



Co-financed by the European Union

**Workshop on modernisation of Danube vessels fleet**

# **Tools supporting decisions of vessel fleet owners**

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# Content

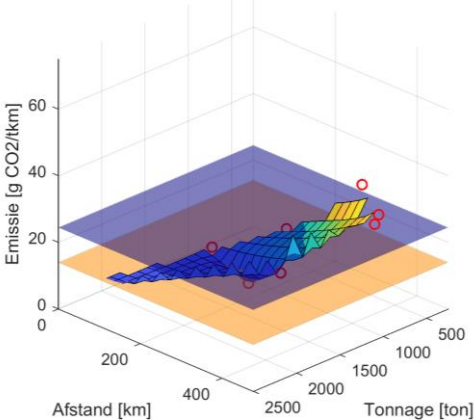
- **Importance of tools**
- **Which tools are currently available?**
- **Some words on the next steps**

# Why tools are important

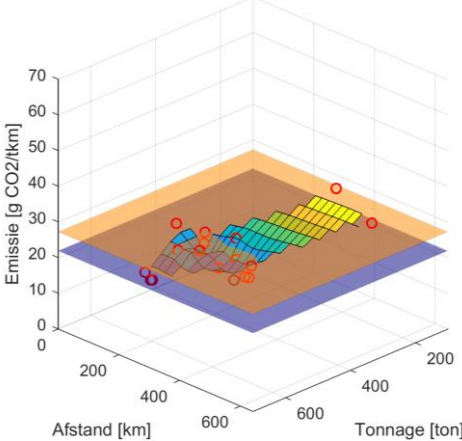
- **Societal challenges create a dynamic level playing field**
- **Technical: solutions are provided**
- **Economical: checks on effectiveness**
- **User perspective: what is the baseline?**
- **Individual level: tools support individual decision making**
- **Collective level: support factbased policymaking (real data)**

# What about theoretic assumptions?

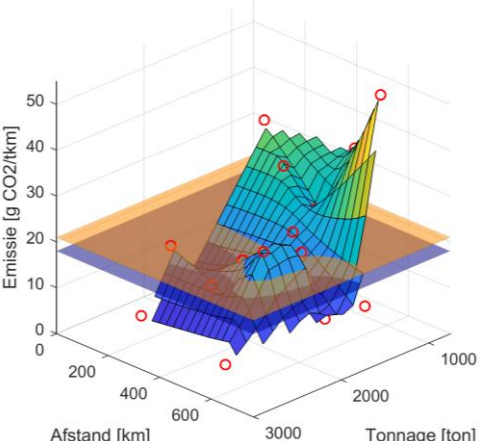
Emissie retourvaart CEMT Va



Emissie retourvaart CEMT III



Emissie retourvaart CEMT VIa



# Tools currently available

- **Total cost of ownership LNG**
- **Greening Tool**
- **Econaut**

# TCO LNG

- Provides detailed insights to ship owners
- Currently being reviewed
- Update on default values, input from other projects

TCO Model Quick Scan Full Scan

## FULL SCAN

1. Characteristics 2. Investments 3. Operations 4. Balances 5. Financing 6. Fin Stat 7. Emissions

**Vessel**

Load type  Capacity

Norm  Vessel types

**Sailing profile**

Total sailing hours  # hours / year Yearly bunker volume  m<sup>3</sup>

Avg gasoil consumption  l/hrs Required LNG tank  m<sup>3</sup>

60.0

**Main engines**

Power  kW Running hours per year  hours

+ Add main engine

**Bow thruster**

Power  kW Running hours per year  hours

+ Add bow thruster

Next step

# IWT Greening Tool

- Provides detailed insights into business operations
- Option to select multiple (combinations of) greening technologies
- Multilingual set-up
- Regional practices are taken into account

The screenshot shows the 'Wizard' interface of the IWT Greening tool v2.0. At the top, there is a navigation bar with links for 'Features', 'Project Objectives', 'Get involved', 'Greening options', and a 'Disclaimer' link. The main content area is titled 'Wizard' and contains a 'Steps' section with a numbered list of six steps: 1. Sailing region (highlighted), 2. Vessel type & engine, 3. Operational costs & hours, 4. Choose suitable options, 5. Refine costs, and 6. View and download results. Below the steps, there are two columns. The left column is titled 'Operational details' and the right column is titled 'Select region'. Under 'Operational details', there are two sub-sections: 'Greening options' and 'Evaluate results'. The 'Select region' section contains two maps: 'Rhine' and 'Danube'. Below the 'Rhine' map is a breadcrumb trail: 'Switzerland > Germany > France > Netherlands'. Below the 'Danube' map is a breadcrumb trail: 'Germany > Austria > Czech Republic > Slovakia, Hungary > Slovenia > Croatia > Bosnia and Herzegovina > Serbia > Montenegro > Romania > Bulgaria > Moldova > Ukraine'. At the bottom right, there is a 'Next step' button and a note: 'Provide vessel & engine details'.

# IWT Greening Tool

- Wizard for easy use
- Multiple vessel types available
- Engine date defines emission profile

## Wizard

### Steps

Follow the steps below to calculate your results.

#### Operational details

- 1 Danube
- 2 Vessel type & engine
- 3 Operational costs & hours

#### Greening options

- 4 Choose suitable options
- 5 Refine costs

#### Evaluate results




- 6 View and download results

### Select vessel

Choose from the following vessel types according to the Classification of European Inland Waterways and your previously selected sailing region. Provide the build year of your main engine to identify its emission profile.

### Vessel type

Choose from the vessel types based on your sailing region. Can't find your vessel type? Choose the most similar one or that matches your classification.

 CEMT Class V	 CEMT Class VI	 CEMT Class II
Tonnage (t) 2000	Tonnage (t) 6800	Tonnage (t) 950
Length (m) 95	Length (m) -	Length (m) 89
Beam (m) 11.4	Beam (m) -	Beam (m) 13.5

### Main engine

Engine emission profiles vary according to the year of construction. Therefore, based on the number of engines in a certain class of year of construction, weighted averages were taken to determine the profile of NOx and PM emissions, which are the most relevant for the external costs. The emission profiles applied in the model for the various engine base years are presented below.

Year build



# IWT Greening Tool

- Default values serve as a starting point
- To be adjusted by cost calculator for those who would like to do so

## Steps

Follow the steps below to calculate your results.

### Operational details

1. Climate ✓
2. Vessel Pushboat + 4 barges (MSS) ✓
3. Operational costs & hours ✓

### Greening options

4. Choose suitable options
5. Refine costs

### Evaluate results

6. View and download results

## Operational details

Based on your sailing region & vessel details we have default values for the operational details such as costs. You can fine-tune individual values to narrow down the most suitable greening options for your situation or continue with these values.

### Yearly costs

<b>Operational costs</b> Please enter your operational costs per year in Euro.	<b>Fuel costs</b> Fill in your average fuel costs in the current situation.
<input type="text" value="890,900.00"/> Euro per year	<input type="text" value="574,992.00"/> Euro per year

If you wish to use other values that better reflect your situation, please overwrite default values by your own values. Not sure what your costs are exactly? Use the cost calculator to fine tune the results.

Cost calculator

### Operational hours

Operational hours

Average operational hrs per day  Per day

### Engine details

Total power   
The total engine power of your vessel In kW

Main engine   
Engine power of main engine In kW

Number of engines   
The number of engines your vessel has in operation Total engines

### Emissions profile

Based on your previously chosen year of construction the following default emission profile has been preselected.

< 1975	<input type="text" value="2.376.000.00"/>	<input type="text" value="10.80"/>	<input type="text" value="0.60"/>
CO2 (kg per year)	NOx (g/kWh)	PM (g/kWh)	

# IWT Greening Tool

## Greening options

Now that you've calculated specific operating costs for your current situation, we can assess how specific retrofit greening options may affect them. Please choose options that are suitable for your vessel.

Not sure what option to choose? Check the Greening options details page first.

## Propulsion improvements

Available options that affect the fuel efficiency of your propulsions system.

<p>Engine retrofit SCR + DPF</p> <p>Read more...</p> <p>Propeller upgrade   Hull Improvements Exhaust system</p> <p>Idle time due to installation <b>7 days</b></p>	<p>Engine retrofit LNG DF 95-5</p> <p>Read more...</p> <p>Fuel system</p> <p>Idle time due to installation <b>21 days</b></p>	<p>Engine retrofit FWE</p> <p>Read more...</p> <p>Exhaust system</p> <p>Idle time due to installation <b>10 days</b></p>
<p>Engine retrofit FWE + SCR</p> <p>Read more...</p> <p>Exhaust system</p> <p>Idle time due to installation <b>15 days</b></p>	<p>Engine retrofit GTL</p> <p>Read more...</p> <p>Fuel system</p> <p>Idle time due to installation <b>---</b></p>	<p>Engine retrofit SCR</p> <p>Read more...</p> <p>Exhaust system</p> <p>Idle time due to installation <b>7 days</b></p>

## Greening options

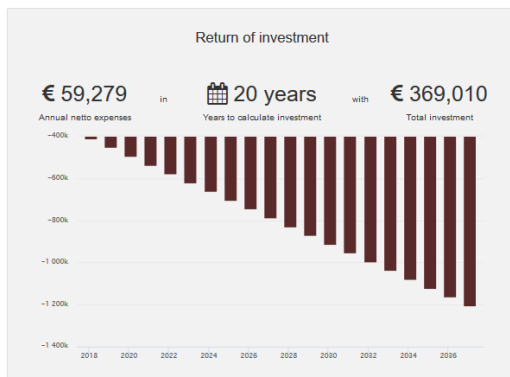
In this step you can fine-tune again or add another greening option.

<p>Engine retrofit</p> <p>✓</p> <p>SCR</p> <p>Finetune the costs factors of this greening option?</p> <p>Cost calculator</p> <table border="1"> <tr><td>Investment - Euro in total</td><td>175,056</td></tr> <tr><td>Annual costs - Euro annually</td><td>29,640</td></tr> <tr><td>Installation - In days</td><td>7</td></tr> <tr><td>Technical lifespan - In years</td><td>6</td></tr> <tr><td>Extra fuel costs - In euros per year</td><td>14,375</td></tr> <tr><td>Annual costs - In euros per year</td><td>29,640</td></tr> </table>	Investment - Euro in total	175,056	Annual costs - Euro annually	29,640	Installation - In days	7	Technical lifespan - In years	6	Extra fuel costs - In euros per year	14,375	Annual costs - In euros per year	29,640	<p>+</p> <p>No selection</p> <p>not defined</p> <p>No hydronamic option selected. You can still go back to include one for the calculation.</p> <p>Finetune the costs factors of this greening option?</p> <p>Cost calculator</p> <table border="1"> <tr><td>Investment - Euro in total</td><td></td></tr> <tr><td>Annual costs - Euro annually</td><td></td></tr> <tr><td>Installation - In days</td><td></td></tr> <tr><td>Technical lifespan - In years</td><td></td></tr> <tr><td>Annual costs - In euros per year</td><td></td></tr> <tr><td>Annual savings - In euros per year</td><td></td></tr> </table>	Investment - Euro in total		Annual costs - Euro annually		Installation - In days		Technical lifespan - In years		Annual costs - In euros per year		Annual savings - In euros per year	
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# IWT Greening Tool

## Greening results

Below you will find results applicable to your situation on the basis of the information you entered in previous steps. Keep in mind that these results are only indicative. You should not make any decision before consulting an expert. Contact an expert.



## Costs

Cost	Amount
<b>Total investment - Euro</b>	<b>369,010</b>
<b>Installation time loss - Euro</b>	<b>18,898</b>
<b>Maintenance + Interests - Euro annually</b>	<b>13,024</b>
<b>Fuel costs change - Euro</b>	<b>28,750</b>

## Comparison

The table below shows the results for both the current situation of your vessel and the situation after applying specific greening options.

Factor	Current	Change
<b>Total costs - Euro annually</b>	<b>1,465,892</b>	<b>59,279</b>
<b>Fuel costs - Euro annually</b>	<b>574,992</b>	<b>28,750</b>
<b>Emissions</b>		
CO <sub>2</sub> - in kg per year	1,149,984.00	5%
NO <sub>x</sub> - in g/kWh	10.80	-60%
PM - in g/kWh	0.60	0%

Now that you have completed this run feel free to use the options to Download the results (pdf) or share the results by email. Please note the shared links will remain working and anyone who has the shared link can access this results.

Download

Share

# Econaut

- For Android, iOS, [www.econaut.nl](http://www.econaut.nl)
- Easy to use
- Same method applied to everyone
- Distance, fuel, tonnes
- Green Award certification scheme
- Possibility to integrate with AIS, RIS

Eén methodiek voor de hele sector.

## CO2 berekenen op basis van dezelfde afspraken.

Met behulp van de Econaut maken alle binnenvaartondernemers voortaan hun CO2-berekeningen op basis van dezelfde rekenkundige afspraken. Dat verhoogt de betrouwbaarheid van de cijfers en maakt prestaties onderling vergelijkbaar. Door middel van een persoonlijk account legt u uw CO2-prestaties eenvoudig vast in een rapport. Dit rapport wordt maandelijks automatisch per e-mail verstuurd als PDF. U kunt deze bewaren voor uw eigen administratie en delen met uw opdrachtgevers.



Altijd uw gegevens bij de hand!

Altijd en overal gegevens invullen,  
bekijken en berekenen

Download voor iOS

Download voor Android

# Econaut

Econaut [Users](#) [Translate descriptions](#) [e.van.der.linden@eibip.nl](#) en

← [TRIPS](#) / NEW

**Date**

Start date

**Load**

Cargo type  Bulk  Container

**Terminals**

From  To

Distance

[Calculate the travelled distance](#)

**Load**

Empty trip

Tonnage

M³/ton  Default 1.16 in tonne value

**Fuel usage**

Type of fuel  Diesel  LNG

Fuel (litres)

## ÜBERBLICK März 2018

DURCHSCHNITTLICHE CO2 EMISSIONEN

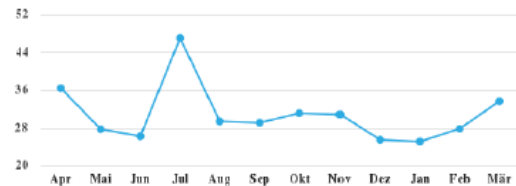
**33.65**

GRAMM/CO2/TONNEN-KM

Vergangener Monat

**27.8**

GRAMM/CO2/TONNEN-KM



DURCHSCHNITTLICHE CO2/GESAMT

**91182.96**

CO2 GESAMT KG



GESAMTTONNAGE

**10048.0**

TONNAGE (KILOTONNE)



GESAMTDISTANZ

**3072.0**

KM



# Next steps

- **Hosting by EICB: options for independent monitoring**
- **Market insights visitor preferences**
- **Policy support by fact based emission performance monitoring**
- **Instrumental to incentive schemes**
  
- **Greening Tool → i-Steer application (Prominent)**
- **TCO LNG → LNG Breakthrough**
- **Econaut → EIBIP**

# Questions?

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