Interreg CENTRAL EUROPE
European Union
European Regional Development Fund

REEF 2W

INCREASED RENEWABLE ENERGY AND ENERGY EFFICIENCY BY INTEGRATING, COMBINING URBAN WASTEWATER AND WASTE MANAGEMENT SYSTEM

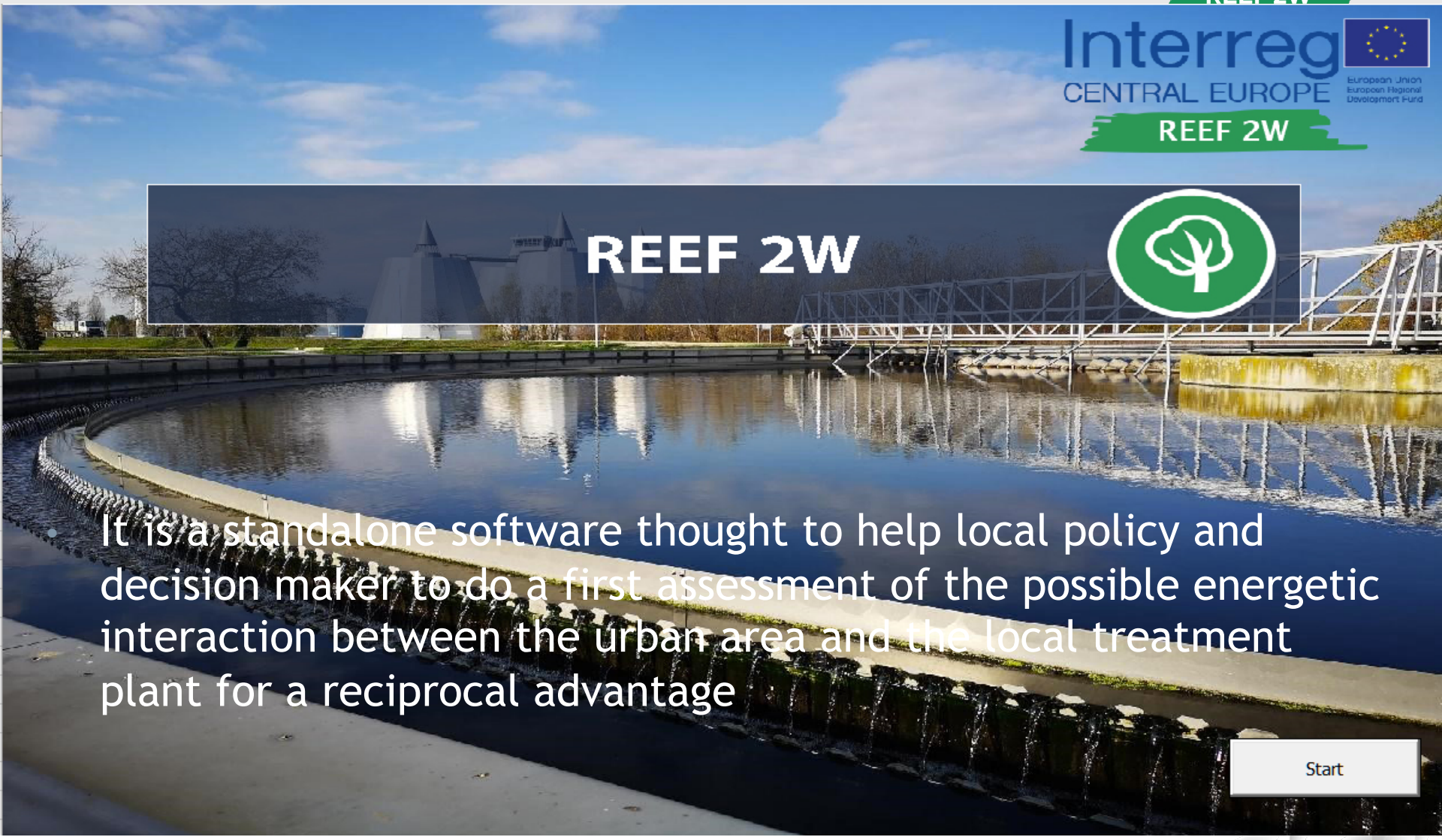
TAKING COOPERATION FORWARD

ECOMONDO Rimini 05/10/2019

REEF 2W Tool and its possible applications

Roberto Farina ENEA

WHAT IS THE REEF 2W TOOL?

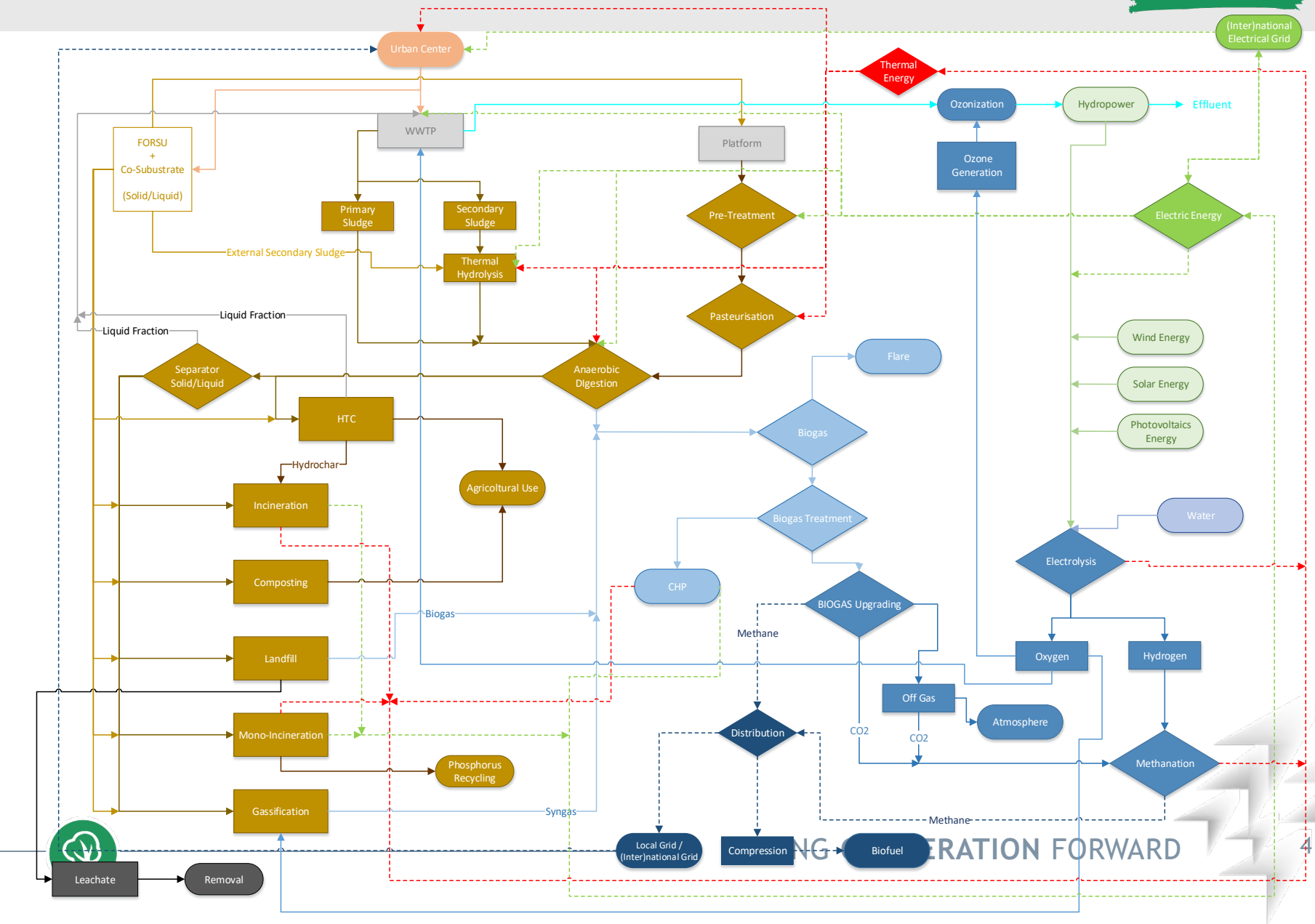


- It is a standalone software thought to help local policy and decision maker to do a first assessment of the possible energetic interaction between the urban area and the local treatment plant for a reciprocal advantage

HOW THE TOOL WORKS

- It was developed in one of the most common electronic sheet using a VBA language.
- It is not necessary to have an internet access (during the use)
- All the information provided by the user and received remain in the computer of the user.
- At the moment developed in English, but already implemented to dialog in German, Croatian, Czech, Italian, possible add any other language
- It works providing an assessment of the status quo situation and one or more possible future scenarios

LOGICAL SCHEME TO DEVELOP THE TOOL



INTRODUCTIVE PAGE

Tool progress status:

Status quo

☑ Status quo

Report

Future situation

☐ Future situation

Future situation

Report

Information about WWTP and Plant type

Energetic Assessment

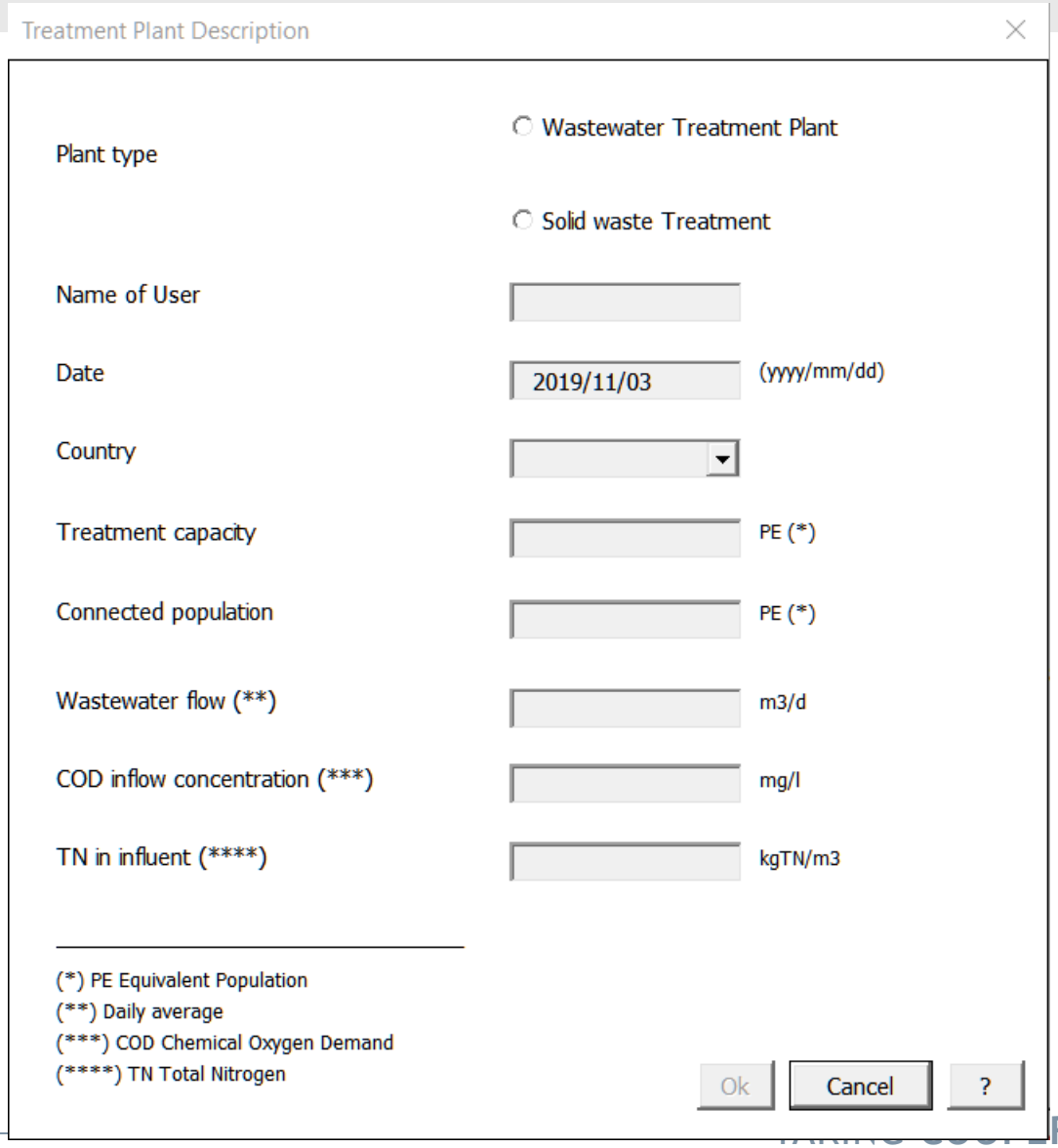
Spatial Assessment

Environmental Assessment

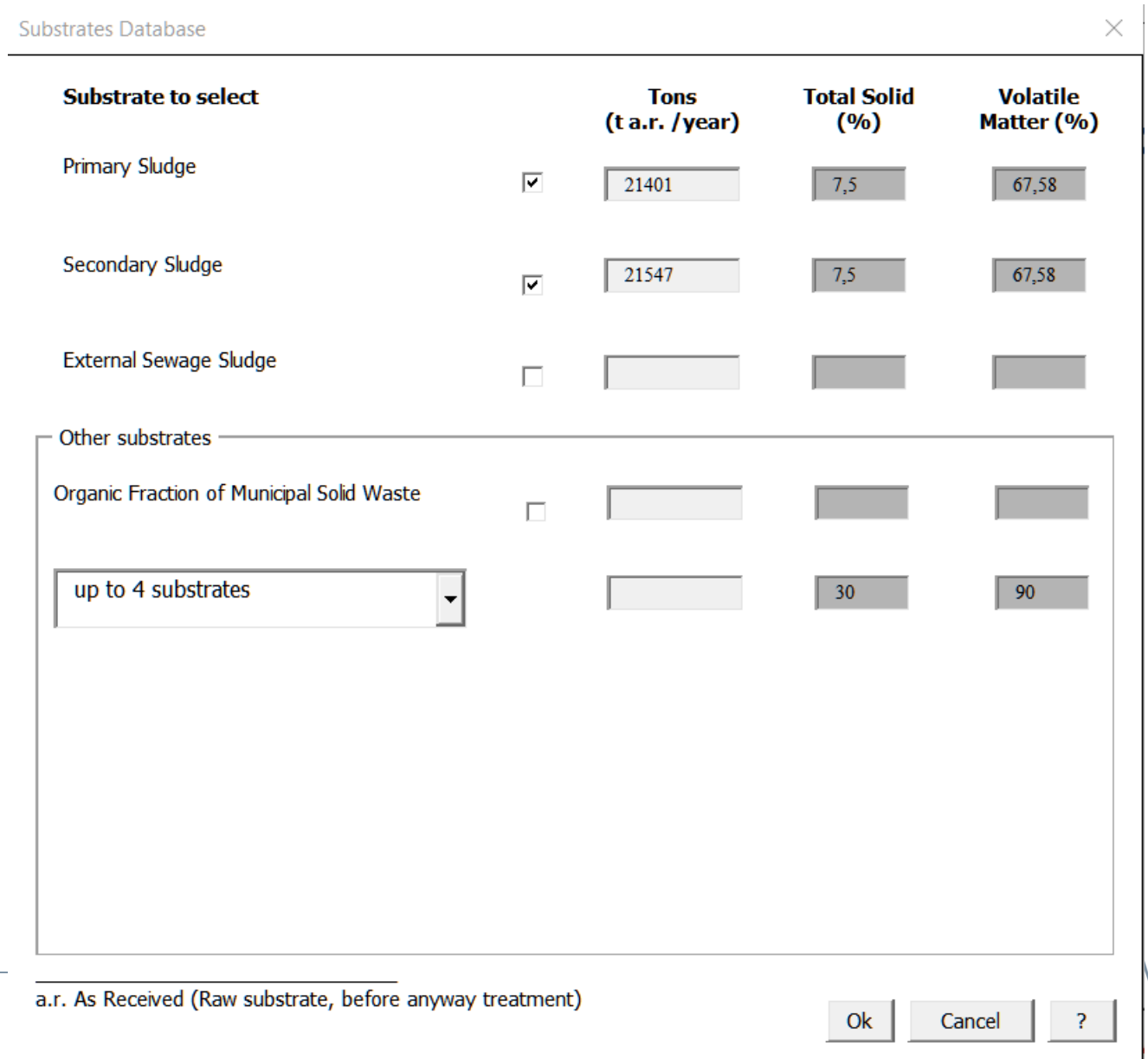
Economic Assessment

Reset

INTRODUCTIVE PAGE



ENERGETIC ASSESSMENT



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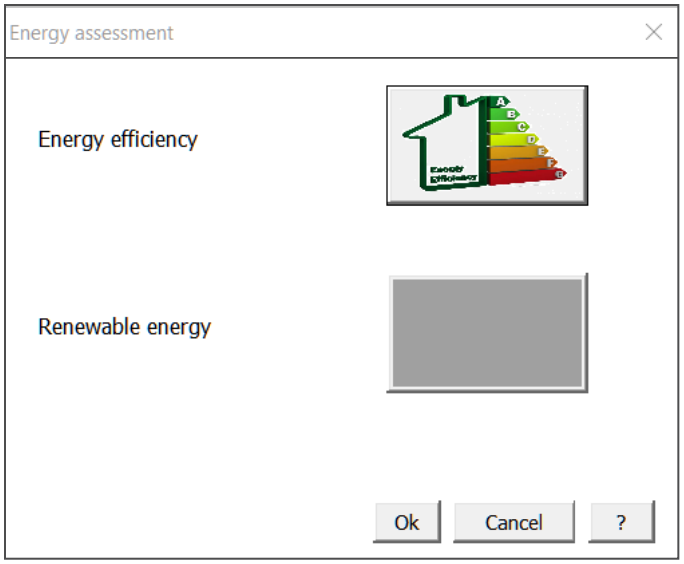

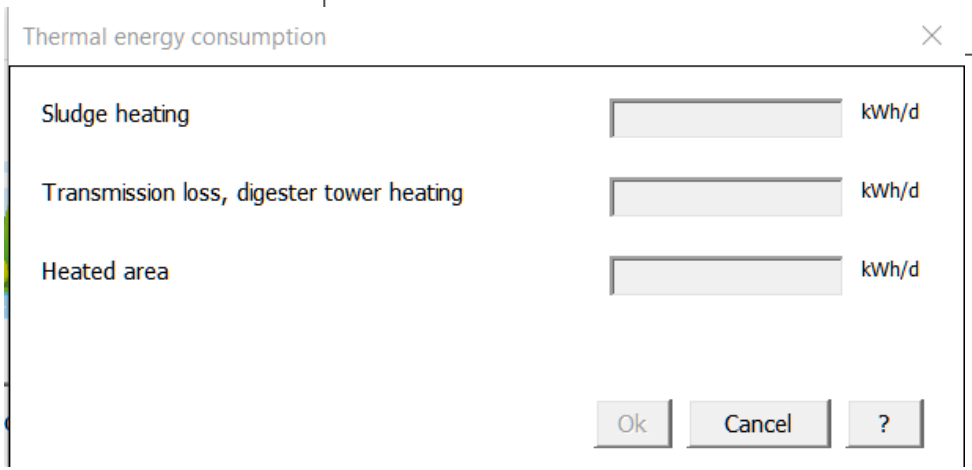

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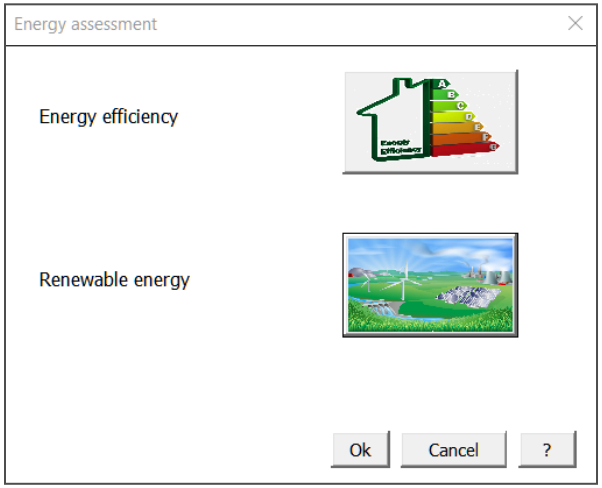

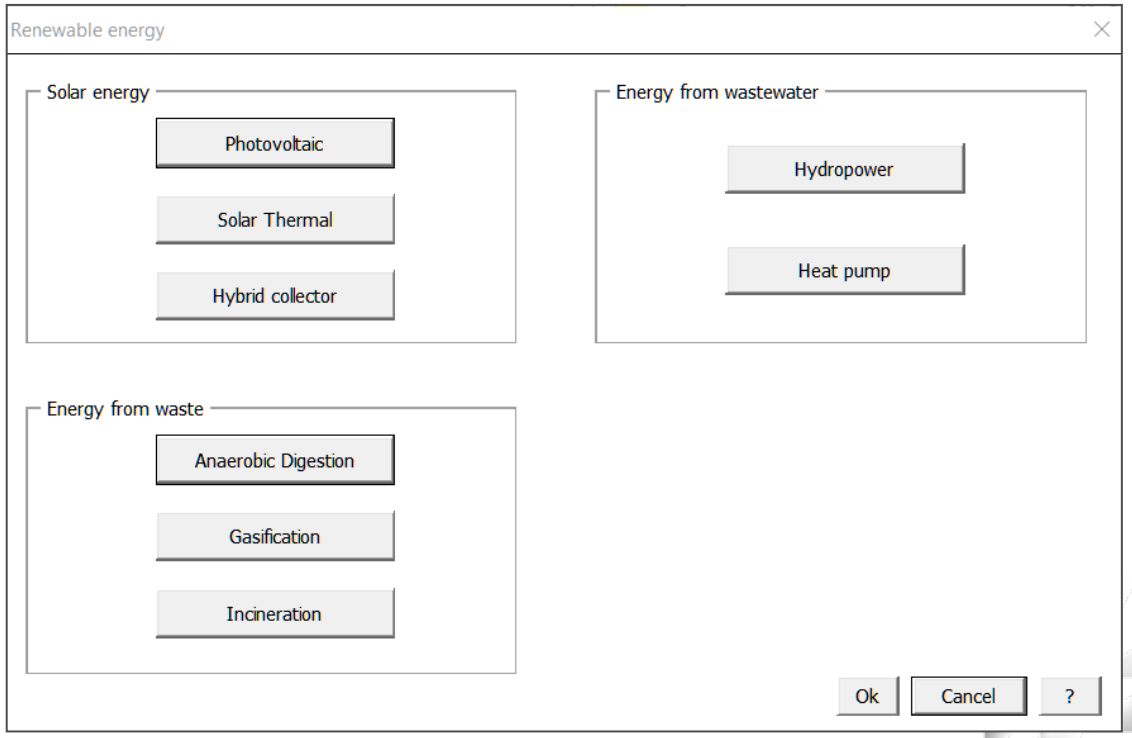

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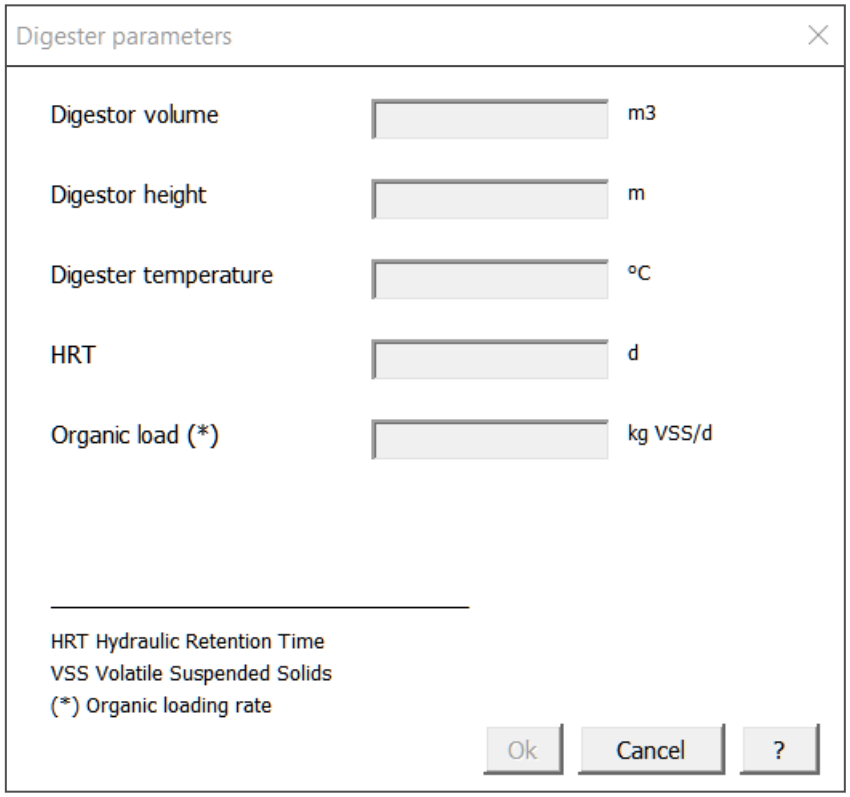

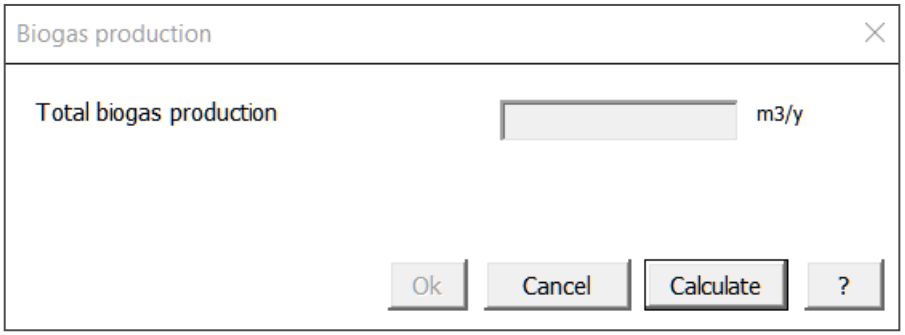

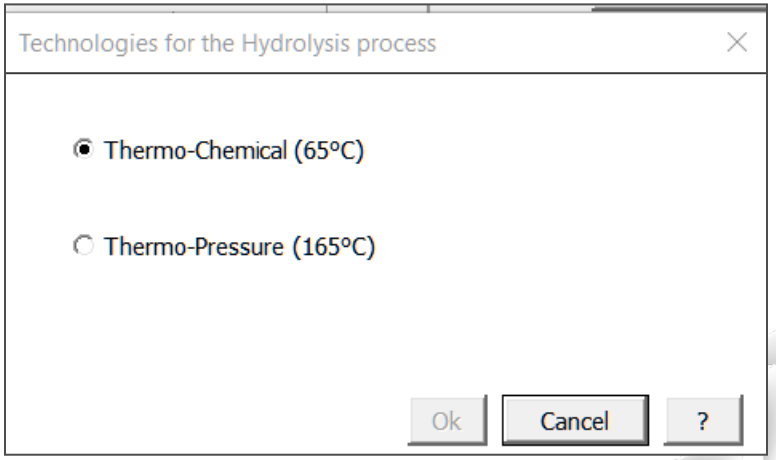

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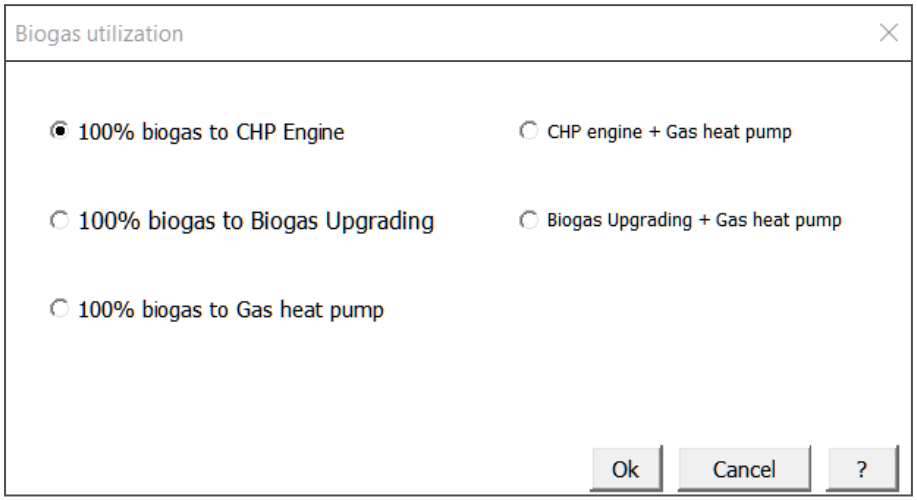
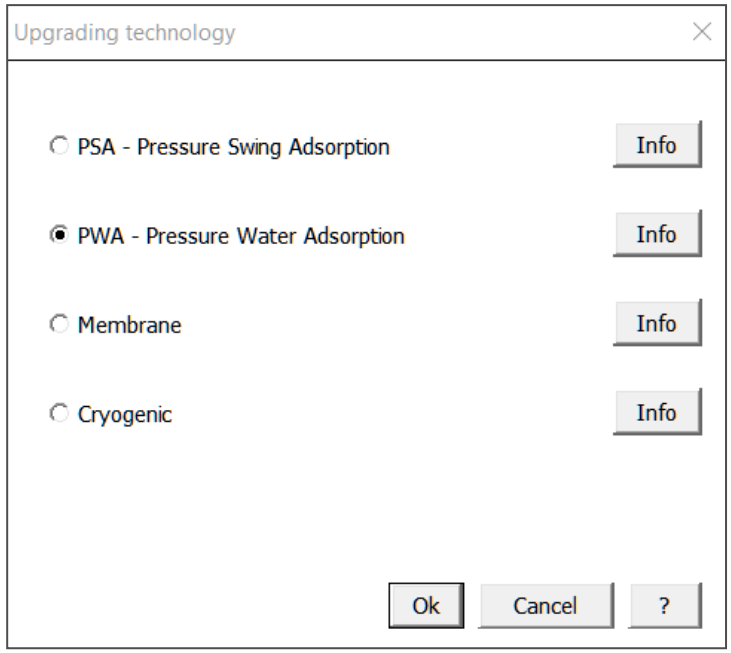
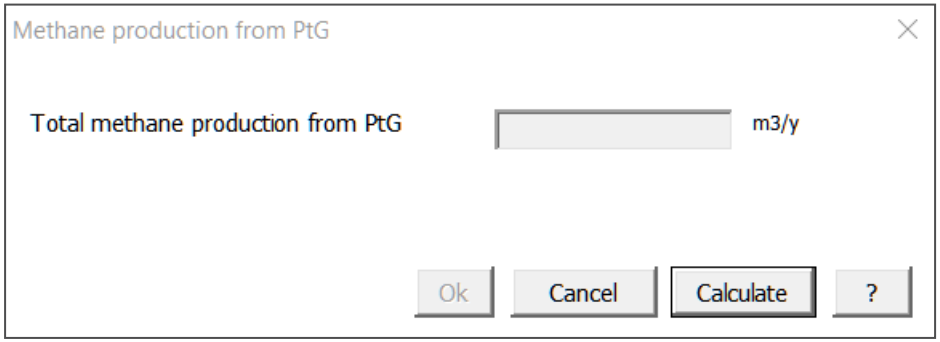






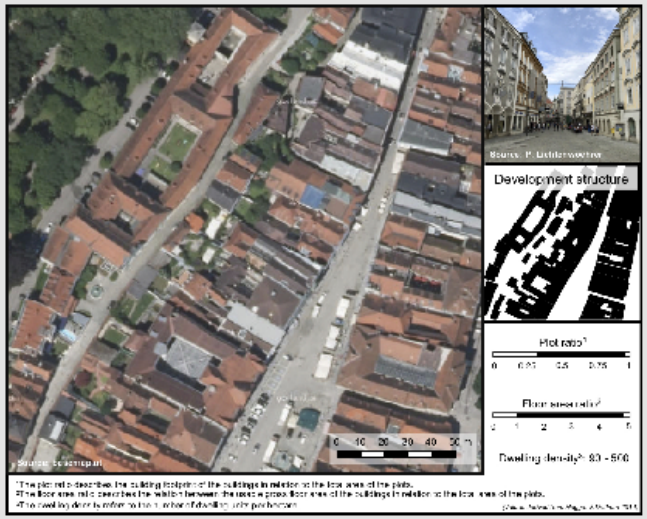
Spatial assessment

Spatial Assessment

- Evaluate the existing energetic requirements of the considered urban area for the different urbanized areas considered (centre, peri-urban, industrial, rural)
- Evaluate the potential development that the urban area will have
- Suggest possible energetic interaction between the treatment platform and the urban area

SPATIAL ASSESSMENT

Medium sized town centre



From 800 To 4000

Value changed 800

Legend

> 2	MWh/(m y)
0,5 - 2	MWh/(m y)
< 0,5	MWh/(m y)

Connection density	0	MWh/(m y)
Available thermal excess energy from the WWTP or the solid waste treatment	436.059.498.43	MWh/y
Total heat demand in the surrounding area of the WWTP or the solid waste treatment	0,00	MWh/y
Remaining thermal excess energy from the WWTP or the solid waste treatment	436.059.498.43	MWh/y

Gross development area	Specific heat demand	Degree of connected heat consumers (*)	Settlement specific grid length (inter.)	Grid length (exter.)
ha	MWh/(ha y)	%	m/ha	m

(*) If not all potential heat consumers connect to the district heating grid (degree of connected heat consumers < 100 %) the length of the settlement specific internal grid might be affected

Ok Cancel ?

Environmental assessment

Environment Assessment

- Environmental evaluation is based on the reduction of carbon dioxide emissions
- Existing and future situation are considered and compared. The effect on the greenhouse gases emission are analysed and reported.

SPATIAL ASSESSMENT

REEF 2W Model

Environment Assessment

Type of thermal energy supply

- (•) Natural gas
- ( ) District heating

Thermal Energy excess

Do you export the thermal energy excess?

- (•) Yes
- ( ) No

Sludge use

- ( ) Mono-Incineration
- ( ) Co-Incineration
- ( ) Anaerobic digestion+HTC (*)
- ( ) Anaerobic digestion+Composting
- (•) Agricultural Use
- ( ) Landfilling

(*) HTC Hydrothermal Carbonization

Ok | Cancel | ?

Reset

Energetic Assessment

Spatial Assessment

Environmental Assessment

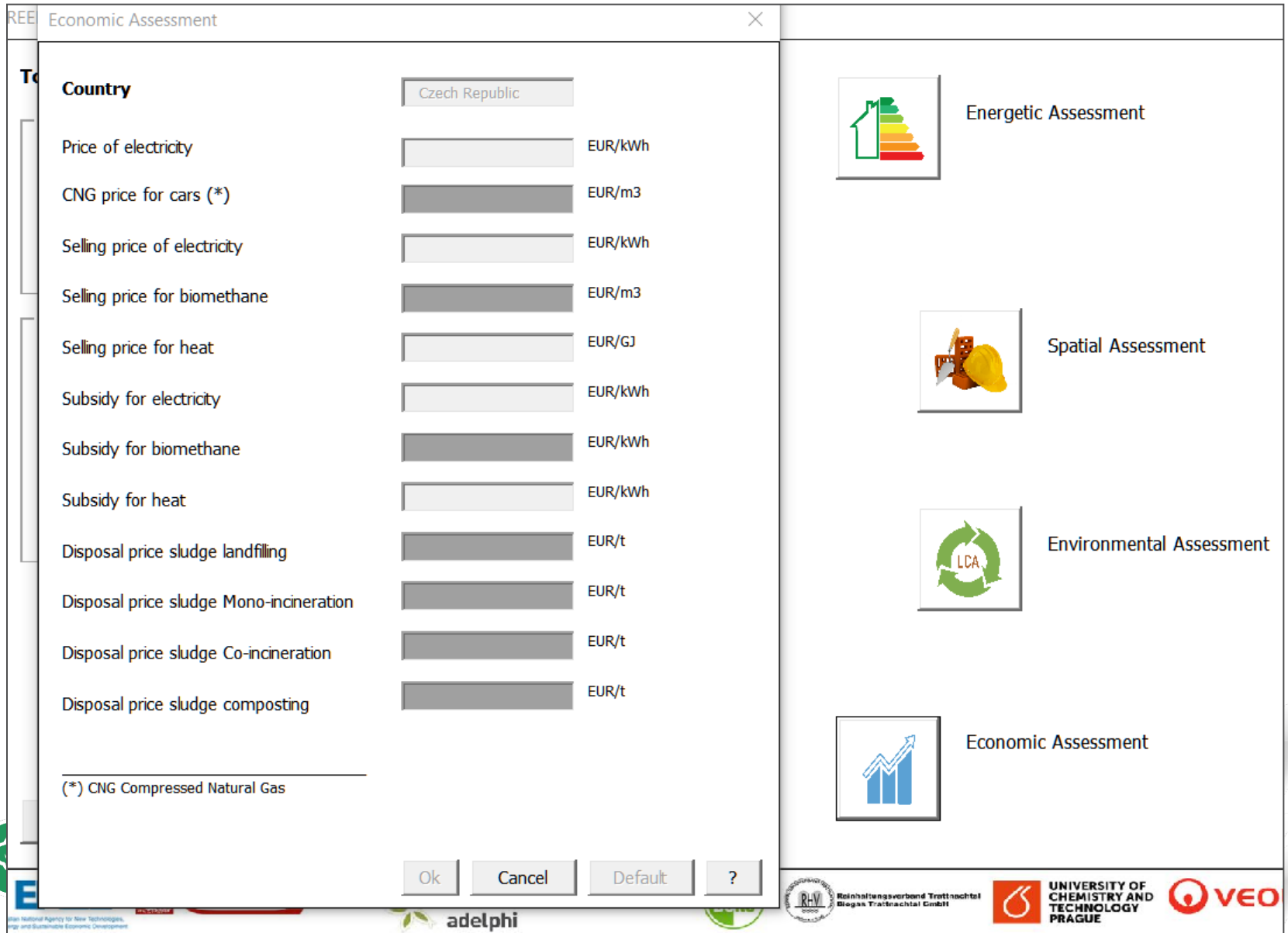
Economic Assessment

Economic assessment

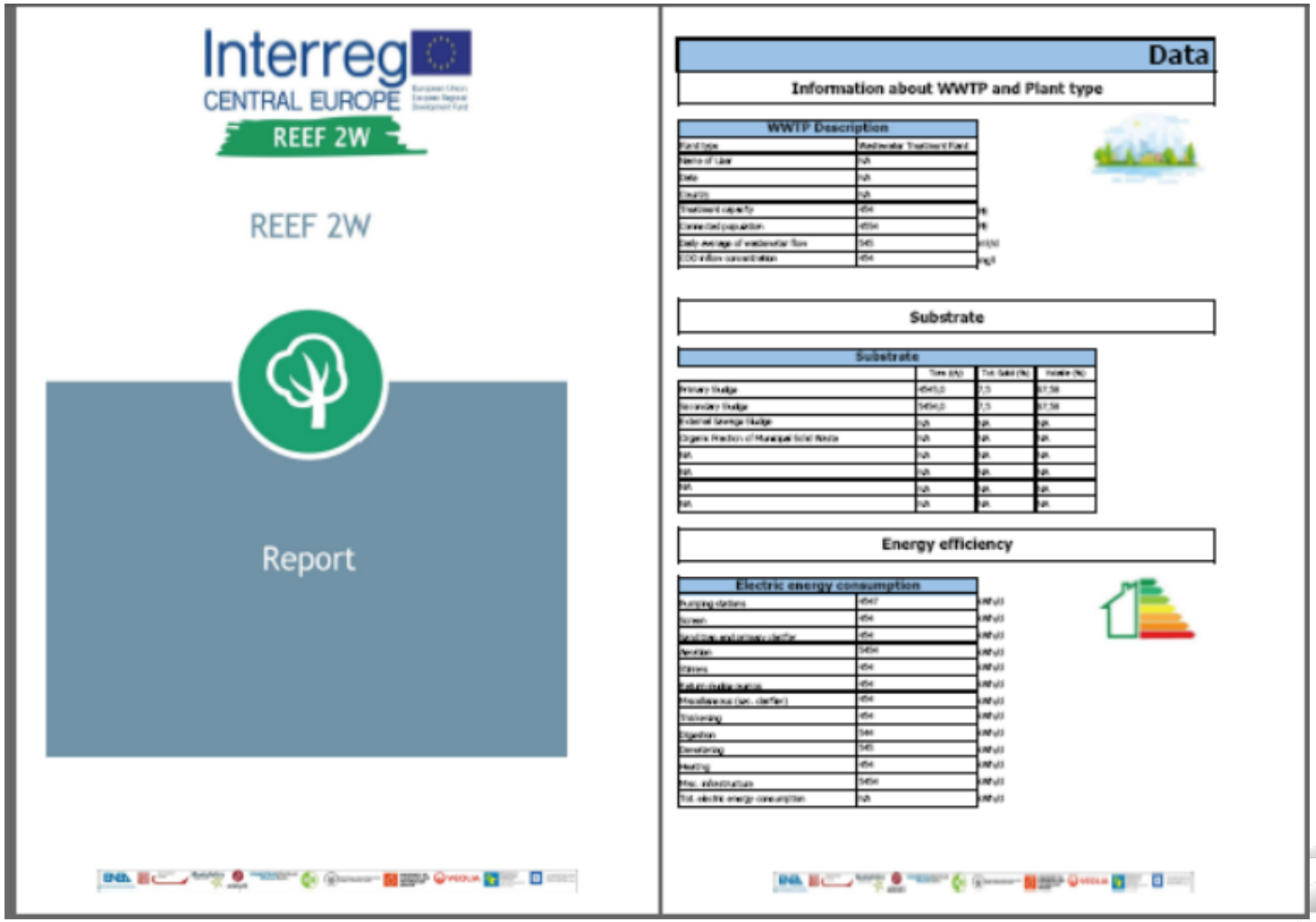
Economic Assessment

- Operational cost have been considered for the evaluation of the economic advantage that the recovery of energy from wastes can determine, considering also incomes from new wastes disposal, and subsidies for the production or energies
- Investment costs are considered to provide a rough idea about.

ECONOMIC ASSESSMENT



REPORT



REEF 2W

Report

Data

Information about WWTP and Plant type

WWTP Description

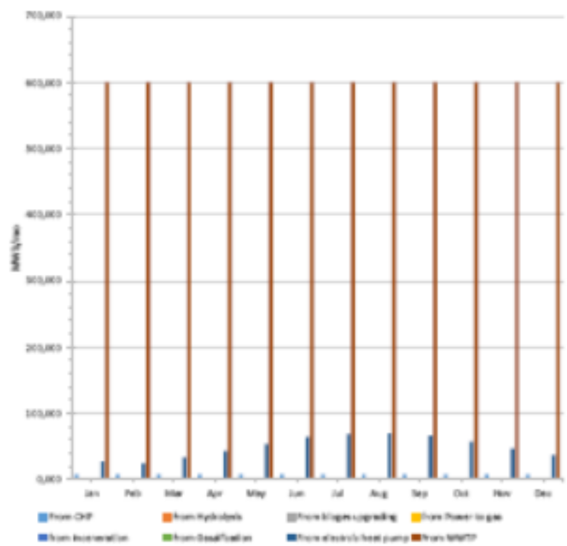
Substrate

Substrate

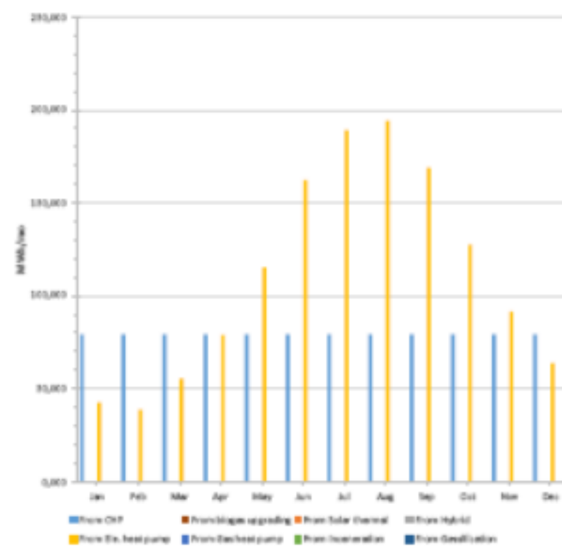
Energy efficiency

Electric energy consumption

Electric energy CONSUMPTION								
	From:							
	CHP	Hydrolysis	Upgrading	P2G	Incineration	Gasification	El. heat pump	WWTP
	MWh/mo	MWh/mo	MWh/mo	MWh/mo	MWh/mo	MWh/mo	MWh/mo	MWh/mo
Jan	7,21	NA	NA	NA	NA	NA	26,65	599,88
Feb	7,21	NA	NA	NA	NA	NA	24,69	599,88
Mar	7,21	NA	NA	NA	NA	NA	32,89	599,88
Apr	7,21	NA	NA	NA	NA	NA	42,43	599,88
May	7,21	NA	NA	NA	NA	NA	54,08	599,88
Jun	7,21	NA	NA	NA	NA	NA	64,67	599,88
Jul	7,21	NA	NA	NA	NA	NA	68,71	599,88
Aug	7,21	NA	NA	NA	NA	NA	69,38	599,88
Sep	7,21	NA	NA	NA	NA	NA	65,70	599,88
Oct	7,21	NA	NA	NA	NA	NA	57,24	599,88
Nov	7,21	NA	NA	NA	NA	NA	46,84	599,88
Dec	7,21	NA	NA	NA	NA	NA	36,41	599,88
Tot (MWh/y)	86,28	NA	NA	NA	NA	NA	589,68	7198,55
							[illegible]	7874,79



Thermal energy PRODUCTION								
	From:							
	CHP	Upgrading	Solar thermal	Solar hybrid	El. heat pump	Gas heat pump	Incineration	Gasification
	MWh/mo	MWh/mo	MWh/mo	MWh/mo	MWh/mo	MWh/mo	MWh/mo	MWh/mo
Jan	79,19	NA	0,08	0,30	42,58	NA	NA	NA
Feb	79,19	NA	0,08	0,30	38,78	NA	NA	NA
Mar	79,19	NA	0,08	0,30	55,58	NA	NA	NA
Apr	79,19	NA	0,08	0,30	79,72	NA	NA	NA
May	79,19	NA	0,08	0,30	115,24	NA	NA	NA
Jun	79,19	NA	0,08	0,30	162,33	NA	NA	NA
Jul	79,19	NA	0,08	0,30	188,06	NA	NA	NA
Aug	79,19	NA	0,08	0,30	194,06	NA	NA	NA
Sep	79,19	NA	0,08	0,30	168,90	NA	NA	NA
Oct	79,19	NA	0,08	0,30	127,37	NA	NA	NA
Nov	79,19	NA	0,08	0,30	91,51	NA	NA	NA
Dec	79,19	NA	0,08	0,30	63,58	NA	NA	NA
Tot (MWh/y)	950,27	NA	1,01	3,63	1327,26	NA	NA	NA
							[illegible]	2276,19



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