1. parameter studied: Steam/Carbon ratios

Table I. The average of the process streams with different steam/carbon ratios

Steam/Carbon ratio	Amount of natural gas, kg/h	Feed average, kg/h	Fuel average, kg/h	Hydrogen production, kg/h
2.8	1891	1568	317	5370
2.9	1900	1520	328	5395
3	1943	1529	372	5476
3.1	1964	1530	392	5528
3.2	1992	1518	420	5588

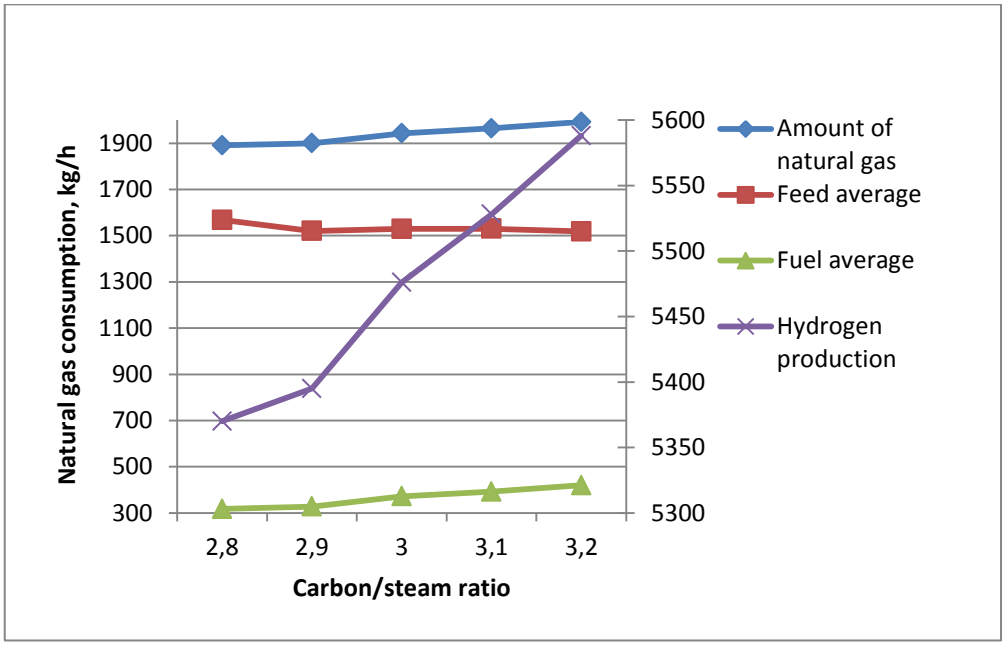

Figure 1. Total natural gas consumption, natural gas consumption divided to feed and reformer fuel and hydrogen production with different steam/carbon ratios in Solvay Chemicals Finland Oy

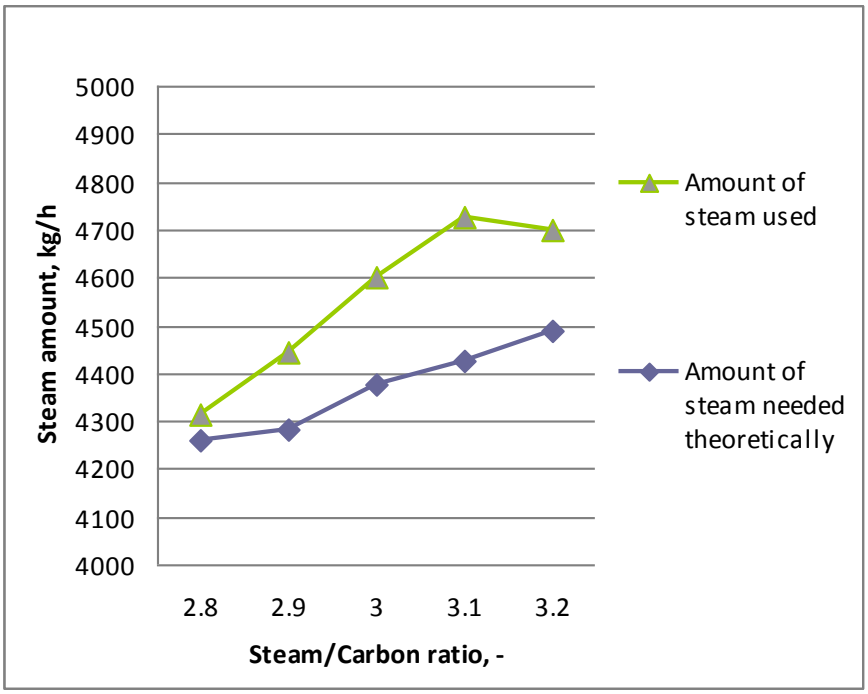

Figure 2. Theoretical steam consumption compared to the stoichiometric calculated amount of steam needed in the process

2. parameter studied: Reformer outlet temperature

Table II. Natural gas consumption is divided to feed and fuel for various reformer outlet temperatures

Reformer outlet temperature, °C	Natural gas consumption, kg/h	Feed average, kg/h	Fuel average, kg/h	Hydrogen production, kg/h
788	1872	1582	296	5356
793	1907	1554	333	5412
798	1943	1529	372	5476

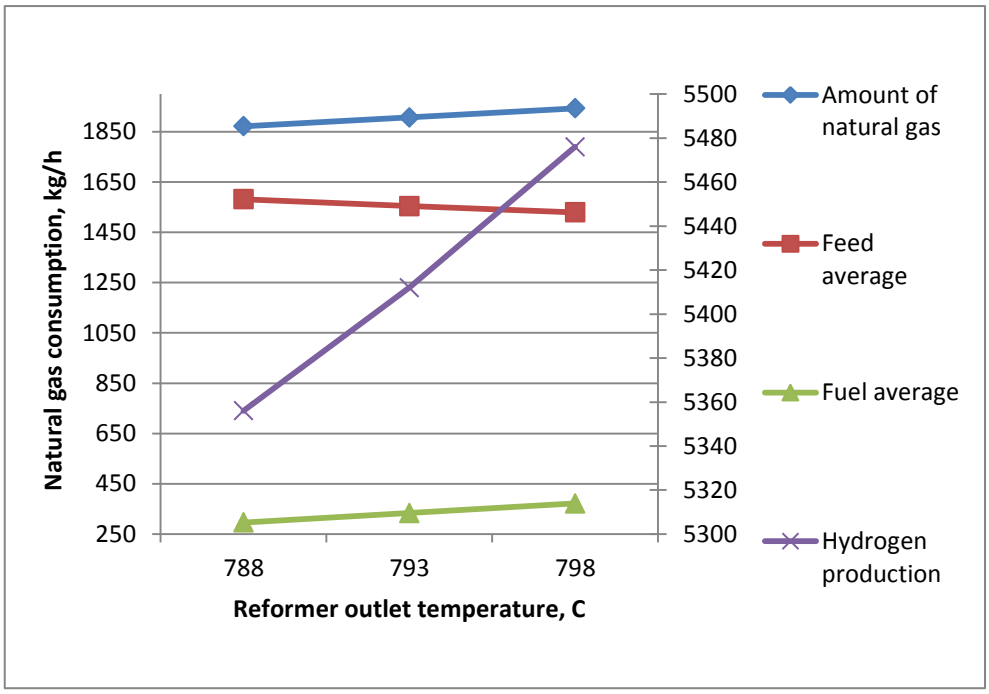

Figure 3. Total natural gas consumption, natural gas consumption divided to feed and reformer fuel and hydrogen production with different reformer outlet temperatures in Solvay Chemicals Finland Oy

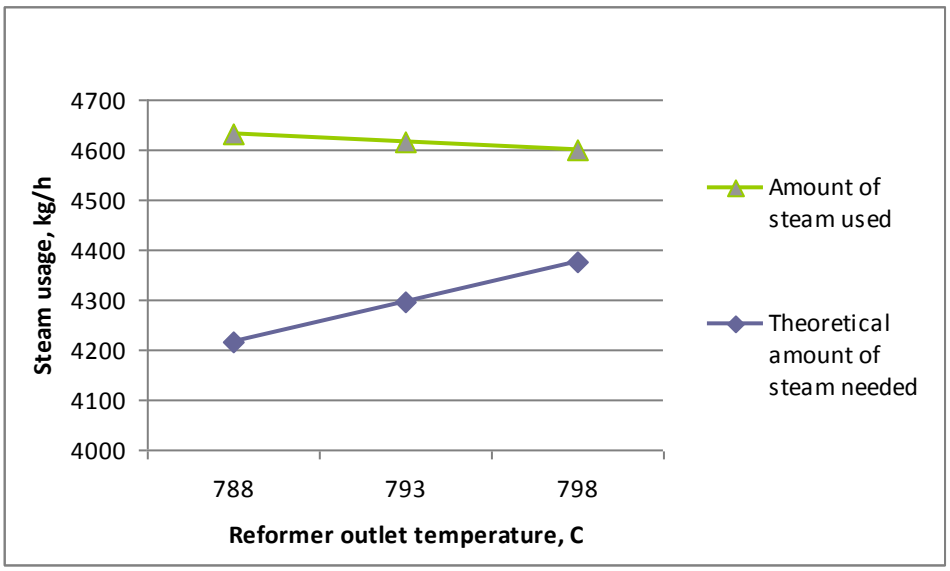

Figure 4. Theoretical steam consumption compared to the stoichiometric calculated amount of steam needed in the process

3. parameter studied: Shift conversion inlet temperature

Table III. Natural gas consumption is divided to feed and fuel for various shift conversion inlet temperatures

Shift conversion inlet temperature, °C	Amount of natural gas, kg/h	Feed average, kg/h	Fuel average, kg/h	Hydrogen production, kg/h
325	1949	1541	379	5470
335	1943	1529	372	5476
345	1933	1484	363	5417

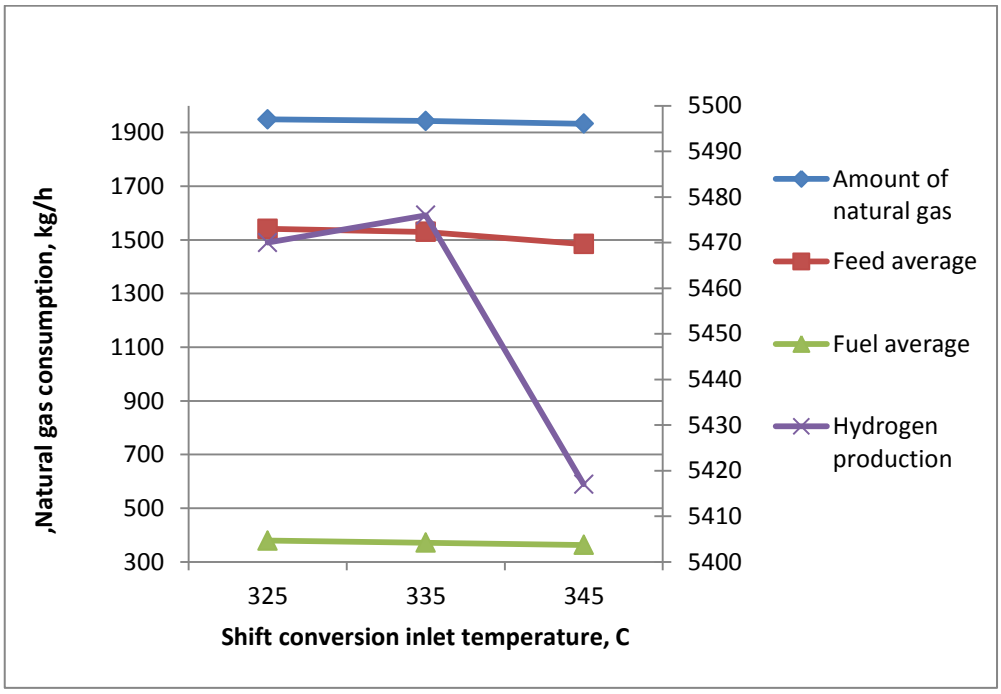

Figure 5. Total natural gas consumption, natural gas consumption divided to feed and reformer fuel and hydrogen production different shift conversion inlet temperatures in Solvay Chemicals Finland Oy

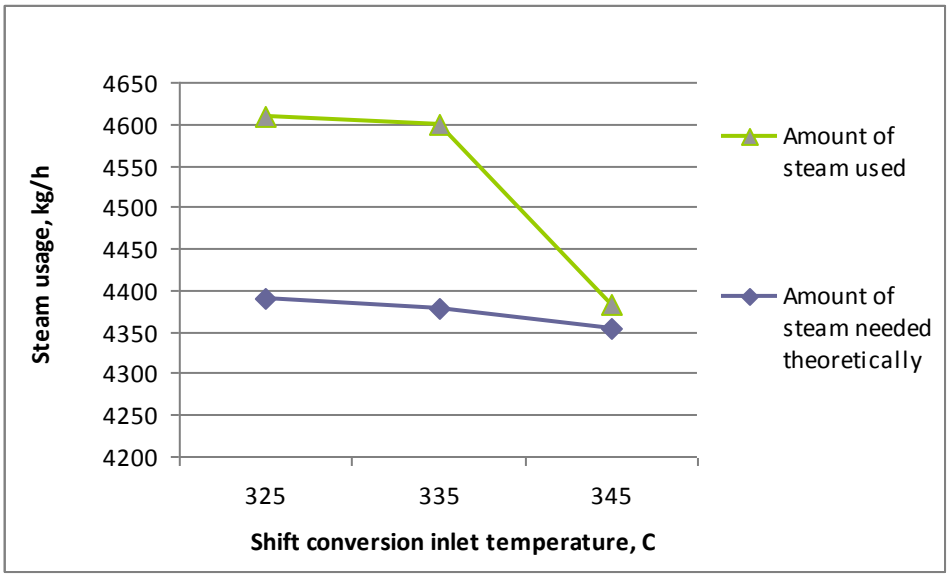

Figure 6. Theoretical steam consumption compared to the stoichiometric calculated amount of steam needed in the process

Efficiency determinants

Table IV. Numerical values of efficiency determinants

Changed parameter	Changes parameter value	η 1	η 2
Reformer outlet temperature	788	0.4883	0.4157
	793	0.4790	0.4164
	798	0.4824	0.4155
Shift conversion temperature	325	0.4898	0.4160
	335	0.4824	0.4155
	345	0.4829	0.4134
Steam/Carbon Ratio	2.8	0.4869	0.4151
	2.9	0.4826	0.4120
	3.0	0.4824	0.4155
	3.1	0.4885	0.4165
	3.2	0.4862	0.4144