



Economic evaluation of farm small scale biogas plants

Brussels, 8 February 2016



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Programma of the European Union

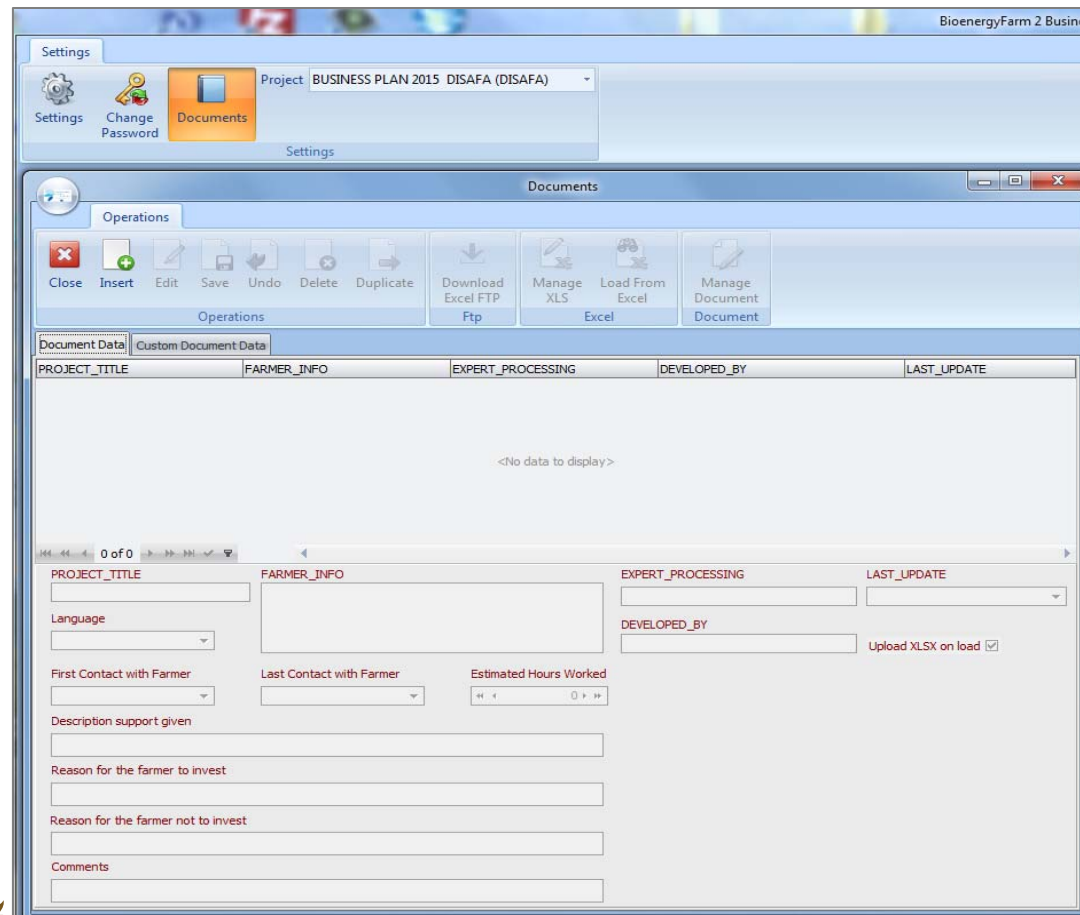


Business plan tool purpose

- Target of 700 business plan made
- The planned executable application
 - Simplified business plan compilation → template available
 - Automatic printout of the report and saving of data for statistic purposes on a on-line SQL
 - Realtime statistics collected on-line
 - Consistency of formatting, sections in the Business Plan
 - Availability of public report for EU

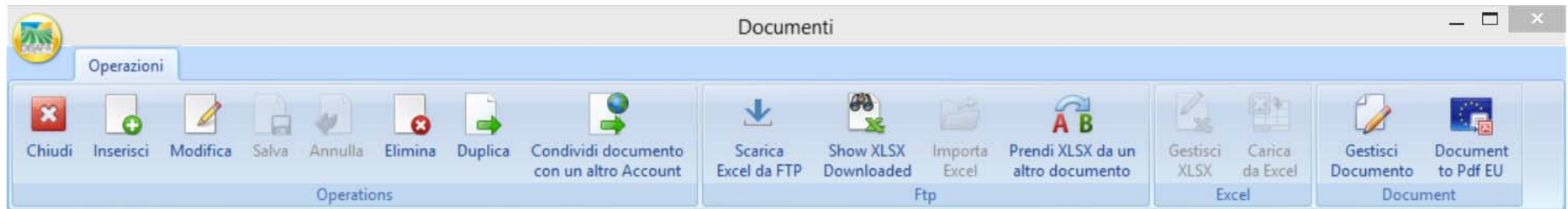


Tool main interface



Tool main interface

- Share template, data with other users



The excel part of the BP tool

Micro-scale digestion calculation tool

Version 1.3 0

Navigation: Next tab, Previous tab

Business

2.3.1 What is your country: Italy, Name client/farmer: Ramero Luigi, Location: Ramero
 Change your language: English, Address: Strada provinciale 215
 What is your region: Piedmont, E-mail: ramero@gmail.com, Postal code: 12012
 Select currency: [EUR/EUR], Telephone number: 01224586934, City/Town/Village: Boves
 Exchange rate: 1,000

Livestock

2.3.2.1 Specify livestock

Species	[type of animal]	Type of manure [Solid or Liquid]	Day-fresh manure [yes or no]
Cows	Young dairy cows (calf <1 year)	Solid manure	Yes
Cows	Dairy cows	Liquid manure	Yes
Cows	Dairy cows	Solid manure	Yes

2.3.2.2 Specify number of animals and time in barn

No. animals [#]	Grazing	
	[days / year]	[hour / day]
45		
200		
90		
Total		

2.3.2.3 AND/OR Specify supply of manure

Manure Supply [ton/year]	Costs [EUR/ton]	Manure Input		Organic [yes or no]
		[ton/year]	[m ³ /year]	
		591	585	
		5.380	5.327	
		1.183	1.425	
		-	-	
		-	-	
		-	-	
		7.154	7.337	

2.3.2.4 Make stable modifications to produce fresh manure?

Cofermentation

2.3.3 Do you want cofermentation? No

2.3.3.5 Specify cosubstrates

[Category]	[ton/year]	Costs [EUR/ton]	Price indication [EUR/ton]	Organic [yes or no]
Total				
Share (mass) cosubstrates of total digester input				[%]
Land use to produce cosubstrates				[ha]

Digester Details

2.3.6 Main characteristics of the biogas plant

Digester Volume	529	[m ³] useful (nett) volume
Override Volume		[m ³] useful (nett) volume 2.3.6.1
Retention time	26	[days]
ODM load	3,50	[kg/m ³ .day]
Nitrogen load	1,93	[gr/liter]
DM input	10,39	[%]
ODM input	9,44	[%]
DM Digestate	5,27	[%]
ODM Digestate	4,27	[%]
Nitrogen organic origin		[%]

Biogas potential

Based on your farm size you can produce per year:

Biogas	301.468	[m ³] of biogas
Methane content	55	[%]
This equals to Diesel equivalent	165.530	[Litre] Diesel equivalent
Heat		Heat Unit 2.3.6.2
Biogas Boiler Capacity	175	[kW th]
Heat Production	5,046	[GJ] Heat

2.3.4 Desulfurization with active carbon: Yes

Default Overwrite

Interface_1 Interface_2 Interface_Inv Interface_FW Interface_CF Interface_Digester trans Substrates_manure Substrates_cosub



The output of the tool – the business plan report

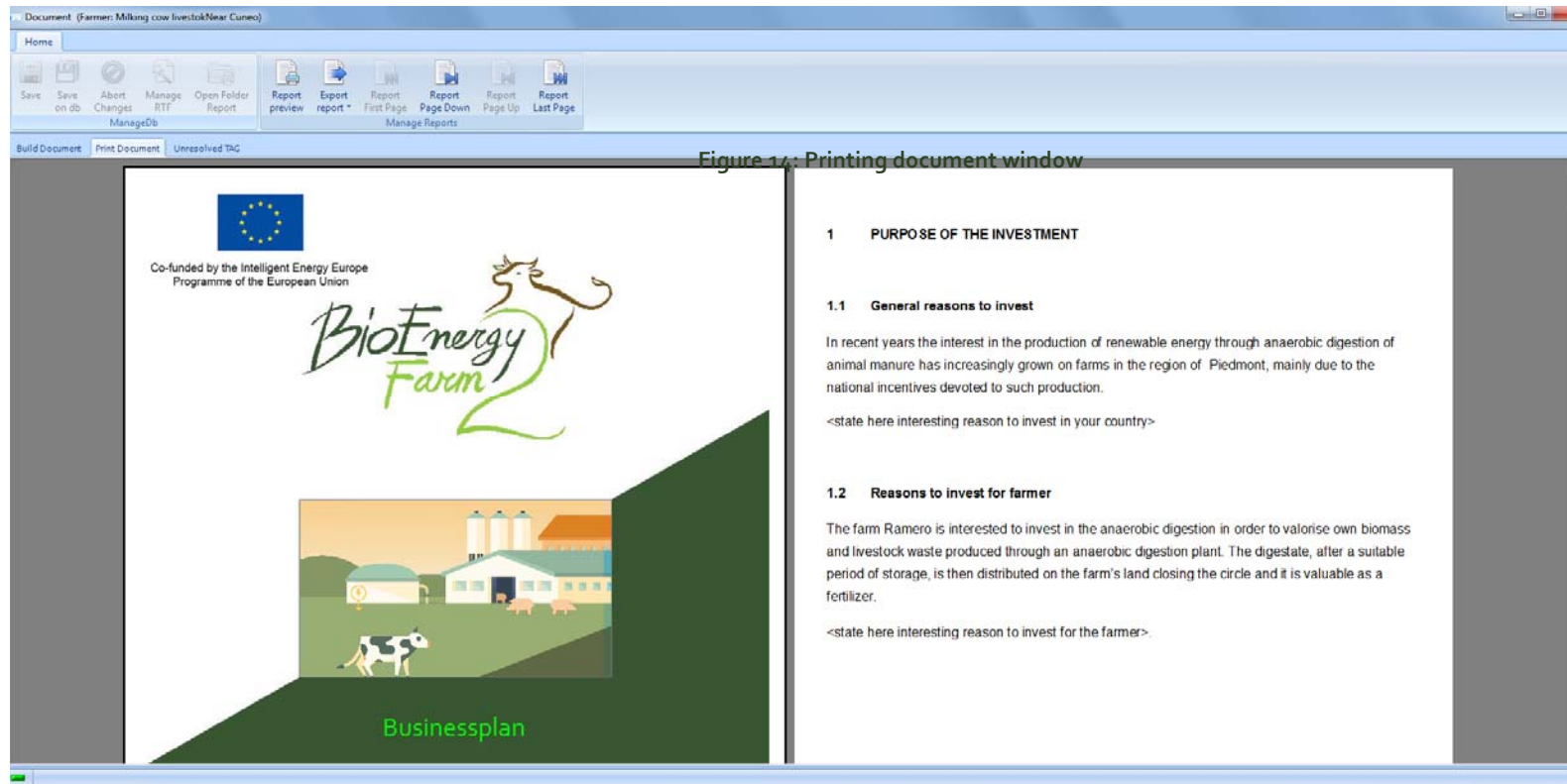


Figure 14: Printing document window



Benefits of the tool

- Benefits:
 - Safety of data, reusability of data and BP
 - Always last excel version for data filling and last tool version
 - Secure repository of data
 - Continuous monitoring of progress against deadline
 - Statistic available about investment, power, etc.



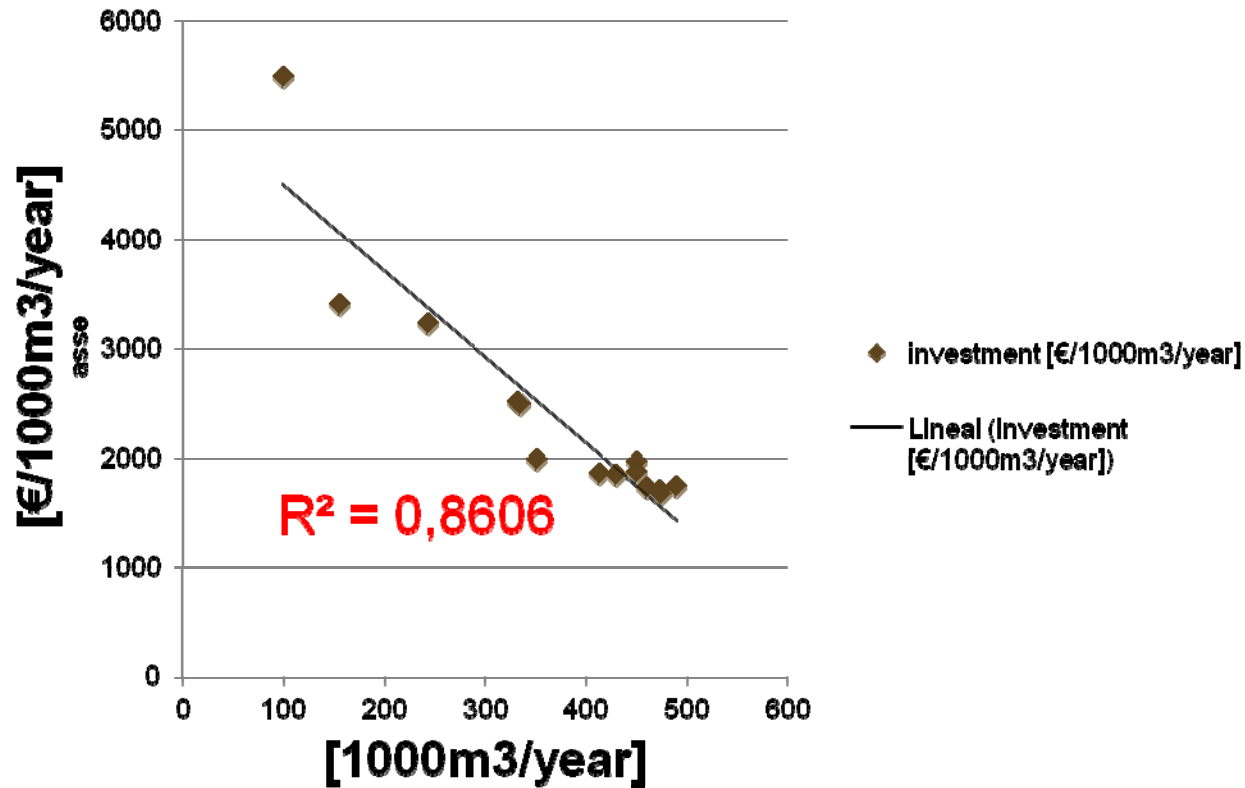
Business plans surveyed n=92 (as 31/01/2016)

Number of Business plan surveyed	
Country	Number of BP made
Belgium	12
Denmark	9
France	3
Germany	4
Italy	43
Netherlands	16
Other	1
Poland	4

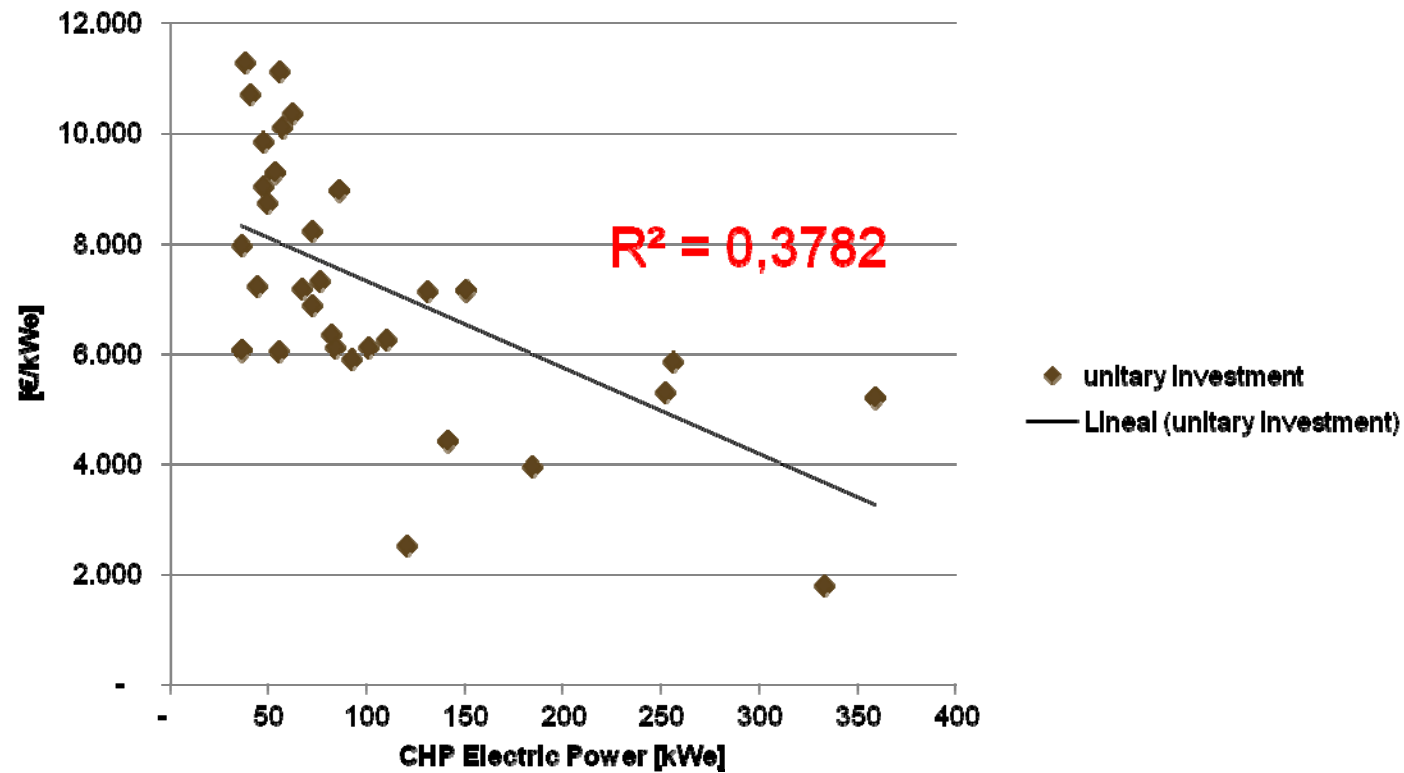
All were CHP or biomethane



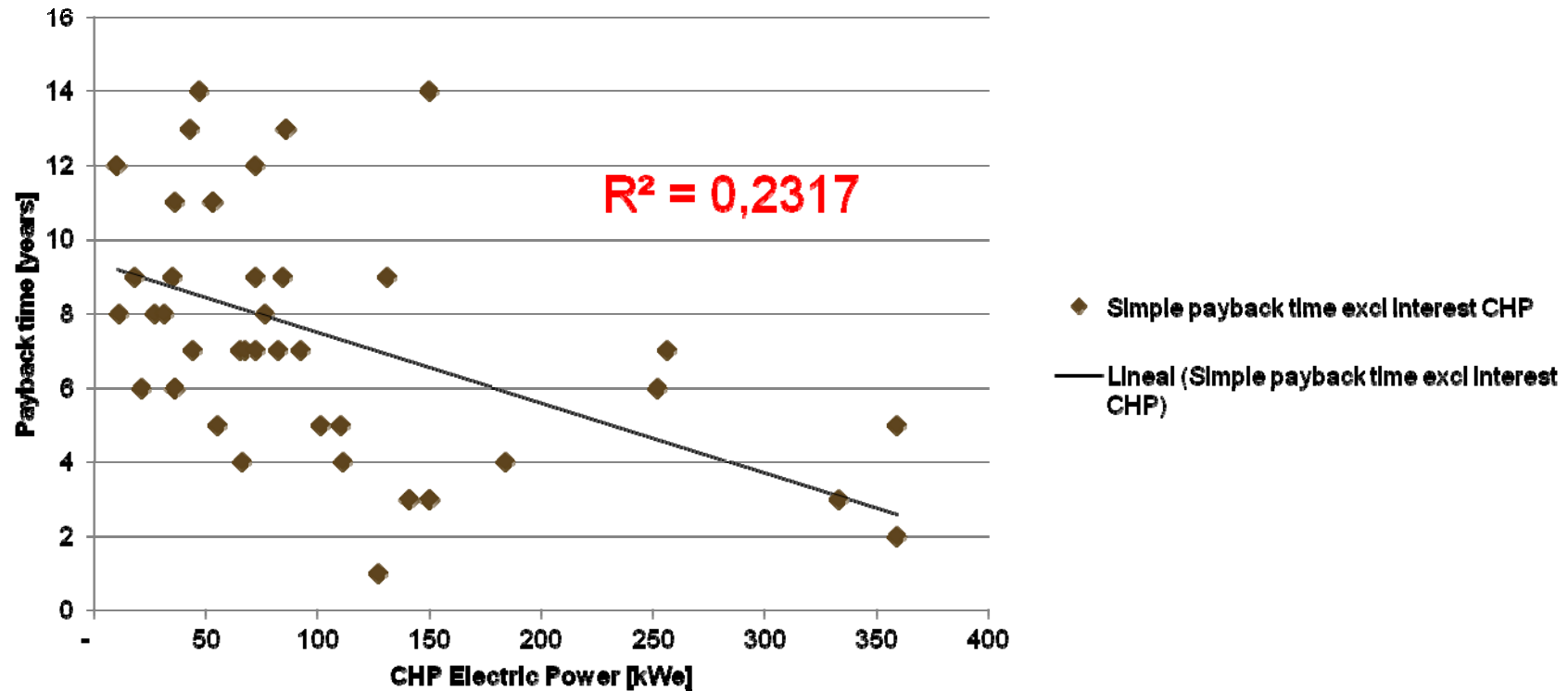
Biomethane unitary investment



CHP unitary investment

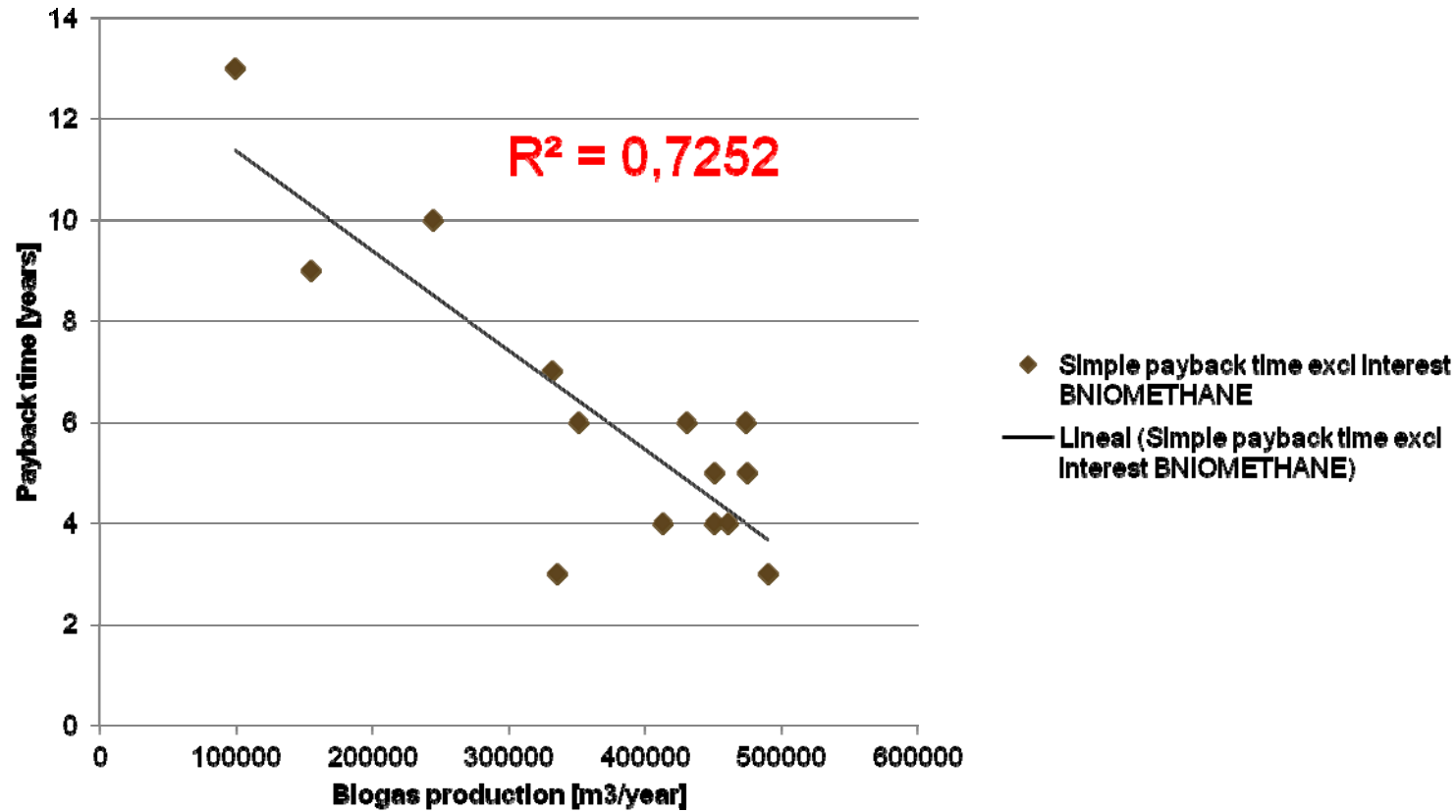


CHP payback time



Variability on feasibility change country by country → incentives, regulation, investments

Biomethane payback time



Variability on feasibility change less (only NL projects)



Feasibility of farm small biogas plants

CHP		
total	62	67%
payback ≤ 20 years	51	82%
payback ≤ 10 years	34	55%
BIOMETHANE		
total	16	17%
payback ≤ 20 years	15	94%
payback ≤ 10 years	12	75%
combined payback ≤ 20	66	72%
combined payback ≤ 10	46	50%
not feasible	14	15%
TOTAL	92	



Conclusions

- 55% CHP and 75% Biomethane BP are feasible with current incentives (technical problems not analyzed → executive project)
- Variability on feasibility change country by country → incentives, regulation, investments
- Tool made for business plan is good also to collect data around europe about feasibility of small farm biogas plants → policy makers use?
- We/EU should reduce this variability with actions on incentives, regulation, training





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