

# GREEN DANUBE

**Integrated transnational policies and practical solutions  
for an environmentally-friendly Inland Water Transport system  
in the Danube region**



**REDUCTION OF POLLUTANT EMISSIONS FROM IWT  
VESSELS AND IMPACT ON CRITICAL URBAN, RURAL  
AND PROTECTED ENVIRONMENTAL AREAS  
by use of alternative innovative greening technologies**

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## WP 4 - Greening Technologies

**Objective:** To contribute to emissions reduction in the Danube ecosystem by analyzing and promoting existing green technologies for IWT, and providing tailor-made innovative solutions for Danube region.



- **Start** : March 2017; **End** : June 2019
- **WP Leader:** BDCA
- **Partners:**; ACTEDJ, CER, CRUP, DCC, DST, PDM, REC, RSOE
  - *ASPs: BMA, DC, MT, OVF, PLOVPUT*
- **Deliverables**
  - **D.4.1.1:** Technical report on inventory results including information on all vessel types.
  - **D.4.2.1:** Technical Report on “Existing technologies and best practices for reduction of IWT air pollution on the Danube River”
  - **D.4.3.1:** Report on existing facilities for supply of alternative fuels along the Danube



## WP 4 - Greening Technologies (2)

- **Output 4.1: IWT vessels regime and green technologies database (Feb 2018)**  
A database on IWT vessels regime and green technologies database, integrating the inventories produced under activities 4.1, 4.2 and 4.3 will be established with aim to provide a knowledge base to Strategy development. This database will be an essential tool for national public authorities, international interest groups organizations and policy decision makers involved in Danube environment protection.
- **Output 4.2: National workshop organised in 7 countries (June 2019)**  
1 national workshop organized in each of the 7 project countries for presentation of pollutant emissions reduction solutions, including joint testing of Toolkit for innovation and to contribute to information sharing on existing possibilities for greening.
- **Output 4.3: Strategy for greening the Danube IWT (June 2019)**  
Strategy for greening the Danube IWT will provide a set of tailored recommendations for reducing pollutant emissions by using innovative green technologies. It will consider the specific characteristics of the IWT in general and the respective features of IWT on the Danube in particular.



## ACTIVITY 4.1: Survey on characteristics and operating regimes of IWT vessels passing monitored critical areas

**Objective:** To carry out a survey on characteristics & operating regimes of IWT vessels, analysis their impact on air quality, and identification of conditions & targets for reducing pollutant emissions.



- **Start** : March 2017; **End** : June 2018
- **Partners:** CER (Activity Leader); BDCA, PDM, RSOE, DST, CRUP, DCC
- **Deliverable D.4.1.1:** Technical report on inventory results including information on all vessel types.
- **Delivery Period:** Period 3



## Activity 4.1 – Tasks to be done by the partners

- **CER**
  - Activity leader, coordinate the partners activities
  - Develop an inventory structure for consolidated data on the most relevant inland vessels involved in international traffic along the Danube corridor
  - Collection of relevant technical data on inland vessels.
  - Provide template document for the collection of information
  - Elaborate a Technical report which will include key figures of the inventory and also conclusions in connection with inland navigation and national fleets and the interrelations of effects of different technical parameters
- **BDCA, PDM, RSOE, DST, CRUP and DCC**
  - Will support CER in the development of the inventory, providing technical data about fleets with sufficient details on ships engines and main pollutant emissions
  - Will provide feedback on the conclusions of the Technical report and on the interpretation of data collected

*PPs will collect information in their countries on the statistical data of IWT existing fleet. The inventory will be based on the Danube official statistics which cover the national fleet of riparian countries.*

# Draft structure of the Inventory, proposed by CER (1/2)



Most relevant inland vessels involved in international traffic along the Danube				
I. PUSHERS				
Type	2 x 1600 CP	2 x 1200 CP	2 x 890 CP	...
Number of units (registered in each country)				
<b>Dimensions:</b>				
Max. Length				
Max. Width				
Max. Height				
Max. Draught				
Maximum number of barges that can be taken in convoy				
<b>Transport capacity for:</b>				
single vessel				
convoy				
Type of goods transported				
<b>Main engines:</b>				
Number				
Type				
Power/revolution				
Year of construction				
If the engine meets the EU norms				
<b>Fuel consumption:</b>				
As single vessel				
As convoy/number of units in convoy				
<b>Quality of fuel used</b>				
....				

# Draft structure of the Inventory, proposed by CER (2/2)



<b>II. TUGS</b>				
Type	2400 CP	600 CP	500 CP	...
.....				
<b>III. PASSENGER VESSELS</b>				
Type	Regular trips vessels	Cruise vessels	....	.....
.....				
<b>IV. DANGEROUS GOODS TRANSPORT VESSELS</b>				
Type (according ADN Regulation)	Type N	Type G	Type C	.....
.....				





## Proposed **Content** for Deliverable 4.1.1

- To be provided by CER





# Activity 4.1 Timeline

<b>TIMELINE Activity 4.1</b>	<b>2017</b>												<b>2018</b>	
<b>Project month</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Monitored area identified/fixed														
Inventory structure / Data formats agreed														
Start inventory / data collection														
Update - at meeting Serbia, and meeting Varna														
Draft survey report completed														
Final report & Deliverable 4.1.1														

<b>Partner</b>	<b>Man hours 4.1</b>
CERONAV	480
BDCA	480
PDM	240
RSOE	160
DST	160
CRUP	120
DCC	240
REC	160
<b>Total</b>	<b>2040</b>



## Activity 4.2: Inventory of innovative technologies and best practices for emission reduction on the Danube River

**Objective:** Elaboration of an Inventory of Existing Innovative Technologies and Best Practices aiming at emissions reduction of the inland waterways sector.



- **Start** : March 2017; **End** : June 2018
- **Partners:** BDCA (Leader), CER, DST, PDM, REC  
*ASP: BMA, DC, MT, OVF, PLOVPUT*
- **Deliverable D.4.2.1:** Technical report on “Existing technologies and best practices for reduction of IWT air pollution on the Danube River”.
- **Output 4.1:** IWT vessels regime and green technologies database
- **Delivery Period:** Period 3



## Draft structure of the Inventory

- I. Existing Innovative Technologies** and
- II. Best practices**, aiming at emissions reduction of the IWT.

For point I, BDCA and CER will focus on collecting comprehensive information on:

- 1) Existing technological solutions**, and
- 2) Relevant technical and operational measures**, aiming at low carbon shipping and air pollution control, which will include:
  - 2.1 Replacing/conversion of diesel engines to use LNG;
  - 2.2 Decreasing fuel consumption by optimizing vessels performance;
  - 2.3 Introducing Ship Energy Efficient Management Plan for existing vessels;
  - 2.4 New design criteria for new vessels;
  - 2.5 Improving vessel operation practices;
  - 2.6 Application of energy efficiency measures;
  - 2.7 Use of renewable energies- to run vessel equipment or to drive whole vessels by solar or/and wind energy



## Role of PPs regarding the types of information which should be collected

### **BDCA:**

- 1.Introducing Ship Energy Efficient Management Plan for existing vessels
- 2.Replacing/conversion of diesel engines to use LNG
- 3.Application of energy efficiency measures
- 4.Use of renewable energies- to run vessel equipment or to drive whole vessels by solar or/and wind energy.

### **CER:**

- 1.Decreasing fuel consumption by optimizing vessels performance
- 2.New design criteria for new vessels
- 3.Improving vessel operation practices

### **PDM:** clarification of policy/strategy related issues:

1. LNG conversion political aspects, and
2. Coordination in Energy Efficiency management planning

### **DST:**

- 1.Analyzing and recommending measures for Optimum Operation/Intelligent Routing, including Toolkit for innovation take-up.



## Activity 4.2 – Summary of tasks by partners (AF)

- **BDCA**
  - Activity leader, coordinate the partners activities
  - Contribute to the preparation of the Inventory of existing innovative green technologies and best practices.
  - Responsible for studying the issues related to Energy Efficiency & Use of Renewable Energy;
  - Coordinate the elaboration of the Technical Report with contributions from CER, DST, PDM and REC.
- **CER**
  - Collect relevant information in Romania, Croatia and Serbia;
  - Provide feedback on the conclusions of the Technical report and on the interpretation of data collected
- **PDM, DST, REC**
  - Collect relevant information in Austria (PDM); in Germany (DST), in Hungary (REC), and in other European rivers (REC)
  - Provide feedback on the conclusions of the Technical report and on the interpretation of data collected



## Proposed Content for Deliverable 4.2.1

Existing technologies and best practices for reduction of IWT air pollution on the Danube River

1. Executive summary
2. General information. Danube IWT technology analysis. Danube area environmental status & local specifics.
3. Review & Assessment of existing technologies toward low carbon IWT shipping
4. Review on operational measures toward low carbon IWT shipping
5. Review on emerging and future technologies
6. Best Practices analysis and recommendations for implementation
7. Conclusions & Recommendations



# Activity 4.2 Timeline

	2017												2018	
Project month	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Structure and content of D.4.2.1 fixed.														
Best Practices Criteria/Template approved (meeting Serbia)														
Tentative report on existing technologies drafted														
Tentative report on existing technologies drafted														
Meeting Varna. Draft reports discussed. Recommendations														
D.4.2.1 Completed; Activity Report completed														

Partner	Man hours 4.2
CERONAV	480
BDCA	480
PDM	160
DST	160
REC	160
<b>Total</b>	<b>1440</b>





## WP 4 - Greening Technologies

- **Activity 4.3:** Inventory of existing facilities and future option for supply of alternative fuels along the Danube
- **Deliverable D.4.3.1:** Report on existing facilities for supply of alternative fuels along the Danube including information on legal background for alternative fuels infrastructure and on the availability of alternative fuels infrastructure and in the Danube Region.
  - Final report February 2018
- **Delivery Period:** Period 3
- **Partners:** CER, BDCA, DST, REC







## Activity 4.3: Tasks to be done by the partners

- **PDM**
  - Activity leader
  - Coordinate the partners activities
  - Collection of the most relevant information on existing facilities for supply of alternative fuels along the Danube
  - Provide template document for the collection of information
  - Collection and integration of all information into a report- deliverable
- **CER, BDCA, REC and DST**
  - Will collect the information in their countries and also in the Danube riparian countries
- **PDM, BDCA, CER, DST and REC**
  - Develop the needed inventory relying on experience and know-how



## Proposed Content for Deliverable (1/2)

- Executive summary
- Introduction
- Current status of alternative fuels
- Status of implementation
- EU policy and legal framework, e.g.:
  - Clean Power for Transport Package
  - Regulation (EU) 2016/1628 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery
  - Directive 2009/28/EC on the promotion of the use of energy from renewable sources
  - NAIADES II
  - Tasks of EU Member States
  - Other relevant regulations
- National policies and frameworks
- Implementation measures in Europe



## Proposed Content for Deliverable (2/2)

- Demand analysis for the supply of alternative fuels
- Projects, plans and initiatives in the Danube Region
  - Status of alternative fuels infrastructure per country
  - Future options for alternative fuels per country
  - Reference to the EU Danube Region Strategy
- Roadmap towards environmentally-friendly and low-carbon transport systems
  - Action catalogue
  - Governance and legislation
  - Awareness
  - Markets and financing
  - Infrastructure
  - Vessels and equipment
  - Jobs and Skills



# Start of work: Bunker-facilities in the Danube region





## Activity 4.3 Timeline

- First draft of content April 2017
- Draft description of general chapters by PDM June 2017
- Partners input to national tasks September 2017
- Activity meeting November 2017
- Draft document December 2017
- Final report February 2018

<b>Partner</b>	<b>Man hours 4.3</b>
CER	320
PDM	160
BDCA	480
DST	160
REC	160
<b>Total</b>	<b>1.280</b>



## Activity 4.4: Strategy for emissions reduction on the Danube by use of innovative green technologies

- **Objective:** Integrate tailor-made recommendations aiming at emissions reduction in a Strategy for greening the Danube inland water transport, including analysis of current situation, recommendations for implementation of green technologies, as well as an indicative roadmap to reach its objectives
- **Start Month** : March 2017; **End Month**: June 2019
- **Partners:** DST(Leader), ACTEDJ, BDCA, CER, PDM,RSOE, DST, REC,  
*ASP: BMA, DC, MT, OVF, PLOVPUT*
- **Deliverable:** None  
**Output 4.2:** National workshop organised in 7 countries  
**Output 4.3** Strategy for greening the Danube IWT
- **Delivery Period:** Period 5





## Suggested Approach (DST)

- State of play analysis
  - Challenges the Danube fleet has to meet (Engine and emission standards etc.)
- Innovation Roadmap from PLATINA II (adaption for the Danube)
- Development of a tailor made roadmap for the Danube
- Discussion and evaluation of greening technologies with PPs
- Implementation of a consolidated strategy



## Activity 4.4 – Summary of tasks by partners (AF)

- **DST**
  - Activity leader, coordinate the partners activities
  - .....
- **CER, BDCA, PDM**
  - .....
- **ACTEDJ, RSOE, DST, REC**
  - .....

## Proposed Draft Content for Output 4.3 Strategy

To be drafted by DST, in cooperation with CER, BDCA, preferably before meeting in Varna, November 2017





# Activity 4.4 Timeline

	2017												2017												2019					
Project month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Activity 4.4																														
.....																														
.....																														
.....																														
.....																														
Final report & Output 4.3																														

Partner	Man hours 4.4
CER	480
ACTEDJ	160
PDM	160
BDCA	480
RSOE	80
DST	480
REC	160
<b>Total</b>	<b>2000</b>





Danube Transnational Programme  
**GREEN DANUBE**



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