

## Appendix A

**Table A1.**

- Energy: Natural Gas CC with CCS

	Current	2010	2020	2030
1) Range of unit size and project size [MW]		450	450	450
2) Nominal efficiency				
<i>i) For electricity generation only [%]</i>		54	56	57
<i>ii) For combined heat and power [%]</i>				
3) Efficiency at partial load				
4) Flexibility towards fuel, fuel resource availability, plant siting and infrastructures (e.g. cooling water needs, high voltage, grid gas pipes, etc.)				
5) Flexibility towards exploitation:				
<i>i) Cold start [minutes from 0% to 90% of nominal power]</i>				
<i>ii) Warm/lukewarm start [minutes from 0% to 90% of nominal power]</i>				
<i>iii) Uncontrollable variation in load [% from nominal power]</i>				
<b>Total energetic score</b>				

- Ecology and resource use:

1) Exhaust, direct for operation [kg/kWh] / indirect				
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for construction and dismantling [kg/kW]:				
i) $CO_2$ [kg/kWh <sub>electricity</sub> ] / [kg/kW]		0.044898 /	0.044181 /	0.043235 /
ii) $SO_2$ [kg/kWh <sub>electricity</sub> ]		0.000215 0.000208 /	0.000215 0.000202 /	0.000215 0.000200 /
iii) $NO_x$ [kg/kWh <sub>electricity</sub> ]		0.000001 0.000454 /	0.000001 0.000440 /	0.000001 0.000437 /
iv) $PM_{10}$ [kg/kWh <sub>electricity</sub> ]		0.000001 0.000008 /	0.000001 0.000008 /	0.000001 0.000008 /
v) $NMVOC$ [kg/kWh <sub>electricity</sub> ]		0.000002 0.000150 /	0.000002 0.000146 /	0.000002 0.000144 /
vi) <i>Methane</i> [kg/kWh <sub>electricity</sub> ]		0.000000 0.001007 /	0.000000 0.000982 /	0.000000 0.000970 /
vii) $N_2O$ [kg/kWh <sub>electricity</sub> ]		0.000000 0.000011 /	0.000000 0.000011 /	0.000000 0.000011 /
viii) $C_{14}$ [kg/kWh <sub>electricity</sub> ]		0.000000 0.000033 /	0.000000 0.000032 /	0.000000 0.000032 /
ix) <i>Heavy metals [most important ones, g/kWh<sub>electricity</sub>]</i>		0.000001	0.000001	0.000001
2) Thermal exhaust [TJ/GWh <sub>electricity</sub> ]				
i) <i>Into air</i>		0.199692	0.197273	0.192974
ii) <i>Into water source</i>		<b>0.8690300</b>	<b>0.8767680</b>	<b>0.8397960</b>
3) Liquid waste, direct for operation [kg/kWh] / indirect for construction and dismantling [kg/kW]:				
i) <i>Total liquid waste [kg/kWh<sub>electricity</sub>]</i>				
ii) <i>Total nitrogen into water source</i>		0.000000	0.000000	0.000000

<i>[kg/kWh<sub>electricity</sub>]</i>		/	/	/
iii) <i>Total phosphor into water source</i> <i>[kg/kWh<sub>electricity</sub>]</i>		0.000000	0.000000	0.000000
iv) <i>Total chlorides into water source</i> <i>[kg/kWh<sub>electricity</sub>]</i>		0.000740	0.000721	0.000712
v) <i>Total sulfates into water source</i> <i>[kg/kWh<sub>electricity</sub>]</i>		/	/	/
vi) <i>Others (KMnO<sub>4</sub>, iron, organic materials, solid materials)[Separately]</i>		0.000001	0.000001	0.000001
		0.000015	0.000015	0.000015
		/	/	/
		0.000001	0.000001	0.000001
		Iron:	Iron:	Iron:
		0.000003	0.000003	0.000003
		/	/	/
		0.000000	0.000000	0.000000
4) Solid waste [tons/MWh <sub>electricity</sub> ]				
i) <i>Flue dust</i>				
ii) <i>Slurry</i>				
iii) <i>Hazardous waste</i>		Waste Oil:	Waste Oil:	Waste Oil:
		<b>0.000015</b>	<b>0.000015</b>	<b>0.000015</b>
iv) <i>Radioactive waste</i>				
v) <i>Other solid waste</i>				
5) Safety and health impacts				
i) <i>Population affected by worst perceived accident during operation [nr of persons]</i>				
ii) <i>Number of deaths over the fuel cycle</i> <i>[persons/MWh<sub>electricity</sub>]</i>				
iii) <i>Other effects</i>				
6) Visual impact and noise				
7) Footprint and use of resources				
i) <i>Primary material moved for construction</i> <i>[kg/kW<sub>p</sub> of nominal power]</i>				
ii) <i>Secondary material moved for construction</i> <i>[kg/kW<sub>p</sub> of nominal power]</i>				
	Total:	Total:	Total:	Total:

<p>iii) <i>Main materials uses for construction (five)</i>  <i>[kg/kW<sub>p</sub> of nominal power]</i></p> <p>iv) <i>Primarily material moved for usage e.g. fuel</i>  <i>[tons/ MWh<sub>electricity</sub>]</i></p> <p>v) <i>Secondary material moved for usage e.g. fuel</i>  <i>[tons/ MWh<sub>electricity</sub>]</i></p> <p>vi) <i>Critical materials in construction and usage</i>  <i>(materials that may become a limiting factor</i>  <i>for the technology) [kg/kW<sub>p</sub> of nominal</i>  <i>power]</i></p> <p><b>Total ecological score</b></p>		<p>Iron: 24440  Aluminum: 142  Concrete: 71519  Copper: 1139</p>	<p>Iron: 24440  Aluminum: 142  Concrete: 71519  Copper: 1139</p>	<p>Iron: 24440  Aluminum: 142  Concrete: 71519  Copper: 1139</p>
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- Economy (without subsidies, price level for 2003):

<p>1) Investment cost [euro/MW]</p> <p>2) Availability [hours per year]</p> <p>3) Operational time [hours of nominal power/year]</p> <p>4) Reliability [%]</p> <p>5) Technical life span [years]</p> <p>6) Construction time [years]</p> <p>7) Fuel cost [euro/MJ]</p> <p>8) Operation and Maintenance (O&amp;M) cost  [euro/MWh<sub>electricity</sub>]</p> <p>9) Waste handling and dismantling [euro/  MWh<sub>electricity</sub>]</p> <p><b>Total economic score</b></p>		<p>945.9</p> <p>7500</p> <p>35</p> <p>4</p> <p>1.891785</p> <p>0.058435</p>	<p>889.6</p> <p>7500</p> <p>35</p> <p>4</p> <p>1.891785</p> <p>0.058435</p>	<p>833.4</p> <p>7500</p> <p>35</p> <p>4</p> <p>1.879124</p> <p>0.058435</p>
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