TECHNOLOGY FACTSHEET

BIOMASS BOILER FOR BUILT ENVIRONMENT >5 MWTH

Date of factsheet	3-9-2018
Author	Ayla Uslu
Sector	Built environment
	District heating
ETS / Non-ETS	Non-ETS
Type of Technology	Biomass
Description	Refers to a hot water boiler that supplies heat to a district heating network. Wood pellets are used as reference fuel. A selective non-catalytic reduction (SNCR) is taken into account for the reduction of NOx. Thus, the main components consist of a wood pellet silo storage, where wood pellets can be stored up to one week, in addition to a pellet boiler, SNCR, other mechanical components and a simple building.
TRL level 2020	TRL 9

TECHNICAL DIMENSIONS

	Functional Unit		Value and Range						
Capacity	MWth				16.67				
			16.67		-			16.67	
	MWth	NL	Current		2030		2050		
Potential				-		-			-
			Min	-	Max	Min	-	Max	Min	-	Max
Market share	%			-			-			-
			Min	-	Max	Min	-	Max	Min	-	Max
Capacity utlization factor						1.00				
Full-load running hours per year						6,000				
Unit of Activity										
Technical lifetime (years)						15				
Progress ratio						-				
Hourly profile										
Explanation	The functional unit refers to MWth input. The number of full load hours of such a boiler can vary greatly. It is assumed that the boiler covers a large part of the base load and can also function as a seasonal boiler. That is why the full load hours are set to 6,000. The solid biomass potential can be based on the biomass potential studies conducted by DNV GL and the Biomass Policies project. These studies looked at the biomass potential in the Netherlands. The feedstock categories included are: waste wood, forest residues, fuel wood (refers to only current fuel wood use), nature and landscape biomass, and woody/lignocelluloses dedicated crops (this category is included in the Biomass Policies project). These studies indicate the solid biomass potential to be in the range of 41-46 PJ in 2020, increasing to 58.7-72.8 PJ in 2030. The import potential to the Netherlands is more difficult to determine. It will depend, amongst others, on the policy frameworks within the EU member states and outside. The biomass potential in Europe has been defined by a number of studies. The most recent ones are Biomass Policies (Elbersen et al, 2015), JRC EU-TIMES (Ruiz et al., 2015) and BioSustain (PWC, 2017). Amongst these studies, the lowest range (referred to as low availability) and the highest range (referred to as high availability) are observed in the JRC study. According to this study, in 2020 the lowest and the highest EU total biomass potential are 8.33-18.17 EJ. In 2030, this range is 8.61-19.97 EJ and in 2050 it is 8.16-21.13 EJ. How much of this potential can be considered as import potential to the Netherlands will depend on the national policies of each country and the intra EU trade developments regarding wood chips and wood pellets. There is also wood chips and wood pellets import potential to Europe and to the Netherlands from regions outside of the EU (form the US, Canada, Russia and Ukraine, Latin and Central America etc). Biomass Policies defines the import potential as 16.67 EJ in 2030, whereas JRC defines it as 0.28-0.52 EJ, increasing to 0.94 EJ.

COSTS

Year of Euro	2015								
	Euro per Functional Unit		Current		2030		2050		
Investment costs	mln. € / MWth			0.491		0.491		0.491	
			Min	-	Max	Min	-	Max	Min	-	Max
Other costs per year	mln. € / MWth			-		-			-
			Min	-	Max	Min	-	Max	Min	-	Max
Fixed operational costs per year (excl. fuel costs)	mln. € / MWth			0.026		0.026		0.026	
			Min	-	Max	Min	-	Max	Min	-	Max
Variable costs per year	mln. € / MWth			0.0000026		-			-
			Min	-	Max	Min	-	Max	Min	-	Max
Costs explanation	In above figures MWth refers to input. Costs data are converted to 2015. Investment costs cover the costs regarding wood pellet storage in silos, wood pellet boiler, SNCR installation and the building cost. In SDE+, costs associated with the construction of the installations, excluding the site costs, are also included in the investment costs. The fixed O&M costs include costs for fixed maintenance and operational management (remote controlled boiler). The variable O&M costs refers to the costs for consumables and ash-sale.								

ENERGY IN- AND OUTPUTS

	Energy carrier	Unit	Current		2030		2050		
Energy carriers (per unit of main output)	*Main output:*	PJ		-0.90		-			-
	Heat		-0.90	-	-0.90	Min	-	Max	Min	-	Max
	Biomass (wood)	PJ		1.00		-			-
			1.00	-	1.00	Min	-	Max	Min	-	Max
		PJ		-		-			-
			Min	-	Max	Min	-	Max	Min	-	Max
		PJ		-		-			-
			Min	-	Max	Min	-	Max	Min	-	Max
Energy in- and Outputs explanation									

EMISSIONS (Non-fuel/energy-related emissions or emissions reductions (e.g. CCS))

	Substance	Unit	Current		2030		2050		
Emissions				-		-			-
			Min	-	Max	Min	-	Max	Min	-	Max
				-		-			-
			Min	-	Max	Min	-	Max	Min	-	Max
				-		-			-
			Min	-	Max	Min	-	Max	Min	-	Max
				-		-			-
			Min	-	Max	Min	-	Max	Min	-	Max
Emissions explanation									

REFERENCES AND SOURCES

SDE+ Eindadvies 2019

DHV, 2017. Biomassapotentieel in Nederland. Verkennende studie naar vrij beschikbaar biomassapotentieel voor energieopwekking in Nederland. Paula Schulze, Johan Holstein, Harm Vlap. GCS.17.R.10032629.2

Elbersen et. al.2015. Biomass potential in the Netherlands (as part of the biomass Policies project).