

## D.T 2.5.2 - ACTION PLANS ON ECO-SOLUTIONS DEPLOYMENT - VENICE (NAPA)

---

Energy efficiency

Final version  
10/2019

---





## Table of contents

Executive summary .....	2
5. Cluster 5 - Energy efficiency solutions: overview of needs and good practices in cooperation with stakeholders to develop the action plan.....	6
5.1 Actions:.....	7
- Action 1: Implementation of innovative lighting system in the port area	
- Action 2: Car charging stations	
5.2 Main challenges tackled .....	7
5.3 Results to be achieved .....	8
5.4 Key actors.....	8
5.5 Tasks to be performed .....	9
5.6 Time plan and financial results .....	13
5.7 Expected results .....	133



## Executive summary

The North Adriatic Sea Port Authority - including the ports of Venice and Chioggia (hereafter NASPA) is an independent public body according to the Port Italian Law in force. Its task is to guide, plan, promote and monitor port activities in the European Core port of Venice and European Comprehensive port of Chioggia, which was recently merged in 2017. NASPA green strategy aims constantly at improving synergies for port development, both in terms of trades and environment protection. The port's green strategy, in compliance with ESPO guidelines (EcoPorts Port Environmental Review 2016), is implemented by a continuous commitment and actions aiming at reducing air pollution, protecting the Venetian Lagoon, re-developing port areas and achieving the higher energy efficiency.

Fig. 1 - ESPO Environmental priorities 2016



Over the last 15 years, NASPA has been carrying on a series of concrete green actions such as:

- restoration of the Venetian port waterfront;
- massive remediation campaign of more than 110 hectares of land and water in Cargo Port Venezia- Marghera;
- use of alternative energies and planning of infrastructure for renewable energies as Liquefied natural Gas (LNG)
- cutting emissions and air quality monitoring pairs with quaysides designed specifically to avoid any contamination from the Port into the lagoon.

Within the TalkNET project, NASPA aims at improving best tailor-made solutions to manage the reduction of energy consumption, also developing specific action plans.



This document is dedicated to the development and improvement of Eco-innovation solutions, one of the two fields of action of the TalkNET project, along with Multimodality. Respectively, specific sub-topics are developed through the project activities of both fields, as shown in the table below:

1	LAST MILE CONNECTIONS OF MULTIMODAL NODES	<b>MULTIMODALITY</b>
2	NODE MANAGEMENT OPTIMIZATION	
3	ASSESSMENT OF MULTIMODAL SERVICES	
4	ALTERNATIVE FUELS DEPLOYMENT	<b>ECO-INNOVATION</b>
5	ENERGY EFFICIENCY SOLUTIONS	

In particular, it will present the “Action Plan on Eco-solutions deployment - Venice (NAPA)” and will be focused on the topics of energy efficiency.

Starting point to present the actions that are planned is the related “*Analysis on eco-solutions deployment - Venice (NAPA)*” that was focused on the assessment of energy consumption on the port area and port processes directly managed by NASPA. It was outlined, on the one hand, the needs and the opportunities to deploy energy efficiency in port terminals and, on the other, the possibility for NASPA to improve the use of electric cars in the port area providing some charging stations for electric cars, in order to reduce the pollutant emissions and to use alternative source of energy. Therefore alternative fuels solutions will be included in the energy efficiency plans, as they came out from the same answer to the needs and challenges identified in the initial analysis phase of the project in the field of eco-innovation solutions.

In fact, the actions that will be presented in details in this action plan are the answers to the problems, needs and challenges identified within the first step of the project activities, that is to say the analysis phase of the TalkNET nodes’ regions, both for Multimodality and Eco-innovation.

In general, the analysis has foreseen the assessment of the multimodal chain in which ports and logistics nodes operate, to understand how is the state of art (AS-IS analysis) and what are the methods to improve the situation (TO-BE). The tool chosen to achieve these aims is the S.W.O.T. analysis.

The actions planned are presented per cluster. TalkNET has set-up five thematic clusters - corresponding to the five sub-topics shown in the table above - right on the basis of the common priorities identified through the analyses of all project partners, identifying the cooperation networks with mapped stakeholders in order to improve their coordination.

Moreover, the actions presented will support and will be the ground for the implementation of the pilot actions that will be carried out within the project.



Therefore, the core intervention logic of the project is the following:

- 1) to detect the problems affecting the nodes (analysis phase)
- 2) to find solutions through specific actions planned (planning phase)
- 3) to test and implement the solutions presented (testing phase)

Finally, the document will offer also a brief overview of the best practices that can offer good solutions to better plan actions and the pilot actions foreseen in the project (the complete collection of best practices is available in the knowledge management activity of the project: Outputs Knowledge tools).

In the following paragraphs, a summary of each action included in this document will be presented, clearly linking problems/needs/challenges and actions/solutions that will be illustrated through the support of the results of the SWOT analysis.

*Action 1: Implementation of innovative lighting system in the port area*

*Action 2: Car charging stations*

#### SWOT ANALYSIS - RESULTS

##### **STRENGTHS**

Through the LogIS platform, AdSPMAS can view and extract in real time the data related to the movement of goods and traffic flow for each terminal operator.

The subjects involved in the project are on average sensitive to the implementation of environmental and energy best practices

##### **WEAKNESSES**

Absence of dedicated PODs for some of the terminal operators involved in the analysis makes difficult installing systems for self-generation of electricity (i.e. photovoltaic systems) and obtaining more focused energy data.

Absence of reward / incentive mechanisms for terminal operators wishing to invest in low CO<sub>2</sub> emissions processes and technologies: these mechanisms could increase their commitment to the adoption of good practices aimed at reducing and containing environmental impacts

##### **OPPORTUNITIES**

The use of alternative fuels could reinforce the AdSPMAS brand

##### **THREATS**

The use of alternative fuels requires high investments: a deep feasibility assessment are required to evaluate the expected return on investment.



---

The port of Venice can improve the energy efficiency in the port area by adopting the following type of interventions - CO2 emissions performances are included in the actions:

- Switch to electric cranes
- Installation of a photovoltaic system
- LED replacement - light towers
- Others

In relation to e-mobility solutions to be adopted, columns for charging electric vehicles in the port of Venice can be installed, implementing new technology and infrastructure moving towards e-mobility solutions.



## 5. Cluster 5 - Energy efficiency solutions: overview of needs and good practices in cooperation with stakeholders to develop the action plan

At national level, the Italian ports now have an important reference to improve environmental sustainability. Recently (December 2018) the Italian Ministry for Environment, Protection of the Territory and the Sea has published the “Guidelines for the preparation of Environmental Energy Planning Documents for Port Systems” (DEASP). In application of directive 2014/94/EU, the document foresees that the ports could consider, due to the needs of internal mobility, the realization of stations for charging vehicles, which could also be used to serve any internal rental services of electric vehicles or internal shuttles.

At local level, the port is included in the Venice Municipal strategy<sup>1</sup> to reduce emissions, which actions are focused on two main goals, that is to say traffic control and modal rebalancing in favour of public transport and non-motorized mobility.

Anyway in the Italian panorama of transport actors, the number of players committed to fostering sustainability solutions is growing faster and new projects are interesting the alternative fuels deployment sector. There are many players in the field who are installing columns in Europe and, in particular, Italian. Enel X, Ionity and E.on are the main actors. In Italy from an infrastructural point of view, Enel X's objective is to provide the country with a network of extensive charging points for electric cars. Therefore Enel has presented and launched a plan that provides for a private investment, totally paid by the Group, of between 100 and 300 million euros. The goal is to install around 7.000 charging points to 14.000 top-up points, by 2020 to reach 14.000-28.000 top-up points in 2022.

Within this framework, the Italian Ports Association (Assoporti) already sign an agreement with Enel X in July 2018, which will make available to the ports 300 charging stations for electric cars, creating a strong incentive for operators to equip themselves with electric cars contributing to the reduction of carbon dioxide emissions.

---

<sup>1</sup> <http://www.trasporti.provincia.venezia.it/mososten/TTZ/PianiComunali/Venezia/VeneziaParte1.3.pdf>



## 5.1 Actions:

### Action 1: Implementation of innovative lighting system in the port area

The port of Venice will improve the energy efficiency in the port area also by implementing innovative lighting systems. Within this aim several interventions have been identified. CO2 emissions performances are included in the action.

### Action 2: Car charging stations

The port of Venice will install columns for charging electric vehicles, implementing new technology and infrastructure moving towards e-mobility solutions.

## 5.2 Main challenges tackled

According to its Environmental Policy, NASPA is committed to manage effectively the environmental fallouts of its operations, developing a sustainable supply chain, investing in new technologies and enhancing international and national cooperation. In order to achieve these goals, NASPA is carrying out activities under the so-called “Green Port” initiative<sup>2</sup>. This initiative focuses on four main areas: water, soil, air and energy.

Considering NASPA objectives for efficient use of energy and commitment for use of renewables, in 2010 NASPA has adopted a LED technology system in the passengers’ terminal, saving 70% of energy in comparison to traditional light emitting systems.

In addition, since August 2015, another LED system, supported by solar panels, is in use along 15 km of one of the main port canals, i.e. the Malamocco-Marghera Canal.

The port of Venice has started up a number of projects aimed at cutting dangerous emissions and promoting the use of alternative energy, in order to improve the safety both among its employees and companies that daily work in the Port of Venice. NASPA is committed in supporting the deployment of a sustainable and efficient transport system and promoting the decarbonisation of transport modes along the TEN-T core network corridors Baltic-Adriatic and Mediterranean through the realization of a LNG bunkering facility. The development of a LNG supply facility for transport sector in the North Adriatic area will allow to:

---

<sup>2</sup> <https://www.port.venice.it/en/green-port.html>





- contribute to the objectives of low greenhouse gas emissions, low-carbon and clean transport, fuel security, reduction of external costs and environmental protection;
- promote a low-carbon transport with the aim of achieving by 2050 a significant reduction in CO2 emissions, in line with the relevant Union CO2 reduction targets.

## 5.3 Results to be achieved

Main results to be achieved for eco-solutions deployment are focused on:

- 1) investments for energy efficiency:
  - ✓ Implementation of innovative lighting system in the port area and port structures
- 2) investment to reduce the carbon footprint:
  - ✓ Assessment of energy consumption within the port area in order to reduce the CO2 emissions
  - ✓ Realization of charging stations for Electric Vehicles (EV) within the port area

## 5.4 Key actors

The responsible actors taken into consideration that will carry out action plans for the deployment of ECO-solutions are the following:

- the operators who use the port terminal areas in concession to implement energy efficiency, and
- NASPA with the area/processes directly managed by the authority to reduce the carbon footprint



TERMINALS	ACTIVITIES
AdSP - MAS (Autorità di Sistema Portuale del Mare Adriatico Settentrionale)	Headquarters
TIV - Terminal Intermodale Venezia Spa	Containers Terminal
VECON Spa	Containers Terminal
Multi Service Srl	Multipurpose Terminal
TRV - Terminal Rinfuse Venezia spa	Multipurpose Terminal
VRPM - Venice Ro-Port-Mos Scpa	Ro-Ro/Ro-Pax
VTP - Venezia Terminal Passeggeri Spa	Cruise Terminal

## 5.5 Tasks to be performed

In the following tables, it will be illustrated on the one hand energy consumption and CO2 emissions performances and on the other the possibilities and types of interventions and investments of the port terminals taken into consideration.

Fig. 2 - Total Energy Consumption: 5.590 TOE

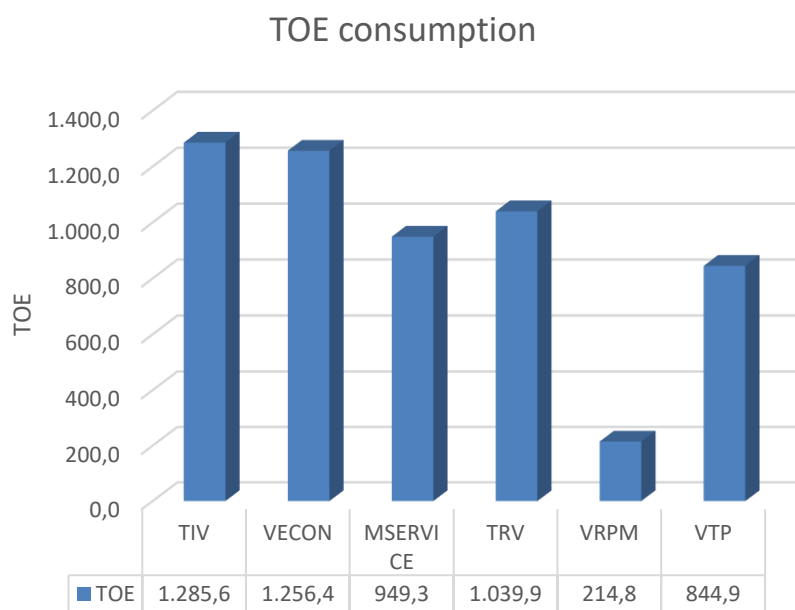




Fig. 3 - CO<sub>2</sub> Total Emissions: 13.733 tCO<sub>2</sub>

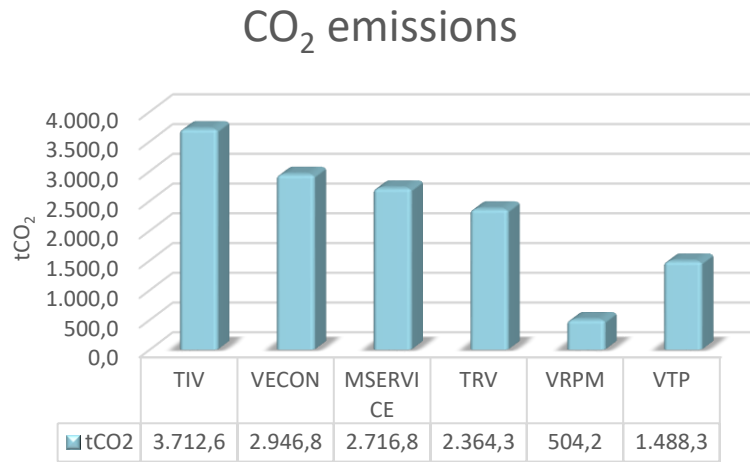
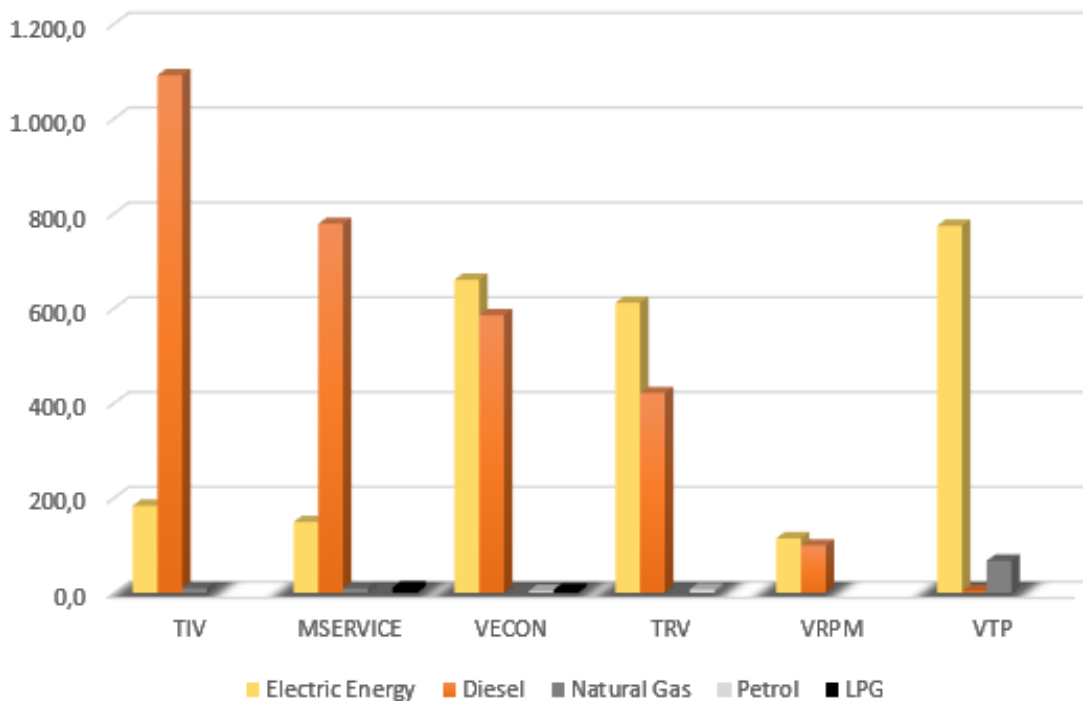


Fig. 4 - Energy Sources Consumption





The interventions identified can be traced back to the following types:

- > Switch to electric cranes (diesel cranes)
- > Installation of a photovoltaic system
- > LED replacement - light towers
- > Others

The reduction foreseen in TOE consumption and CO<sub>2</sub> emissions by category is summarized in the following table:

<b>Interventions</b>	<b>TOE Reduction</b>	<b>tCO<sub>2</sub> Reduction</b>
Switch to electric cranes	782,4	3.344,6
LED replacement - light towers	94,3	160,5
Installation of a photovoltaic system	184,0	313,1
Others	137,5	406,5
	<b>1.198,1</b>	<b>4.224,7</b>

With regard to NASPA goals to implement actions in order to use energy in a more efficient way, the study has highlighted the possibility to install charging stations for electrical cars in the port area with the aim to reduce the pollutant emissions using alternative source of energy.

After safety, pollution constitutes the other serious problem caused by traffic, while taking into account the presence of other contributing factors such as, first of all, economic and industrial activities. In general, the strategy to solve this problem involves two areas of intervention: on the one hand control and reduction of unit pollution levels (i.e. emissions per vehicle \* km), on the other monitoring and reduction of the overall generating quantity (i.e. the total number of vehicles \* km in the area in question).

As for the control of environmental externalities, energy saving strategies also consider the control and reduction of unit consumption in the monitoring and reduction of vehicles \* total km. The actions envisaged mainly concern traffic control and rebalancing modal in favour of public transport and non-motorized mobility (ref. Qualitative framework for Air Quality in the Municipality of Venice Summary of relevant Programs and Projects\_2017).

The most obvious strategy therefore could be the progressive replacement of traditional vehicles currently in use in the port area with electric vehicles. However, some factors must be taken into consideration:

- vehicle obsolescence to be replaced: in terms of LCA (analysis of the environmental impact of the vehicle's life cycle), as well as in economic terms, it may not be convenient to dispose of a vehicle that is still in good condition in favour of a new one, albeit more efficient;

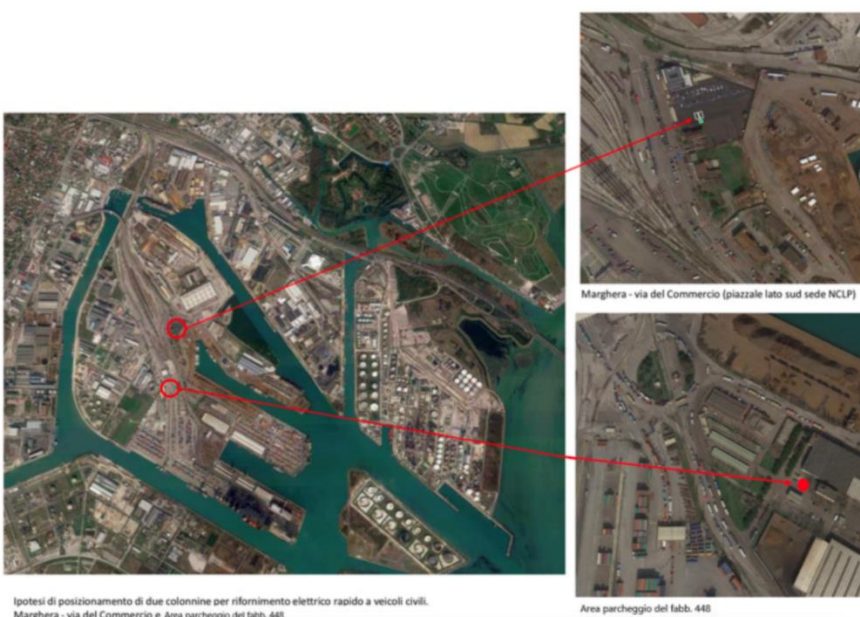


- the lack of infrastructure for car charging, to be installed in order to support the transition towards more sustainable mobility solutions: implement and test first installation of charging stations.

These two factors seem to direct the schedule to the first step of positioning columns charging stations for cars.

The results of the executive design will indicate the number of columns to be installed (two or three) as well as the locations for the installation.

Fig. 5 - Possibility of locations to install the charging stations for electric cars in the port areas





## 5.6 Time plan and financial resources

- ✓ Implementation innovative lighting system in the port area and port structures: by 2023.

There are infrastructural limits that prevent the application of the illustrated opportunities to deploy energy efficiency in port terminals. In particular, about the fact that the electrical rooms are actually managed by a concessionaire and that the terminal holders have not direct control over their POD (Energy Point of Delivery), making therefore difficult installing systems for self-generation of electricity.

To develop efficient energy production systems it is mandatory that the holder can have its own fiscal POD.

These problems will be solved in a couple of years due to the modification of national laws that implies to manage the electricity supply accordingly to new rules and procedures.

- ✓ Realization of charging stations for Electric Vehicles (EV) within the port area: by 2020.

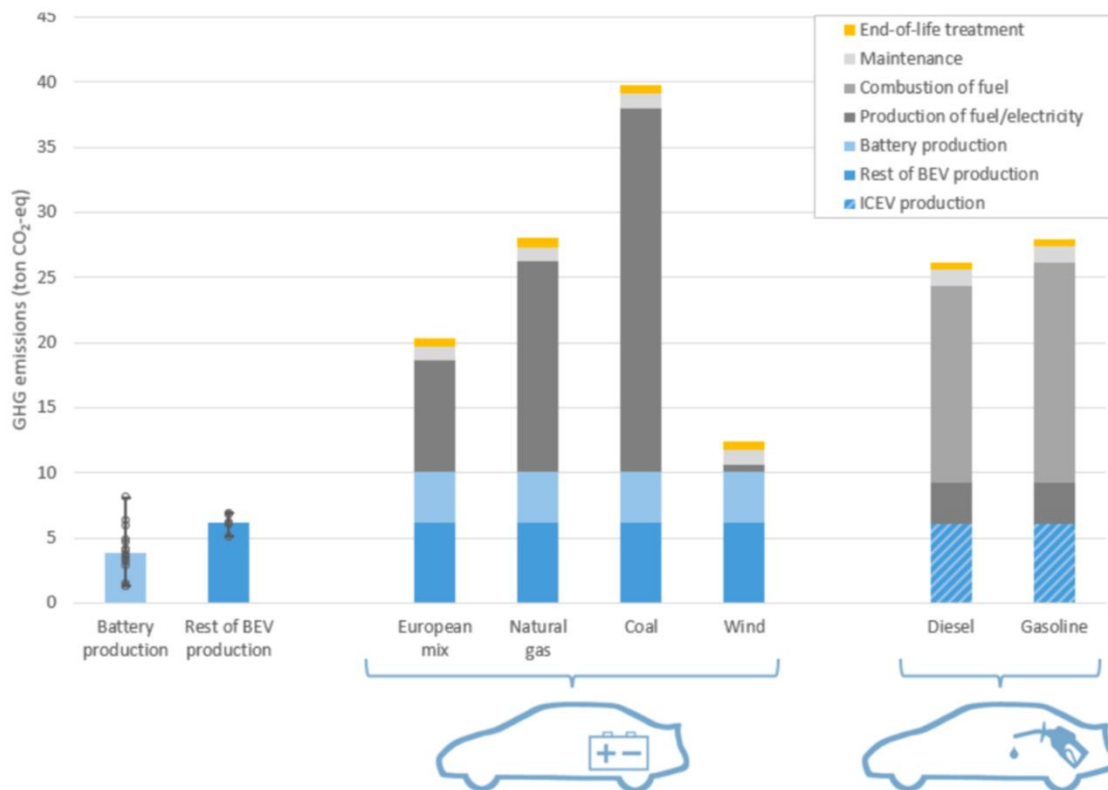
The type of technology could vary the cost of each columns

## 5.7 Expected results

Following the implementation of all the identified energy efficiency improvement opportunities, a total TOE reduction of 21,4% (around 1200 TOE) was estimated, and a 30,8% reduction in CO2 emissions, as summarized in the following table.

Fig. 12 - Total TOE and emissions reduction achievable with the implementation of identified interventions

	Primary Energy Consumption [TOE/Y]	CO <sub>2</sub> Emissions [tCO <sub>2</sub> /y]
<b><i>ex ante</i></b>	5.590,8	13.733,0
<b>Reduction</b>	1.198,1	4.224,7
<b><i>ex post</i></b>	4.392,7	9.508,3
<b>Reduction %</b>	21,4%	30,8%



Note: The vehicle's operational lifetime is assumed to be 150 000 km.

**Figure 41: Lifecycle GHG emissions of mid-size 24 kWh battery electric (left) and internal combustion engine (right) vehicles (Fonte: Policy Department for Structural and Cohesion Policies - Resources, energy, and lifecycle greenhouse gas emission aspects of electric vehicles).**