

Renewable energy for transport

This report provides some information at the metropolitan region and regional levels about policies and activities to promote renewable energy.

It is intended to facilitate dialogue.

This “working draft” version is intended to solicit comments and additional information.
Data in this draft are not necessarily complete or accurate.

It will be complemented and completed by the study carried out by external experts.

Rationale



From the application:

Objective

identify and promote good practice in the field of substitution of fossil-based fuel by developing affordable technology

Expected results:

Detailed insight in practical work on the themes will be provided and discussed among colleagues, good practice examples will be identified, and policy recommendations given in general and adjusted to the specific situation of each region

The promise of metropolitan region action for renewable energy



Metropolitan region governments can play a key role in encouraging renewable energy at the local level as:

- Decision-makers (legislative and/or taxing authority)
- Planning authorities
- Managers of city infrastructure (purchasing power)
- Role models for citizens and businesses
- Facilitators for private activity

The “energy systems of tomorrow” could enable moving towards 100% renewable energy – and many are now calling for this – with distributed generation, demand-side measures, embedded energy storage, smart grids, and electric vehicles. Metropolitan region governments can be leaders in shepherding and managing these transitions.

Catch MR metropolitan region competence on energy strategies



	COMPETENCE ON SECTORAL MATTERS RELATED TO ENERGY		
	COMPETENCE ON ENERGY STRATEGIES	INFRASTRUCTURE	ENERGY STRATEGY OR ACTION PLAN
Berlin Brandenburg	X	X	X
Wien	X	X	X
Oslo	X	X	X
Akershus	X	X	X
Goteborg	X	X	X
Ljubljana	X	X	adoption in progress
Budapest	X		X
Lazio	X	X	X
Prov Rome	X	X	X

All concerned metropolitan region has competence on energy strategies in their jurisdiction.

Only Ljubljana has not set up an energy strategy or action plan, but it is in process to be adopted

Catch MR metropolitan region competence on energy strategies



COMPETENCES/ INFLUENCE ON ENERGY STRATEGIES

	ENERGY SUPPLY	PRODUCTION SUPERVISION	RENEWABLE ENERGY SOURCES PROVISION	ENERGY EFFICIENCY SUPPORT	OTHER
Berlin Brandenburg	X		X	X	
Wien	X	X	X	X	X PROMOTION/SUBSIDY OF ALTERNATIVE ENERGY SOURCE
Oslo	X		X	X	
Akershus	X	X	X	X	
Goteborg	X	X	X	X	
Ljubljana	X		X	X	
Budapest				X	
Lazio		X	X	X	X COORDINATING R&D OF TECHNOLOGIES
Prov Rome		X		X	

Catch MR metropolitan region competence on energy strategies



COMPETENCES/ INFLUENCE ON SECTORAL MATTERS RELATED TO ENERGY INFRASTRUCTURES

	TRANSPORT	WATER MANAGEMENT	SPATIAL PALNNING	PUBLIC BUILDINGS	WASTE MANAGEMENT	OTHER	
Berlin Brandenburg	X	X	X	X			
Wien	X	X	X	X	X	X	WATER TREATMENT, BUILDING STANDARDS, SPECIFIC SUBSIDIES FOR ENERGY EFFICIENCY CONSTRUCTION OF BUILDINGS
Oslo	X	X	X	X	X	X	DISTRICT HEATING SYSTEM (OWNERS INTEREST)
Akershus	X	X	X	X	X		
Goteborg	X	X	X	X	X		
Ljubljana	X		X	X	X		
Budapest							
Lazio	X		X	X	X	X	PUBLIC LIGHTING
Prov Rome	X	X	X	X	X		

Framework for Metropolitan Region Renewable Energy Policies/Activities



TARGETS SETTING (IN ADDITION TO EU AND NATIONAL ONES)

	CO2	GPP	RENEWABLE ENERGY FOR CONSUMERS	RENEWABLE ENERGY FOR GOVERNMENT OPERATIONS	RENEWABLE ENERGY FOR PUBLIC BUILDINGS	RENEWABLE ENERGY FOR PRIVATE BUILDINGS	BIOFUELS GOVERNMENT FLEETS	BIOFUELS PUBLIC TRANSPORT	OTHER
Berlin Brandenburg	X	X	X	MISSING DATA	X		X	MISSING DATA	X
Wien	X	X							
Oslo	X		X		X		X	MISSING DATA	X
Akershus	X				X		X		X
Goteborg	X	MISSING DATA							X
Ljubljana	X						X	X	
Budapest	X								
Lazio	X		X						
Prov Rome	X	X							

Framework for Metropolitan Region Renewable Energy Policies/Activities



	REGULATION BASED ON LEGAL RESPONSIBILITY AND JURISDICTION				OPERATION OF METROPOLITAN INFRASTRUCTURE			VOLUNTARY ACTION AND GOVERNMENT AS ROLE MODEL				INFO/promo
	Urban	Building	Taxes	Other	Purchase	Investement	Utility	Demo	Grants	Land	Other	
Berlin Brandeburg				X		X	X		X	X		X
Wien	X	X		X	X	X	X	X	X	X	X	X
Oslo	X			X		X	X	X	X	X		X
Akershus				X	X	X	X	X				X
Goteborg	X	X			X	X	X	X		X	X	X
Ljubljana	X	X			X	X	X	X	X			X
Budapest	MISSING DATA							X	X	X		X
Lazio	X	X	X	X		X	X	X	X	X	X	X
Prov Rome				X	X	X		X	X	X	X	X

A missing data: road pricing as tax and demand management?



The **road charges includes fuel taxes, licence fees, parking taxes, tolls, and congestion charges**, including those which may vary by time of day, by the specific road, or by the specific vehicle type, being used.

Road pricing has two distinct objectives: revenue generation and congestion pricing for demand management purposes.

Road pricing is a tool to reduce congestion and oil consumption and thereby improve air quality and standards of health. Motorists are encouraged to change their habits, travelling at different times or by different routes, possibly to alternative destinations, or making their journey by public transport and/or non-motorised transport (on foot or by cycle).

Should be road pricing be included then?

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SPECIFIC SUPPORT/INCENTIVES POLICIES (IN ADDITION TO EU OR NATIONAL ONES)

	NOX EMISSIONS	CARBON EMISSIONS	COGENERATION	RENEWABLE ENERGY SOURCES	ENERGY EFFICIENCY	WATER REUSE/TREATMENT	WASTE REUSE TO PRODUCE ENERGY	OTHER
Berlin Brandenburg		X	X	X	X			
Wien	X	X		X	X			X
Oslo	X	X	X	X	X	X	X	
Akershus		X		X	X	X		
Goteborg	X	X			X			
Ljubljana	X	X		X	X			
Buda pest		X	X		X		X	
Lazio	MISSING DATA	MISSING DATA	X	X	X	X	X	
Prov Rome	X	X	X	X	X	X	X	

Framework for Metropolitan Region Renewable Energy Policies/Activities



ENERGY AS A KEY PRIORITY

For all participant metropolitan region
energy is a key priority

Framework for Metropolitan Region Renewable Energy Policies/Activities



MOST IMPORTANT GOALS IN THE METROPOLITAN REGION ENERGY STRATEGY

	ENERGY SUPPLY			REDUCTION OF ENERGY CONSUMPTION						
	IMPROVE ENERGY SUPPLY SYSTEM	MORE RENEW ENERGY IN GENERAL	MORE RENEW ENERGY IN TRANSPORT	ENERGY CONS REDUCTION/ EFFICIENCY	INCREASE PUBLIC TRANSPORT USE	COLLECTIVE USE	CYCLING/ WALKING	LAND USE- TRANSPORT INTEGRAT	ENERGY MGM PUBLIC BUILDING	ENERGY AGENCY
Berlin Brande burg	X	X		X	MISSING DATA	MISSING DATA	MISSING DATA			X
Wien		X		X	X		X	X		
Oslo			X	X	MISSING DATA	MISSING DATA	MISSING DATA	X		
Aker shus		X						X	X	
Gote borg			X	X	X	X	X			
Ljublja na				X	X		X		X	
Buda pest			X	X	X	X	X			X
Lazio			X	X	MISSING DATA	MISSING DATA	MISSING DATA		X	
Prov Rome		X			X				X	

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KEY ELEMENTS OF METROPOLITAN REGION ACTION PLANS							
	LEGISLATIVE	GPP	PUB INFRASTRUCTURE INVESTMENT	GRANTS TO PRIVATE	EU PROJECTS	AWARENESS RAISING	OTHER
Berlin Brandenburg	X			X			
Wien	X					X	
Oslo			X	X		X	
Akershus		X	X		X		
Goteborg						X	X SAVE ELECTRICITY/ LOCAL ELECTRICITY PRODUCTION
Ljubljana	X		X			X	
Budapest							X NOT SPECIFIED
Lazio			X	X		X	
Prov Rome		X		X		X	

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PLANS TO INTRODUCE NEW ENERGY TECHNOLOGIES OR UPGRADE EXISTING ONES						
	OIL	NUCLEAR	CLEAN COAL	GAS	RENEWABLE ENERGY	OTHER
Berlin Brandenburg			X		X	
Wien					X	
Oslo	NO PLANS					
Akershus					X	X ELECTRICITY + HYDROGEN IN TRANSPORT
Goteborg				X	X	X USE OF SURPLUS HEAT
Ljubljana				X	X	X WASTE INCINERATION PLANT - COGENERATION - DISTRICT COOLING SYSTEM
Budapest	DECLARES NO COMPETENCE					
Lazio					X	
Prov Rome					X	

Framework for Metropolitan Region Renewable Energy Policies/Activities



PRIORITY ABOUT TECHNOLOGIES FOR LOW CARBON TRANSPORT (1=HIGHEST PRIORITY)

Berlin Brandenburg	<ol style="list-style-type: none"> 1. Hybrid Electric Vehicle (HEV) 2. Intelligent Transportation System 3. Pure Batteries Electric Vehicle (BEV) with electricity, paying particular attention to electricity production from Renewable Energies
Wien	<p>DATA NOT VALID (SAME VALUE TO MORE THAN ONE ITEM) DATA TO BE ASKED AGAIN</p>
Oslo	<ol style="list-style-type: none"> 1. Pure Batteries Electric Vehicle (BEV) with electricity, paying particular attention to electricity production from Renewable Energies. 2. Internal Combustion Engine (ICEV) with Biogas 3. Internal Combustion Engine (ICEV) with Biodiesel and Bioethanol

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PRIORITY ABOUT TECHNOLOGIES FOR LOW CARBON TRANSPORT (1=HIGHEST PRIORITY)

Akershus	<ol style="list-style-type: none"> 1. Fuel Cell Electric Vehicle (FCEV) with Hydrogen, paying particular attention to hydrogen production from Renewable Energies. 2. Pure Batteries Electric Vehicle (BEV) with electricity, paying particular attention to electricity production from Renewable Energies 3. Intelligent Transportation System
Goteborg	<ol style="list-style-type: none"> 1. Internal Combustion Engine (ICEV) with Biogas 2. Pure Batteries Electric Vehicle (BEV) with electricity, paying particular attention to electricity production from Renewable Energies 3. Hybrid Electric Vehicle (HEV) 4. Internal Combustion Engine (ICEV) with Biodiesel and Bioethanol 5. Internal Combustion Engine (ICEV) with Natural Gas 6. Intelligent Transportation System

Framework for Metropolitan Region Renewable Energy Policies/Activities



PRIORITY ABOUT TECHNOLOGIES FOR LOW CARBON TRANSPORT (1=HIGHEST PRIORITY)

Ljubljana	<ol style="list-style-type: none"> 1. Internal Combustion Engine (ICEV) with Natural Gas 2. Hybrid Electric Vehicle (HEV) 3. Internal Combustion Engine (ICEV) with Liquid Petroleum Gas 4. Internal Combustion Engine (ICEV) with Biodiesel and Bioethanol 5. Intelligent Transportation System 6. Internal Combustion Engine (ICEV) and Hybrid vehicles with Fuel Blend 7. Internal Combustion Engine (ICEV) with Hydrogen 8. Internal Combustion Engine (ICEV) with Biogas 9. Fuel Cell Electric Vehicle (FCEV) with Hydrogen, paying particular attention to hydrogen production from Renewable Energies 10. Pure Batteries Electric Vehicle (BEV) with electricity, paying particular attention to electricity production from Renewable Energies.
Budapest	MISSING DATA
Lazio	DATA NOT VALID (SAME VALUE TO MORE THAN ONE ITEM) – DATA TO BE ASKED AGAIN
Prov Rome	Pure Batteries Electric Vehicle (BEV) with electricity, paying particular attention to electricity production from Renewable Energies.

Framework for Metropolitan Region Renewable Energy Policies/Activities



PRIORITY ABOUT TECHNOLOGIES FOR LOW CARBON TRANSPORT (1=HIGHEST PRIORITY)

Lazio

DATA NOT VALID (SAME VALUE TO MORE THAN ONE ITEM)
DATA TO BE ASKED AGAIN

Prov Rome

1. Pure Batteries Electric Vehicle (BEV) with electricity, paying particular attention to electricity production from Renewable Energies.
2. Intelligent Transportation System
3. Hybrid Electric Vehicle (HEV)
4. Internal Combustion Engine (ICEV) with Biodiesel and Bioethanol
5. Internal Combustion Engine (ICEV) with Biogas
6. Fuel Cell Electric Vehicle (FCEV) with Hydrogen, paying particular attention to hydrogen production from Renewable Energies
7. Internal Combustion Engine (ICEV) with Hydrogen
8. Internal Combustion Engine (ICEV) and Hybrid vehicles with Fuel Blend
9. Internal Combustion Engine (ICEV) with Natural Gas
10. Internal Combustion Engine (ICEV) with Liquid Petroleum Gas

Tasks for the external experts hired in the project



The selected technologies will be explored by the external experts:

- Assessment of their affordability.
- Discussion on quantitative characterisation of present markets and future development up to 2020, identification of most promising technologies, current experiences, best practices and future options for project developers and investors.
- Identification of key success factors, risks and barriers for renewable energy in transportation

Some consideration



- Metropolitan region policy and action have become very significant.
- There are many different approaches to renewable energy policy in transport at the local level.
- Many factors are influencing the approaches chosen, including regulatory authority and jurisdiction, financing availability, influence of national and state policies, existence of stakeholder groups, local business interests, geographic resource availability, building stock, and population density
- Renewable energy policies are usually part of broader climate and environmental policy frameworks – but renewables in transport can get left behind
- Possible synergetic effects between the evolution of road transport and the increased uptake of renewable energy

Importance of tackling non-financial and non-technical barriers to renewable energy in transport

Some consideration



Forerunner metropolitan regions are the ones where sustainable transport systems are developed from a well thought out package of policies.

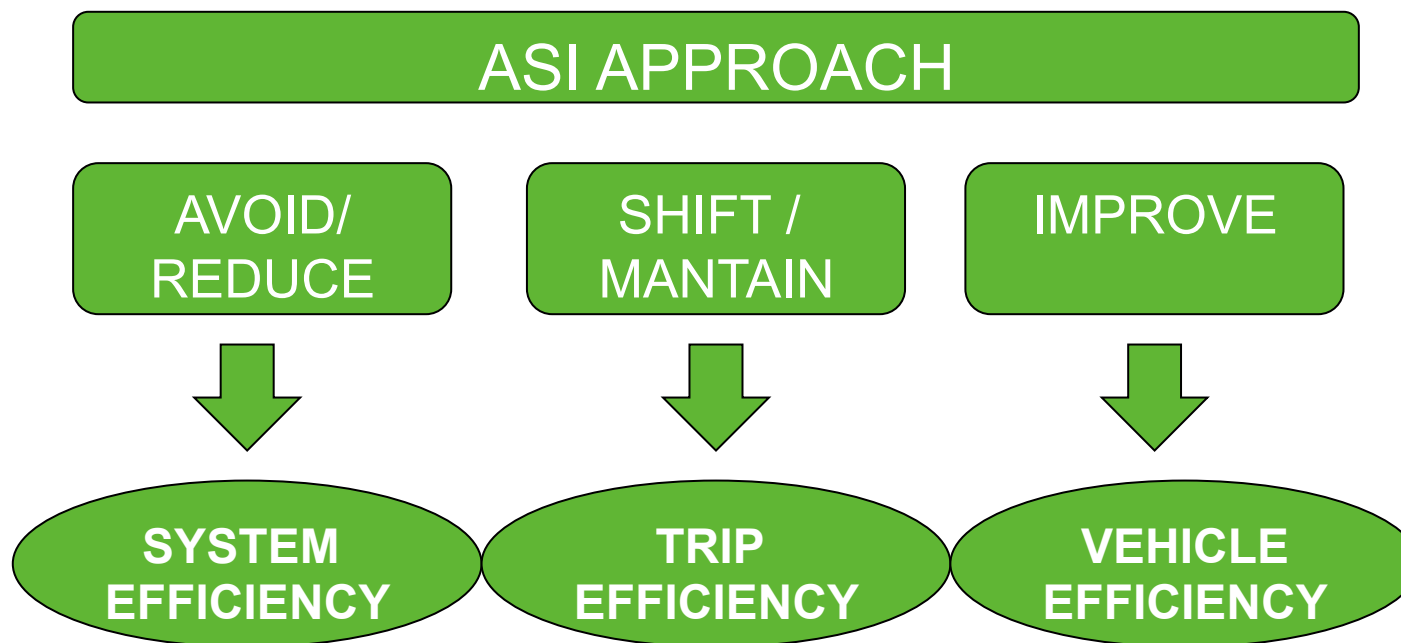
A strategy is needed that uses a combination of measures to ensure a balanced approach between technological enhancement and changes in transport behaviour and more attention to the internalisation of external costs of transport.

More effective strategies (also looking at the inventory results) are based on *avoiding* unnecessary journeys and reducing the lengths of trips, *shifting* transport demand to low-carbon modes, and *improving* the carbon intensity of all modes of transport

Catch MR metropolitan region policies and activities in the ASI framework



We used the guiding principle of the “Avoid-Shift-Improve” (ASI) framework to systematise policies and activities presented in the inventories by the Catch MR partners



ASI as guiding principle



AVOID

The key elements of the 'Avoid' strategy component (*avoid or reduce travel or the need to travel*) are integrated land-use and transport systems planning, for which there is considerable scope for improvement in both the procedures for land-use planning and the institutions who have responsibility for overseeing this process.

ASI as guiding principle



SHIFT

The 'Shift' pillar of the ASI strategy (*shift to more environmentally friendly modes of transport*) is related to modal choice. In the passenger transport sector this emphasizes a need to shift private car travel to lower carbon modes such NMT (walking and cycling), shift to formal public transport options (bus, rail and other forms of mass rapid transit) and strengthening the attractiveness of these travel modes. In some country context this strategy component also comprises avoiding a shift to private cars and motor cycles from NMT (non motorised transport) or public transport and instead maintaining a high modal share of NMT. Encouraging development of transport networks combining different modes and enhanced possibilities for intermodal exchange facilities for movement of people (e.g., between NMT and formal public transport) and freight (e.g., between rail and road connection for the "last mile" from origin and to destination) are important elements in the implementation of this pillar.

ASI as guiding principle



IMPROVE

The implementation of the 'Improve' (*the energy efficiency of transport modes and technologies*) pillar of ASI strategy can help to reduce emissions from private cars and other low occupancy vehicles (e.g. motor cycles). Technological improvements can help to make engines and fuels less carbon intensive. Energy efficiency of road vehicles can be improved through improved drive-train efficiency using a number of engine and transmission technologies, by developing longer term options such as plug-in hybrids and hydrogen fuel cell vehicles (Kobayashi et al., 2009), ecodriving styles, improved maintenance, and better traffic management and route choice. Advanced technology vehicles (Electric Vehicles, Plug-in Hybrid Electric Vehicles, and Fuel Cell Vehicles) will play an increasing role, particularly after 2020 (IEA, 2009) yet in urban areas they will not alleviate present or future congestion levels. Alternative fuels such as biofuels, electricity and hydrogen can help to decarbonise transport systems, however the life-cycle GHG impacts of biofuels are still poorly understood which makes assessment of their mitigation potential in the transport sector uncertain. Traffic and public transport system management is another key element of this pillar. Improving fuel economy rather than increasing horsepower and vehicle mass has significant mitigation potential in the transport sector (IPCC, 2007). Its particular impact in cities with a high rate of motorization may however be more limited because efficiency gains are likely to be outstripped by increases in fleet size and increases in vehicle kilometres travelled (Darido *et al.*, 2010). Nevertheless an improvement in the energy efficiency of vehicles is essential as demand for private travel will inevitably remain high.

Presentation of Catch MR metropolitan regions policies and actions according ASI



	Barrier removal	Catalytic	Innovative
AVOID	Parking policies	Implement Road pricing/ congestion Charging Transit Oriented Development Optimize demand and supply of public transportation system and route reorganisation	Develop and pilot test compact, mixed land use cities

Presentation of Catch MR metropolitan regions policies and actions according ASI



	Barrier removal	Catalytic	Innovative
SHIFT	Parking policies Enabling policies and regulatory frameworks for private sector participation	Urban rail schemes Optimization conventional bus Systems Bike and pedestrian infrastructure	Low/Zero Emission Zones

No partners reported performance assessment schemes for urban transport systems (innovative initiative).

Presentation of Catch MR metropolitan regions policies and actions according ASI



	Barrier removal	Catalytic	Innovative
IMPROVE	Fuel Economy standards Speed limits	Second generation bio-fuels (i.e. eco-labelled vehicle fuel in Goteborg, clean bus fleet in Berlin Brandenburg	Charging infrastructure electric vehicles (i.e. Oslo, Berlin Brandenburg, Akershus, Intelligent Technology System (i.e Berlin Brandenburg, AP for bikers in Wien)

Lesson learnt and some provisional conclusion



Measures should support an **overall vision of low-carbon transportation**, based on avoiding unnecessary journeys, shifting travel activity to low carbon modes, and improving the energy efficiency of each mode. The external costs of transport need to be fully internalised and long-term political commitment, setting aside national or local party interests, is crucial for success.

A **systemic approach** should integrate and **go beyond individual projects** and **support policy packages** to achieve sustainable transportation. Policies should aim to achieve the wider sustainable development benefits of transport and remove financial and non-financial barriers.

Lesson learnt and some provisional conclusion



Transport networks evolve over long periods of time. Any strategy therefore needs to **consider the long term effects of decisions and policies** that go beyond the commitment periods of the EU strategy or Kyoto Protocol . This is especially important as transport infrastructure decisions taken today will be very costly to revise in the future. In order to deliver incentives towards low-carbon transport, resources for climate mitigation should be predictable for decades rather than years.

Efficient transport networks are needed for sustainable development. In order to achieve low-carbon transportation, it is important for transport policy approaches **to reflect a strategic and integrated approach by incorporating transport effects from other sectors** (e.g. organization of industrial production processes, design of cities).

Lesson learnt and some provisional conclusion



Regional and metropolitan institutions are needed to (a) **coordinate activities**, (b) **organize stable funding**, **technology transfer and capacity building** and (c) **take responsibility for measuring, reporting and verifying performance, impact and emissions**. It is of outmost importance to create effective environments that ensure administrative feasibility and operational capability. In order to ensure implementation, institutions are needed to link regional activities with the national ones and the international Framework.

Lesson learnt and some provisional conclusion



The engagement of the private sector needs to be substantially enhanced.

There are two fundamental reasons that require enhanced engagement which both fully apply to transport.

First, investment needs in the transport sector are well beyond the capacity of the public sector and in many cases call for investments in activities which are within the domain of the private sector.

Second, while moving away from a project driven approach towards a more programmatic and sectoral approach the need for active coordination with private sector stakeholders increases. The engagement of the private sector in sustainable transport may be hampered by poor enabling policies and regulatory frameworks



Thank you for your attention