting and Transportation, Nantes Métropole, FR

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Jiří Kohout,
Transport project manager, Plzen City, CZ

Iva Machalová,
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Robert Stussi,
Mobility Consultant, CIVITAS, PT

Jan-Olaf Willums,
Chairman and Founder, InSpire invest, NO

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Programme Director Sustainable Transport, TRL, UK

Allan Alaküla,
Head of Tallinn EU Office, City of Tallinn, EE

Paolo Gandolfi,
Deputy Mayor, Municipality of Reggio Emilia, IT

Antonín Tym,
Geothermal project manager, City of Litoměřice, CZ

Ger Baron,
Project Manager ICT, Amsterdam Innovation Motor, NL

Célia Laranjeira,
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Antonio Gomes Martins,
Coordinator of the Energy for Sustainability Initiative, University of Coimbra, PT

Giorgio Ambrosino,
Director, GA Consultancy, IT

Paolo Pissarello,
Vice-President, Associazione Genova Smart City (AGSC), IT

Rut Bízková,
Chairperson, Technology Agency of the Czech Republic (Former Minister of Environment), CZ

Plus 18 case study leaders (see page11).
Full details of the Forum programme and presentations can be found at:

Useful Links

Eco-innovation Action Plan
http://ec.europa.eu/environment/ecoap/

European Commission – Directorate-General Environment
www.ec.europa.eu/environment

European Innovation Partnership on Smart Cities and Communities
www.ec.europa.eu/dgs/environment/index_en.htm

EU action plan on urban mobility (2009)

EU air policy homepage
www.ec.europa.eu/environment/air/index_en.htm

Eco-Innovation Observatory (with 2012 annual report available)
www.eco-innovation.eu

Horizon 2020
www.ec.europa.eu/research/horizon2020

Covenant of Mayors
www.eumayors.eu/index_en.html

CIVITAS
www.civitas.eu/index.php?id=69

European Environmental Agency
www.eea.europa.eu

Smart Cities stakeholder platform
www.eu-smartcities.eu/

Next Forum

15th European Forum on Eco-innovation
Monday 12 and Tuesday 13 November 2013
in Hanoi, Vietnam

This forum will illustrate how and which existing eco-innovations can increase resource efficiency and reduce food waste in the food chain through a combination of processing, packaging and retail solutions.

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For the latest information on eco-innovation in Europe, visit the official EcoAP website:

• Policy and Actions
• Innovative Technologies
• Funding resources
• Links and forthcoming events
• EcoAP news and other communication tools