BIO-METHANE REGIONS

Co-funded by the Intelligent Energy Europe Programme of the European Union

Presentation to the City Council, Thisted, and Farmers Organisation.

By Leif Amby

Member of the Danish Bio-Methane Regions Advisory Group

DANINCO

Biomass in Thisted Municipallity

"Biomass for Energi Production"

August 2013

DANINCO

Why use the biomass for energy production?

- It is sustainably
- It can be produced locally.(local selfsufficiancy)
- The money for energy stays in the municipallity.
- It can be distributed though the existing networks. (district heating, natural gas or electric power)
- Biogas can be stored in the natural gas underground storage
- Biogas production can be extended by methanisation of wind power

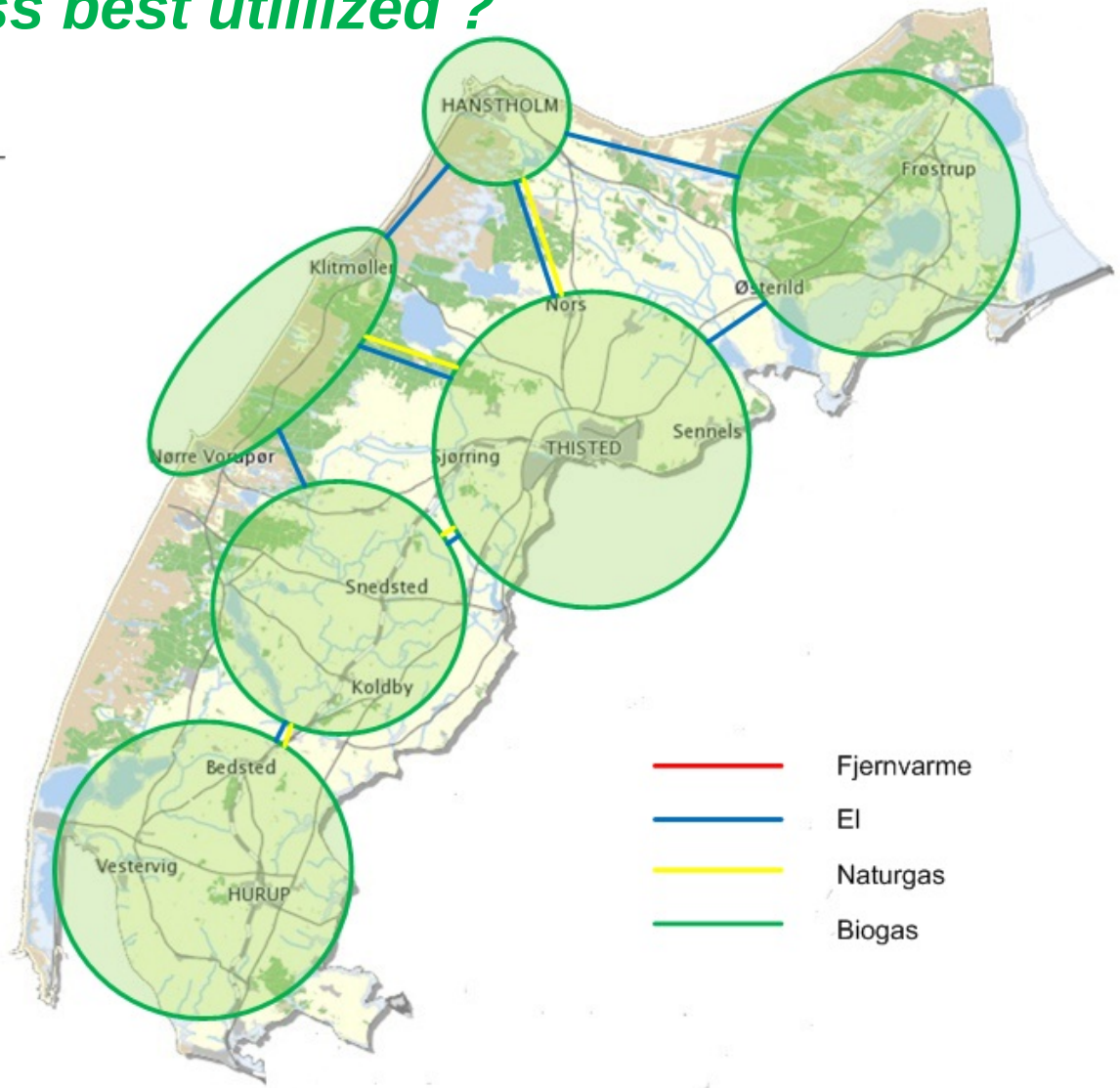
Thus biogas production is one of the best solutions for biomass based energy production.

DANINCO

How is biomass best utillized ?

There is no standard solution!

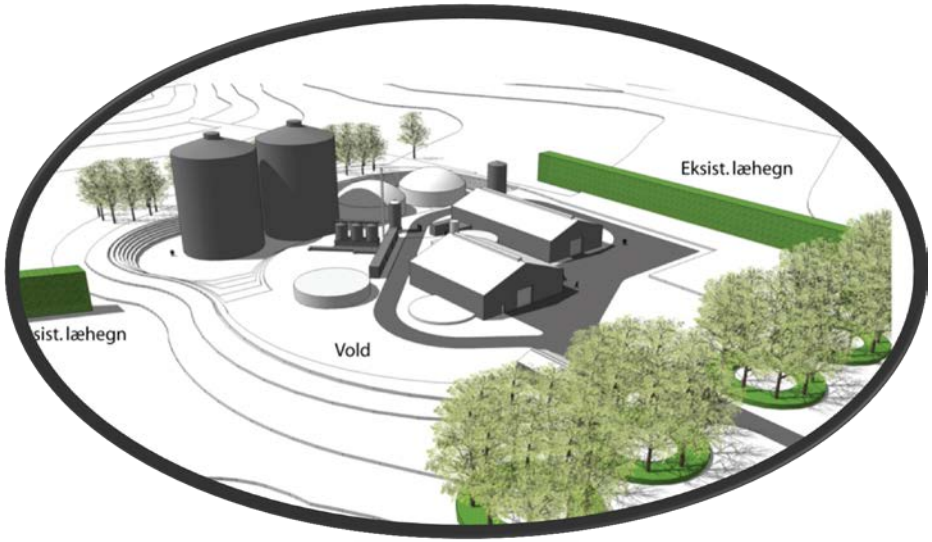
The rigth solution must be developed for the actual local conditions.

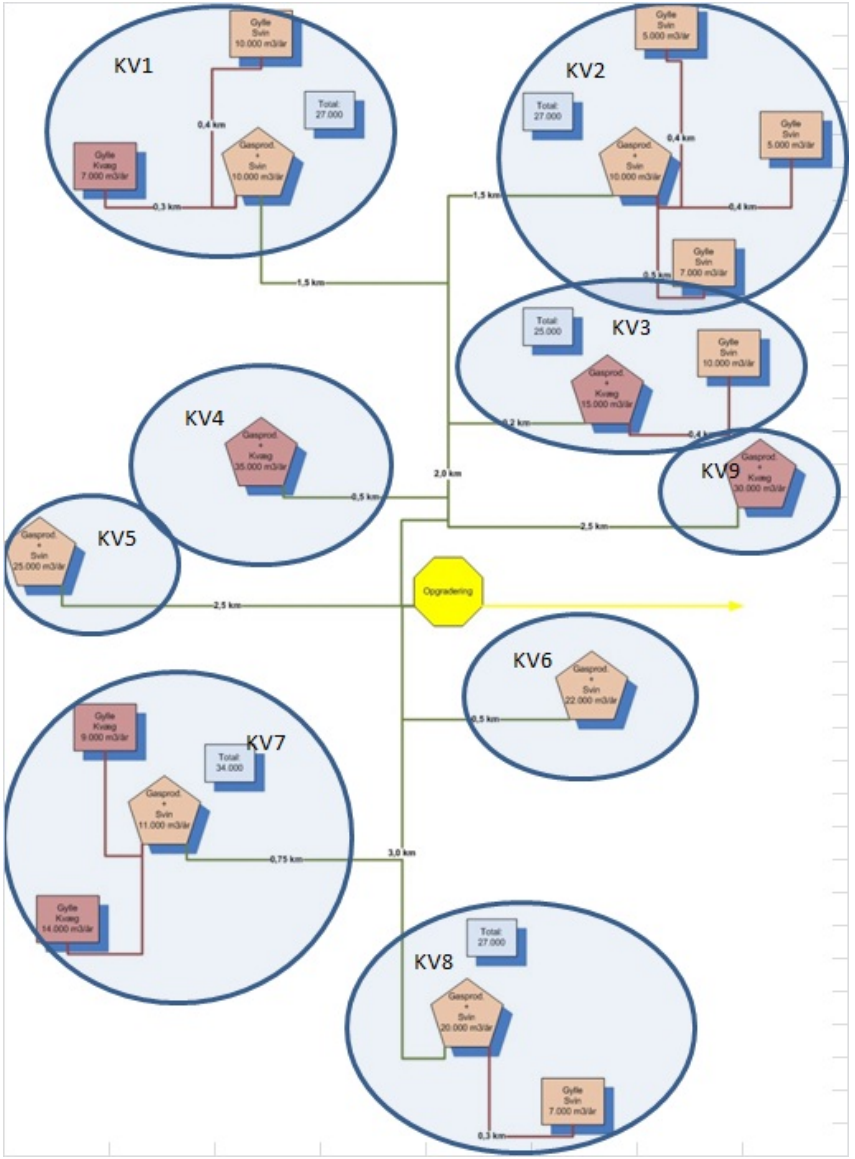


DANINCO

Biogas, but how?

Common centalized plant or a common network solution?





DANINCO

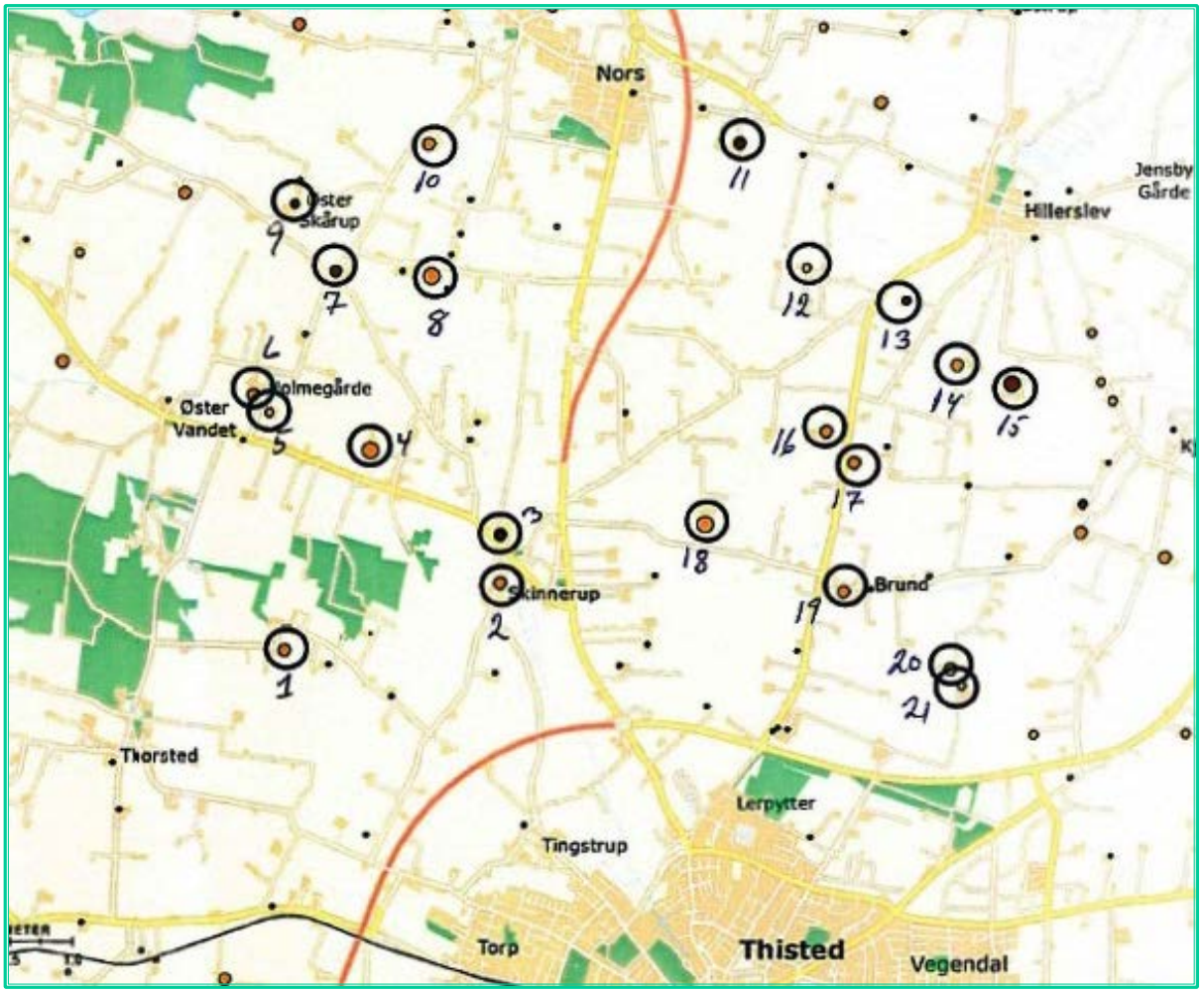
The network solution?

In Thisted Municipality the network solution is investigated. The basic requirements are:

- The network must be a good business case
- There must be a professional staff to run the whole setup i.e. network and production facilities.
- The network must be designed for expansion

DANINCO

Who has the biomas?



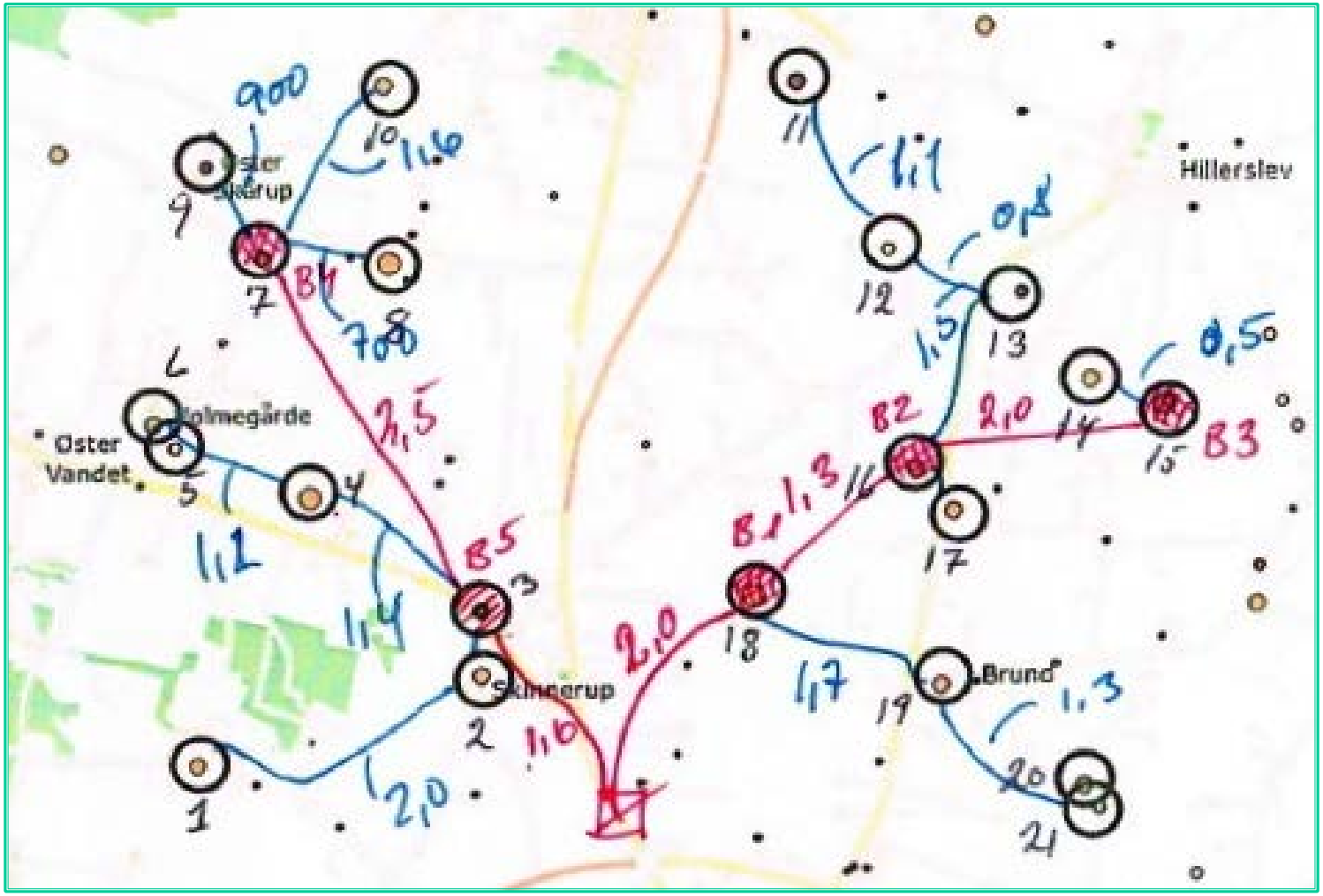
DANINCO

How much biomass is available from the farmers?

Farm	Livestock [AU]	Livestock bedding [tons]	Other biomass [tons]	Annual slurry production [tons]
1	274		777	6017
2	267		35	7277
3	230			5000
3	42			1400
4	320			8736
4	17			460
5	12			240
5	210			4000
5	89			900
6	280			3700
7	275			6000
8	280			4000
9	258	305		2200
10	187			3554
11	355	411		5713
12	164		850	3028
13	150	140		3000
13	60			1200
14	200			3800
15	729	1285		14200
16	217		5774	4288
17	230			4233
18	230		4500	4583
19	141			2552
20	183	22		3371
21	172	56		3500
Total		2.219	11.936	106.952

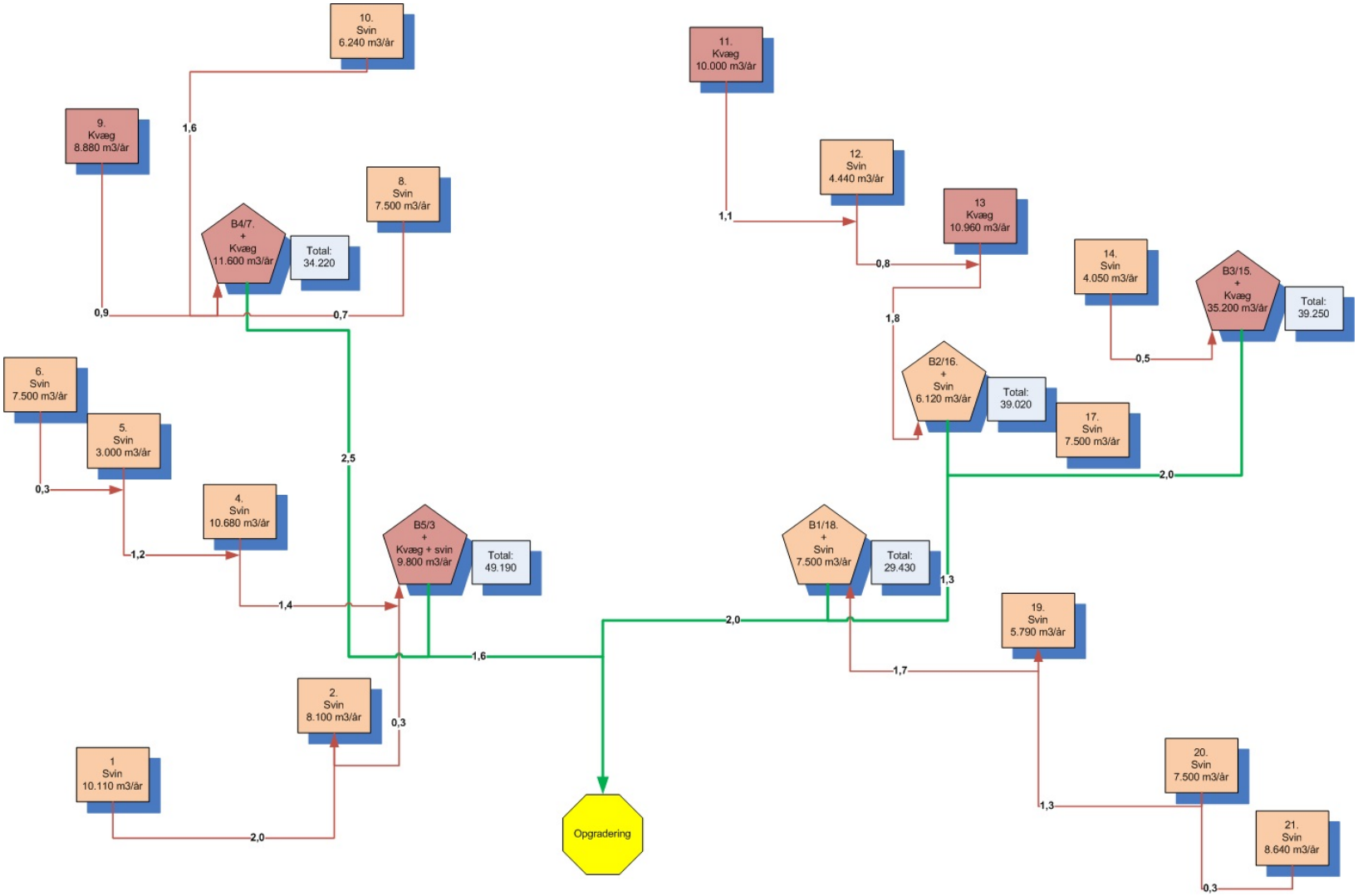
DANINCO

How is the biomass collected to the biogas plant?



DANINCO

Network for common decentralised biogasproduction.



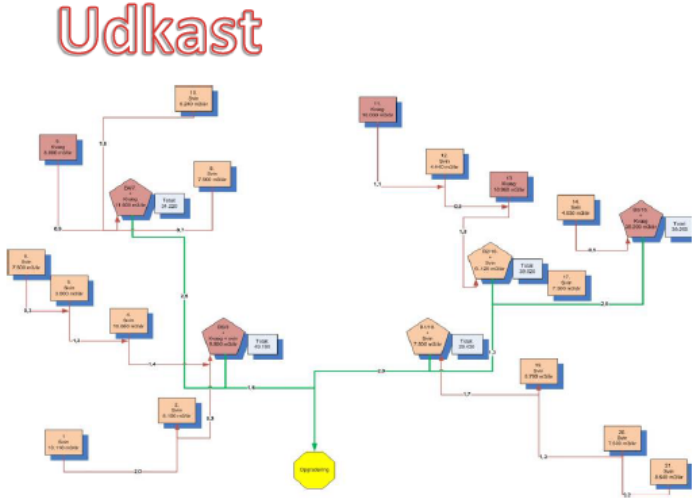
DANINCO

Model for calculation.

Netværksmodel for decentral biogasproduktion

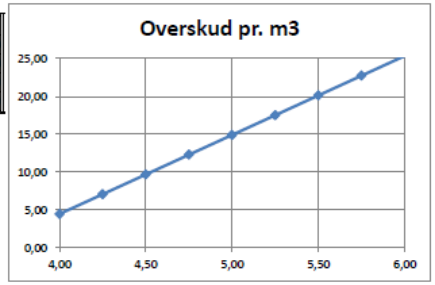
	Antal	Længde	Biomasse	Pris		Pris
		km		kr./m	kr./anlæg	kr.
Gyllerørledning:	16	16		800		12.720.000
Biogasrørledning:	5	9		700		6.580.000
Biogasanlæg	5		200.785		4.000.000	20.000.000
						39.300.000

Biomasse	Mængde	Gaspot.	Nm3	Gaspris	Sum gassalg
Svinegylle	104.670	11	1.151.370		
Kvæggylle	86.440	12	1.037.280		
Majsensilage		89	0		
Græsensilage	1500	100	150.000		
Hønsemøg (tør)		127	0		
Hønsegylle		28	0		
Glycerin		354	0		
Gums/Soapstock		190	0		
Frisk græs		53	0		
Mave/tarm (Kvæg)		38	0		
Mave/tarm (svin)	5475	55	301.125		
Fibre (Gylle)		60	0		
Dybstrøelse	2700	60	162.000		
Korn		275	0		
Foderroer		64	0		
Kartofler		60	0		
	200.785		2.801.775	4,00	11.207.100



			Drift:	DB1 Gassalg - Drift		Renter	Overskud før afskriv-ning og skat	Afskriv-ning	Resultat før skat	Overskud efter skat 1. år (25%)	Overskud efter skat 1. år pr. m3 gylle			
Gassalg	11.207.100	kr.	4.125.000	7.082.100		1.965.000	5.117.100	3.930.000	1.187.100	**890.325**	**4,43**	Invest.:	39.300.000	Reaktor, procesvarme, gasledning + rensning

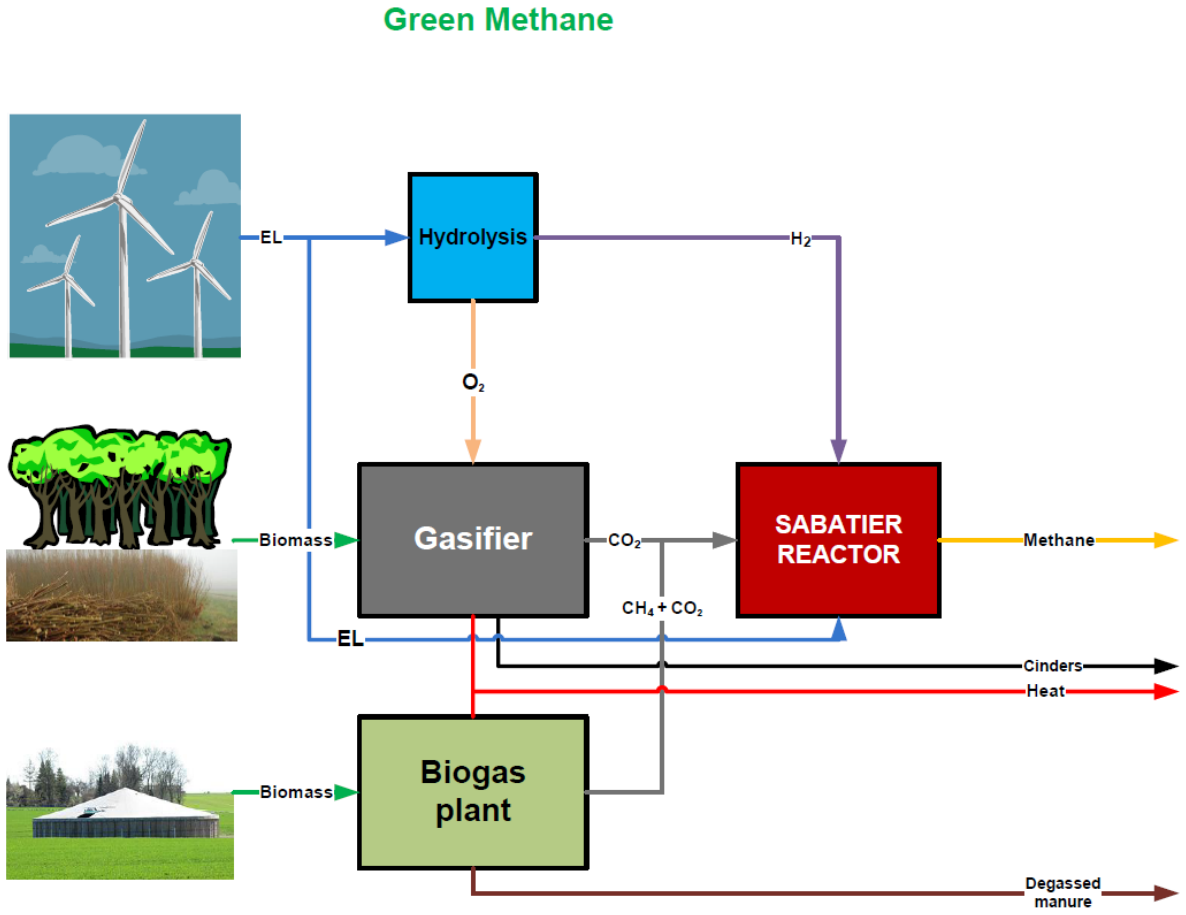
Drift:		Pr. enhed	
Personale	1,5	500.000	750.000
Vedligehold		75.000	375.000
El - pumper + rører		300.000	1.500.000
Procesvarme		300.000	1.500.000



Gaspris	Overskud pr. m3
4,00	4,43
4,25	7,05
4,50	9,67
4,75	12,28
5,00	14,90
5,25	17,52
5,50	20,13
5,75	22,75
6,00	25,37

DANINCO

The Energy System – what is the solution in Thisted Municipallity?



DANINCO

What is the biogas potential in Thisted Municipallity?

Biomass sources	Estimated annual mass of raw biomass [tons]	Estimated annual mass og dry matter	Estimated annual energy production potential	Biogass potential	Combustion potential
Manure	1.000				
Energy crops	50.(				00
Energy crops [Willow]	2.400	1.200	6.000	0	6.000
Straw [grain and rape straw]	25.000	20.0			80.000
Environmental crops	1.000	50(			3.000
Sludge	10.000	2.00			0
Waste – household	10.000	8.00			12.000
Waste – industial	25.000	10.0			25.000
Wood	45.000	40.000	180.000	0	180.000
Biomasse i alt:	1.168.400	184.700	541.00	232.000	309.000

20.000.000 Nm3

This gas ammount can not be achieved solely on the basis of the existing biomass reserves!

DANINCO

What is the biogas potential in Thisted Municipallity?

Barriers for the utilization of biomass for biogas:

- Not all manure (slurry) is economically interesting for biogas production.
- No all biomass is immediatly available for energy production

Opportunities for increased biomass potential to biogas :

- Energy Crops
- Household waste
- Gasification of wood chips.
- Metanisation based on wind power.

DANINCO

When will the new solutions be implemented?

Basic assumptions :

1. The biomass shall be available
2. The production facilities shall be established
3. There must be an atractive marked for the energy.

DANINCO