

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

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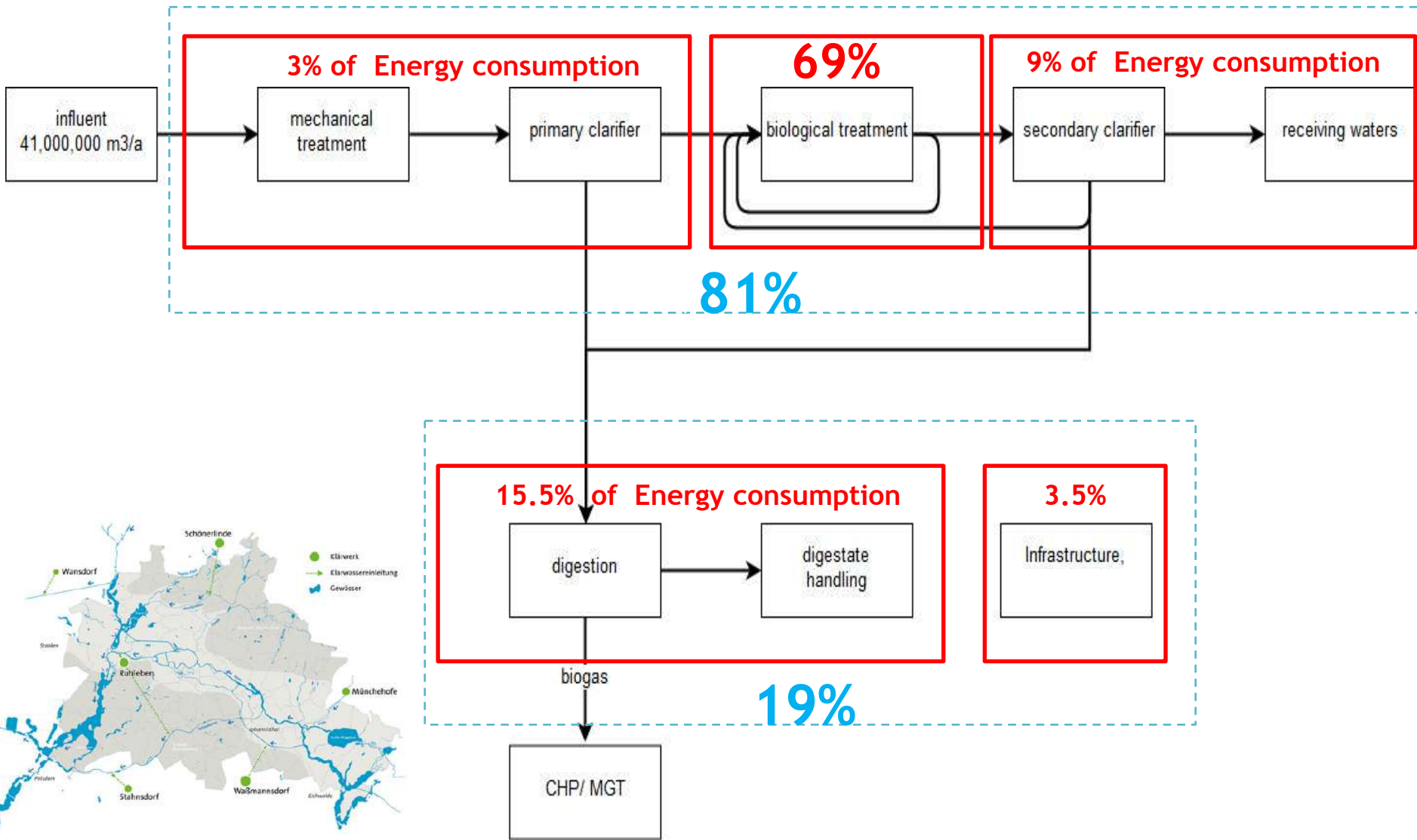
 REEF 2W Final Conference

 *Berlin Case Study*

 Mehdi Habibi, KWB Berlin

Pilot Site in Berlin

Energy performance



Pilot Site in Berlin

Energy performance

Table 2: Electric energy efficiency of the selected WWTP

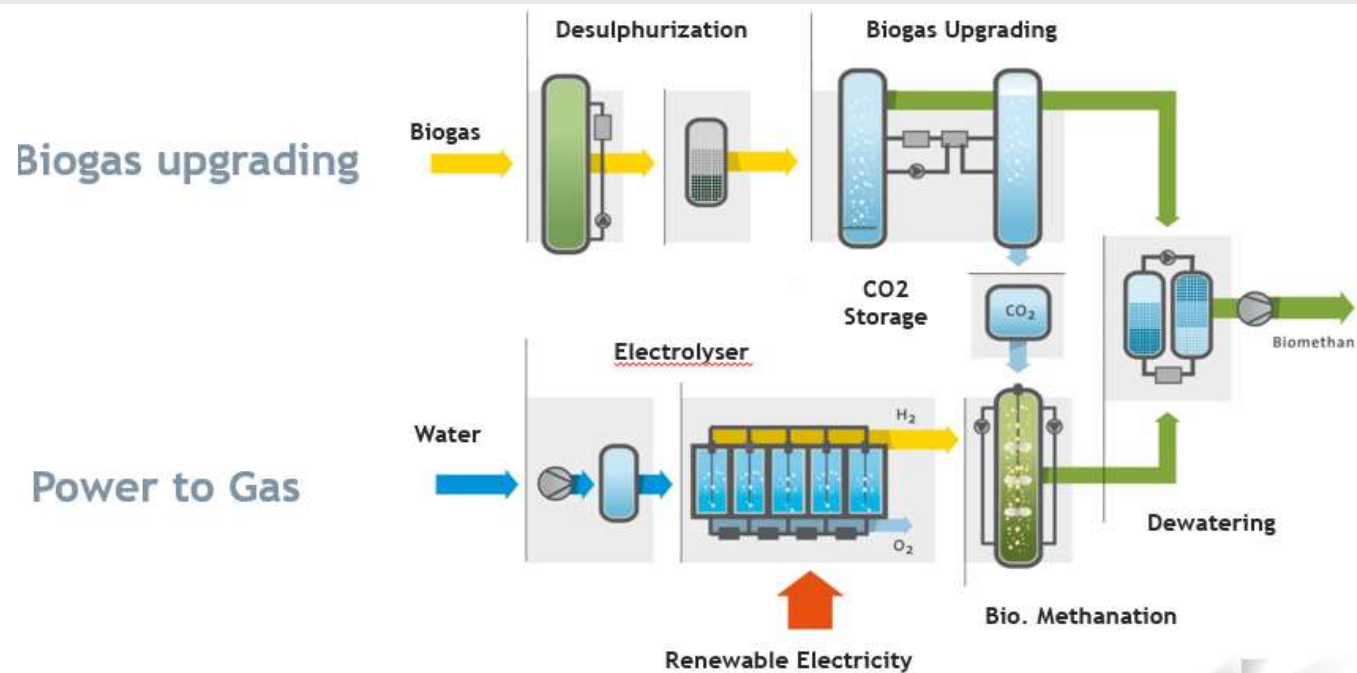
Electric energy consumption		<i>Standard range</i>	
WWTP total [kWh/PE120/a]	23,27	20,00	50,00
1) inflow pumping station and mechanical pre-treatment [kWh/PE120/a]	1,05	2,50	5,50
2) mechanical-biological treatment [kWh/PE120/a]	17,60	14,50	33,00
3) sludge treatment [kWh/PE120/a]	3,50	2,00	7,00
4) infrastructure [kWh/PE120/a]	1,12	1,00	4,50

Table 3: Thermal energy efficiency of the selected WWTP

Thermal energy consumption		<i>Standard range</i>	
WWTP total [kWh/PE120/a]	13,15	0,00	30,00
sludge heating [kWh/PE120/a]	10,42	8,00	12,00
transmission loss, digester tower heating [kWh/PE120/a]	0,54	0,00	4,00
generation, storage and distribution loss [kWh/PE120/a]	1,10	0,00	2,00
heat for buildings [kWh/PE120/a]	1,09	0,00	2,00



Pilot Site in Berlin Scenarios



Scenario	CHP	Biogas upgrading system	Electrolyser for PtG
Status quo (I)	6 MW	0 m ³ /h biogas	0 MW
Scenario II	0 MW	1800 m ³ /h biogas	0 MW
Scenario III	0 MW	1800 m ³ /h biogas	7.8 MW



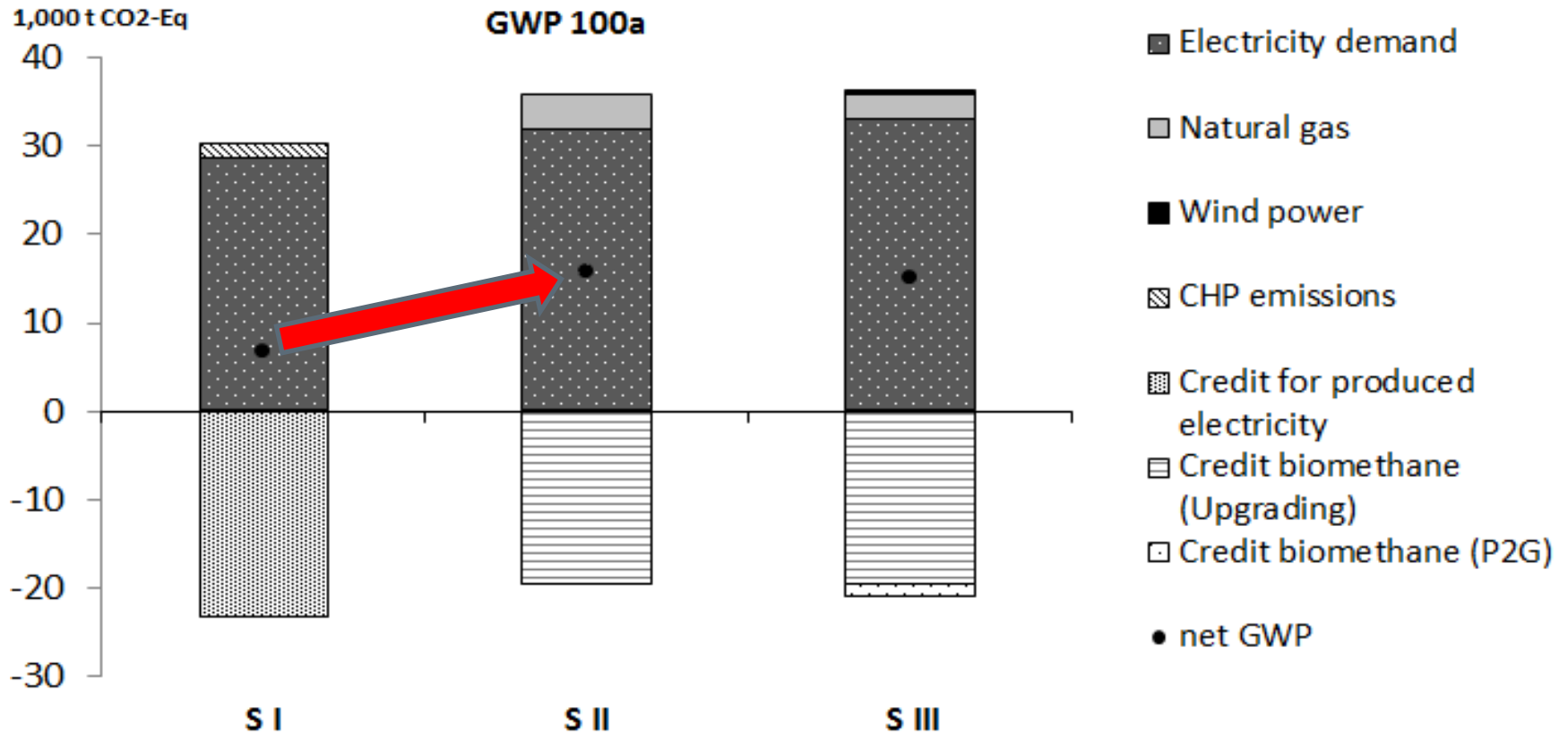
Results of Environmental Assessment for Berlin case study



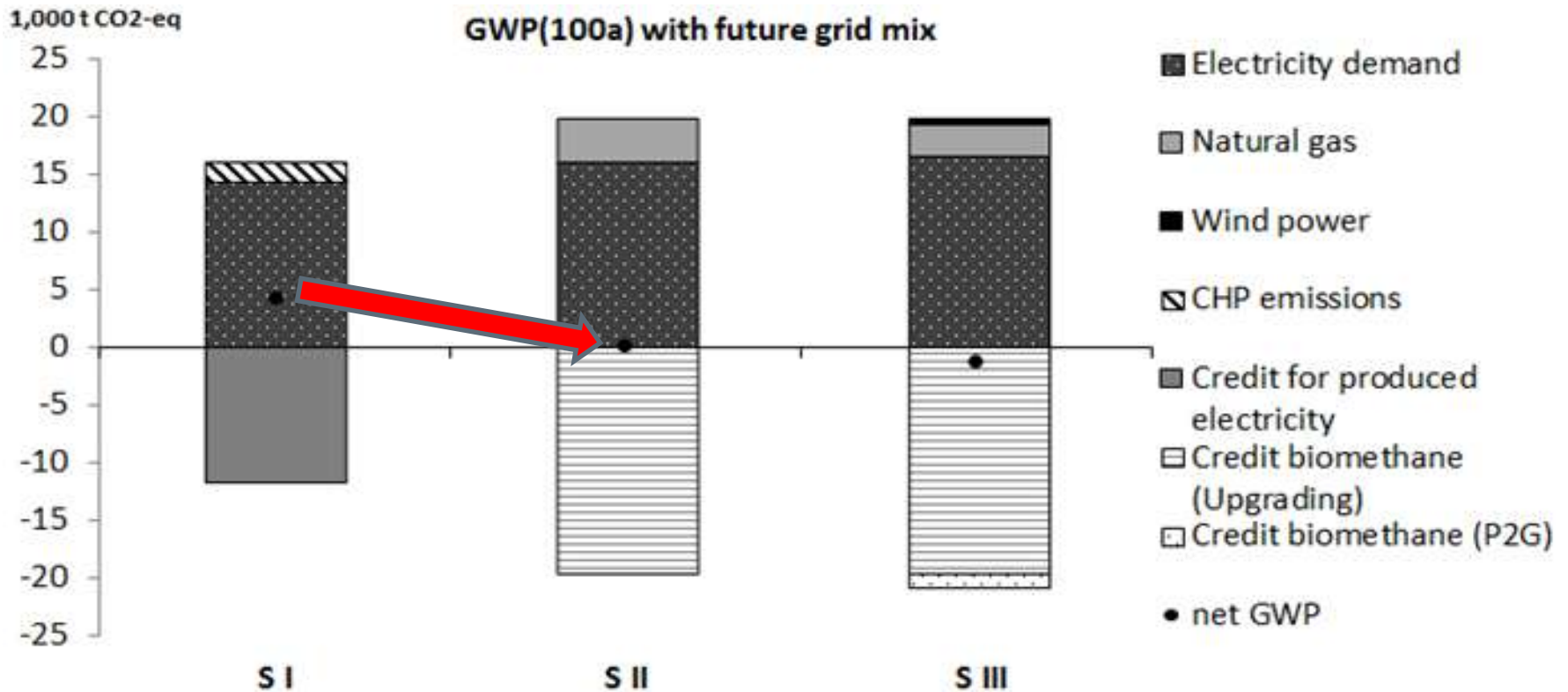
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Assessment of the Global Warming Potential with electricity mix of 2014



Assessment of the Global Warming Potential with electricity mix of 2030



Take Home Message:

Biogas upgrading and injection in the gas grid :

- At the moment: no reduction of GWP, better to produce electricity with CHP and substitute current power mix with high GWP
- In the future: it can decrease the GWP if green electricity is in the grid

Power to Gas:

- It can decrease the GWP (if PtG uses excess renewable electricity available in the grid)



DISCUSSIONS AND QUESTIONS



Contact details



Name : Mehdi Habibi
Kompetenzzentrum Wasser Berlin gGmbH
Project Acronym: REEF2W



www.kompetenz-wasser.de



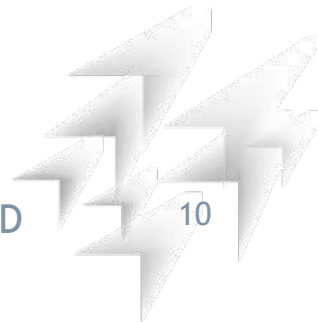
Mehdi.habibi@kompetenz-wasser.de



Uff. +49 (0) 30 53653 - 820
Fax +49 (0) 30 53653 - 888



[linkedin.com/MehdiHabibi](https://www.linkedin.com/MehdiHabibi)



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