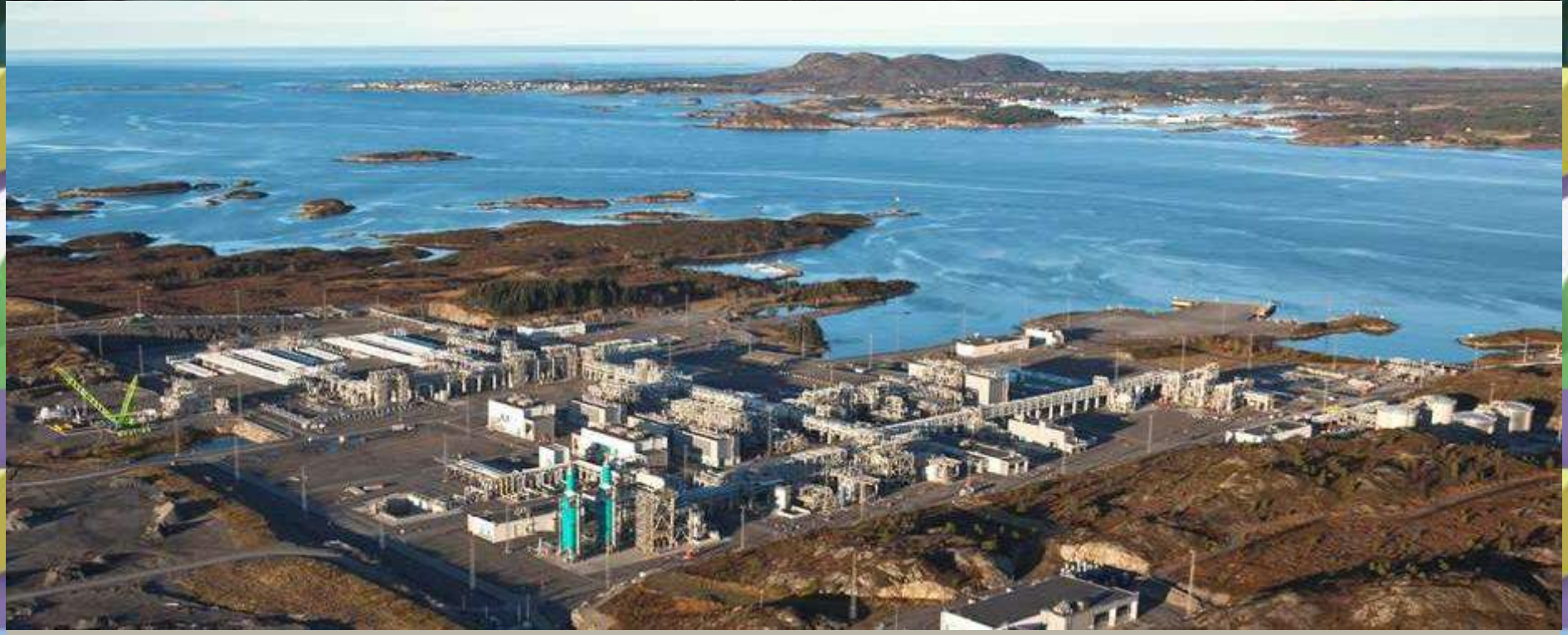


Møre og Romsdal fylkeskommune

-Ein tydeleg medspelar

Utility of low temperature waste heat from natural gas processing plant - Nyhamna

Lina Jonasson

Beyond Energy Action Strategies BEAST

Møre og Romsdal fylkeskommune

-Ein tydeleg medspelar

Utility of low temperature waste heat from natural gas processing plant - Nyhamna

Lina Jonasson

Beyond Energy Action Strategies BEAST


Jan Mayen
Arctic Ocean
N Norway
Tromsø
Harstad
Narvik
Bodø
Mo i Rana
Norwegian Sea
SWEDEN
RUSSIA
FINLAND
Namsos
Faroe Islands (Denmark)
Trondheim
Ålesund
Molde
NORWAY
Helsinki
Hamar
Gjøvik
Tallinn
Bergen
Hønefoss
Stockholm
ESTONIA
Oslo
Haugesund
Drammen
Skien
Stavanger
Grimstad
LATVIA
Riga
Kristiansand
UNITED KINGDOM
North Sea
DEN.
Baltic Sea
LITH.
BELA.
Vilnius
RUS.
0 100 200 mi
0 100 200 km
70°
65°
60°
5°
0°
5°
10°
15°
20°
25°
©MAPS.com

Background for utilisation of the wasteheat

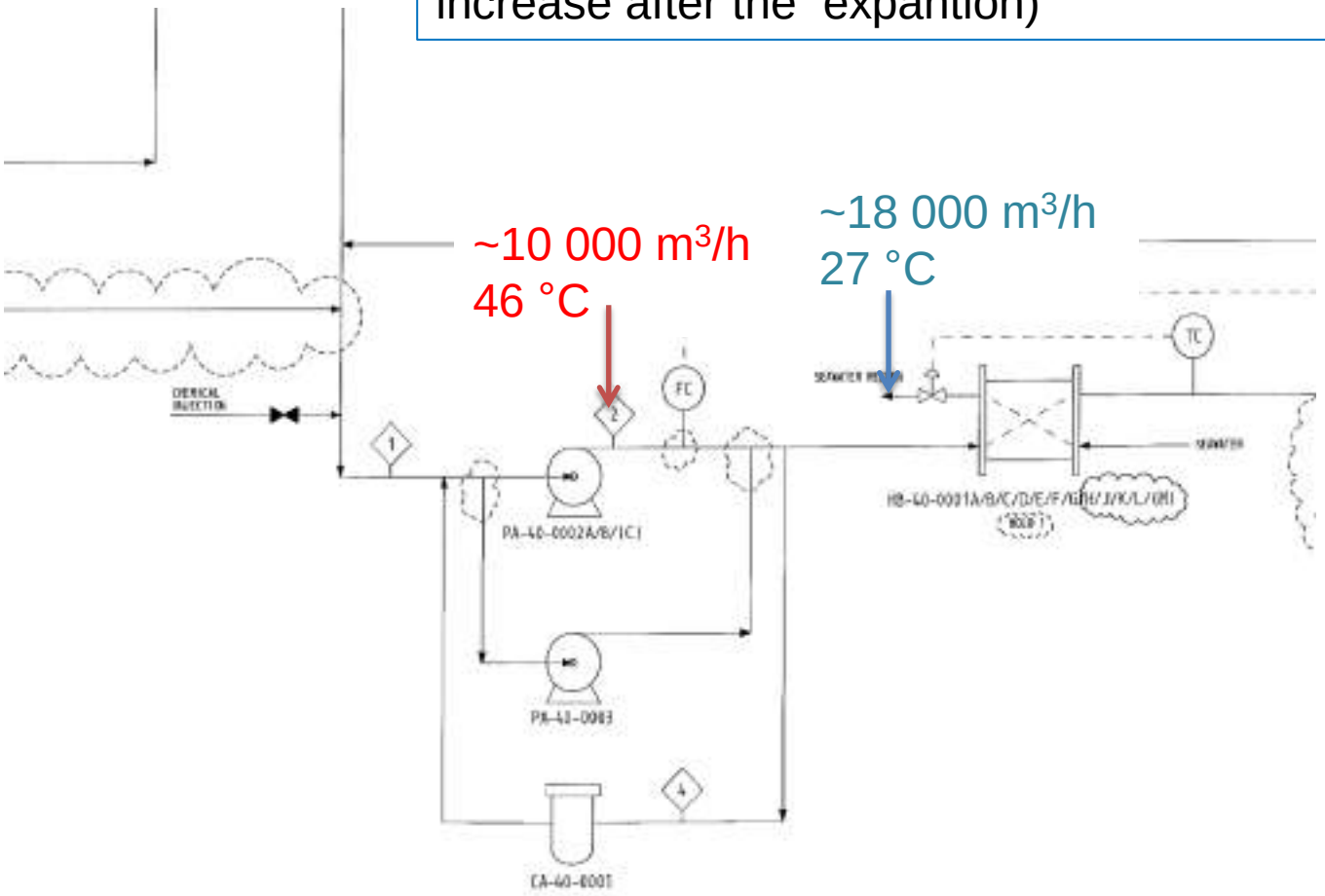
- More natural gas to Nyhamna
- Nyhamna will expand = more cooling
- Wasteheat

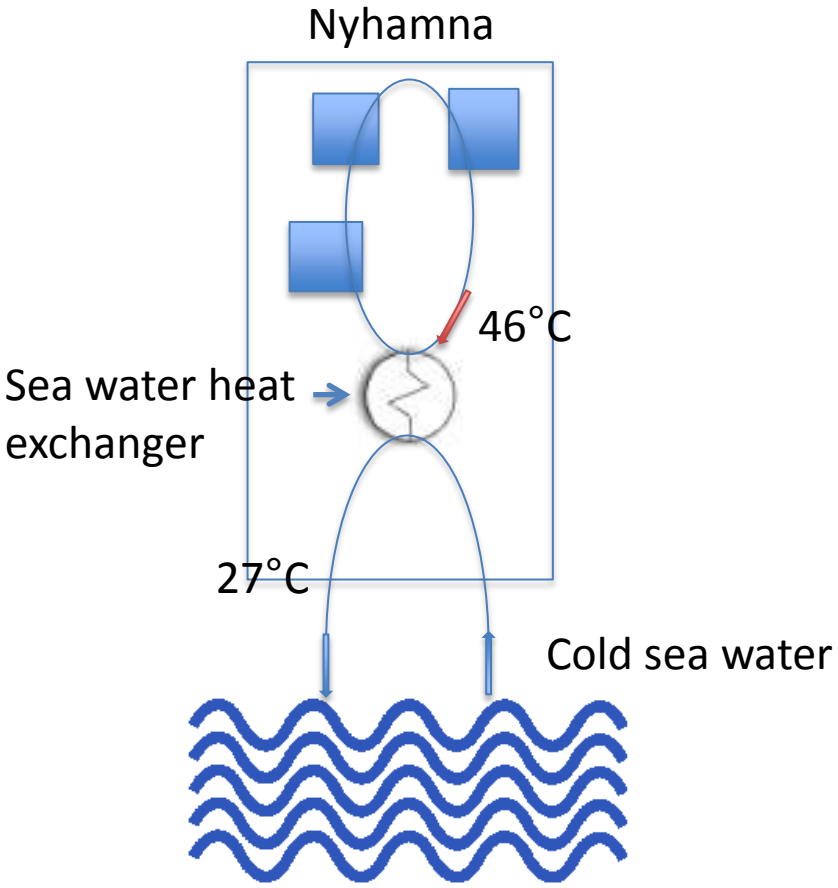
  ~2,7 TWh/år = 4 medium hydropower plants!
- Use the heat before it is let out to the sea = 46 °C
- Norske Shell AS have investigate different possibilities for usage
  - …salad , tomatoes and flowers, fish- and shell aquaculture
- The County authority
  - Have established a forum with undergroups
  - The project is part of the BEAST project
  - Own investigations

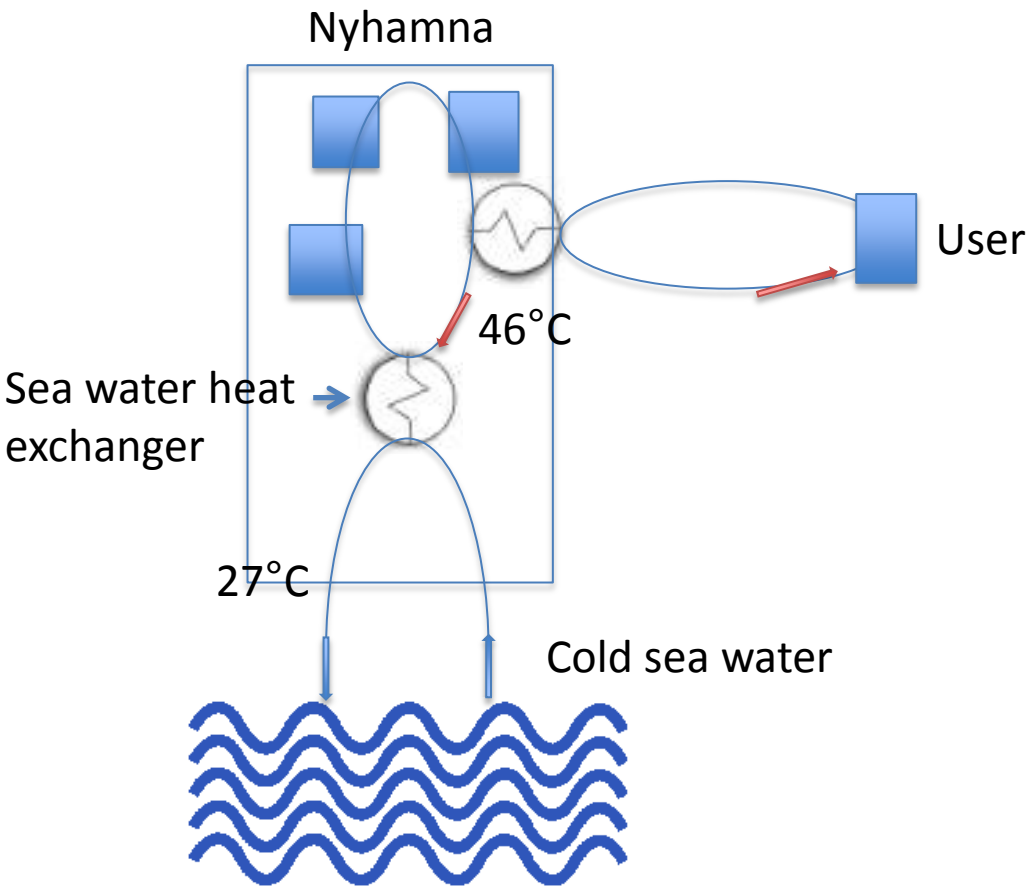
Report done by: FRONT GROUP aPOINT [Sensacon]

		Temperature range			
Category	Activity	15-25° C	24-40° C	40-75° C	>75° C
Agriculture	Deep artificial earth heat (>50cm)				
	Shallow artificial earth heat (50-25cm)				
	Heat exchange with artificial watering				
Forestry	Deep artificial earth heat (>50cm)				
Greenhouse	Heat exchange against air				
	Heat on floor				
	Sand heat				
	Heat exchange against water				
Waterbased biomass	Heat exchange- algea cultivation				
	Heat exchange – fish farming				
	Heat exchange – shellfish growing				
	Heat exchange – marine animals				
Hydroponic system	Heat exchange – fish farming tank				
	Heat exchange –hydroponic crop production				
Construction industry	Heating of rooms				
	Heating of tap water				
	Heating of bathing constructions				
	Snow-melting sport facilities				
	Snow-melting roads/parking places				
Other	Production of electricity				
	Industrial heating				
	Drying of products				
	Heating for biogas production				

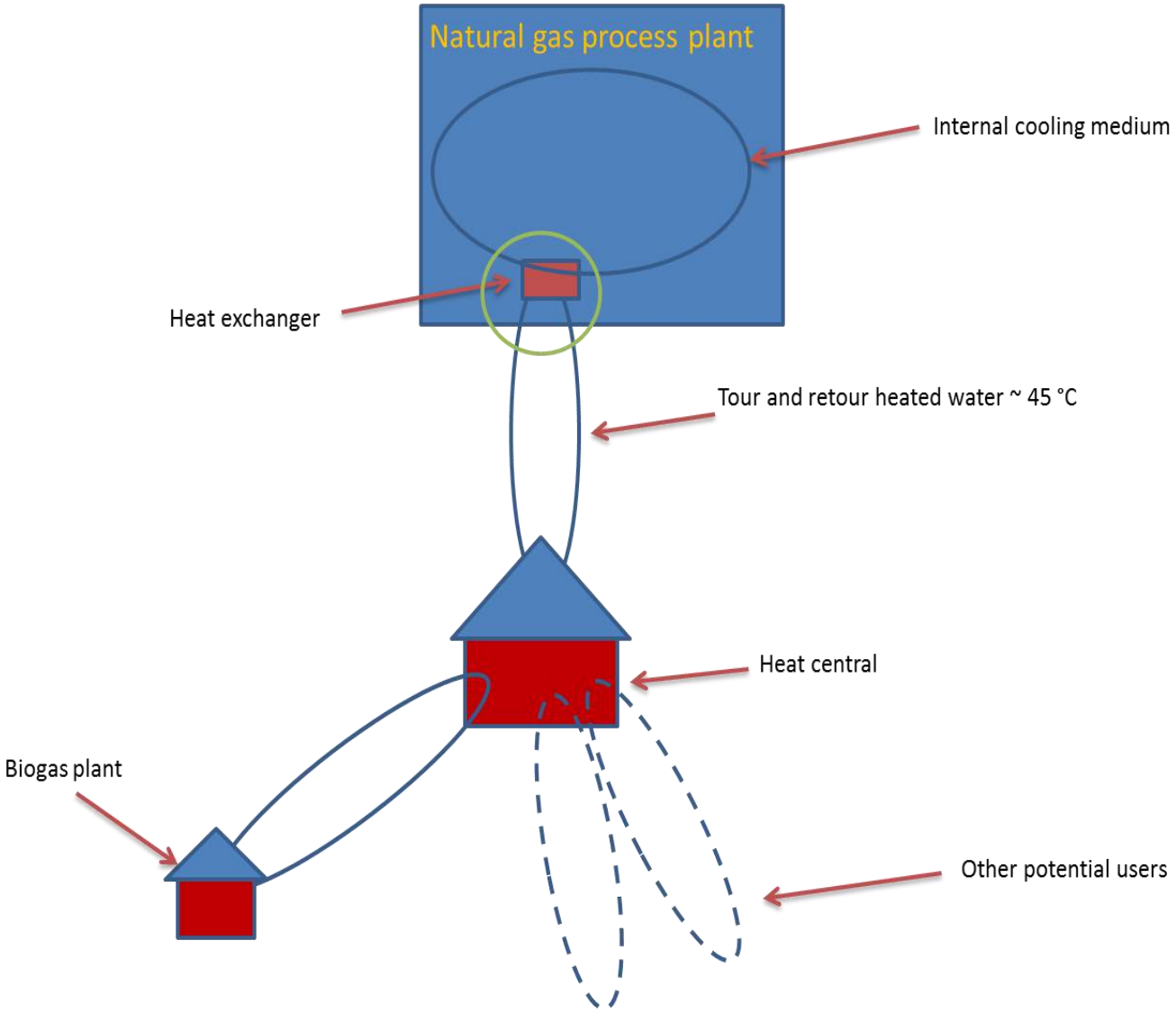
Measured values – present (The volume will increase after the expantion)



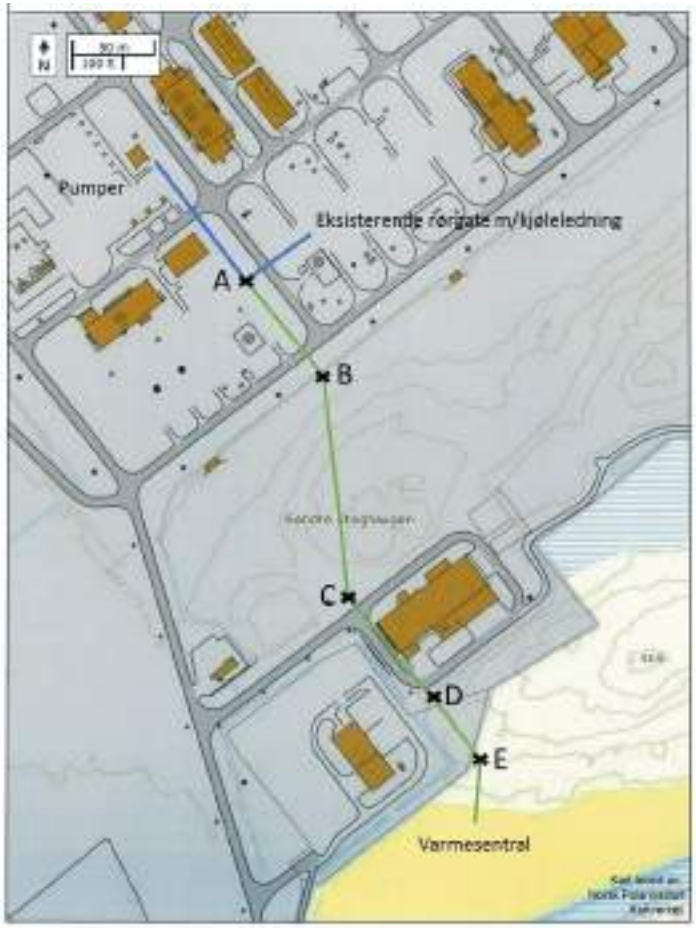

Nyhamna
46°C
Sea water heat
exchanger
27°C
Cold sea water


Nyhamna
User
46°C
Sea water heat
exchanger
27°C
Cold sea water

Example of how the system could look like



Cost estimation (trasee based on a student project in 2014)



Shortest way out of the plant will cost around

5 000 000 Euro

= Possibilities to offer industry cheap energy

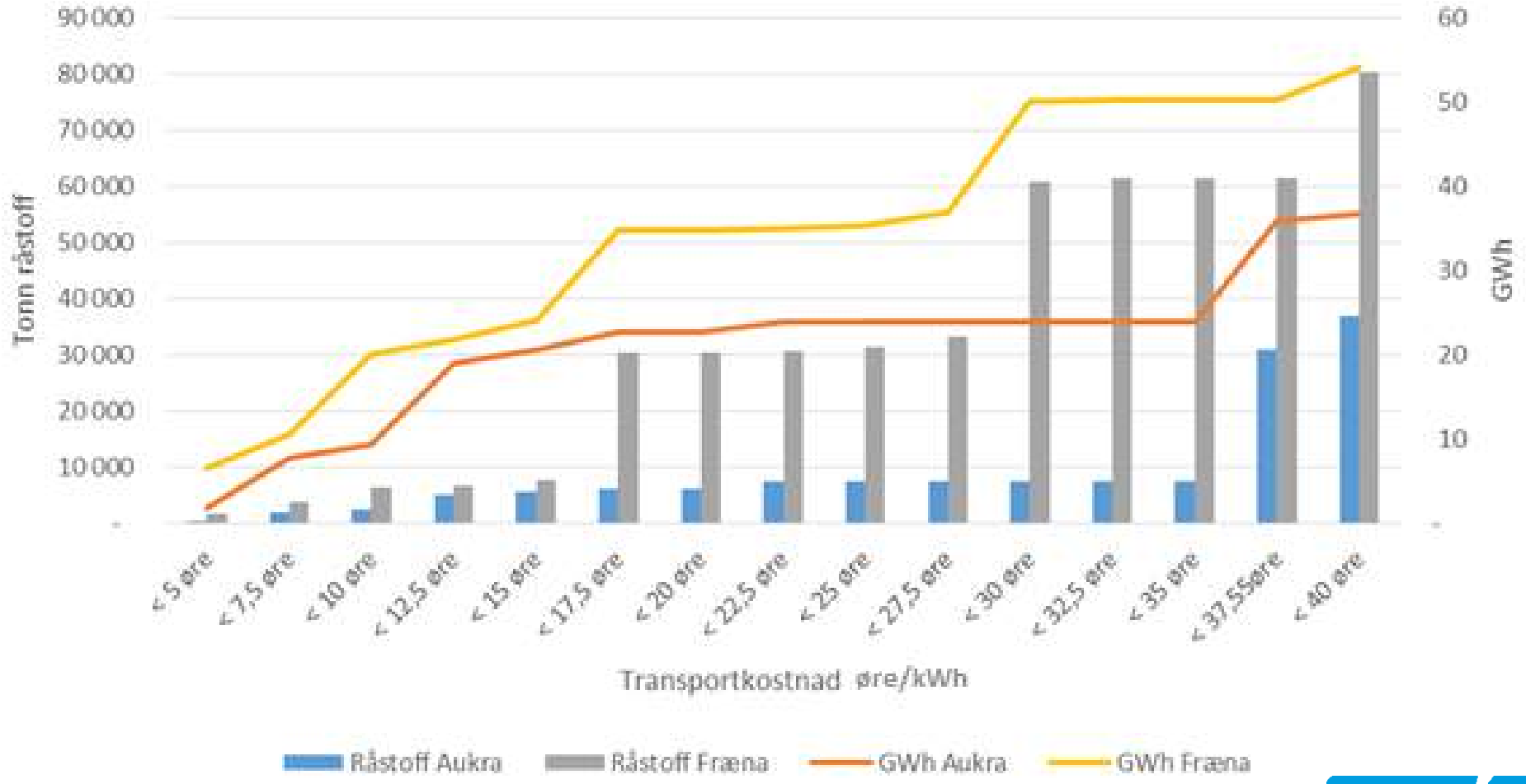
Short payback time

Further working

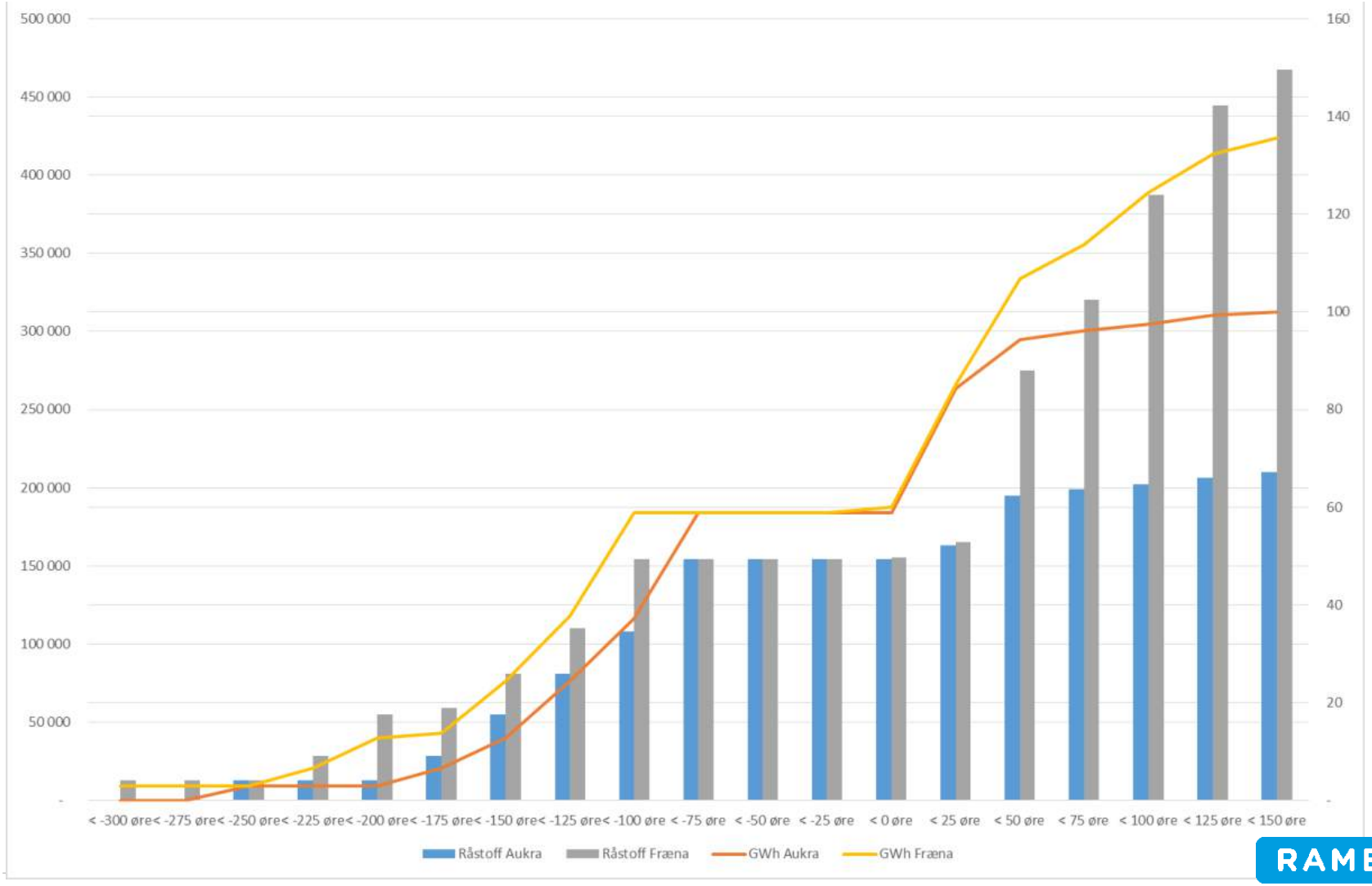
- Logistic analyze regarding biogasproduction
  - First part is done - conclude Fræna could be a better place for a biogasplant

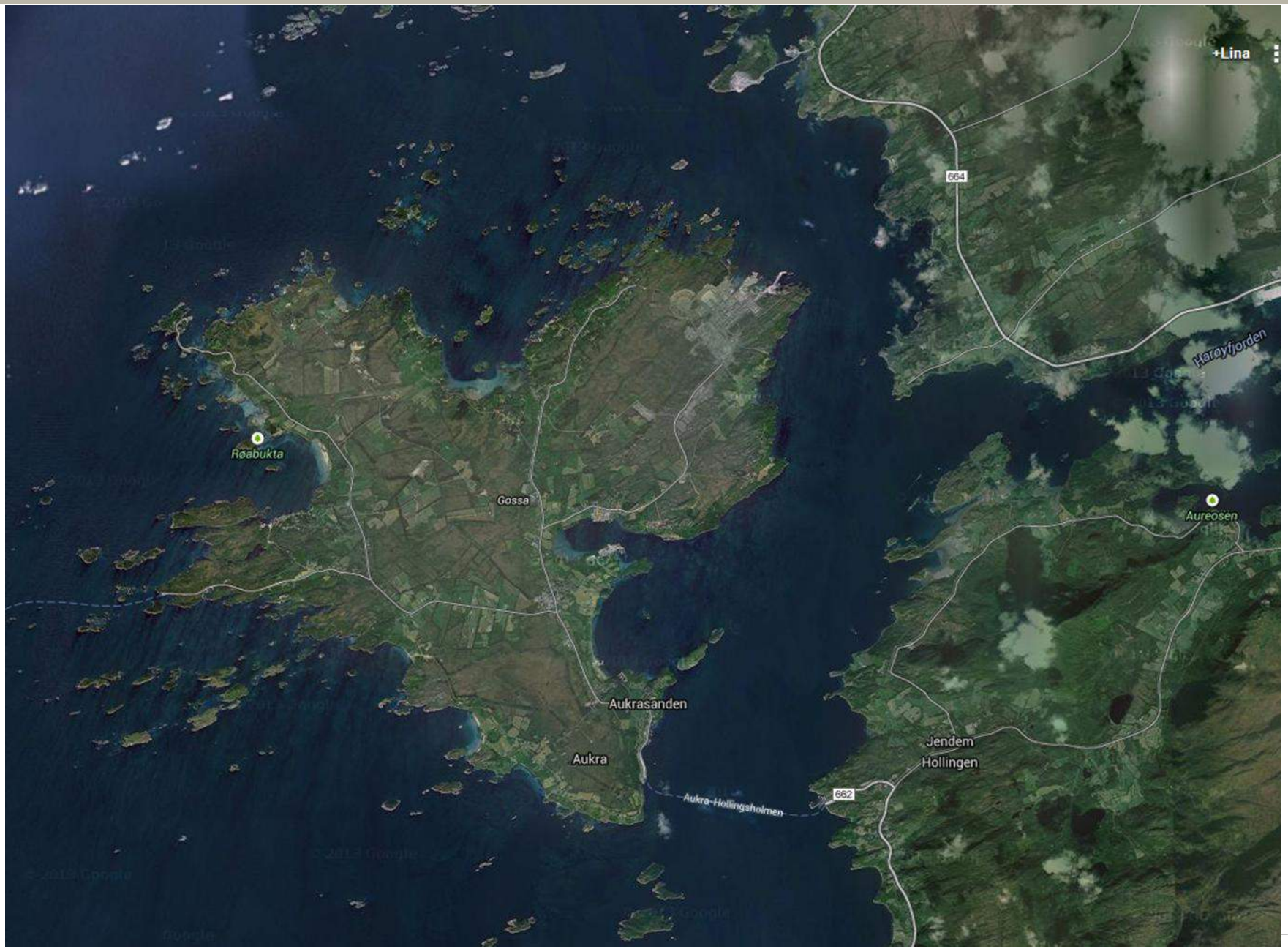
Total biomass potential due to transport cost

(report done by Rambøll)



Total biomass potential due to transport cost and gate fee (report done by Rambøll)

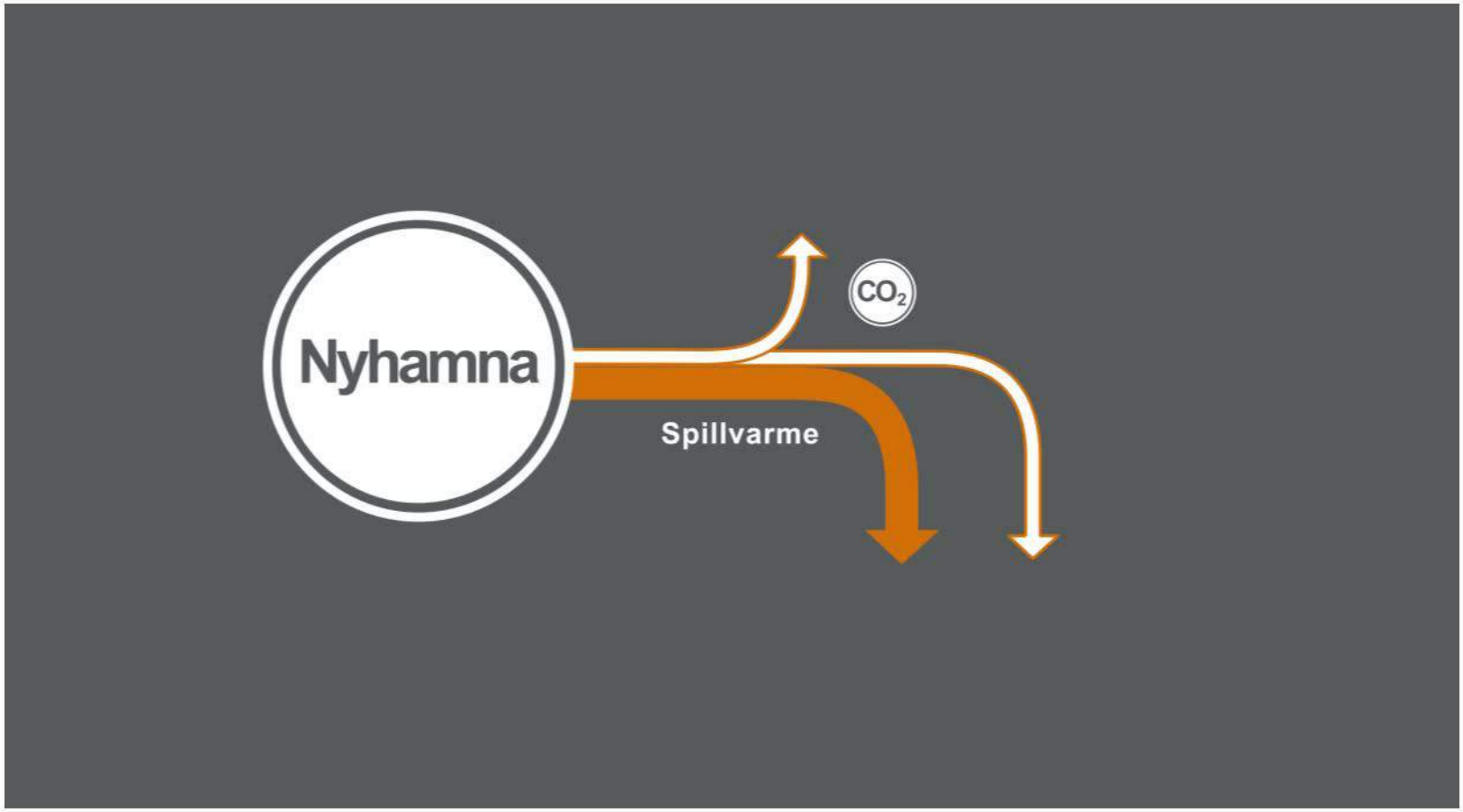


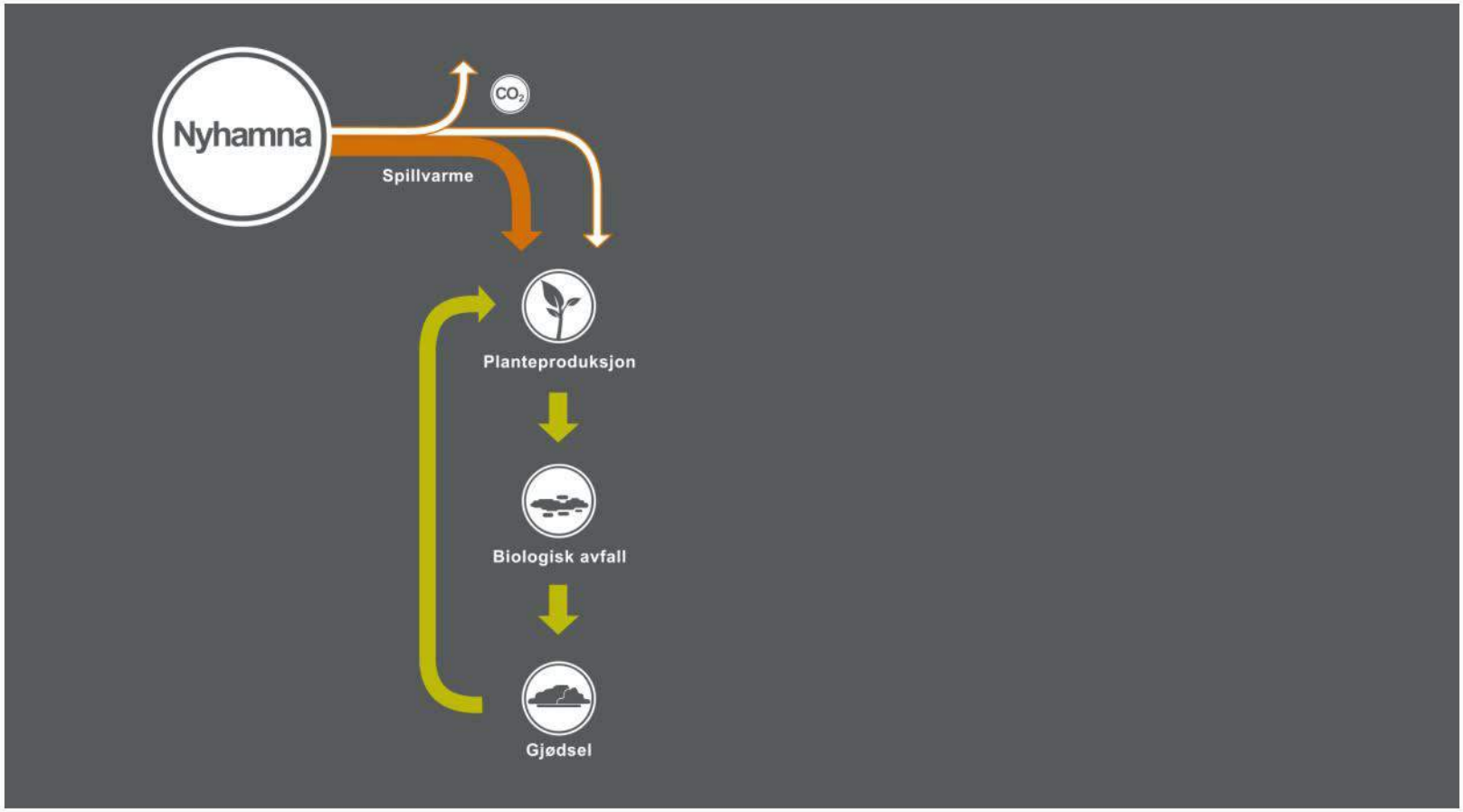

+Lina
664
Høyfjorden
Røabukta
Gossa
Aureosen
Aukrasanden
Aukra
Jendem
Hollingen
662
Aukra-Hollingsholmen

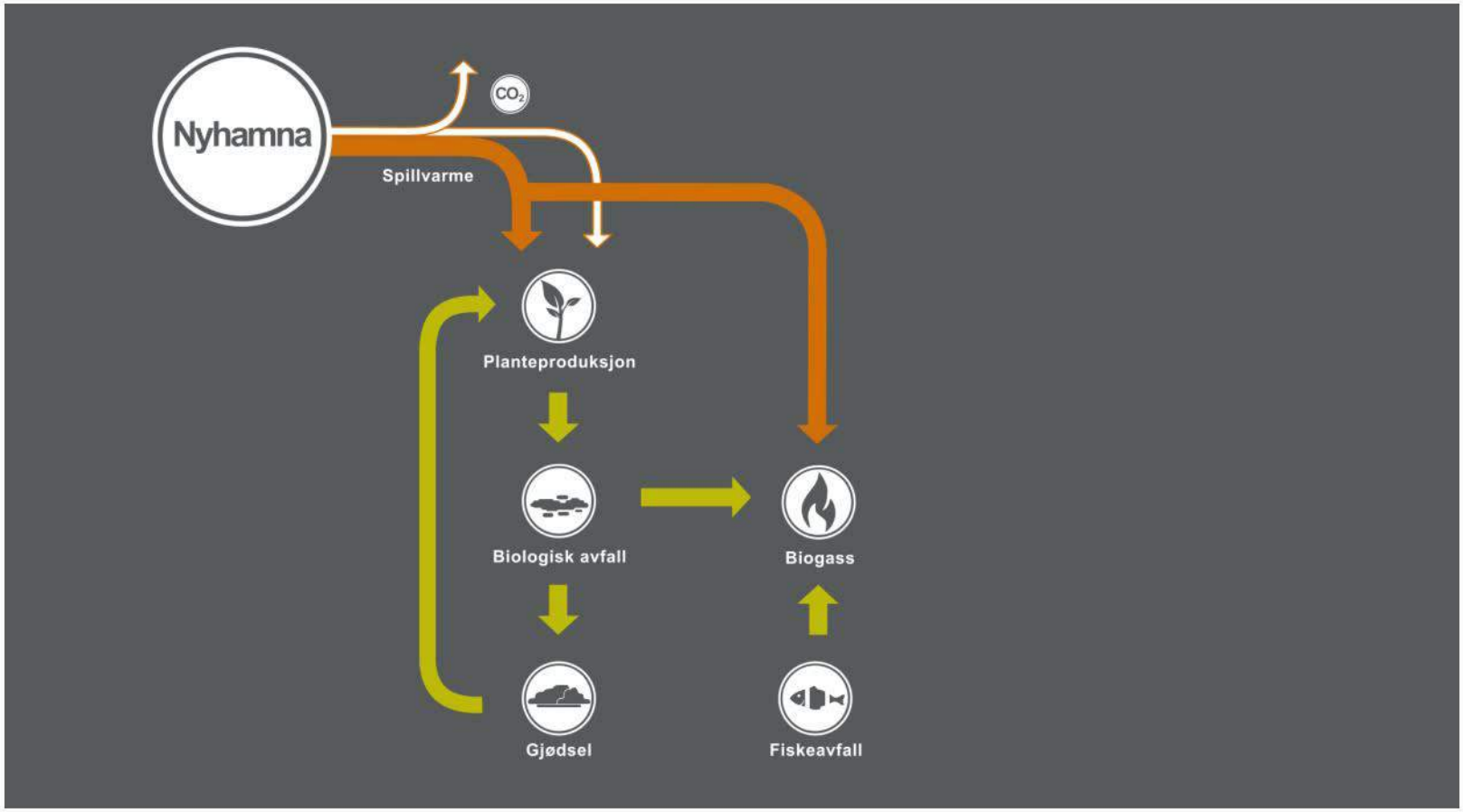
Further working

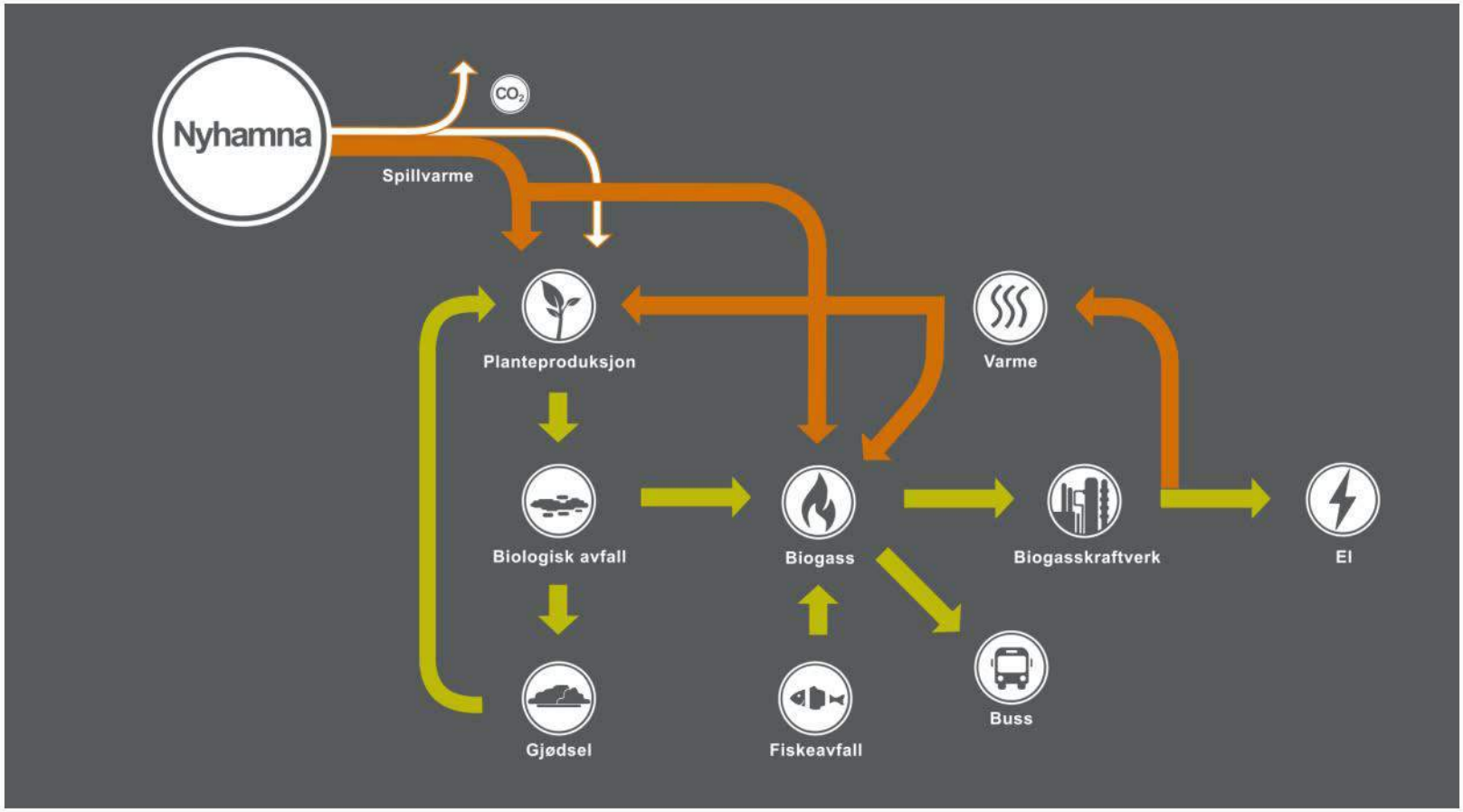
- Logistic analyze regarding biogasproduction
  - First part is done which conclude that Fræna could be a better place for a biogasplant
- Technical solutions for a biogasplant that utilise the waste heat optional
- Workshops/gatherings for possible investors and other interested in Biogas production

Visualizing


Nyhamna
CO_2
Spillvarme


Nyhamna
CO_2
Spillvarme
Planteproduksjon
Biologisk avfall
Gjødsel


Nyhamna
CO_2
Spillvarme
Planteproduksjon
Biologisk avfall
Biogass
Gjødsel
Fiskeavfall


Nyhamna
CO_2
Spillvarme
Planteproduksjon
Varme
Biologisk avfall
Biogass
Biogasskraftverk
El
Gjødsel
Fiskeavfall
Buss

Thank you for listening ☺

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