Analysis of Existing Legislation and Funding Applicable to Urban Electric Buses

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PROJECT FULL TITLE: ZERO EMISSION URBAN BUS SYSTEM

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Coordinator: *UITP – International Association of Public Transport*

SUMMARY SHEET

Programme	Seventh Framework Programme
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Website	*www.zeeus.eu*
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Abstract	The report provides an overview over the existing regulatory framework affecting zero-emission bus systems as well as funding opportunities potentially usable to their introduction. After the introdcution to the topic the first section of the report includes a clustered list of both EU and national as well as regional funding programmes and an evaluation according to the input provided by project partners. Correspondingly in the second section the existing legislation on EU and national level pertaining to zero-emission bus systems are listed and evaluated. The third section of the report provides information on energy and fuel taxation. In the last section VDV proposes a way forward with a view to the completion of the task and the final report D 51.7. Parts of the information and the evaluation provided in the report were gathered with the help of ZeEUS project partners, especially the members of the ZeEUS National Observatory (ZNO), as well as other international partner organisations of VDV.
Key words	Zero-emission vehicles legislation; financing; energy taxation; EU funds; URBACT; ELENA; H2020; ESIF; CEF ; Urban Innovative Actions ; EIB ; JESSICA ; EFSI EU legislation; Clean Vehicles Directive; PSO Regulation; GBER; Energy Taxation Directive; France ; Germany ; Italy ; Poland ; Spain; Sweden; UK
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39	STRATHCLYDE PARTNERSHIP FOR TRANSPORT	SPT	United Kingdom
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Entity	Short name	Country	Contact person
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DOCUMENT CHANGE LOG

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CONTRIBUTING PARTNERS

#	Participant Partner Name	Short Name	Country
1	INTERNATIONAL ASSOCIATION OF PUBLIC TRANSPORT	UITP	Belgium
2	TRANSPORT DE BARCELONA SA	TMB	Spain
9	RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN	RWTH	Germany
10	HELMUT BERENDS	BERENDS	Germany
11	FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V	Fraunhofer	Germany
12	Solaris Bus & Coach S.A.	Solaris	Poland
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33	ASSTRA - ASSOCIAZIONE TRASPORTI	ASSTRA	Italy
35	Verband Deutscher Verkehrsunternehmen	VDV	Germany
38	UNION DES TRANSPORTS PUBLICS - (U.T.P)	UTP	France

ACRONYMS

AVMS: Automated Vehicle Monitoring System

CO_2 : Carbon Dioxide

CSPE : Contribution to the Public Supply of Electricity (contribution au service public de l'électricité)

CVD: "Clean Vehicles Directive**"** (Directive 2009/33/EC)

DG TAXUD: Direction-General for Taxation and Customs Union

DoW: Description of Work

DPI: Dynamic Passenger Information

EBSF: European Bus System of the Future

EEG : German Renewable Energy Act (Erneuerbare-Energien-Gesetz)

EGVI: European Green Vehicles Initiative

EIB : European Investment Bank

EU : European Union

GBER : General Block Exemption Regulation

GPP : Green Public Procurement

ITS: Information and Telecommunication System

KfW : German Bank for Restructuring (Kreditanstalt für Wiederaufbau)

KPI: Key Performance indicators

LCC: Life Cycle Cost

NMHC : Non-Methane Hydrocarbons

NOME: New Organisation of the Electricity Market law

NOx : Nitrogen Oxides

PT: Public Transport

PTA: Public Transport Authority

PTO: Public Transport Operator

RDI: Research, development, innovation

TICFE : Domestic Tax on the Electricity Final Consumption (taxe intérieure sur la consommation finale d'électricité)

VDV : Association of German Public Transport Companies (Verband Deutscher Verkehrsunternehmen)

WP: Working Package

ZNO: ZeEUS National Observatory

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1 EXECUTIVE SUMMARY

Zero-emission buses are more cost intensive in terms of procurement, infrastructure and cause intensive system changes in retrofitting the depots and workshops. There are challenging changes of operating processes for the public transport companies compared to the operation and driver education of diesel buses.
Therefore financial benefits are required to support the introduction in the cities and companies.

This report provides an overview and evaluation of the financial conditions affecting the introduction of zero-emission urban bus systems in the European Union.

The analysis is sectioned into three main parts of the european and national

- promotion and funding programmes,
- legislations and
- taxations.

The report finds a wide variety of promotion and funding programmes, with different legislations and taxation systems across Europe. On the European level there are funding programmes mainly for the research and the procurement, additionally there are national funding programmes also mainly for research and procurement. There is only one programme in Great Britain for funding the operation of low emission buses, even there are higher costs due to the existing technical limits of electric vehicles. On European level there are many loan programmes to support ecologically friendly vehicles. Borrowing money has to be refunded in the future and increase the operating costs for the local authorities, transport companies and citizens. The aim is to support public transport in general. This must be kept in mind on all federal levels when new funding programmes and loans are created.
In terms of legislations there are no tools at the moment, which can definitily support the introduction of zero emission buses. Nevertheless there are national laws, like in France, which are pushing the introduction in a definite way.

European law allows for the Member States to apply exemptions or reductions to the tax rate for energy products and electricity used for local public passenger transport. The level of the electricity tax rate is a key factor for the economic successful operation of electric busses. 25 of the 27 EU Member States make use of the reduction options permitted by the European Energy Tax Directive. Only Germany and Austria have by far the highest electricity tax rate. The other EU members use fiscal guidance more consequent to promote zero-emission busses.

The document leads to several recommendations to increase the situation:

- Advance and discuss the classification of funding tools with national and EU experts and develop a list of requirements for the “ideal” funding instrument for zero-emission buses;
- Analyse cities’/regions’/countries’ strategies and instruments to procure zero-emission only from 2020/2025 as well as the National Policy Frameworks to be

submitted by the Member States in the framework of the Directive 2014/94/EU on the deployment of alternative fuels infrastructure;

- Create an overview over the energy taxation regimes in the Member States and analyse their impact on zero-emission mobility.

The report also investigates the fact, that the analysis conducted has limitations and therefore there must be a further leading following report 51.7.

2 SCENE SETTER: THE EUROPEAN MARKET FOR ZERO-EMISSION BUSES

Preliminary findings of the ZeEUS project indicate the five challenges to the introduction of electric buses to be:

- Cost of procurement, charging infrastructure, maintenance, system change etc.
- Operational changes like lower reliability and flexibility as compared to diesel buses
- A changed approach to tenders and contracts that take into consideration risk sharing between public transport operators and authorities as well as the differences in tendering
- Lack of interoperability especially for fast-/ opportunity charging
- Energy provision depending on the quality of the network as well as costs for electricity

Cost is at the top of the list because the operation of zero-emission buses still increases the investment costs of the transport companies considerably. Not only are the original costs for procureing zero-emission buses much higher but also the investment into charging infrastructure has to be considered. Presently, the market price for e.g. an electric bus lies at about EUR 700,000, whereas the original costs for a conventional diesel EURO VI -powered bus for public transport only amount to about EUR 350,000 on average[1]. Moreover, the operation of electric buses leads to additional costs for spare batteries, the adaptation of depots and workshops and the additional staff needed, which also has to be considered in the decision-making process.

Nevertheless, the environmental benefits the technology provides convince a few public transport operators (PTOs) and public transport authorities (PTAs) to invest in zero-emission buses. Statistical data for Germany indicates that in January 2016 there were e.g. 137 registered electric buses running[2]. Taking into account the total market size of the European bus market, which according to Fraunhofer MOEZ report accounts for between 23.000 and 27.000 vehicle acquisitions per year over the long term[3], electric buses presently make up a very small fraction of the market. Similar average assumptions can be made for other zero-emission technologies.

One of the hindrances to wide-scale market uptake of zero-emission buses has so far also proven to be the market fragmentation caused by the many different technologies on offer and the low demand in numbers of buses per city. Especially the situation with regards to demand is bound to change though, as VDV members for instance indicate that they intend to purchase 550 more electric buses in the time frame until 2020.[4] In order to establish the potential EU-wide demand for electric buses in the upcoming years up to 2025, the ZeEUS project has also performed a survey. The answers from 19 PTOs and PTAs representing 25 mostly northern and western European cities or regions indicate a demand of 40.000 zero-emission buses in this time frame.

In the time frame until 2025 the growth of the European market for especially electric buses may progress even more rapidly. Following the C40 “Clean Bus Declaration” of 40 cities worldwide (of which 13 European) in 2015 pledging to have over 40.000 buses operating

[1] *https://www.vdv.de/e-mobilitaet-im-oepnv-weiter-foerdern.pdfx?forced=true*

[2] *http://de.statista.com/statistik/daten/studie/259805/umfrage/bestand-an-bussen-mit-alternativen-antrieben-in-deutschland/*

[3] *http://www.moez.fraunhofer.de/content/dam/moez/de/documents/Working_Paper/Working_Paper_Electric_Buses.pdf.*

[4] Information from VDV

on clean technologies by 2020[5], several European cities[6] and the Netherlands[7] and France[8] as the first European countries to do so announced strategic plans for the introduction of low-/zero-emission buses on a large scale until 2025 or 2030[9].

Another interesting way forward to increase the number of zero-emission buses purchased in order to give the industry the possibility to develop their products on a larger scale and ultimately to decrease prices is the joint procurement of electric buses as is foreseen by several cities, for example between the transport companies of Hamburg, Berlin, Stuttgart, Munich, Düsseldorf, Cologne and Darmstadt.[10] [11] At the same time the whole public transport community is electrified to observe the developments foreseen for Zuidoost-Brabant, where Eindhoven has just tendered out the operation of its public transport service to Transdev daughter Hermes under the condition that the city of Eindhoven's bus fleet goes fully electric by 2020.[12] The record number of 40 electric buses had been provided by a Dutch manufacturer in 2016.

While acknowledging the need to analyse these new developments within the scope of the final report D 51.7, this first analysis is focusing on the financing, regulatory and taxation framework applying to zero-emission buses with a view to establishing requirements for regulatory change in order to facilitate the market uptake of zero-emission buses. The global cities going ahead setting ambitious targets for the uptake of low-/ and zero-emission buses is certainly an indication of a possible future development. Nevertheless, a critical mass supporting market penetration will depend on the ability of smaller and medium-sized cities to take up the new technology. The report therefore sets out to analyse the general regulatory and financing framework for zero-emission bus systems on EU, national and partly regional level.

[5] *http://www.c40.org/blog_posts/c40-clean-bus-declaration-urges-cities-and-manufacturers-to-adopt-innovative-clean-bus-technologies*

[6] Paris: *http://www.ratp.fr/en/ratp/r_118194/ratp-launches-the-bus-2025-project/*

Warsaw: *http://zeeus.eu/news/mza-is-aiming-to-have-one-of-the-cleanest-european-bus-fleet*

Copenhagen: *http://www.venturasystems.com/en-4-172/copenhagen-is-introducing-the-first-full-size-pure-electric-buses-from-byd.html?view=all*

[7] *https://www.government.nl/latest/news/2016/04/15/dutch-public-transport-switches-to-100-percent-emissions-free-buses*

[8] *http://www.developpement-durable.gouv.fr/The-Energy-Transition-a-user-s,42904.html*

[9] Brussels: *http://bellona.org/news/future-energy-system/electric-vehicles/2016-05-brussels-aims-to-fully-electrify-its-bus-fleet-by-2030*

[10] *http://roter-renner.de/nc/detail/datum/2016/07/11/bvg-einkaufsverbund-mit-der-hochbahn.html*

[11] Düsseldorf: NahverkehrsNachrichten 23.6.2017, p. 2

[12] *http://www.busandcoach.com/news/articles/2016/major-order-for-electric-citeas-for-eindhoven/*

3 PARTNERS' CONTRIBUTION

The following table provides an overview over the contributions of each ZeEUS partner involved in the drafting of the report.

Company	Sections	Description of the partner contribution
UITP	Introduction; 1; 2	• Preliminary findings of the project • Coordination of ZeEUS National Observatory (ZNO) and gathering of information provided by ZNO members • Contribution of input and evaluation on EU legislation with regards to transport, energy and environemental policy
TMB	1; 2	• Contribution of input on the Spanish regulation and financing framework via ZNO
RWTH	1; 2	• Contribution of input on the German regulation and financing framework • Evaluation of certain meassures
BERENDS	1; 2	• Methodological input • Clustering of funds • Evaluation of certain meassures
Fraunhofer	1; 2	• Contribution of input on the German regulation and financing framework • Evaluation of certain meassures
Solaris	1; 2	• Contribution of input on the Polish regulation and financing framework • Evaluation of certain meassures
EURELECTRIC	1; 2; 3	• Contribution of input on the regulation (especially energy taxation) and financing framework
SLL	1; 2	• Contribution of input on the Swedish regulation and financing framework • Evaluation of certain meassures • Update of upcoming meassures
TRL	1; 2	• Contribution of input on the British regulation and financing framework via ZNO
ASSTRA	1; 2	• Contribution of input on the Italian regulation and financing framework via ZNO
VDV	all	• Contribution of input on the German regulation and financing framework • Evaluation of certain meassures • Extensive research on European funding programmes • Analysis of the German and EU legislation and funding system and partly proposals for improvement • Analysis of the German and EU energy and fuel taxation and proposals for improvement • Coordination of input from the ZeEUS partners • Final drafting
UTP	1; 2; 3	• Contribution of input on the French regulation and financing framework via ZNO • Evaluation of cetain measures • Update on up-coming regulation

Table 1 Description of the partner contribution

4 SECTION 1: FUNDING INSTRUMENTS FOR ZERO-EMISSION URBAN BUS SYSTEMS

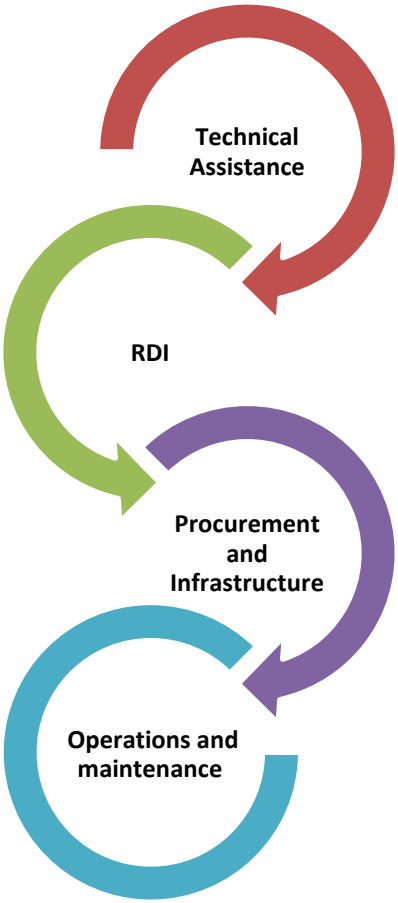

Figure 1 Metholodogy for clustering the funding instruments according to their use

As mentioned in the beginning the introduction of zero-emission bus systems requires a systemic adaptation that is not limited to the procurement of the vehicles as such. Before operating zero-emission buses in regular services PTOs and PTAs have to draw up conceptual analyses that can include cost-benefit analyses, feasibility studies, charging schemes, planning of charging infrastructure in cooperation with energy providers, the preparation of tenders etc. which are all part of the costs of systemic changes necessary. Another challenge is provided by the need to cooperate with a whole new set of stakeholders from the field of energy provision.

Public transport services have to adhere to the highest standards when it comes to reliability of services and safety of the passengers. Before being able to operate regular services with the help of zero-emission buses, PTOs and PTAs therefore have to test the system's reliability extensively. During pilot phases the zero-emission buses run under constant scrutiny und the systems are being optimized and improved as needed in order to minimise the risk inherent to systemic changes.

The systemic change needed in order to be able to operate zero-emission buses also includes the setting up of charging infrastructure which means a considerable investment

for PTOs and PTAs. Due to the early stage of technology uptake there is a multitude of different zero-emission bus systems available and in addition to the high actual costs for vehicles and infrastructure also the higher transaction cost for such a system change have to be taken into account. The costs for information and decision-making, the costs of entering into contractual relations and the costs of risk incurred are much higher for the purchase of zero-emission bus systems as compared to the standard diesel bus.

Finally, the operation of zero-emission buses requires substantial adaptation of operation schemes, depots, repair and maintenance facilities as well as the training of staff. Different requirements with regards to safety have to be taken into account, certain operational procedures require more time, staff has to deal with a whole set of new products and parts, depots have to be adapted and so on.

In order to identify the best funding instruments for each step in the process of introducing zero-emission bus systems outlined above, Section 1 is therefore structured along the processes of technical assistance, RDI, procurement and infrastructure, operations and management. In some cases funding instruments are valid for two or severall processes though.

The overview has been compiled with the help of ZeEUS partners and contains a limited amount of examples of cases where the funds were used for public transport projects. More of these experiences will be collected and analysed with a view to the final report D51.7. The limited number of examples identified suggests however that usage of the funding especially from European level is low for the public transport sector in general and the introduction of zero-emission bus systems specifically.

Section 1 of the report gives an overview over different funding possibilities on EU (marked as A), national (marked as B) and regional/local (marked as C) level. For every funding instrument it is also specified what institution to apply to. This is important because preliminary feedback from partners suggests that transaction costs for dealing with different levels of funding providers is increasing as the distance between provider of funds and applicant for funds increases, which is to say: it is regarded as easier to apply for funding when the primary interlocutor is the local or regional administration rather than the European institutions.

Furthermore the partners exhibited a preference for grants as opposed to loans, because there is currently no business case to be made for the introduction of zero-emission buses. As long as their costs are considerably higher and the general funding scheme of public transport does not allow for the internalisation of external benefits, loans are not regarded as a feasible way to go. For the aforementioned reasons the overview of funding instruments was therefore structure in a way to allow for these differences to be displayed.

4.1 European Union (EU)

At European level the following funding instruments are available.

	ACRONYMS / DESCRIPTION	GRANT / LOAN	TECHNICAL ASSISTANCE	RESEARCH, DEVELOPMENT, INNOVATION	PROCUREMENT & INFRASTRUCTURE	OPERATIONS
A1	URBACT III	Grant	x			
A2	ELENA European Local ENergy Assistance	Grant	x	x		
A3	Horizon 2020	Grant		x	x	
A4	Fuel Cell Joint Undertaking	Grant		x	x	
A5	CIVITAS	Grant	x	x	x	
A6	LIFE	Grant	x	x		
A7	Cohesion Fund	Grant			x	
A8	European Regional Development Fund	Grant		x	x	
A9	Connecting Europe Facility Urban Nodes	Grant	x		x	
A10	Urban Innovative Actions	Grant	x		x	
A11	EEEF European Energy Efficiency Fund	Grant & Loan	x		x	
A12	EIB - Loans in the field of transport and infrastructure	Loan		x	x	
A13	JESSICA - Joint European Support for Sustainable Investment in City Areas	Loan			x	
A14	European Fund for Strategic Investment (EFSI) “Juncker Plan”	Loan		x	x	

4.2 France

Preliminary research suggests that there is no specific funding available for zero-emission buses.[13]

4.3 Germany

4.3.1 FUNDING FOR PUBLIC TRANSPORT: SPLIT BETWEEN LAYER OF GOVERNANCE AND RESORTS

The German Government can only promote investments in public transport, and thus also zero-emission buses, to a limited extent because of split responsibilities between the Laender and the federal government. Since a framework reform in 2007, the German Government may only fund areas for long-term which it also has the legislative power (Art. 104b of the Basic Law for the Federal Republic of Germany (GG)) and can only financially support the *Laender* and the municipalities to a limited extent in areas for which it does not have the legislative power. The funding of investments in new vehicle technologies within public transport is furthermore split between several federal ministries: the Federal Ministry of Transport and Digital Infrastructure (BMVI) funds research and development projects as well as demonstration projects, e.g. the Electromobility Showcase programme, whereas the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) is responsible for the market introduction stage of the new vehicle technologies. As various technologies have now been tested in model projects in Germany and as some of them have turned out to be suitable for daily use, the German Government has now begun to transfer its support from the research and development field to the field of introduction of market-ready technologies on the market.

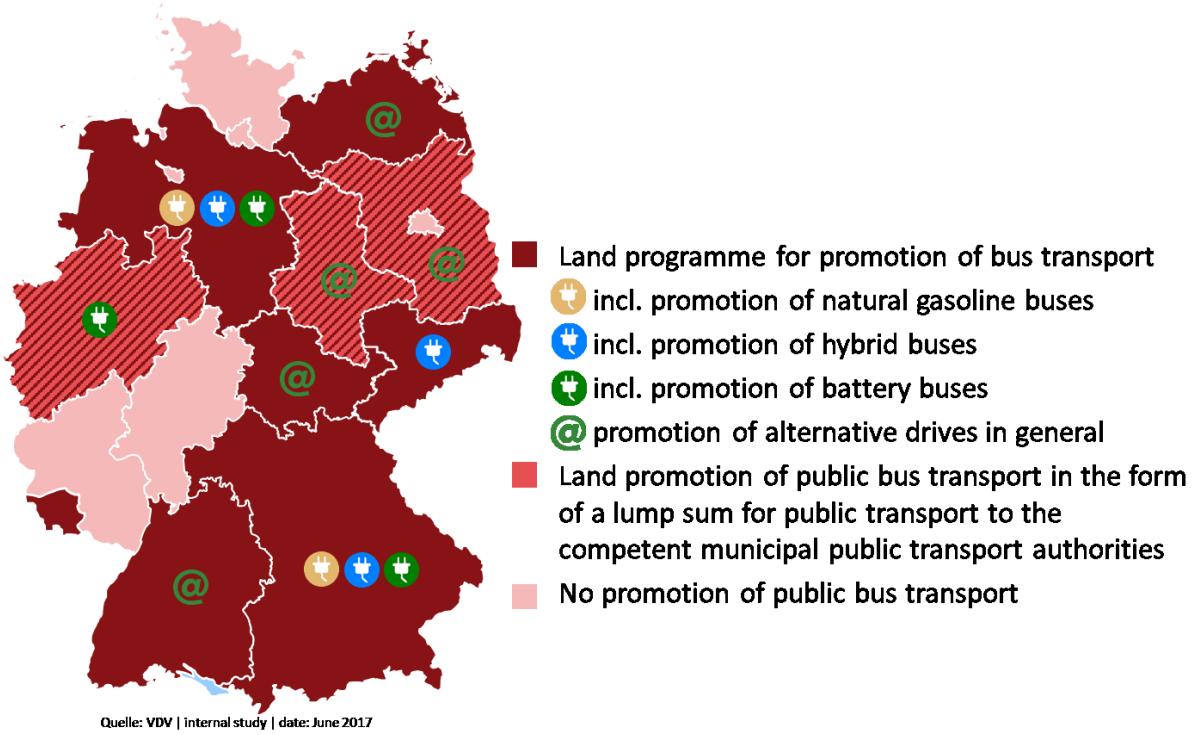

Figure 2 Overview German Laender promotion programmes for bus transport

[13] *Information from UTP (Union des Transports Publics et Ferroviaires) July 2016*

Just as in case of their public transport laws the *Laender* have set very different investment priorities in their laws on funding locally operated public transport. As regards the regional public road transport the acquisition of new low-consumption line-service buses is an important component of the programmes of the *Laender* for investment in public transport. Seven *Laender* with big rural areas have initiated their own programmes for the promotion of bus transport (see map to the left). Four of these *Laender* also promote electric buses in their programmes, and five of them promote hybrid buses. Another three *Laender* promote bus transport in the form of a lump sum for public transport, and then the competent municipal public transport authorities are themselves responsible for the proper use of this money. According to this model the competent counties and urban districts must themselves provide a minimum proportion of the investment funds for the public transport infrastructure, and, in return, they can finance e.g. line-service buses without vehicle technology restrictions.

In the German municipalities there is also a close connection between the budgetary situation and the investment level. Whereas cities with population dynamics tend to have higher investment levels, many municipalities are in a precarious economic situation, which sometimes even includes budgetary supervision, and therefore reduce their already low investment level even more. Consequently, the services and the quality of public transport have already decreased in some cities and towns. These municipalities prioritise a basic public transport offer by bus and rail, which means that they cannot use the potential of low-emission electric buses for their public transport for economic reasons.

4.3.2 NATIONAL PROMOTION PROGRAMMES FOR ELECTRIC MOBILITY WITHIN PUBLIC TRANSPORT

At German national level the following funding instruments are available.

	ACRONYMS / DESCRIPTION	GRANT / LOAN	TECHNICAL ASSISTANCE	RESEARCH, DEVELOPMENT, INNOVATION	PROCUREMENT & INFRASTRUCTURE	OPERATIONS
B1	National Hydrogen and Fuel Cell Technology Innovation Programme Phase II	Grant		X	X	
B2	National Climate Protection Initiative: Renewably Mobile	Grant			X	
B3	Funding Directive Electromobility	Grant	X		X	
C1	Model Regions for Electric Mobility	Grant		X	X	
C2	Electromobility Showcase	Grant		X		

4.3.3 OUTLOOK: HOW TO FINANCE MARKET-UPTAKE?

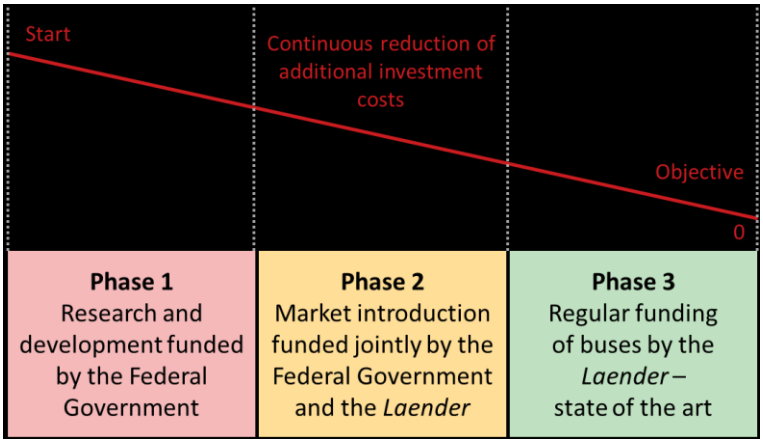

Figure 3 Proposed method to finance market-uptake

The present research-oriented programmes for the promotion of the development of vehicle prototypes now have to be followed by support for the procurement of electric buses. Otherwise, the procurement of new electric buses will (relatively) soon end for economic reasons. Joint and coordinated funding action of the German Government and the *Laender* is absolutely necessary at the market introduction stage for two reasons. Firstly, in Germany investments in public transport are a *Laender* task, and, secondly, the Basic Law for the Federal Republic of Germany sets tight limits for funding by the German Government – as explained above. Moreover, the high extra investment costs in electric mobility can only be compensated more or less completely if the support framework is accurate and based on cooperation between the German Government and the *Laender*. The above figure illustrates the transition from federal research and development funding (phase 1) to regular funding of buses by the *Laender* (phase 3) via funding by the German Government and the *Laender* at the market introduction stage (phase 2). It is the objective to reduce the high extra investment costs for electric mobility in comparison with the costs for conventional vehicle concepts at each phase.

Interestingly, the Federal Minister for the Environment, Nature Conservation, Building and Nuclear Safety has announced to set up an own funding programme for the procurement of electric buses until the end of 2016.[14]

[14] *http://roter-renner.de/nc/detail/datum/2016/02/07/bund-foerderung-von-e-bussen-kommt.html*

4.4 Italy

At Italian national level the following funding instruments are available.

	ACRONYMS / DESCRIPTION	GRANT / LOAN	TECHNICAL ASSISTANCE	RESEARCH, DEVELOPMENT, INNOVATION	PROCUREMENT & INFRASTRUCTURE	OPERATIONS
C3	Funding program for the regions' efforts to improve air quality through the modernization of the fleet for the local public transport	Grant			X	
C4	Funding program for the enhancement of the air quality: call for the allocation of investment grants for the purchase of electric buses	Grant			X	

4.5 Poland

As mentioned above, Poland makes use of both Cohesion and ERDF funds for the procurement of low-/ zero-emission buses. Furthermore, Poland makes use of the so called "territorial contracts" in which the central government and the authorities of individual provinces agree on development goals and the investments that are crucial for both sides. The contracts indicate what actions will be supported by the government and which by local and regional government. Investments recorded in the Contracts will be financed by EU and national funds.[15]

	ACRONYMS / DESCRIPTION	GRANT / LOAN	TECHNICAL ASSISTANCE	RESEARCH, DEVELOPMENT, INNOVATION	PROCUREMENT & INFRASTRUCTURE	OPERATIONS
B4	GAZELA BIS – low emission urban public transport	Loan			X	

[15] *https://www.mr.gov.pl/strony/zadania/polityka-rozwoju-kraju/zarzadzanie-rozwojem-kraju/krajowa-strategia-rozwoju-regionalnego/*

4.5.1 OUTLOOK: ELECTROMOBILITY FUND ANNOUNCED BY POLISH GOVERNMENT

At the beginning of June 2016 the Polish government announced an Electromobility Development Plan[16] that aims to reduce emissions from transport and enable cities to meet air pollution targets. The project e-bus targets buses specifically but the development plan will also include measures for electric passenger cars. While environemental and health benefits are at the heart of the strategy, the government also seeks to strengthen the national industry. The vice-minister for development foresees that the programm will creat a Polish market of electric buses worth PLN 2.5bn per year. While Polish bus manufacturer Solaris is already exporting electric buses, also Ursus is still in a testing phase. The Electromobility Fund is supposed to be running from the end of the year and will combine national funds and EU funds for both RDI and procurement activities. The government also foresees changes to the energy and procurement laws as well as the laws on local taxes and fees in order to support electromobility uptake. The Polish government plans to spend PLN 19bn (EUR 4,7bn) for the development of electromobility in Poland in the next years.

4.6 Spain

At Spanish national level the following funding instruments are available.

	ACRONYMS / DESCRIPTION	GRANT / LOAN	TECHNICAL ASSISTANCE	RESEARCH, DEVELOPMENT, INNOVATION	PROCUREMENT & INFRASTRUCTURE	OPERATIONS
B5	MOVELE - Strategy for Electric Vehicle Support	Grant			X	
B6	MOVEA - Integral Strategy for Alternative Fuels Vehicle Support	Grant			X	

[16] *http://biznes.onet.pl/wiadomosci/kraj/morawiecki-plan-elektromobilnosci-kolem-zamachowym-gospodarki/drv714*

4.7 Sweden

At Swedish national level the following funding instruments are available.

	ACRONYMS / DESCRIPTION	GRANT / LOAN	TECHNICAL ASSISTANCE	RESEARCH, DEVELOPMENT, INNOVATION	PROCUREMENT & INFRASTRUCTURE	OPERATIONS
B7	State support for sustainable urban environments - urban contracts	Grant		X	X	
B8	Klimatklivet	Grant			X	
C5	ElectriCity			X		

In Gothenburg several stakeholders (Volvo Group, Region Västra Götaland, City of Gothenburg, Chalmers University of Technology, Swedish Energy Agency, Johanneberg Science Park, Lindholmen Science Park, Business Region Göteborg, Göteborg Energi, Västtrafik, Älvstranden Utveckling, Akademiska Hus and Chalmersfastigheter) have set up an RDI project called “ElectriCity”[17]. The project funds activities in the field of sustainable mobility and attractive public transport and is set to run until 2018. One of the results of the project is the test bus line number 55 with special recharging infrastructure, bus stops and passenger information.

4.7.1 OUTLOOK: DIRECT PURCHASE INCENTIVES ”ELBUSSPREMIE” FOR ELECTRIC BUSES ANNOUNCED

The “elbusspremie” wil provide grants for the procurement of pure electric vehicles and plug-in hybrids as well as trolleybuses used in public transport under a public service contract. The grant will be provided in accordance with EU state aid legislation in order to promote market uptake of electric buses. Regional public authorities, municipalities and the regional PTA can apply to the Swedish Energy agency. [18]

[17] *http://www.goteborgelectricity.se/en/node/19505*
[18] *http://www.regeringen.se/globalassets/regeringen/dokument/miljo--och-energidepartementet/pdf/information-om-bestammelserna-i-ny-forordning-om-elbusspremie.pdf*

4.8 United Kingdom

At UK national level the following funding instruments are available.

	ACRONYMS / DESCRIPTION	GRANT / LOAN	TECHNICAL ASSISTANCE	RESEARCH, DEVELOPMENT, INNOVATION	PROCUREMENT & INFRASTRUCTURE	OPERATIONS
B9	Air quality grant scheme	Grant	X			
B10	The Green Bus Fund	Grant			X	
B11	*Clean Bus Technology Fund*	Grant			X	
B12	Low Emission Bus Scheme	Grant			X	
B13	Bus Service Operators Grant (BSOG) Low Carbon Electric Bus (LCEB) incentive	Grant				X

5 SECTION 2: LEGISLATION IMPACTING ZERO-EMISSION URBAN BUS SYSTEMS

Although the recent dynamic development referred to in the introduction is mostly based on the cities' and regions' activities with regard to curbing the emissions from transport, the role of EU and national legislation should not be underestimated when it comes to the introduction of zero-emission buses to public transport. There are many ways in which legislation influences zero-emission urban bus systems, ranging from the actual definition of vehicles considered to be "clean" or "green" to the introduction of provisions supporting green public procurement of public transport buses. Moreover, legislation in the field of state aid sets the conditions for the funding of zero-emission bus systems. This important point has already surfaced in Section 1 where several comments of evalution regarded the funding rate provided as too low to provide a real incentive for the system change. Finally, national legislation can also be of strategic nature or prescribe certain targets when it comes to zero-emission mobility. The overview provided below illustrates the existing variety of national legislation and similar to Section 1 showcases the dynamic development in this policy area. While the evaluation of EU legislation is quite extensive and profound, the different national measures are more difficult to judge because they cater to the specific national circumstances.

5.1 European Union

5.1.1 THE EUROPEAN LEGAL FRAMEWORK FOR THE PROCUREMENT OF CLEAN VEHICLES: DIRECTIVE 2009/33/EC

The Directive on the promotion of clean and energy-efficient road transport vehicles requires all purchases of road transport vehicles covered by the public procurement Directives and the public service Regulation to take into account energy and environmental impacts in the purchase decision. The minimum impacts to be taken into consideration include energy consumption, CO_2 emissions and emissions of the regulated pollutants of NO_x, NMHC and particulate matter. On top of that also other environmental impacts can be considered. In order to meet these requirement the directive gives two and a half options setting technical specifications for energy and environmental performance, or including energy and environmental impacts as award criteria in the purchasing procedure. The inclusion of energy and environemental impacts into the purchasing decision can also be done with the help of a standardized monetisation method.

The Directive is currently under review which has become necessary because when the Directive 2009/33 was adopted, "clean" vehicles in the field of buses still meant advanced diesel buses mainly. Now technological change has picked up and many different technologies start to be available. With the introduction of alternatively-fuelled and electric buses, bus operators face new challenges. To this regard, the Directive is not used enough; in particular it does not apply to alternative fuels, hybrids, etc. This should be developed to make the Directive more relevant.

For public transport operators, when they purchase buses, the energy/fuel consumption is of particularly high relevance as buses run every day for up to 16 hours (compared to private cars which run far less). In particular the consideration of energy consumption / fuel consumption is therefore a relevant factor that influences the final decision. This is why operators request transparent information about the fuel/energy consumption of vehicles.

When looking for carbon reduction, the Directive's impact is limited by the fact that CO_2 is a global pollutant and that the Directive does not take into account e.g. the national energy mix when assessing electric vehicles. In order to emit zero emissions an electric vehicle would have to use green / renewable electricity. This link is currently missing in the Directive.

Furthermore, the harmonised monetisation methodology gives relatively low points to the CO_2 value; as a result, the CO_2-related share in the life cycle costs is almost disappearingly small. Moreover, "savings" in this area are only virtual and not real, as no one gives you the money you save in terms of CO_2 emissions. The monetarisation methodology should therefore not be the only option, as some authorities have made good experiences with other approaches, such as defining environmental and emission requirements prior to the procurement and leaving it up to the operator to select and offer a combination of vehicle technology and fuels that meet these requirements.

Most of the feedback from members with regards to applicable legislation mentioned the national implementation acts of the CVD.[19]

5.1.2 THE EUROPEAN LEGAL FRAMEWORK FOR PUBLIC TRANSPORT SERVICES: REGULATION (EC) NO. 1370/2007

The contracting and financing of public transport services that cannot be provided exclusively on the basis of proceeds achieved on the market is subject to the provisions of Regulation (EC) No. 1370/2007. When it comes to promoting zero-emission buses it is therefore important to distingiush between public transport services at an entrepreneurial initiative based exclusively on the proceeds achievable on the market (i.e. non-subsidized transport) and public transport services at the initiative of an authority on the basis of a public service obligation in the public interest.

If zero-emission buses operated within the scope of non-subsidized public transport services are to be supported by a funding authority, the European and national rules for business aid have to be observed. In case of public transport falling within the scope of Regulation (EC) No. 1370/2007 a public service contract is to be concluded between the competent authority in the sense of the Regulation and the transport operator as the performer of the passenger transport services. This contract regulates the public service obligations and the financial compensation. It is irrelevant whether such a contract is concluded with an external company or with an in-house operator (direct award, entrusting).

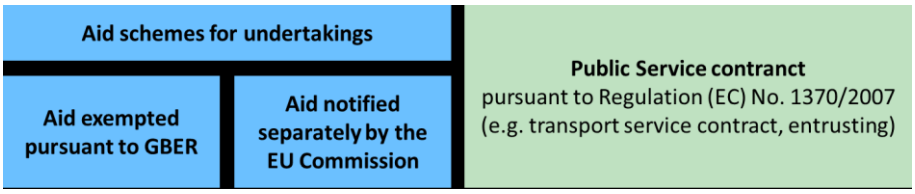

Figure 4 legal classification of transport services

Within the scope of the public service contract the transport company can be committed to providing transport services of a certain selective individual standard (e.g. operation of vehicles with alternative drives or driving without local emissions). From the point of view of awarding such an obligation is unproblematic in case of public transport services based on a public service obligation within the scope of entrusting or by way of a transport contract; extra investment costs for the operation of electric buses can be fully offloaded.

[19] Italy: *http://www.gazzettaufficiale.it/gunewsletter/dettaglio.jsp?service=1&datagu=2011-03-24&task=dettaglio&numgu=68&redaz=011G0063&tmstp=1301302373955*
Germany:
http://www.bundesgerichtshof.de/SharedDocs/Downloads/DE/Bibliothek/Gesetzesmaterialien/18_wp/VergabeRModG/bgbl.pdf;jsessionid=CB8BDEB6DD7496AB897A26BF589A4023.2_cid319?__blob=publicationFile

So far, existing public service contracts, which usually have durations of ten years in case of bus transport services, only rarely include an obligation to provide transport services of a certain selective individual standard (operation of electric buses). Therefore, subsidies for public transport services presently can only be bundled by authorities if existing public service contracts are amended, to the extent legally possible, and made dependent on the actual situation at the location in question.

The public service contract concluded between the Hannover Region as the competent authority for public transport and üstra Hannoversche Verkehrsbetriebe AG in September 2015 includes an obligation to provide the transport services in the inner city of Hanover by way of hybrid buses or vehicles with at least comparable clean vehicle technology. In order to compensate the extra investment costs for zero-emission mobility, any new public service contract should always include an obligation to provide transport services of a certain selective individual standard. To achieve that the promotion of electric buses makes a difference and that as many authorities and companies as at all possible profit, it seems to be meaningful to develop a suitable promotion concept on the basis of business aid schemes because both companies performing non-subsidized transport services and companies performing public transport services on the basis of a public service obligation can benefit from such aid schemes (see above figure).

5.1.3 THE EUROPEAN LEGAL FRAMEWORK FOR BUSINESS AID: REGULATION (EU) NO. 651/2014

Commission Regulation (EU) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty – the so-called General Block Exemption Regulation (GBER) – exempts certain categories of state aid, which contribute considerably to employment and strengthen the competitiveness in Europe, from the obligation of notification and permit. Promotion programmes at the research and development stage (phase 1) of electric mobility fall within the “aid for research and development and innovation” exempted pursuant to the GBER, which allows an aid intensity between 50 % and 85 % for industrial research. Pursuant to Article 36, paragraph 4 ff “aid for environmental protection” is the only relevant aid exempted for the market introduction phase (phase 2).

Aid for environmental protection can also be granted for the acquisition of new transport vehicles for road if these new vehicles comply with new adopted Union standards and are purchased before those standards enter into force. The adopted standards have to represent an improvement and may not have been applied to vehicles purchased earlier. State aid is only granted for the extra investment cost. The rate of funding for environmental protection may not exceed 40 %. It may be increased up to 60 % for small and medium-sized undertakings depending on their status, but usually small municipal transport companies do not fall within this category. Thus, it is generally possible to support an introduction concept for electric buses (phase 2) via the aid for environmental protection exempted pursuant to the GBER, but the funding is limited to 40 % of the extra investment costs occurring for electric mobility.

Pursuant to Article 8, paragraph 3a of the GBER aid with identifiable eligible costs exempted by this Regulation may be cumulated with any other State aid as long as those measures concern different identifiable eligible costs. In the German context for instance, in order to cumulate aid, it is important that electric buses are not promoted by the *regional level authorities like the German Laender* as Article 8, paragraph 3b of the GBER would apply then. This paragraph stipulates that the maximum aid intensity pursuant to the GBER shall not be exceeded. However, most of the present promotion programmes of the German *Laender* already include the condition that only buses with low-emission drives (EURO-VI, hybrid bus or electric bus) can be promoted. Thus, according to the European aid law it is not possible to cumulate aid money to achieve higher funding quotes, i.e. it is

only possible to receive funding for up to 40 % of the extra investment cost for electric mobility at the market introduction stage.

Any higher aid has to be notified to the EU Commission beforehand and separately. The approval procedure takes about one year, and it is very unlikely that a significantly higher aid intensity is accepted. In Germany about EUR 7.2bn were awarded as exempted aid in 2013. This sum is more than one third of the total sum of the exempted aid of all member states and the biggest single sum in a member state. The EU Commission aims at exempting 90 % of the entire aid granted within the scope of the GBER.

5.1.4 THE EUROPEAN LEGAL FRAMEWORK FOR PUBLIC ALTERNATIVE FUELS INFRASTRUCTURE: DIRECTIVE 2014/94/EU

The so-called “Alternative Fuels Infrasturcture Directive” 2014/94/EU mandates the deployment of alternative fuel stations (including electric charging stations) across Europe with common standards for their design and use, as well as consumer information requirements. The directive aims at accelerating the market up-take of electric and hydrogen vehicles as well as vehicles running on natural gas, with the long-term goal of reducing the transport sector’s climate impact and dependence on oil.

The directive requires Member States to draw up national policy frameworks detailing minimum numbers of recharging and refuelling points to be established in their territory. The national policy frameworks had to be reported to the European Commission by end of 2016 and are currently being analysed by the Commission.

Several aspects of the directive are relevant for public transport. For instance, the directive states that publicly accessible recharging points for electric vehicles should be installed, in particular, at public transport stations, such as port passenger terminals, airports or railway stations. It also mentions explicitly that the national plans should include measures that can promote the deployment of alternative fuels infrastructure in public transport services. Further to this, Member States shall ensure that national policy frameworks take into account the needs of the different transport modes existing on their territory. National policy frameworks shall also take into account the interests of regional and local authorities, as well as those of stakeholders concerned. Last but not least, the directive calls for the development of technical standards for the recharging of electric buses.

5.1.5 A NEW METHODOLOGY TO MEASURE, CERTIFY AND REPORT CO_2 EMISSIONS OF HEAVY DUTY VEHICLES

In 2014, the European Commission set out a strategy to curb CO_2 emissions from Heavy Duty Vehicles (HDVs), including trucks, buses and coaches. This strategy foresees, in the short term, that CO_2 emissions from new HDVs be certified, reported and monitored. By enhancing the transparency about the fuel consumption and CO_2 emissions of vehicles available on the market, the Commission expects that more vehicles with lower CO_2 emissions will be purchased.

As a first step, the European Commission has developed a computer simulation tool, VECTO, to measure CO_2 emissions from new vehicles. Based on this tool, the Commission intends to issue new legislation mandating the CO_2 certification of those vehicles; it is expected that the legislation for trucks is passed in the course of 2017 and for buses in the course of 2018. Another piece of legislation will require the monitoring and reporting of CO_2 emissions during real-world operations of those HDVs.

Once this legislation is in force, the Commission may consider further measures to curb CO_2 emissions from HDVs, for example via mandatory limits on average CO_2 emissions from newly-registered HDVs (as is already the case for cars and vans).

5.2 France: Energy Transition for Green Growth Act

In France the Energy Transition for Green Growth Act[20] sets the basis for the energy transition and sustainable growth in the field of buildings, transport, circular economy and renewable energy. The Act is further spelt out by decrets that clarify how to implement the provisions foreseen. The law was passed on 17. August 2015 and the relevant decret for public transport buses is not published yet, so at this moment a comprehensive analysis is difficult. Some preliminary remarks with regards to the design of the legislation with regards to public transport buses can however be made.

The Energy Transition for Green Growth Act [21] prescribes that all new buses and coaches that are procured for public transport services from 2025 onwards must be low-emission vehicles. Article 37 para. 3 [22] specifies that these provisions are applicable to networks with more than 20 vehicles, which covers 78 % of the urban PT networks according to the latest UTP (Union des Transports Publics et Ferroviaires) survey.[23] Local authorities are subject to the same requirement concerning 20 % of their fleet. According to UTP the Décret d'application de l'Article 37 Transition Energétique pour la croissance verte gives a definition containing specific requirements for low emission vehicles. It furthermore foresees the introduction of the 2025 target for 100 % of low-emission bus acquisitions in several steps: from 2020 on (2018 for public transport network of Paris – RATP) the French State and its public bodies must conform to a minimum share of 50 % of vehicles with low CO_2 and air pollutants emissions when renewing thier fleets. This concerns public transport systems in towns with over 100.000 inhabitants and Paris with its suburb.

When it comes to the evaluation it has to stated that the legislation exibits some critical weaknesses, most of which apply to the financial implications, in particular, it does not foresee any extra budget for the higher investment costs for low-emission buses incurred by the municiplalities who procure the buses. With regards to the specific requirements for low-emission buses defined in the decret several stakeholders have criticised that these are too specific and cannot necessarily be matched by the market.

5.3 Germany: Electro-Mobility Law and National Development Plan for Electromobility

The German “Electro-Mobility Law” was passed in 2013 and entered into force in 2015. Paragraph 1-8 include the the rules to start for electric vehicles on German roads, however there are no specific provisions for electric buses other than to allow for/ encourage quality improvements. On the positive side, it recognises the need to reduce emissions and noise and improve air quality to which electric buses would contribute. On the negative side it does not specify the promotion of electric buses as a requirement. The “National Development Plan for Electro-Mobility” [24] promotes the use of electric vehicles. This strategic plan outlines all foreseen activities concerning electric vehicles, hybrid vehicles and hydrogen vehicles. These activities include RDI, demonstrations and market incentives but they mostly address passenger cars.

[20] *http://www.developpement-durable.gouv.fr/The-Energy-Transition-a-user-s,42904.html*
[21] *http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000031044385*
[22] *https://www.legifrance.gouv.fr/eli/loi/2015/8/17/DEVX1413992L/jo/article_37*
[23] *http://utp.fr/actualite/transition-%C3%A9nerg%C3%A9tique-pour-la-croissance-verte-publication-de-la-loi*
[24] *https://www.bmbf.de/files/nationaler_entwicklungsplan_elektromobilitaet.pdf*

5.4 Italy: Green Public Procurement

Apart from the funding instruments provided to the regions as set out in the previous section, Italy since 2012 also prescribes a minimum of environmental criteria for the procurement, rental and leasing of vehicles and gives directions about the criteria for the tender to the PTAs and PTOs.[25] In accord with the EU requirements, these criteria will be updated the light of technological and market trends every two years. Furthermore, the decree on *"Urgent measures for the growth of the country"*[26] issued in 2012 contains provisions for measures to encourage the development of low emissions transport vehicles. Chapter 4bis includes incentives for the purchase of public and private low emission vehicles (electric and hybrid) during the years 2013-2015 provided by the budget of the Ministry of Economic Development. Finally the recently adopted *"environmental provisions for measures to promote green economy and contain the the excessive use of natural resources"*[27] from the year 2015 facilitate the use of Green Public Procurement (GPP).

It thus seems as if the possibilities for the procurement of low emission and zero emission vehicles have been provided for within the legislation during the last years. However, it remains so far unclear how the different legislative provisions relate and what is their de facto impact. This question needs to be further studied.

5.5 Poland: upcoming Electromobility Development Plan

In June 2016 the Polish government announced an Electromobility Development Plan that aims to reduce emissions from transport and enable cities to meet air pollution targets.[28] The project e-bus targets buses specifically but the development plan will also include measures for electric passenger cars. The government foresees changes to the energy and procurement laws as well as the laws on local taxes and fees in order to support electromobility uptake. In March 2017 the Polish government approved the Electromobility Development Plan in Poland. The E-car programme, which is a part of the govenmental Electromobility Programme (supervised both by the Ministry of Energy and the Ministry of Development), announced the plan to develop 6,000 charging points and 400 fast-charing points in Poland by 2020. By 2025 the programme wants to see 1m electric cars on Polish roads. At the end of 2016, electric buses in Poland were good for only 0.3 % of all Polish urban bus fleet. Acroding to the E-bus programme, there should be 1,000 electric buses in operations by 2025.

Since February 2017, 45 cities and municipalities in Poland signed a memorandum of understanding with the Polish government expressing a will to buy at least 819 electric buses – up to 7 % of the total Polish bus fleet – in the next few years, probably by 2023-25. In April 2017 there were already 321 electric buses in the "procurement process" in Poland (in a broad sense, from a formally expressed willingness to buy to actual deliveries of electric buses). According to a current draft of April 2017 of the forthcoming electromobility and alternative fuels bill, 30 % of the urban mass transit in cities bigger than 50,000 inhabitants should be zero-emmission and zero-GHG-emission. So practically they want electric buses only, excluding gas-propulled buses.

[25] *http://www.gazzettaufficiale.biz/atti/2012/20120129/12A06333.htm*
[26] *http://www.gazzettaufficiale.it/atto/serie_generale/caricaDettaglioAtto/originario?atto.dataPubblicazioneGazzetta=2012-08-11&atto.codiceRedazionale=12A08941*
[27] *http://www.gazzettaufficiale.it/eli/id/2016/1/18/16G00006/sg*
[28] *http://biznes.onet.pl/wiadomosci/kraj/morawiecki-plan-elektromobilnosci-kolem-zamachowym-gospodarki/drv714*

5.6 United Kingdom: Transport and Climate Change Acts

The UK Transport Act[29], implemented in the year 2000, is a general Act covering the requirements for Local Transport Authorities to prepare Local Transport Plans and bus strategies for developing public transport, including the possibility of agreeing Quality Partnership Schemes with bus operators. It includes a provision in Part II Paragraph 142 that allows the condition "to reduce or limit noise or air pollution" to be included in the conditions for bus service operators. While the Act recognises the need to reduce emissions and noise and improve air quality, it does only encourage and not not specifilly request zero-emission buses. Also the UK Climate Change Act[30], implemented in the year 2008, aims to reduce the green house gases and to promote low carbon economy in the UK. The Act therefore puts in place a framework to achieve a mandatory 80 % cut in the UK's carbon emissions by 2050 (compared to 1990 levels), with an intermediate target of between 26 % and 32 % by 2020. While the transport sector is supposed to contribute a fair share of emission reductions, there are no specific provisions for public transport and zero-emission buses included.

[29] *http://www.legislation.gov.uk/ukpga/2000/38/part/II*
[30] *http://www.legislation.gov.uk/ukpga/2008/27/contents*

6 SECTION 3: TAXATION OF FUEL AND ENERGY

When analysing the numerous funding instruments in Section 1 categorized by the different stages of the process, the funding possibilities for operations and management definitely stand out since there is only one instrument in this category (*B13*). While operation and maintenance costs are of a relevant amount when it comes to the operation of zero-emission buses, incentives for these specific steps as part of operating zero-emission buses should be given in a different way. The cost of maintenance consist of both investment regular costs, since the mainenenace facilities and staff have to be adapted and adapt respectively to dealing with the different technologies in zero-emission buses. These investements related to systemic change should definitely be funded in order to incentivise the further take-up of zero-emission mobility. Operations, on the other hand, are purely regular costs which are mostly regulated with the help of taxation istruments. VDV therefore considers taxation of energy and especially electricity to play an important part when it comes to enhancing market-uptake of zero-emission buses.

6.1 European Union: Council Directive 2003/96/EC on the taxation of energy products and electricity

The Directive allows for the Member States to apply exemptions or reductions to the tax rate for energy products and electricity used for local public passenger transport including taxis (Article 5 third indent). Further in the text, the Directive states that *"[…] Member States may apply under fiscal control total or partical exemptions or reductions in the level of taxation to: […] e) energy products and electricity used for the carriage of goods and passenger by rail, metro, tram and trolley bus […]."* (Article 15 1e)

Clearly, the future technological developments enabling the operation of zero-emission buses were not yet known in the year 2003, when the Council Direcive was conceived. In light of the recent developments in the market of zero-emission buses and the dynamics to be expected, the public transport sector is now faced with the question of whether zero-emission buses can also be benefiting from the reduced tax rate at national level.

While some Member States argue that the exemptions should be applicable to zero-emission buses as they identify as local public passenger transport and therefore included in Article 5[31], they Commission (DG TAXUD) recommends making use of the procedure laid out by Article 19 enabling the Member States to "[…] introduce further policy exemptions or reductions for specific policy considerations." Since environmental policy is also one of the priorities of the Commission, this procedure should normally be successful. Nevertheless the fact remains that it would be an additional procedure requiring unanimity in the Council. It would therefore be preferable for zero-emission buses to be included and eligible for a reduced rate by default.

The problem arising from the seemingly exhaustive list included in Article 15 1e was already known during the last attempt for a revision of the Directive in the year 2015 but since the revision failed for lack of support the contradiction between Article 15 1e and 5 is still in the text. At the moment another attempt for revision still would not seem to be able to be passed unanimously in the Council and in the short-term this way does not seem the most promising.

VDV therefore considers, that the Commission should issue guidelines on the application stating that zero-emission buses are inherent in the text of Article 5 and should therefore benefit from reduced rates. This could be possibly done in the framework of the Directive

[31] Procedure of changing the national legislation is ongoing in Germany

2014/94/EU on the deployment of alternative fuels infrastructure implementation as the question is likely to come up again in the National Policy Frameworks to be submitted by the Member States at the end of the year.

The proposed alignment of the tax on energy for zero-emission buses with the reduced rate for rail rolling stock would not only mean that the discrimination would be eliminated, but also that the tax rate would be reduced to the minimum rate of 0.50 euros/MWh on the basis of Article 5 third indent of the above mentioned Council Directive. Article 5 does not include any restriction on energy products and allows relief down to the minimum tax rate of 0.50 euros/MWh in case of business use.

6.2 France

Public Transport in France is currently faced with meassures leading to an increase in the costs of electricity. The Domestic Tax on the Electricity Final Consumption (taxe intérieure sur la consommation finale d'électricité TICFE) is replacing the Contribution to the Public Supply of Electricity (contribution au service public de l'électricité CSPE). This contribution was introduced in the 2000s to compensate the electricity providers for additional costs arising from their obligations on the public supply of electricity. The TICFE offers reduced rates for "persons engaged in transport business of passengers and goods by rail, metro, tram, trolley and cable." The removal of the existing ceiling for the CSPE could nevertheless still introduce a significant increase in the contribution of public transport operators.

The second measure impacting the price of electricity is the New Organisation of the Electricity Market law (NOME) which establishes a capacity obligation system for all electricity suppliers to provide secure and balanced electricity supply especially in winter in the medium term. In a recent order, the implementation of the capacity obligation mechanism is planned for winter 2016-2017. Since it is the electricity supplier that carry the obligation based on consumption the additional costs will be passed on to the operators.

According to UTP's calculations both measures combined could result in an increase of costs amounting to EUR 4m.[32]

6.3 Germany

6.3.1 TAXATION OF DIESEL FUEL IN GERMANY

As users of electric mobility the transport companies push the technical development of vehicle construction, e.g. the reduction of weight by way of light-weight construction and optimisation of the small loads of the on-board power supply system. The diesel bus also profits significantly from this technical "bus optimisation". The fuel consumption of diesel buses has been reduced and they become more and more efficient and economically attractive to transport companies. Experts believe that the fuel consumption can be reduced even more. Moreover, the price for diesel fuel is low at present and will remain low in the near future. An energy tax to the amount of 470.40 euros/1 000 l is levied on diesel fuel pursuant to Clause 2 (1) No. 4b of the German Act on Tax on Energy. Pursuant to Clause 56 (1) No. 2 of this Act in combination with Clause 56 (2) No. 1 a tax relief of 54.02 euros/1 000 l can be granted for motor vehicles performing line-service transport pursuant to Clauses 42 and 43 of the German Law on Passenger Transport.

[32] Information received from UTP (Union des Transports Publics et Ferroviaires)

6.3.2 TAXES ON ENERGY CONSUMED BY PUBLIC TRANSPORT AND ENERGY SURCHARGES IN GERMANY

The purchase price for electricity is low, but electricity is subject to third-party costs outside the control of the transport companies. In the below table the taxes on electricity consumed by public transport as well as energy surcharges e.g. pursuant to the German Renewable Energy Act (EEG) are listed for the single modes of transport. The listed rates are valid in 2017. The rates with a blue background are standard rates and the ones with a green background are reduced rates.

	Urban/regional rail rolling stock	Trolleybus (electric bus)	Hybrid bus, battery bus (electric bus)	
Tax on energy	1.142 cents/kWh Relief purs. to Cl. 9 (2) Act on Tax on Energy		2.05 cents/kWh Standard rate	
Renewable energy surcharge in 2017	1.376 cents/kWh Limitation purs. to Cl. 65 of the EEG 2015	6.88 cents/kWh Standard rate		annual reassessment
Fees for access to electric supply networks in 2017	7.71 cents/kWh preliminary, weighted average			
Licence fee	1.35 cents/kWh average, differs locally			
KWKG Surcharge 2017	0.438 cents/kWh, reduced to 0.040 cents/kWh from 100 MWh/a			
StromNEV Surcharge 2017	0.388 cents/kWh, reduced to 0.050 cents/kWh from 1 GWh/a			
Offshore Surcharge 2017	- 0.028 cents/kWh, reduced to 0.038 Cent/kWh from 1 GWh/a			
Cl.18 AbLaV Surcharge 2017	0.006 cents/kWh			

Table 2 Overview over taxes on electricity used for public transport in Germany, valid in 2017

Thus, it is apparent that electric buses are discriminated considerably in Germany on account of buses with conventional drives. Above all, it should be the objective to overcome this discrimination and not to develop new privileges. Electricity consumed by public transport should be subject to the same regulations for tax on energy and renewable energy surcharge – irrespective of the mode of transport (see table below). Non-discrimination of hybrid buses, electric buses, trolleybuses and rail rolling stock ensures consistent administrative procedures with the authorities and the transport companies and reduces red tape. Consequently, the successful introduction of electric buses on the German market has to be based on a major disburdening in respect of taxes and surcharges. With the current modification of the law of taxation on energy and electricity, the German Parliament decided in June 2017 the alignment of tax on energy. Starting from 2018 all means of public transport will have the same reduced tax rate on energy, as recommended by VDV.

	Urban/regional rail rolling stock	Trolleybus (electric bus)	Hybrid bus, battery bus (electric bus)
Tax on energy	1.142 cents/kWh Relief purs. to Cl. 9 (2) Act on Tax on Energy --> **Alignment of relief**		
Renewable energy surcharge in 2017	1.376 cents/kWh Limitation purs. to Cl. 65 of the EEG 2015 --> **Extension of limitation**		

Table 3 Proposed taxation scheme on electricity used for public transport in Germany

7 CONCLUSION AND NEXT STEPS

As announced in the introduction, this draft report cannot yet provide an all-encompassing analysis of the regulatory and financial framework affecting the introduction of zero-emission urban bus systems because the development increasingly picks up speed. Naturally, the final report D51.6 will have a different set-up than this one and include additional information. VDV has managed to provide a comprehensive analysis of the German and EU situation and will seek to further extend the level of detailed insight into the other Member States:

- encourage an exchange experiences with national and EU funding instruments within the sector and provide feedback to representatives of funding institutions;
- analyse the funding systems in different Member States in conjunction with the EU level in order to identify a comprehensive arrangement;
- collect a list of requirements towards the “ideal” funding instrument for zero-emission buses.

7.1 Funding: advance and discuss the classification of funding tools with national and EU experts and develop a list of requirements for the “ideal” funding instrument for zero-emission buses

To date, no comprehensive aid arrangement has been developed for the introduction of zero-emission buses on the market in any of the countries analysed. As the transport companies have high extra investment costs for the introduction of zero-emission bus systems additional funding instruments on all levels are indispensable. However, it is imperative that the different levels of providers of financial support (regional, national, EU) harmonise their approach to the funding and act jointly.

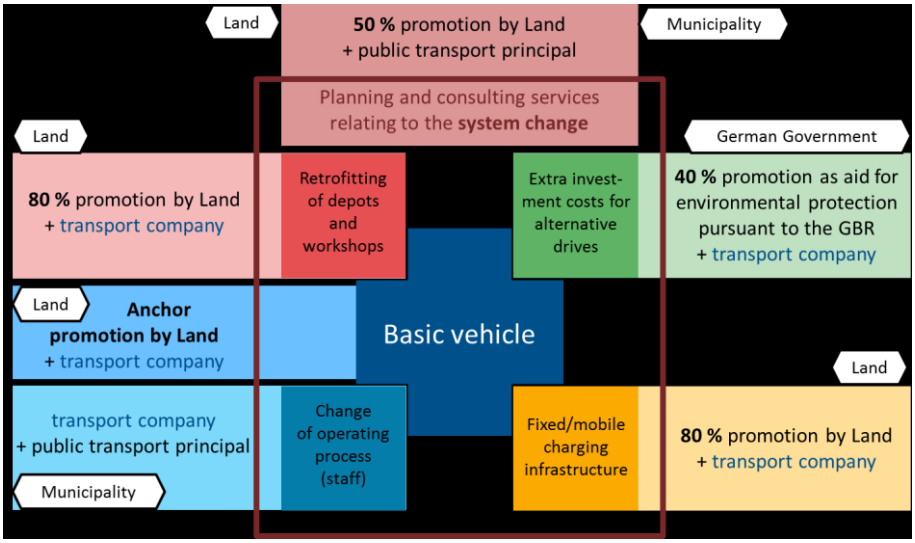

Figure 5 proposed funding strategy for the promotion of zero-emission buses

VDV has undertaken an analysis for the German funding tools and proposed an initial overall strategy for the promotion of the introduction of zero-emission buses on the market (see figure above). While this strategy will be discussed with experts from other Member

States in order to establish differences and commonalities, it is already clear today that several points of VDV's finding are valid also for other Member States, namely:

- The present research-oriented promotion programmes for the development of prototypes have to be followed by promotion programmes for the acquisition of zero-emission buses as fast as possible so that there will not be a time gap. Otherwise, the acquisition of new zero-emission buses will stop more or less rapidly for economic reasons.
- The national governments could promote concepts for the introduction of zero-emission buses in the form of aid for environmental protection pursuant to the GBER. Then the maximum aid is limited to 40 % of the extra investment costs occurring for zero-emission mobility. According to the European aid law higher funding quotes are not possible for the same objective without separate notification by the EU Commission. Therefore, the various funding authorities have to fund different eligible costs.

Furthermore experts from the public transport can exchange their experiences among themselves and identify good practices. The ultimate goal will be to collect a list of requirements establishing an "ideal" funding instrument for the introduction of zero-emission bus systems in European cities. For this purpose it is imperative to start a dialogue with the institutions providing the funding, such as the Commission, the EIB and the Department for Transport. ZeEUS partners therefore aims to gather relevant experts for zero-emission bus funding from the istitutions.

7.2 Analyse cities'/regions'/countries' strategies and instruments to procure zero-emission only from 2020/2025 as well as the National Policy Frameworks to be submitted by the Member States in the framework of the Directive 2014/94/EU on the deployment of alternative fuels infrastructure

Since the overview on legislative or strategic national acts impacting zero-emission buses showed that very few concrete acts drive the development and the situation is still dynamic with severall countries having recently having introduced or announced to introduce national acts it is very different to get a complete picture. One way forward to be explored with the European Commission is to have a closer look into the National Policy Frameworks to be submitted by the Member States at the end of the year 2016. Since measures and incentives to support the intrdocution of alternatively-fuelled vehicles will be included in the NPFs, this would be a very good basis for further discussion.

Another strand of developments to be taken into account is the decentralised development of many cities announcing their own emission reduction strategies, often including the target of procuring only low- or zero-emission buses from a certain point in time onwards. Relevant material on European cities through the ZeEUS partners will be collected: VDV has been already collecting examples of German cities. In order to analyse the impact these strategic targets have on public transport, the following issues will be ananlysed:

- How is the bus procurement financed
- What is the role of the public transport companies within the strategy
- What impact does the strategy have on the public transport company's planning
- Which other measures for the reduction of emissions are included
- How do the cities plan to procure the zero-emission bus systems (how many vehicles in what time frame: step-by-step vs. a large number at once, which vehicles and

infrastructure do they plan to procure: from one manufacturer vs. many manufacturers, etc.)

7.3 Create an overview over the energy taxation regimes in the Member States and analyse their impact on zero-emission mobility

The EU Commission has been recommended reduced tax rates for a long time, to promote the supply of certain services and as an incentive for certain behaviors. Social aspects, public transport and the environment are especially mentioned. In addition, the reduced tax rates should be institutionally applied to a whole category (KOM (2007) 380, p. 12 f). EU regulation permits reductions for local and long-distance transport. Since taxation is still mostly the competence of the Member States and systems differ considerably, VDV has previously created overviews over the taxation situation in different Member States. One example is the overview on the **value-added tax for public passenger transport** created in 2015/2016[33] (see below).

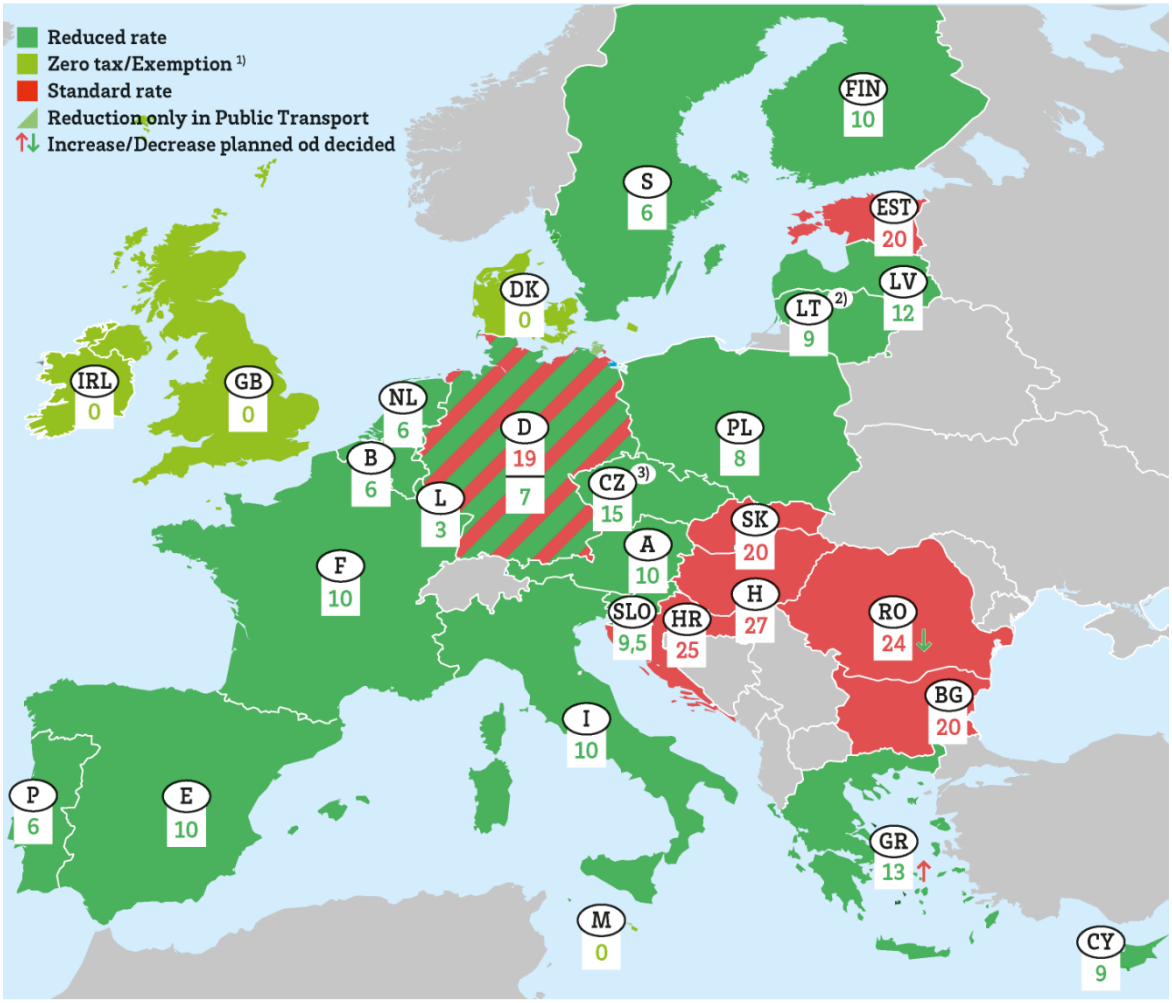

Figure 6 Overview over the level of value-added tax on public transport across Europe

In the EU average the value-added tax is reduced to one third. Particularly committed countries such as Great Britain, Ireland, Denmark, Malta or Luxembourg may even

[33] Internal study VDV, publication "The value-added tax rates in the EU member states", 1) including input tax reduction 2) public passenger transportation on regular routes 3) only regular transport

continue their tax rates below the minimum rate. Germany allow a reduced rate only for local traffic.

Since 2003 there`s an effective minimum **tax rate for gas oil used as fuel** in all European member states.[34] Since 2013 the minimum tax rate has an amount of 330.00 euros/1,000 l (red pillar in figure below). The figure below illustrate the tax rates for gas oil used as fuel in all member states. The deep-blue pillars show the standard rates and the light-blue pillars in some states show the reduced rates for commercial use.[35]

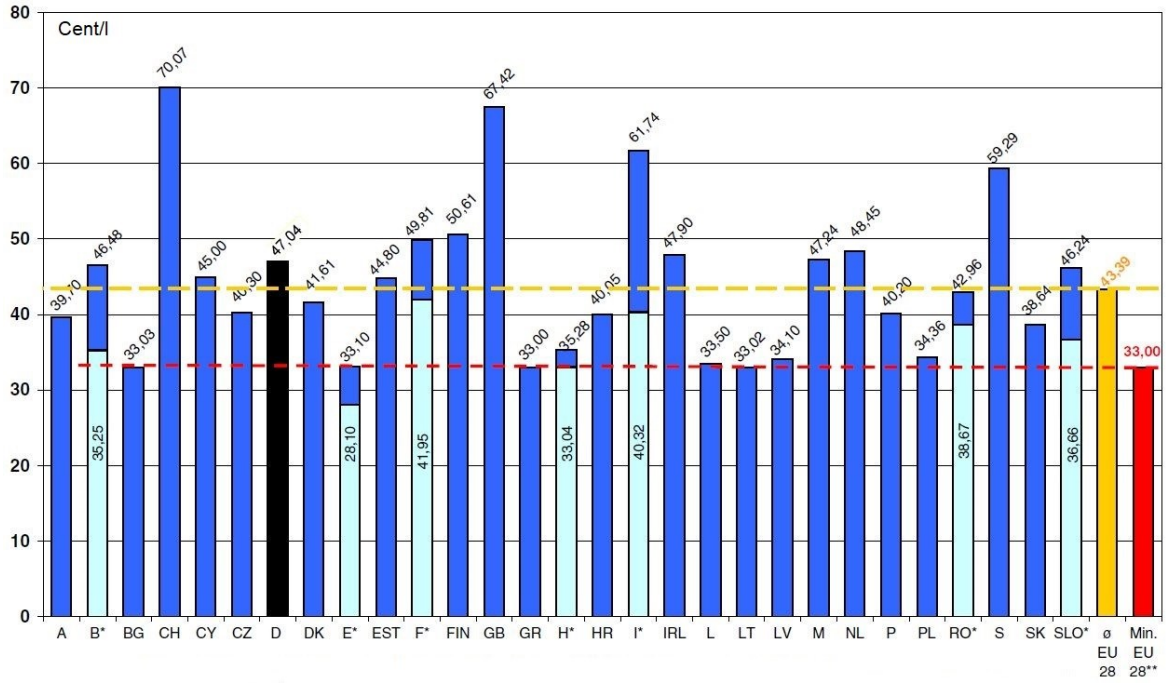

Figure 7 Overview over the level of tax for gas oil used as fuel across Europe

According to the Excise Duty Tables for Energy products and Electricity of the EC, the four member states Belgium, Germany, Finalnd and Italy have reduced rates for gas oil used as fuel for local public passenger transport (rates see table below).[36] There`s no full overview, because the reduced rates aren`t applicable in the Duty Table for all member states. The amount of compensation is quiet different between the several states.

	Rates for use as fuel [EUR/1,000 l]	**Reduced rates for PT [EUR/1,000 l]**
Belgium	507.6529	352.5428
Germany	470.40	416.38
Finland	530.20	228.70
Italy	617.40	403.22

Table 4 Overview over reduced tax rates for gas oil used as fuel in PT

The level of the **electricity tax rate** is a key factor for the economic successfull operation of electric busses. The European Energy Tax Directive is the necessary framework in the

[34] Annex I of Directive 2003/96/EC
[35] EC Excise Duty Tables, part II Energy products and Electricity, 1.1.2017; figure by Bundesverband Güterkraftverkehr Logistik und Entsorgung e. V.
[36] EC Excise Duty Tables, part II Energy products and Electricity, 1.1.2017

European law. Article 5 of the Council Directive 2003/96/EC of 27. October 2003 permits the reduction of the energy tax rate to the EU minimum tax rate of 0,50 euros/MWh or the full exemption from the energy tax for public transport. The following overview points the rates of energy tax for public passenger transport created in 2016/2017[37] (see below).

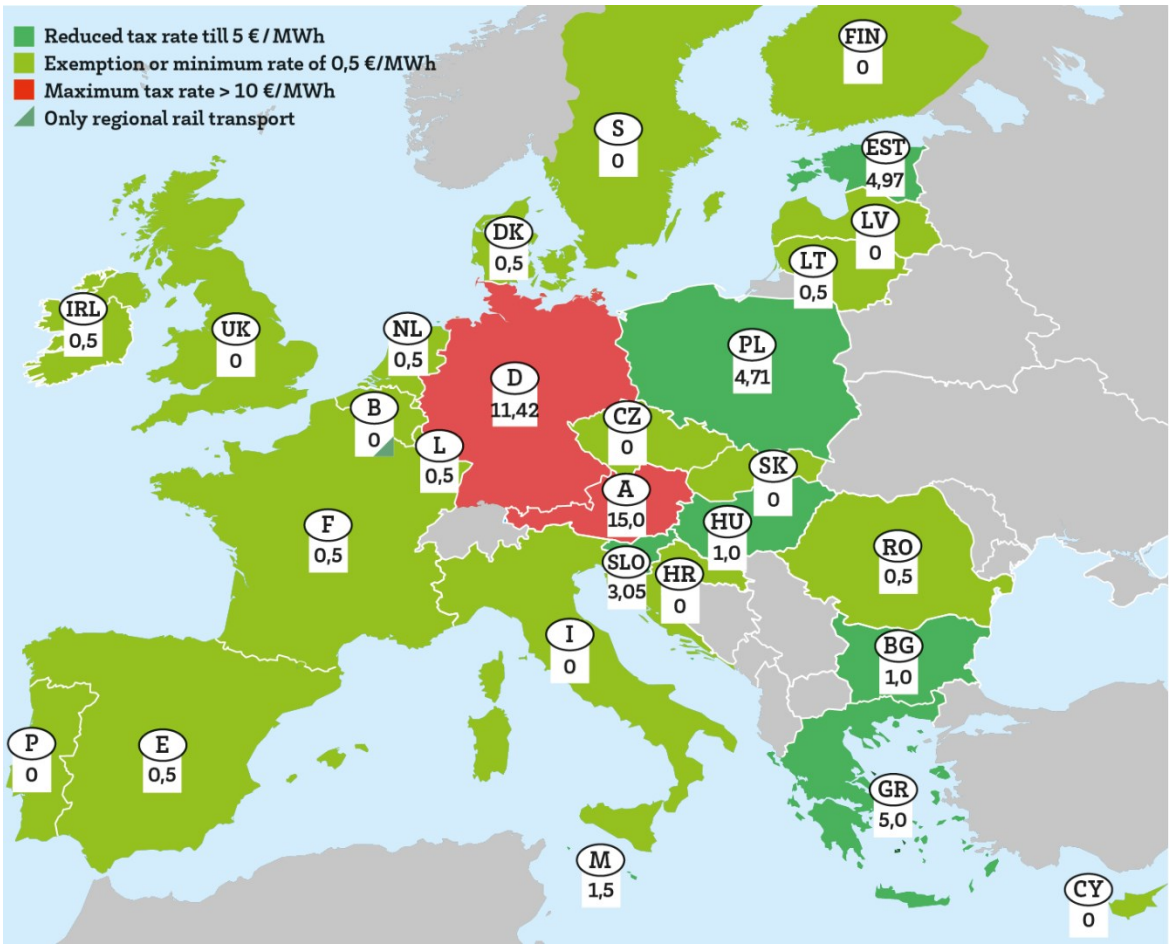

Figure 7 Overview over the level of energy tax on public transport across Europe

25 of the 27 EU Member States make use of the reduction options. 18 of the EU countries grant the total exemption from the energy tax ore use the minimum tax rate of 0,50 euros/MWh, e.g. Portugal, Spain, France, Italy, the Netherlands, Sweden and Finland. A further seven EU member states raise an energy tax of 5,0 euros/MWh or less, e.g. Poland, Estonia, Hungary or even Greece. Only Germany and Austria have a tax rate above 10,0 euros/MWh and belong to the tail lamp in Europe.

Opposite the other EU members, Germany is altogether a high-tax country for electric public transport. The other EU members use fiscal guidance more consequent to promote electric public transport and especial electric busses.

[37] Internal study VDV; EC Excise Duty Tables, July 2016

8 APPENDIX:

In this appendix the complete sheets of funding instruments are reported.
The following information are included in each sheet.

Name of the programme
Budget:
Timeframe:
Form of funding:
Rate of funding:
Applicants:
Apply to:
Modalities
Funded:
Examples: (if applied)

A1 URBACT III

Budget:	EUR 96,3m	**Timeframe:**	2014-2020
Form of funding:	☒Grant ☐Loan		
Rate of funding	— more developed regions: max. 70 % — less developed & transition regions: 85 % — Norway&Switzerland: 50 %		
Applicants:	— Networks of 4-6 cities from at least three different MS+Switzerland+Norway — public transport operators and authorities can be part of an urban network		
Apply to:	European Commission		
Modalities	— calls for projects are published online *http://urbact.eu/open-calls-networks* — project proposal in the first six months — implementation of the project in 24 months		
Technical Assistance | RDI | Procurement | Operations			
Funded:	Exchange in action, implementation and implementation networks as well as invitation of experts in the field of: — urban mobility — low CO_2 emissions economy		
Example:	Electric Vehicles in Urban Europe II		
Evaluation:	Very limited use for zero-emission buses so far		

A2 ELENA European Local ENergy Assistance

Budget:	Funded through H2020	**Timeframe:**	2014-2020
Form of funding:	☒Grant ☐Loan		
Rate of funding	Max. 90 %		
Applicants:	Local and regional authorities		
Apply to:	European Investment Bank (EIB)		
Modalities	Applications can be submitted online via *http://www.eib.org/products/advising/elena/index.htm*		
Technical Assistance | **RDI** | Procurement | Operations			
Funded:	Grant only for technical assistance to support projects in the fields of energy efficiency, use of renewables, smart grids and urban public transport (use of alternative fuels etc.). Creation of local and regional investment programmes worth at least EUR 30 Mio.		
Examples:	**Barcelona** – 2011-2014: Transports Metropolitans de Barcelona, retrofit existing diesel and GNC buses into hybrids; total costs EUR 2.26 Mio.; 85 % ELENA contribution[38] **Provinces North Brabant, Limburg** – 2012-2015: cities of Helmond, Eindhoven, 's-Hertogenbosch, Tilburg; external support to implementing successful tenders for PT concessions featuring large-scale zero emission investments; total costs EUR 2.73 Mio.; 90 % ELENA contribution[39]		

[38] *http://www.eib.org/products/advising/elena/projects/index.htm* | Factsheet Energy Efficient Bus Network for Barcelona
[39] *http://www.eib.org/products/advising/elena/projects/index.htm* | Factsheet The Zero Emission Buses in Netherlands

A3 Horizon 2020

Budget: ~ EUR 80bn	**Timeframe:** 2014-2020 2016/2017 (Work Programme)
Form of funding:	☒Grant ☐Loan
Rate of funding	· Research and Innovation: 100 % · Innovation: 70 % (non-profit 100 %) · Demonstrations: 70 % · Public procurement of innovative technology: 20 %
Applicants:	· In general several partners from several member states
Apply to:	European Commission
Modalities	· Calls for projects are created on the basis of the multi-annual working programmes and published online : *https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/master_calls.html*
Technical Assistance | **RDI** | **Procurement** | Operations	
Funded:	· Relevant calls: — Mobility for growth — Green vehicles
Examples:	**ZeEUS**[40] both for RDI and procurement **Eliptic** on electrification of public transport in cities[41] with three thematic pillars: integration of electric buses, upgrading and/or regenerating electric PT systems, multi-purpose use of electric PT infrastructure in ten European cities London, Brussels, Barcelona, Warsaw, Gdynia, Bremen, Eberswalde, Leipzig, Oberhausen, Szeged with eleven use cases in the electric bus pillar *http://www.eliptic-project.eu/*

[40] *http://zeeus.eu/*
[41] *http://www.eliptic-project.eu/*

A4 Fuel Cell Joint Undertaking

Budget:	EUR 940m	**Timeframe:**	2014-2020
Form of funding:	☒Grant ☐Loan		
Rate of funding	— Research and innovation: max. 100 % — Innovation: max. 70 % — Coordination and Support Action: max. 100 %		
Applicants:	— Legal entities established in Member States and countries associated with H2020 as well as in third countries		
Apply to:	— the Fuel Cell Joint Undertaking is a PPP comprised of a board, an executive director and several advisor bodies		
Modalities	Calls for proposals are published online: *http://www.fch.europa.eu/page/call-2016*		
Technical Assistance | **RDI** | **Procurement** | Operations			
Funded:	Prototyping and testing and demonstrating of fuel cell and hydrogen technology in the fields of: — transport — energy		
Examples:	**Hamburg** – 2010-2016: test and exchange of experiences about fuel cell busses; 2015-2017: scientific study of hydrogen infrastructure for a bus depot with 260 fuel cell busses and participation at a bus commercialisation study[42] **Stuttgart** – 2014: participation at a bus commercialisation study; 2015-2016: participation at the New Bus Fuels Study of filling stations for hydrogen bus fleets; detailed commercialisation study		

[42] *http://www.hamburg-news.hamburg/en/cluster/renewable-energy/hamburg-fully-convert-fuel-cell-operated-buses-202/*

A5 CIVITAS

Budget:	> EUR 430m	**Timeframe:**	2014-2020
Form of funding:	☒Grant ☐Loan		
Rate of funding	Depends on the call		
Applicants:	Cities		
Appply to:	European Commission		
Modalities	Calls for projects and other offers are published online: *http://www.civitas.eu/all-news-page*		
Technical Assistance | **RDI** | **Procurement** | Operations			
Funded:	— clean vehicles — alternative fuels — urban passenger and freight		
Example:	**ELIPTIC** see A3 above *http://www.eliptic-project.eu/*		

A6 LIFE

Budget:	EUR 3.4bn	**Timeframe:**	2014-2020 2014-2017 (Work Programme)
Type of funding:	☒Grant ☐Loan		
Applicants:	Authorities, companies, NGOs – many partners from regional, national or cross-border level		
Apply to:	European Commission		
Modalities	Calls for projects are published online: *http://ec.europa.eu/environment/life/funding/life.htm*		
Technical Assistance | **RDI** | Procurement | Operations			
Funded:	— Environment and resource efficiency — Alternative fuels technologies for public transport		
Example:	**Grenoble** – 2014-2017: LIFE BeeBus; test and demonstration of an electric BRT bus prototype (18 metres) designed for quick recharging during stops at passenger stations; installation of quick charging station at seven bus stops (mainly financed by SMTC Grenoble); establish a central management system for energy and operation supervision; budget EUR 7.04m, EU contribution EUR 2,27m [43]		

[43] *http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4871*

A7 Cohesion Fund

Budget:	EUR 63.4bn	**Timeframe:**	2014-2020
Form of funding:	☒Grant ☐Loan		
Rate of funding	max. of 85 % of the eligible costs		
Applicants:	Public/(private) entities from Member States with a gross national income (GNI) per inhabitant below 90 % of the EU average:		
	— Bulgaria — Croatia — Cyprus — Czech Republic — Estonia	— Greece — Hungary — Latvia — Lithuania — Malta	— Poland — Portugal — Romania — Slovakia — Slovenia
Apply to:	National or Regional Administration		
Modalities	— funding priorities determined within Partnership agreements between the European Commission and Member States — concrete measures and modalities for application determined by Member States/Regions in thematic Operational Programmes		
Technical Assistance | RDI | **Procurement** | Operations			
Funded:	— TEN-T networks (CEF) — Projects related to energy or transport, which benefit the environment: — energy efficiency — use of renewable energy — sustainable transport		
Example:	**Poland** is expected to use about PLN 40bn of funding on low carbon transport. In cities with tram system investments in rail infrastructure will be preferred, in other cities other low-carbon forms of transport that meet the standard of at least EURO VI will be financed. Priority will be given, however, to the purchase of vehicles with alternative propulsion systems (electric, hybrid, biofuel, hydrogen, etc.).[44]		

[44] Information from IGKM (Izba Gospodarcza Komunikacji Miejskiej – Polish Public Transport Association)

A8	*European Regional Development Fund (ERDF)*		
Budget:	> EUR 185bn	**Timeframe:**	2014-2020
Form of funding:	☒Grant ☐Loan		
Rate of funding	— less developed regions (and outermost regions): max 85 % — transition regions: max. 60 % — more developed regions: max. 50 %		
Applicants:	Public and private entities from EU Member States		
Apply to:	— National or regional administration		
Modalities	— funding priorities determined within Partnership agreements between the European Commission and Member States — concrete measures and modalities for application determined by Member States/Regions in thematic Operational Programmes		
Technical Assistance | **RDI** | **Procurement** | Operations			
Funded:	— the low-carbon economy — Infrastructure (energy, environment, transport and ICT) — For zero-emission buses: poss. infrastructure and additional costs for low-emission vehicles		
Examples:	**Poland** is expected to use about PLN 40bn of funding on low carbon transport. In cities with tram system investments in rail infrastructure will be preferred, in other cities other low-carbon forms of transport that meet the standard of at least EURO VI will be financed. Priority will be given, however, to the purchase of vehicles with alternative propulsion systems (electric, hybrid, biofuel, hydrogen, etc.).[45] Saxony-Anhalt in **Germany** will spend EUR 6.17m for funding alternative drives in public transport.[46] Thuringia is preparing a similar funding programme. Lower Saxony will spend EUR 10m for funding alternative fuels in road, rail and inland waterway transportation in general.[47] Brandenburg and Hesse have an ERDF-funding programme for mobility in general including alternative drives.		

[45] Information from IGKM (Izba Gospodarcza Komunikacji Miejskiej – Polish Public Transport Association)
[46] Ministery of land development and transportation Saxony-Anhalt: funding directive for vehicles with alternative drives in public transport, 16.6.2017
[47] Ministery of economy, labour and transportation Lower Saxony: funding directive for alternative fuels in road, rail and inland waterway transportation, 26.5.2016

A9 Connecting Europe Facility – Urban Nodes

Budget:	EUR 100m (EUR 50m for cohesion)	**Timeframe:**	2014-2020
Form of funding:	☒Grant ☐Loan		
Rate of funding	— Studies: 50 % — Works: 20 % — Cohesion: 85 % for all kind of project		
Applicants:	EU Member States		
Apply to:	— The European Commission's Innovation and Networks Executive Agency (INEA)		
Modalities	— Project should be discussed with competent TEN-T coordinator for the respective corridor; if possible joint projects with urban nodes along a corridor — Calls for projects are published online: *https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/apply-funding*		
Technical Assistance | RDI | **Procurement** | Operations			
Funded:	Projects with a view to realising the TEN-T network, i.e. especially connections between corridors and modes, last mile, tackling bottlenecks, connect long-distance to regional/local traffic, reduction of CO_2 and noise emissions, etc.		
Evaluation:	Feedback from members after calls suggests that PT urban nodes projects were rejected due to a too small budget; the CEF-projects in the field "Actions implementing transport infrastructure in nodes of the core network, including urban nodes" are mostly focussed on urban/suburban railway and tramway infrastructure, multimodal infrastructure and studies		
Example:	No use for zero-emission buses so far		

A10	*Urban Innovative Actions (UIA)*		
Budget:	EUR 372m	**Timeframe:**	2015-2020
Form of funding:	☒Grant ☐Loan		
Rate of funding	Max 80 % (maximum of EUR 5m)		
Applicants:	Cities with > 50,000 inhabitants		
Apply to:	A permanent secretariat of the Region-Hauts-de-France in Lille on behalf of the European Commission; UIA is a initiative based on article 8 of ERDF		
Modalities	Calls for proposals are selected on the basis of the urban agenda and published online: *http://www.uia-initiative.eu/en/call-proposals*		
Technical Assistance | RDI | **Procurement** | Operations			
Funded:	innovative solutions, possible higher risks for projects tackling problems in the field of: — energy transition — mobility		
Evaluation:	The first call did not include mobility as eligible theme[48]		
Example:	No projects in the UIA topic urban mobility at all, therefore no zero-emission bus projects		

[48] *http://www.uia-initiative.eu/en/call-proposals*

A11	*European Energy Efficiency Fund (EEEF)*		
Budget:	EUR 265m	**Timeframe:**	2014-2020
Type of funding:	☒Grant ☒Loan (guarantee, etc.)		
Projects:	Projects worth EUR 5-25m		
Applicants:	Local and regional authorities, public and private companies carrying out public tasks		
Apply to:	European Investment Bank (EIB), European Commission, Deutsche Bank, Gruppo Cassa depositi e prestiti		
Modalities	Applications can be checked for eligibility and submitted online*: http://www.eeef.eu/home.html*		
Technical Assistance | RDI | **Procurement** | Operations			
Funded:	Saving at least 20 % of CO_2 emissions in — public transport — energy efficiency — renewable energies — alternative fuels Also includes a facility for technical assistance		
Examples:	EEEF provided a refinancing facility to Banca Transilvania for a green on-landing programme to support energy efficiency and renewable energy investments of the public sector in Romania; **Cluj** – 2013: replacing five of 50 old trolley-buses (most of them over 20 years old) with 50 % lower energy consumption; sub-loan size EUR 2.1m[49]		

[49] *http://www.eeef.eu/tl_files/downloads/Annual_Reports_epaper/Annual_Report_2014/*

A12	*EIB - Loans in the field of transport and infrastructure*
Type of funding:	☐Grant ☒Loan (guarantee, etc.)
Applicants:	Public and private entities
Apply to:	European Investment Bank (EIB) or partner banks depending on the size of the project (see below)
Modalities	— Projects worth > EUR 25m: directly apply to EIB — Projects worth < EUR 25m: apply to EIB partner banks in the Member States
Technical Assistance | **RDI** | **Procurement** | Operations	
Funded:	— infrastructure — rolling stock — new technologies — RDI
Evaluation:	**Las Palmas** – EUR 50m loan with the municipality of Las Palmas, Gran Canaria (Spain) and the municipal transport company Guaguas; construction of a new 11,7 km long BRT system including new stops and stations, traffic control centre and 17 hybrid or electric busses, the loan has an EFSI guarantee[50] **Riga** – EUR 75m loan for modernization of the tramway network (acquisition of 20 low floor trams, modernization of the existing tramway infrastructure and depot) and acquisition of ten hydrogen fuel cell buses (HFC) and ten trolleybuses with HFC range extender, building of a hydrogen production and refuelling station[51]

[50] *http://www.eib.org/projects/sectors/transport/index.htm* | Factsheet Las Palmas Bus Rapid Transit
[51] *http://www.eib.org/projects/sectors/transport/index.htm* | Factsheet Riga Transport Company Trams

	A13 JESSICA Joint European Support for Sustainable Investment in City Areas
Timeframe:	2014-2020
Form of funding:	☐**Grant** ☒**Loan (guarantee, etc.)**
Budget:	Member States can decide to convert parts of their ERDF funds to Urban Development Funds
Applicants:	Local and regional authorities, public-private partnerships
Apply to:	The respective national Urban Development Fund
Technical Assistance | RDI | **Procurement** | Operations	
Funded:	public-private partnerships and projects promoting sustainable urban development in the field of urban infrastructure – including transport, energy
Examples:	The **Spanish** fund JESSICA F.I.D.A.E. is a fund financed by the EIB and supported by ERDF; the fund support projects for sustainable urban development, energy efficiency and the use of renewables; total budget EUR 123m; co-financed by public and private grants; transport is one of the four financed sectors of the fund [52]

[52] *http://www.idae.es/index.php/relcategoria.3957/id.833/relmenu.408/mod.pags/mem.detalle*

A14	*European Fund for Strategic Investment (EFSI) "Juncker Plan"*
Form of funding:	☐**Grant** ☒**Loan (guarantee, etc.)**
Budget:	— EU: EUR 16bn guarantee — EIB: EUR 5bn
Applicants:	Public and private entities, other banks or funds etc.
Apply to:	European Investments Bank with support from the European Investment Advisory Hub and the Commission
Modalities	— See A12 for EIB loans - applications can be submitted online and have to undergo the regular EIB eligibility and bankability checks — It is advisable to contact the European Investment Advisory Hub (EIAH) for support: *http://www.eib.org/eiah/index.htm*
Technical Assistance | **RDI** | **Procurement** | Operations	
Funded:	Bankable projects that are in line with EU policy goals with higher risk in the field of — strategic infrastructures incl. transport and energy
Examples:	**Las Palmas** – Construction of a new BRT-system including 17 hybrid or electric busses[53]

[53] http://www.eltis.org/discover/news/eib-fund-brt-las-palmas-spain

B1 National Hydrogen and Fuel Cell Technology Innovation Programme Phase II

Budget:	EUR 250m	**Timeframe:**	2017-2019
Type of funding:	☒Grant ☒ Public-private partnership		
Eligible:	Companies, industry, research, operators nationwide		
Funded by:	Federal Ministry of Transport and Digital Infrastructure; Federal Ministry of Economy and Technology		
Technical Assistance | **RDI** | **Procurement** | Operations			
Funded:	introduction of hydrogen as a climate-neutral secondary energy source and the fuel cell technology		
Evaluation:	Vehicles (road, track and water) and planes are only one of five purpose of funding		
Information:	*https://www.now-gmbh.de/de/nationales-innovationsprogramm/foerderprogramm*		
Examples:	**Phase I 2014-2016:** **Stuttgart** – Pilot test with three fuel cell busses, use of a hydrogen filling station, qualification, establishment of service facilities **Phase II 2017-2019:** no operational projects, first call for vehicles is open until 30.7.2017		

B2 National Climate Protection Initiative: Renewably Mobile

	Timeframe: 2014-2017
Type of funding:	☒Grant ☐ Loan (guarantee, etc.)
Eligible:	PTOs and PTAs nationwide
Funded by:	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
Technical Assistance | RDI | **Procurement** | Operations	
Funded:	field trials; cooperation of electric vehicles and charging power supply systems (charging infrasturcture); rollout with ecological standards
Evaluation:	six electric busses and three plug-in hybrid busses
Information:	*http://www.erneuerbar-mobil.de/en*
Examples:	**Hamburg Elctric Bus Demonstration** Installation of the 9,3 km long Innovation Bus Linie No. 109 in Hamburg; trial of three plug-in hybrid busses and three electric busses; installation of charging infrastructure at terminal stops, validation oft he technical infrastructure and serviceability *http://www.erneuerbar-mobil.de/projekte/held* **Emission-free public transport in Hannover** Pilot test with three electric busses with opportunity charging at the terminal stops with electricity out off the Hannover tramway grad *http://www.erneuerbar-mobil.de/projekte/e-busse-hannover*

B3 Funding Directive Electromobility

		Timeframe:	2015-2019
Type of funding:	☒Grant ☐ Loan	**Funding rate:**	80 % for feasibility studies (authority)
Eligible:	Local and regional authorities, public bodies, companies		
Modalities:	Calls for projects published online		
Funded by:	Federal Ministry of Transport and Digital Infrastructure		
Technical Assistance | RDI | **Procurement** | Operations			
Funded:	Extra-costs for battery-electric vehicles and publically accessible charging infrastructure as well as feasibility studies and related R&D activities;		
Evaluation:	Aims to support market uptake but funding rate is rather low and programm not specifically intended for PT		
Information:	*https://www.now-gmbh.de/de/modellregionen-elektromobilitaet/foerderrichtlinie-2015*		
Examples:	**1st call for vehicles and charging infrastructure:** **Bonn** – five articulated battery-electric busses **Trier, Borkum** – feasability study for electric mobility **2nd call for vehicles and charging infrastructure:** ten projects with overall 25 electric busses **Hamburg** – ten articulated battery-electric busses **Bottrop, Lübeck** – each with one electric bus **Dresden, Leipzig, Geilenkirchen** – feasability study for electric mobility or development of software tools		

B4 GAZELA BIS – low emission urban public transport

Budget:	PLN 300m ~ EUR 68m	**Timeframe:**	2016-2023
Type of funding:	☒Loan up to PLN 50m (~ EUR 11m) at a preferential interest rate, can be combined with EU funding, funding period: max. 15 years ☐ Grant		
Eligible:	Cities indicated in the Territorial Contracts concluded with the provinces as organizers of public transport		
Funded by:	National Fund for Environmental protection and water management (NFOSiGW)		
Technical Assistance | RDI | **Procurement** | Operations			
Funded:	trolleybuses and hybrid electric; charging infrastructure – projects worth at least PLN 5m (~ EUR 1,2m)		
Information:	*https://www.nfosigw.gov.pl/o-nfosigw/aktualnosci/art,752,nowe-programy-w-ofercie-narodowego-funduszu.html*		

B5 MOVELE - Strategy for Electric Vehicle Support

		Timeframe:	2014-2015
Type of funding:	☒ Grant ☐ Loan	**Rate of funding**	Fixed sum
Eligible:	Private customers for cars and motorcycles, PTOs and PTAs for buses		
Funded by:	Ministry for Industry, Energy and Tourism; Agency for Diversification and Energy saving (IDAE)		
Technical Assistance | RDI | **Procurement** | Operations			
Funded:	Direct financial incentives for pure electric vehicles (EUR 20,000 for buses that have a range of > 60 km)		
Evaluation:	Quite popular with cars but rarely used for buses because of the small amount of total costs covered		

B6 MOVEA – Integral Strategy for Alternative Fuels Vehicle Support

Budget:	EUR 16,6m	**Timeframe:**	2016 (Oct)
Type of funding:	☒ Grant ☐ Loan	**Rate of funding**	Fixed sum
Eligible:	Private customers for cars and motorcycles, PTOs and PTAs for buses		
Funded by:	Ministry for Industry, Energy and Tourism; Agency for Diversification and Energy saving (IDEA)		
Technical Assistance | RDI | **Procurement** | Operations			
Funded:	Promotion of electric & other alternatively-fuelled vehicles (EUR 20,000 for buses that have a range of > 60 km)		
Evaluation:	See above B5		
Information:	*http://w41.bcn.cat/en/aprovat-el-pla-movea-per-2016/*		

B7 State support for sustainable urban environments - urban contracts

Budget:	EUR 214m	**Timeframe:**	2015-2018
Type of funding:	☒ Grant ☐ Loan	**Rate of funding**	max. 50 % In return, municipalities make a corresponding long-term investment in housing or sustainable transport
Eligible:	municipalities		
Funded by:	Swedish Transport Administration		
Technical Assistance | **RDI** | **Procurement** | Operations			
Funded:	Investments in local and regional public transport (decarbonisation through modal shift), that are public transport that are innovative, of strong capacity and energy efficient and lower greenhouse gas emissions; demonstration of new technologies, poss. charging infrastructure if part of a larger strategy incl. bus lanes, signalling etc.		
Evaluation:	Limited funding possibilities for electric buses		
Information:	*http://www.trafikverket.se/for-dig-i-branschen/Planera-och-utreda/Planerings--och-analysmetoder/Finansieringsmetoder/statligt-stod-for-hallbara-stadsmiljoer---stadsmiljoavtal/*		

B8 Klimatklivet

Budget:	EUR 78m **Timeframe:** 2015-2018
Type of funding:	☒ Grants for parts of investments, which are not by itself profitable (in accordance with EU state aid rules) ☐ Loan
Eligible:	Stakeholders on local level, such as cities, municipalities, counties, companies or organisations
Funded by:	Swedish Environmental Protection Agency
Technical Assistance | RDI | **Procurement** | Operations	
Funded:	Measures that can get financial support are real efforts to reduce greenhouse gas emissions (i.e. exceed legal requirements) within inter alia the transport sector. For PT: electric vehicles and charging infrastructure. The funding is allocated to specific projects/investments/initiatives in competition between applicants, based on best climate benefit per invested unit.
Evaluation:	Not dedicated to PT; Assessment of measures with the greatest climate benefit based on the greatest reduction of greenhouse gas emissions per investment crown. That means that calculating the climate benefits are decisive for the measures that can be supported. The calculation will show how GHG emissions changed by the action. A common example is that the emissions due to the use of different types of energy without the investment and the investment during the life of the measure are compared. Stockholm PTA cannot receive funding under Klimatklivet as they cannot proove the added value for the climate: 91 % of the fleet is operating on renewable fuels like biogas, ethanol, biodiesel so that the setting op of charging infrastructure and investment in electric buses would not have a positive impact on the climate.
Information:	*http://www.naturvardsverket.se/klimatklivet*

B9 Air quality grant scheme

Budget:	>£ 52m £ 0.5m	**Timeframe:**	Since 1997 2015/2016
Type of funding:	☒ Grant ☐ Loan		
Eligible:	Local authorities		
Funded by:	Department for Environment, Food & Rural Affairs		
Technical Assistance | RDI | Procurement | Operations			
Funded:	Feasibility studies, awareness raising, monitoring the air quality etc.		
Evaluation:	small sums not designed to purchase or upgrade buses		
Information:	*https://www.gov.uk/government/collections/air-quality-grant-programme*		

B10	*The Green Bus Fund*		
Budget:	£ 30mio pa	**Time frame:**	2009-2013
Type of funding:	☒ Grant ☐ Loan	**Rate of funding:**	up to 50 % of extra costs (as compared to standard diesel)
Eligible:	bus operators and local authorities		
Funded by:	Department for Transport		
Technical Assistance | RDI | **Procurement** | Operations			
Funded:	Low carbon buses that meet Low Carbon Emission Bus (LCEB) target for GHG emissions - a 30 % reduction compared to a Euro III diesel bus of the same capacity		
Evaluation:	In total, four rounds of the fund, worth £ 87m, will have delivered more than 1,200 new low carbon buses in England, saving around 28,000 tonnes of CO_2 emissions per year. It was not specifically designed for electric buses - other low emission vehicles are eligible for funding assistance.		
Information:	*http://webarchive.nationalarchives.gov.uk/+/www.dft.gov.uk/pgr/regional/buses/greenbusfund/revisedgreenbusfund.pdfhttps://www.gov.uk/government/collections/background-to-the-green-bus-fund*		

B11	*Clean Bus Technology Fund*		
Budget:	£ 6.8m	**Time frame:**	2015
Type of funding:	☒ Grant ☐ Loan	**Rate of funding:**	max. £ 500,000
Eligible:	Bus operators, local authorities		
Funded by:	Department for Transport		
Technical Assistance | RDI | **Procurement&Retrofitting** | Operations			
Funded:	upgrading buses with technology to reduce emissions in areas of poor air quality		
Evaluation:	In 2014 £ 8m was provided to retrofit over 1,200 buses Unfortunately replaces the Green Bus Fund with fewer funds and limited uses		
Information:	*https://www.gov.uk/government/collections/clean-bus-technology-fund*		

B12 Low Emission Bus Scheme (LEBS)

Budget:	£ 30m	**Time frame:**	2016-2019
Type of funding:	☒ Grant ☐ Loan	**Rate of funding:**	— Max. 90 % of the cost difference between the low-emission bus and the standard diesel equivalent — max. 75 % of purchase and installation on infrastructure
Eligible:	Bus operators, local authorities		
Funded by:	Office for Low Emission Vehicles (OLEV); Department for Transport		
Technical Assistance | RDI | **Procurement** | Operations			
Funded:	Low and ultra low emission vehicles (ULEVs) and their related infrastructure ideally up to £ 5m Requirements: - Carbon: produce at least 15 % less greenhouse gas emissions (GHG) than the average conventional Euro V equivalent diesel bus of the same total passenger capacity; and - Air Quality: meets or exceeds Euro VI emissions regulations		
Evaluation:	— OLEV has a techniology neutral approach — Retrofitting of buses is excluded		
Information:	*https://www.gov.uk/government/publications/low-emission-bus-scheme*		

B13 Bus Service Operators Grant (BSOG)
Low Carbon Electric Bus (LCEB) incentive

Budget:	~ £ 345m pa
Type of funding:	☒ Grant ☐ Loan **Rate of funding:**
Eligible:	— TfL — bus operators — community transport organisations
Funded by:	Department for Transport
Technical Assistance | RDI | Procurement | **Operations**	
Funded:	— Recovery of fuel costs in order to keep fares down and subsidize lines — Since 2009 operators can also apply for the LCEB incentive which provides £ 6p per kilometre (including dead kilometres) on top of the BSOG payment for all — An LCEB is a bus certified saving the equivalent of 30 % in GHGs compared to an equivalent EURO III diesel bus
Evaluation:	— Positive: helps to keep the fares low and provide bus service to financially unfeasible routes — Negative: even with LCEB incentives it still favours the use of diesel buses
Information:	*http://www.lowcvp.org.uk/initiatives/lceb/lceb-pol/bsog.htm*

C1 Model Regions for Electric Mobility

	Timeframe: Since 2009
Type of funding:	☒Grant ☐ Loan (guarantee, etc.)
Eligible:	metropolitan model regions: Berlin/Potsdam, Bremen/Oldenburg, Hamburg, Munich, Rhine-Main, Rhine-Ruhr, Saxony (Dresden/Leipzig), Stuttgart, Saarland, Mecklenburg-Vorpommern and Central Germany
Funded by:	Federal Ministry of Transport and Digital Infrastructure
Technical Assistance | **RDI** | **Procurement** | Operations	
Funded:	projects for the promotion of electro-mobility; electric buses possible, partly focus on rural areas
Evaluation:	Not specifically intended for PT
Information:	*http://www.bmvi.de/SharedDocs/DE/Artikel/G/modellregionen-elektromobilitaet.html*
Examples:	Test of diesel hybrid busses in **Hamburg**, **Rhine-Ruhr** (25 busses), **Stuttgart** and **Saxony**

C2 Electromobility Showcase

Budget:	EUR 180m grant/ EUR 300m total	**Timeframe:**	2012-2016
Type of funding:	☒Grant ☐ Loan (guarantee, etc.)		
Eligible:	Model regions: “LivingLab BWe mobile” in Baden-Württemberg, “Our horsepower gets electric” in Lower Saxony, “ELECTRIC MOBILITY CONNECTS” in Bavaria and Saxony, and “International Electromobility Showcase” in Berlin-Brandenburg		
Funded by:	Federal Ministry of Transport and Digital Infrastructure; Federal Ministry of Education and Research; Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety; Federal Ministry of Economy and Technology		
Technical Assistance | **RDI** | Procurement | Operations			
Funded:	promotion of electro-mobility; PT possible; projects with electric buses possible		
Evaluation:	Not specifically intended for PT		
Information:	*http://schaufenster-elektromobilitaet.org/de/content/index.html*		
Examples:	**Berlin** – four electric busses on line 204 with inductive charging at the terminal stops; budget EUR 4.1m **Dresden** – one electric bus on line 79 with conductive charging at the terminal stop; budget EUR 1.15m **Leipzig** – two electric midi-busses with conductive charging at the terminal stops; budget EUR 1.08m		

C3 Funding program for the regions' efforts to improve air quality through the modernization of the fleet for the local public transport

Budget:	~ EUR 80m
Type of funding:	☒Grant ☐ Loan **Rate of funding:**
Eligible:	All regions receive a fixed sum based on criteria set out in Article 2
Funded by:	Ministry for the Environment, Land and Sea
Technical Assistance | RDI | **Procurement** | Operations	
Funded:	— purchase of Euro VI or EEV buses for the local public transportation — the purchase of Euro V buses if they substitute an equal number of Euro II or lower PT buses — purchase of trams, metros and trolley-buses (Article 4)
Evaluation:	The funding programme is focused on fleet renewal while electric buses not eligible
Information:	*http://www.minambiente.it/normative/decreto-ministeriale-19-dicembre-2011-n-735-che-istituisce-un-programma-di-finanziamenti*

C4 Funding program for the enhancement of the air quality: call for the allocation of investment grants for the purchase of electric buses

Budget:	EUR 14m	**Timeframe:**	2015-2017
Type of funding:	☒Grant ☐ Loan	**Rate of funding:**	
Eligible:	Regione Piemonte (GTT TORINO, SUN NOVARA, ATI SALUZZO, ATM ALESSANDRIA, ATAP BIELLA, COMUNE CHIVASSO etc.)		
Funded by:	Ministry for the Environment, Land and Sea		
Technical Assistance | RDI | **Procurement** | Operations			
Funded:	Funding for puchasing of full electric buses to replace diesel buses nowadays in service		
Evaluation:	— 19 12m electric buses — twelve 8m electric buses — five 6m electric buses		
Information:	*http://www.regione.piemonte.it/governo/bollettino/abbonati/2015/28/attach/dda1610000204_930.pdf*		
Examples:	**Torino** (line 19, line 102, and lines from other operators), **Novara**, **Vercelli** (line 4), **Alessandria**, **Collegno**, **Chivasso** (line viola, line rossa)		

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