



Biogas 2021 – The Gold Rush



The Kalmar County Biogas Journey
– a selection of people and events

**This account was written in autumn 2020,
in the lead up to the Biogas 2021 – Guldruschen conference.**

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Region Kalmar County

On January 1, 2019 the Regional Council in Kalmar County and Kalmar County Council joined together to form the new organisation Region Kalmar County.

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Foreword

In Kalmar County we are united in a common goal - A climate for growth. We want to create a region where people grow and where companies and organisations establish themselves and develop. A region where close collaboration between the various stakeholders in the region gives the county a unique competitive edge and a strong link between the urban and the rural.

Since 2006 the county has had the goal of becoming a fossil fuel free region by 2030. Since that time work on energy and the climate, and not least biogas, has been an important part of our regional planning and development. In this account we want to explain the biogas journey the county has taken until now, in the hope that our experience might be of benefit to others.

The county's biogas strategy prioritises biogas as a fuel. This prioritisation was also a feature of our journey up to now. Developments within the transport sector are, however, moving fast, particularly the development of electric cars, but also other new technologies. This might mean that biogas finds other areas of use in the future, such as in heavy vehicles and ships, in industry, or in the form of hydrogen.

All possible means of sustainable transport will be needed. However, it should be borne in mind that biogas and, for example, electricity are not always interchangeable. Biogas is part of a circular economy with positive values in areas such as resource utilisation, climate impact, energy production, nutrient flows, self-sufficiency, safety, profitability and regional economics.

Reduction of climate emissions is a global issue of the utmost importance. Developments are mostly led by international and national decisions, but the measures have to be implemented at the local level. Biogas is a part of this work for a sustainable regional development.

KARIN HELMERSSON (C)
Chair, Regional Development Board
Region Kalmar County

PETER WRETLUND (S)
Chair, Public Transport Board
Region Kalmar County

Introduction

The Kalmar County Biogas Journey - a global model for sustainability

Many people in the world have seen improvements over time in the form of increased prosperity, better health and greater freedom. This is a positive trend but it brings with it an increased need for us to use resources more efficiently, otherwise our natural resources will not suffice for food, crop growing, energy and water and so forth. Neither can we afford to contaminate our living environments like we have done in the past. Doing so would produce undesirable effects on health and we would jeopardise the natural ecosystem services, which we need for our survival.

In the coming decades a radical increase in our efficiency will be needed, a resource revolution. We need to derive much more benefit and value from less resources. To do that we cannot continue in the same way as before. We must stop fragmenting society into different sectors, supply chains, public authorities and so on, and rather ensure that resources are used efficiently by means of an improved holistic approach. What is a surplus problem or a waste product in one place needs to be matched with a place or process, where it will become a valuable resource. Fertilisers, for example, pollute the water courses and the Baltic Sea and need to be returned to the fields. Carbon which, to a much too great extent exists as carbon dioxide in the atmosphere, needs to be bound in plants and more fertile soils. And so on.

In order to achieve sustainability the ability of people to provide for themselves where they live must be strengthened. Rural settlements, municipalities and regions which are able to produce more of society's basic functions, such as food, energy and water from low value ingredients such as manure and waste must become richer and develop more viable companies. Such regions will also become more secure through their increased ability to resist crises of different kinds. Strategies whereby we try to solve one problem at a time have proved deficient and generally lead to new problems. Now there is a need instead for holistic solutions which create many values and solve many problems at the same time

One of the best examples of holistic solutions is biogas, specifically the Nordic model. This is based on:

1. Dealing with and solving waste problems with, for example, slaughterhouse waste, food waste or manure.
2. Producing renewable fuel with the very best climate performance.
3. Producing renewable fertilisers which replace mineral-fertilisers and positively effect cultivation in many ways.

Starting with the three principal functions of the Nordic model, it becomes possible to identify many other sustainability effects such as better water and air quality, reduced climate impact, more jobs with strong regional economic development and improved energy and food security, to name but a few. Moreover, the Nordic model may be applied anywhere in the world and we have Swedish companies which can be involved and deliver important parts of the biogas system.

It is against this background of biogas solutions as a holistic tool that the development in Kalmar County should be viewed. Learnings from this are not only of interest in the county, but rather everywhere where there is waste and sewage, where fossil fuels are the basis of transport and where imported mineral fertilisers are necessary for food production. Biogas solutions are pretty much indispensable for sustainable cities and regions. But that does not mean that they are easy to implement. The fact that they involve many different sectors, stakeholders and policy areas is a major challenge. It is not a given that municipal or regional officials are always looking simultaneously for a solution on an issue related to food waste, the need for renewable fertilisers and the replacement of petrol and diesel. Officials are usually looking for a solution to a problem within one sector. Successful implementation therefore requires a good holistic approach, collaboration and persistence!

This tale of biogas in Kalmar County offers experiences and learning which need to be shared with other municipalities and regions in Sweden, and in fact even further afield. How, with great persistence and considerable courage the county has succeeded in integrating different policy areas into a clear initiative on biogas solutions is, to me, a key factor and a model of global relevance. It is also inspiring to see how this clarity has led to an increased interest among private investors in participating in and building the biogas system.

Mats Eklund | Professor of Environmental Technology and Management at Linköping University and director of the Biogas Research Center, BRC

Great courage has been a characteristic of development in the region

Carolina Gunnarsson, Region Kalmar County, it seems like "To do like Kalmar" has become a concept in biogas circles, can you explain this?

– Before I answer this question, I have to talk about the cornerstone of everything that has happened on the biogas front over the last 15 years here in Kalmar. The first decisive step was the regional policy objective, set in 2006, to make the region fossil fuel free by 2030, commonly called "No oil 2030".

Was there a consensus around this decision?

Then was total political consensus around this issue. One factor in this may have been that the Regional Council had already been working with the whole sustainability question and that there was a well-informed Board which had for a long time been constantly informing itself about climate issues. Before this decision the Regional Council staff team even proposed a fossil fuel free region by 2050, but the board honed the objective and decided on 2030.

"To do like Kalmar"

Carolina Gunnarsson again:

– This idea comes from the public transport procurement, worth SEK 5 billion, for Kalmar County 2017 – 2027. The actual procurement took place in 2016. At that time the regional public transport authority Kalmar Länstrafik (KLT) boldly set the requirement for 60% biogas. It was as if the Swedish biogas world had been turned upside down: would it really be possible?

This was not the first or the last time that Kalmar Länstrafik would place demands on gas vehicles, and each new procurement has seen the bar raised. In the latest municipal transport procurement in 2020, the result was 75% biogas. This was possible due to specially built vehicles and nine new filling stations.

– Public traffic procurements are just one example of the history of biogas in Kalmar County. There is a lot of substrate in the county, and a positive desire to invest which has constantly led us to the next phase. Now we are going with liquified biogas, explains Carolina, who continues:

– New investors, both local and international, have come into the county. Soon there will be biogas filling stations in every municipality in the county. The first liquefied gas filling station is already finished and two plants for liquefied biogas are underway, to mention some examples.

Continued high expectations

How do you see the future?

– Expectations continue to be high and there is further potential to expand the production of biogas, emanating from manure, in the county – not least on Öland. Also in Södermöre, the southern part of Kalmar Municipality, work on new biogas production is getting started. There is room for more investment and initiatives through which we can take advantage of the experience we have gained hitherto. For this reason we have started to talk of a Gold Rush [Guldrusch in Swedish, as in the title of the conference]. When we see a sufficiently clear demand for biogas, it will not be particularly difficult to expand production or build more filling stations.

Good results thanks to our private stakeholders

The history of biogas in the county began at the end of the 1990s. At that time there was a major imbalance between production and market. If our private stakeholders had not had the courage to make some major investments, which enabled the market to be "waited in", the situation today would be very different.

But there was also pressure, political will and ambition from the municipalities, who made the county understand that this is serious, we're going to make a "workshop" where things get done, not just hot air.

Elvira Laneborg, Kalmar Municipality

nooil.
For a fossil fuel free region

A workshop full
of enterprising
spirits who
we call
“eldsjälar”



During the compilation of facts for this document politicians, businessmen, civil servants, entrepreneurs in different branches and at different levels in Kalmar County were asked to talk about which people, organisations and companies particularly gave of themselves to the "workshop". Hannele Johansson at Biogas Sydost wrote "It is the commitment and will among everyone involved that meant that

we succeeded. It is also clear that some are more able to both have an impact and be seen."

So here are some specific ones – among many others – with the grand title of Eldsjäl (Entrepreneurial Spirit). Many of them have been mentioned several times.



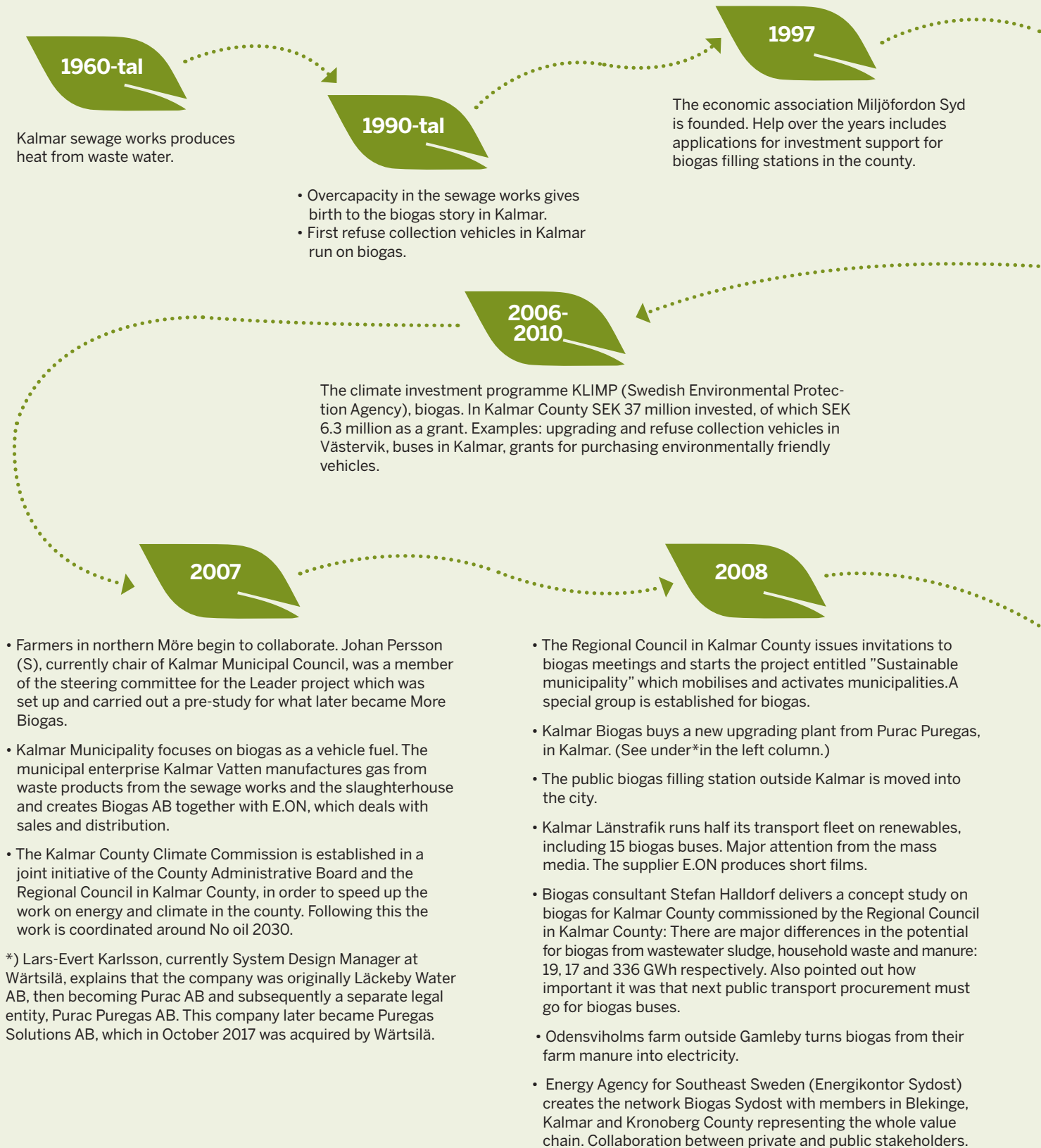
And these are some examples of companies, organisations and networks which many have indicated as being important for the successful development of biogas in Kalmar County:

I would like to flag up our farmers. It is they who ventured into an area unknown to them, invested their money in biogas plants and took the risk. They are my heroes.

Hannele Johansson, Energy Agency for Southeast Sweden



Timeline | The Biogas Journey



1998

Kalmar Vatten opens Kalmar's first biogas filling station (Tegelviken). This is seen as the first step to the county becoming a biogas region. Leads to Kalmar Länstrafik, Hushållningssällskapet, the Municipality and E.ON beginning to act.

2000

The private company Puregas begins biogas upgrading.

2003

The Regional Council in Kalmar County prioritises "the climate" in the county regional development planning.

2005

Regional Council in Kalmar County decides on "No oil 2030", the first action programme is presented.

2006

- The action programme for No oil is decided. The aim is for the county to be a fossil fuel free region by 2030.
- The public waste company Kalmarsundsregionens Renhållare (KSRR) is formed to carry out waste management in the municipalities of Kalmar, Mörbylånga, Nybro, Torsås as well as Oskarshamn (which joined in 2019, more municipalities will join KSRR soon).
- Amanda – the world's first biogas train runs on the Tjustbanan line between Västervik and Linköping 2006–2010 (pilot project).
- Energy Agency for Southeast Sweden is granted EU support for the project MADEGASCAR, which aims to increase the percentage of gas powered cars by influencing demand and accelerating the building of the infrastructure for vehicle gas.

2011

- A three-year project with the Regional Council in Kalmar County at the helm trials mussels, reeds and algae as substrates for biogas.
- Regional climate initiative from the County Administrative Board.
- Construction starts on Hagelsrum Biogas, for electricity and heating, 4 GWh.
- Biogas Sydost is tasked by the County Administrative Boards of Kalmar, Kronoberg and Blekinge as well as the EU to create a common strategy and action plan for biogas for vehicles for the whole of the South East region.

2009

- Västervik Biogas is created and a biogas filling station opens in the municipality.
- After county-wide dialogue the Regional Council in Kalmar County creates a specific action plan for biogas. This plan is still in action. Among its points: Dare to go ahead! Collaboration and cooperation make actions more efficient; Eliminate bottlenecks such as a lack of infrastructure; Think circular!
- The Regional Council in Kalmar County introduces revised action plan No oil. Contains common countywide goals for biogas and plan for all publicly financed journeys to the fossil free by 2020.

2010

- Fish guts and waste turned into biogas in Västervik.
- KSRR invests heavily in biogas vehicles.
- A headline in the publication Barometern states that Kalmar County is a blank spot on the map, despite increased sales. Despite the fact that sales increased 18% the year before, this year there are only two filling stations for private cars – one in Kalmar and one in Västervik. Just over 10 years later there are a total of 14 filling stations in various municipalities in the county, with three more on the way.

2012

- The County Council takes a regional decision for a much stronger environmental approach to public transport.
- Biogas filling station opens in Oskarshamn.
- Regional study for Sydost shows that Kalmar County has extremely good conditions for biogas – a lot of cows and a lot of manure.
- Kalmar Länstrafik and (potential) producers begin to meet.
- The energy and climate work of the county is combined in Klimatsamverkan Kalmar län, a group which consists of the Municipalities, the County Administrative Board, the Region, the University and the Energy Agency.

2013

- The Climate Commission conducts a tour of the county. 13 meetings with municipal politicians and council officers and some representatives of local business and industry. The Commission delivers biogas memorandum looking at context, volumes and the way forward.
- The GAFE – project works with renewables in agriculture, creating working groups with farmers for biogas in Mönsterås, Mörbylånga and Borgholm.
- The County Council: Environmental initiative for public transport, a principle decision prior to the next bus procurement.
- KSRR constructs a pre-processing plant.

2018

- Hagelsrum expands, with upgrading, new digester, 12 GWh.
- Mönsterås Biogas receives SEK 109 million in support from Klimatklivet. Scandinavian Biogas decides to invest heavily in Mönsterås, creates Mönsterås Biogasproduktion AB.
- Gasum discovers Öland with all its manure, leading to a cooperation agreement with Mörbylånga Biogas and Mörbylånga municipality.
- Governor Thomas Carlzon issues invitations to a “Confident climate day” at the residents and the project “Biogas Boost” with 20 stakeholders collaborating enters the scene. It runs until 2021.
- Det regional-global company Puregas Solutions Wärtsilä expands into Norway: builds the largest liquefied gas plant in the world in Trondheim.

- The climate investment support programme Klimatklivet provides countywide investment grants for a number of biogas filling stations.
- OrangeGas and Nordic Gas Solutions arrive in Kalmar County. OrangeGas aims to be the largest provider of non-fossil fuels in north-west Europe.
- A roadmap for how Kalmar County can become a demonstration arena for liquefied biogas is developed by a group including the Regional Council in Kalmar County, The Energy Agency for Southeast Sweden and Energigas Sverige.
- The study “Biogas from manure. System study and macroeconomic impact” for Kalmar County is initiated. Commissioned by: Region Kalmar County, carried out by: WSP Sverige AB.

2019

- In dialogue with the farmers from the area, Kalmar municipality carries out a manure inventory and interest survey in Södermöre.
- Alf Johansson, of Runes Bensin in Emmaboda, discovers biogas. Undertakes filling station construction in Emmaboda, Nybro and Söderåkra. The municipalities promise to add biogas vehicles to their fleets.
- Hagelsrum builds filling stations in Målilla, Hultsfred, Vimmerby and Högsby.
- OrangeGas, in conjunction with Falk Biogas, submits an application to Klimatklivet for a biogas plant for liquefied gas in Alböke,

- Region Kalmar County’s updated (third) action programme for a fossil fuel free region is adopted.
- Energigas Sverige receives SEK 200 million to create an innovation cluster for liquefied biogas across Sweden – Drive LBG. The money comes from the Swedish Energy Agency. Of the SEK 200 million, SEK 36.3 million is awarded to Mönsterås Biogas-produktion and SEK 344 000 to Widéns Åkeri in Kalmar.

2014

- More Biogas operational (20 GWh).
- KSRR begins food waste collection.
- Stefan Hermansson from Väckjö (the first to open a public filling station in Väckjö) wants to open in Kalmar County and is looking for sufficient vehicles to get set up.
- KLT asks the municipalities how they want to prioritise biogas in school transport.
- KLT conducts many discussions with bus companies.
- Biogas Sydost presents the regional biogas strategy for counties Kronoberg, Kalmar and Blekinge. Kalmar County's target: biogas production of 100 GWh/year 2017 and 300 GWh/year 2030. At least one biogas station in each municipality and biogas as first choice in 2017 public transport procurement.
- KLT and Regional Council in Kalmar County meet key municipalities, public transport procurement prepared, including environmental criteria.

2015

- Mönsterås Biogas AB is created, with a number of farmers as part owners. Objective: Manure-based production.
- KLT issues calls for tender.
- 5 percent lower costs for biogas fuel persuades the taxi sector to "jump on the biogas bandwagon".

2016

- The Regional Council in Kalmar County co-finances a pre-study on southern Öland.
- Mörbylånga Biogas AB set up by farmers in conjunction with Mörbylånga Municipality.
- Falk Biogas AB established, northern Öland.
- KLT issues decision on allocations for bus procurement: 60 % biogas, 40 % HVO = 100 % renewable.
- Bergkvarabuss builds filling station and bus depot in Mörbylånga.
- Oskarshamns Energi builds biogas filling station in Mönsterås.

2017

- KLT transport procurement becomes operational: 300 biogas public buses (town and regional buses) plus school buses roll out onto the roads of the county. Results in carbon dioxide emissions from public buses being reduced by 75%, and transport costs reduced by 2%.
- Scania is major winner in KLT procurement, selling 90 Scania busses to Kalmar County: to Flexbuss, Bergkvarabuss and Connect Bus Söne. Flexbuss becomes the first to introduce biogas express buses on passenger routes. Scania busses used on rural routes and Setrabusses on Öland. School and urban routes in Västervik and Oskarshamn operate with Scaniabuses. Urban routes in Kalmar use Mercedes-Benz.
- Svensk Biogas builds new filling station and bus depot in Västervik.
- A pre-study on liquefied biogas on land and sea is delivered by Energy Agency for Southeast Sweden.

2020

- Gasum builds Sverigenät with filling stations for liquefied biogas, including one in Kalmar. This is the first one to be opened in the county.
- Filling station opens in Målilla.
- The national biogas market survey (submitted to the Energy Ministry in December 2019) suggest new support for production. The survey takes a holistic view of biogas.
- Widéns Åkeri in Kalmar orders 4 LBG-trucks (for liquefied biogas) and wants more.
- Oskarshamns Energi opens a filling station in Kalmar.
- The second station on Öland on the way in Färjestaden.
- Government suggests conversion support for vehicles.
- The result of the KLT procurement of special transport services (municipal transport provided for those with mobility difficulties and those living in remote areas): 75 % will run on biogas, 25 % on HVO (synthetic diesel).
- Klimatklivet grants Gasum 15 million euro as support for a production plant on southern Öland (Mörbylånga Biogas).

Kalmar County success factors

In the beginning the public sector was important, not only as a purchaser and as a cohesive force, but also as owner of production plants at sewage plants. Today most production plants are owned privately, but it is still important for the public sector to be involved, for example, in market building – both as a consumer and to provide information and the like to others. The public sector is also very important as part financier of pre-studies, surveys and applications.

Courageous politicians have realised the link environment-farming-biogas-planning and development and inserted compulsory requirements for biogas in procurements of public transport. Kalmar Länstrafik (KLT) has even been active in adapting vehicles, so that biogas could be prioritised for different types of vehicle.

Private entrepreneurs have dared to invest in building biogas filling stations in small settlements without the expectation of quick yield and have thus rapidly succeeded in fulfilling the target of one filling station in every municipality. This paves the way for every inhabitant of a municipality who invests in a biogas car being a winner.

During the compilation of facts for this document politicians, businessmen, civil servants, entrepreneurs in different branches and at different levels in Kalmar County were asked to talk about which factors stand out in creating the success of the county's biogas journey.

Many of these are described elsewhere in this document, but here are some further examples which stand out:

- * Holistic view where biogas is dealt with from a broad perspective within society.
- * Well-functioning climate of collaboration, determination and persistence.
- * Courageous politicians with the will and ability to move from words to actions.
- * Competent, driven staff who share experience with each other in a spirit of generosity.
- * Enterprising farmers who want to and are able to collaborate and take initiatives.
- * Biogas as a tool for a link between urban and rural areas - food production and fuel production, waste management and environmental improvement.
- * Curiosity and desire for innovation around biogas - biogas trains, new substrates from the sea and so on.
- * The insight that there are commercial reasons for renewable energy sources.

It's all about making an economically sustainable circular economy throughout the whole chain: availability of waste materials – biogas production plant – distribution of vehicle gas – consumers (buses, cars etc.) – recipients of bio fertilisers (spreading area). If one link is missing, the whole concept goes missing. For this reason long written agreements must be signed between all of the links, the same dates and the same generations with the same dates and the same durations.

Kjell Axelsson, More Biogas

There is a political interest in sustainability and a desire to exploit local resources. Now we have to see things through. Make sure that biogas doesn't get forgotten or overshadowed when a more popular fad comes along,

Michael Olausson, Scandinavian Biogas

I usually think that biogas is like a puzzle with four pieces: substrate, producers, distributors and consumers. All four pieces have to fit in time-wise and space-wise – so that, for example, 1: the gas which is produced is consumed or 2: there are filling stations (distribution), therefore there are biogas cars (consumption). Without one of these, there isn't the other. In Kalmar we have all four of the pieces, along with a clear political will around biogas.

Elvira Laneborg, Kalmar Municipality

I moved here four years ago and became a biogas devotee. In my previous life in Stockholm I worked in a company where people would whinge about biogas, saying that it was so far between filling stations and the like. Here in Kalmar biogas is seen as a very important piece of a puzzle to slow down climate change, to be locally self-sufficient in fuel and also to produce bio fertiliser which can reduce over-fertilisation. It's much more than 'just' fossil free fuels. A year ago I bought my first biogas car.

Sara Gripstrand, Kalmar Municipality

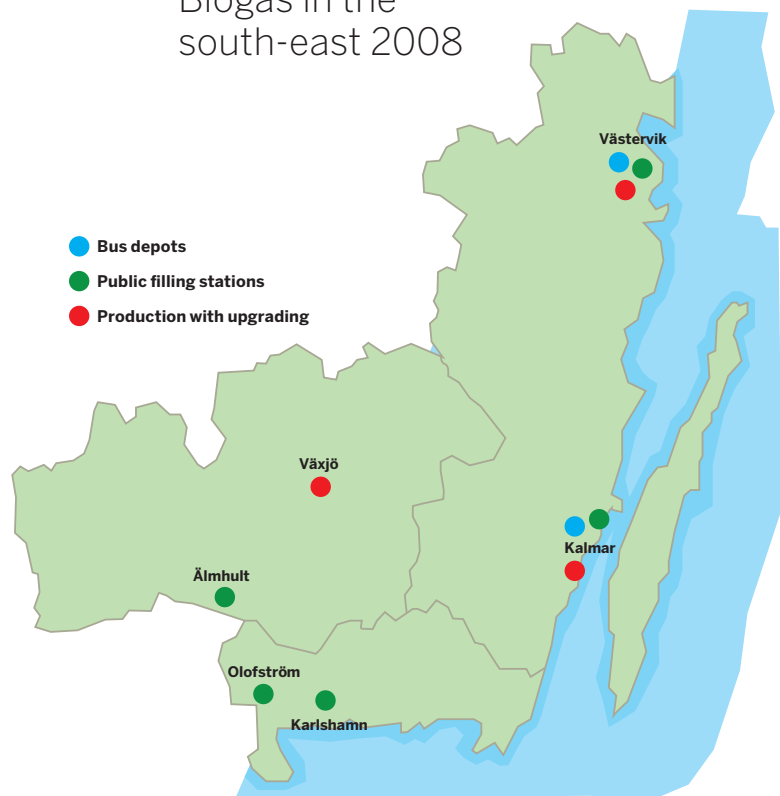
Production plants and filling stations in Kalmar County

Hannele Johansson at Biogas Sydost, can you explain the two maps which illustrate an approximately 10 year development.

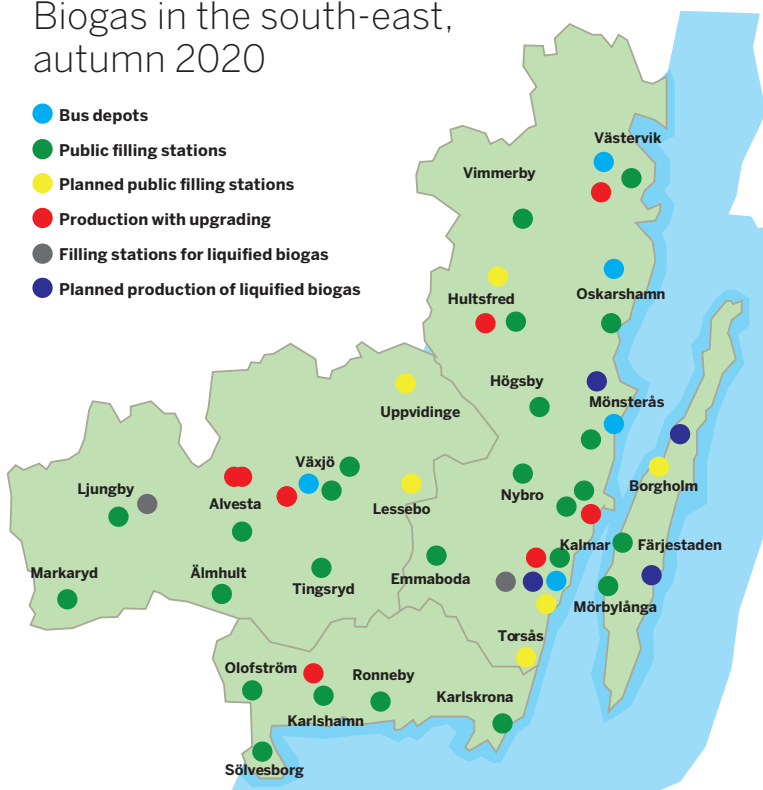
– The first map is from 2008 when the regional network Biogas Sydost, one of eight similar networks in Sweden, was founded. Picture number two shows the situation in 2020. The pictures illustrate the development in our three south-eastern counties. The point of including all three counties is that they supported each other and were able to share experiences with each other. For example when production stopped in one plant, the raw materials could go to another.

– The three counties produced a common strategy where we created goals and concrete measures for 2014 – 2017 looking towards 2020. For example in Kalmar County we created the goal of having at least one filling station in every municipality by 2020, that biogas should be first choice in “stråktrafik”

Biogas in the south-east 2008



Biogas in the south-east, autumn 2020



(inter-town shuttle services) in the county procurement 2017 and even be chosen in procurement of personal cars and service vehicles. All that has now been achieved. The filling stations are all in place or on their way in every municipality in Kalmar and the procurements were carried out in accordance with the goals we set ourselves. We have not done so well with the production targets. The target of production of 100 GWh in Kalmar County in 2017 was reached, but for the whole of the south-east. Kalmar County contributed about half of that.

Can you tell us something about the work of Biogas Sydost?

– For me biogas has always been about collaboration. Collaboration between the public sector and industry, collaboration along the whole of the biogas chain. It has always been an important aspect of our meetings that we go around the table so everyone gets heard. We share the positives, the challenges and we solve problems together.



BIOGASMACKAR

1) Kalmar	E.ON
2) Västervik	Svensk Biogas
3) Oskarshamn	Oskarshamn Energi
4) Läckeby	More Biogas
5) Mönsterås	Oskarshamn Energi
6) Mörbylånga	Mekka Traffic - Bergkvarabuss
7) Målilla	Hagelsrums Biogas
8) Kalmar	(Kalmartravet) Gasum
9) Emmaboda	Runes Bensin
10) Vimmerby	Hagelsrums Biogas
11) Nybro	Runes Bensin (/Polargas)
12) Högsby	Hagelsrum Biogas
13) Kalmar Norra	Oskarshamn Energi
14) Hultsfred	Hagelsrum Biogas
15) Färjestaden	OrangeGas
16) Söderåkra	Runes Bensin (/Polargas)
17) Borgholm	OrangeGas

The numbering reflects the order in which the filling stations were built or in which there was a station in that settlement.

It is unique to have so many different operators running filling stations in one region.

Stefan Halldorf, biogas consultant

Fascinating how manure, which was seen as a burden, can be seen as an asset. Exciting from an environmental point of view and also good for the local economy,

Johan Persson (S), Kalmar Municipality

We have increased production tenfold in the south-east during the time that Biogas Sydost has been in existence, that is 2008–2020. We have introduced liquefied biogas to an extent that was not even envisaged in the strategy. Two filling stations are ready, one in Kalmar and one in Ljungby, in addition to one plant which will produce liquefied biogas which is on its way in Mönsterås. This plant will be the largest biogas production plant in Sweden. If this happens, which we believe it will, we will more than double current production in the south-east region.

Hannele Johansson, Energy Agency for Southeast Sweden

The advantages of biogas

– System approach, holistic approach

Biogas provides renewable energy and contributes to reduced climate emissions. This applies particularly for biogas using manure as a raw material and where it is used to replace fossil fuels. This specific sector is where it is most difficult to find fossil free alternatives. Biogas based on waste products and manure contributes to a circular economy.

– Our region set a target early, in the very first biogas strategy, for biogas primarily to be produced from manure and to be used to replace fossil fuels. It is a sustainable and circular perspective, with biogas where it provides the most system benefit. Of course that doesn't mean that we are not positive about also using biogas for electricity, heating or in industry says Johan Persson, Municipal Commissioner (S) in Kalmar. When treated properly, the digestate can reduce overfertilisation, he continues. Some parts of Kalmar County have a surplus of animals and phosphorus and a deficit of area for spreading. The digester makes it possible, in a subsequent stage, to separate phosphorus from nitrogen. Then the phosphorus can be exported from the county. This in turn makes it possible for the farmers to expand because they can increase the number of animals and thus their production.

Projektet Biogas Boost

Biogas Boost is an information project in Kalmar county. It began in 2018 on the initiative of Mörbylånga Municipality, will run until 2021 and is financed by Klimatklivet and all the participating parties: the 12 municipalities in the county, the Region, plus companies and organisations linked to biogas. – Conditions are good here for both infrastructure change and opinion making, says initiative-taker Elvira Laneborg. The basic idea is to work strongly together to communicate with the public and local companies so that more people see biogas as a smart alternative for the climate. Important co-participants are partly existing biogas car owners, and partly car dealers who must have the will and the courage to communicate the biogas message. The message is that biogas is a simple and cost effective way of helping the environment!

Among the notable private stakeholders are Wärtsilä, More Biogas, Hagelsrums Biogas, not forgetting the gas and energy companies such as E.ON, Svensk Biogas and Oskarshamn Energi. The aim is to build one biogas filling station in every municipality and to double the number of biogas cars in the county. The first goal, at least, will be achieved.



Everything is part of a whole. I love the report from the Biogas Research Centre, based in Linköping University, that shows that biogas contributes to all of the 17 goals in the UN agenda 2030.

Sara Gripstrand, Kalmar Municipality

Biogas solves a lot of problems, and differently from, for example electricity, ethanol, biodiesel etc., it can be used for private cars, buses, trucks, industrial processes and for sea transport. None of the alternatives can do all that.

Michael Olausson, Scandinavian Biogas

The great thing is being able to combine food production (primary production and industry) with consumption and to reclaim various waste and food waste as nutrition for the production of new food and to produce a gas which we can use as vehicle fuel and in such a way create a flow of money which is of benefit in various ways to society, companies, the climate and environment.

Per-Göran Sigfridsson, More Biogas

KLT transport procurements – strong demand produced results

Clear goals, collaboration, long contracts and timing. These are the components which underlie the county's success in its biogas journey.

This summary comes from the Region Kalmar County development strategist Conny Karlsson who, together with County director of transport Karl-Johan Bodell was closely involved with the current procurements regarding public transport.

– Clear goals demonstrating the strong political ambition for a fossil fuel free region by 2030 are of course the main cornerstone of our success, says Conny Karlsson. This is the foundation which allowed us to make such strong demands. He continues:

– A close, fruitful collaboration between public authorities, municipalities, farmers and other biogas producers, suppliers of fuel and of course KLT as public transport organi-

Placing demands on an increased use of biogas naturally led to indirect demands for increased delivery of biogas.

This encouraged an increase in production and the installation of new public filling stations in the eastern parts of Sweden. This development led to greater opportunities for the increased use of biogas in the company and private car market.

Karl-Johan Bodell, County Director of Transport, 2016

ser made these good outcomes possible. Plus of course long contracts at different levels in order to give security to the investment and to get the timing right – building of infrastructure and beginning transport – without getting caught in a stalemate, a chicken-or-egg type situation. When in 2016 Kalmar Länstrafik (KLT) revealed its procurement for public transport there were many raised eyebrows. Not only in the county, but also all around the country. Instead of being technology neutral, the procurement specified that the county's public transport should be run 100% on renewable fuels, of which 60% should be biogas and 40% other renewables – for example, green electricity, RME, synthetic diesel or ethanol.

– There were strong requirements, at all levels. So, for example, synthetic diesel could not contain any palm oil, explains Conny Karlsson.

There were stakeholders in the bus sector who criticised the KLT procurement because it stipulated specific fuels and was thus not technology neutral.

– There were those who expressed irritation as they didn't themselves manufacture biogas buses, explains Ulf Nilsson, at that time chairman of the County Council Traffic Board, in a news article from Biogas Öst in 2016. But KLT didn't pay much notice to it.

– The link between biogas and local business and industry and regional development were decisive in the formation of the procurement, notes Ulf Nilsson, in the same article.

What can you tell us about the actual procurement process?

– In our experience it is important to be well informed in advance in order to find the appropriate, well-balanced level of requirements. For this reason we carried out a thorough background survey before even beginning to sketch out the basis of the procurement, explains Conny Karlsson, who is both an engineer and an economist. We went to major trade fairs, including private car fairs, where we established contacts with different stakeholders.



– We benefited a lot from being well informed in advance and having wide contacts in the market where together with Fiat we developed bodywork to make space for biogas, auxiliary tanks and seats for a car of a certain size – which we needed but which didn't exist. We made contact with Fiat via a local motor-home dealer, and built on their bodywork, explains Conny Karlsson.

Kalmar länstrafik (KLT) was set up as a pub limited company, half owned by the municipality and half owned by the county council. Now its activities are an operational area within Region Kalmar County.

2006, Regional Board decides that:

- Public transport in Kalmar County shall be free from fossil fuels by 2020 (No oil).
- Biogas is to be the first-choice alternative where possible

Can you tell us a little more about your way of working?

– Around 50% of transport procurement in the country get reassessed. We didn't have time for that, so we began a dialogue early with all kinds of different stakeholders, even those submitting an offer.

Is that actually possible?

– In the case of public procurement it's extremely important to win trust and the whole time to be careful to explain what you are doing and why. Clarity creates security, says Conny Karlsson. We devoted a lot of time to dialogues – all links in the chain – this is the part that Karl-Johan Bodell was very good at.

– We talked with the transport companies, debating risks and opened ourselves to them to make sure that it works.

No one knew everything at the beginning, a lot of humility was required to make it work. Of course you have to be careful to treat everyone equally and we talked the same amount with every participant. The knowledge we got from good preparation meant that, for example, if someone said "that's impossible" we could counter that, and show our calculations of how it would be possible, explains Conny Karlsson.

Do you have anything to add about the outcome?

– I'm convinced that our negotiation technique was decisive in making sure there were no appeals or cost increases. To sum up I would say that you have to dare to think outside the box but within a certain framework, concludes Conny Karlsson.



Some good examples in the county

The municipalities are forging ahead in Kalmar County!

The speed of change depends on what each person and each organisation does. The municipalities in Kalmar County have collaborated and forged ahead under the heading No Oil. The municipalities own less than 1% of the vehicles in Sweden but they are an important driving force on the journey to a society independent of fossil fuels - by taking the lead, showing possibilities, building infrastructure and hastening a positive development. Here we present an image of 2020 and some examples of how the municipalities have forged ahead with biogas development:

- * Västervik and Kalmar municipalities have been producing biogas in sewage treatment plants and upgrading to vehicle gas for more than 10 years.
- * The municipalities in Kalmar County own over 30% of the biogas vehicles in the county.
- * Oskarshamn municipality has the highest proportion of biogas in the municipality's vehicle fleet. 45% of its vehicles run on gas.
- * Kalmar is the municipality which has the most biogas vehicles, with 223. The chairman of the municipal board has challenged local car dealers to work together to be the municipality with the highest percentage of fossil free vehicles in Sweden.
- * Mörbylånga municipality has only 16,000 inhabitants but two biogas filling stations which are both a result of initiatives from the municipality.
- * Emmaboda municipality has converted 25 vehicles to biogas, with 28 more to come in 2021.
- * Kalmar municipality is preparing land together with local farmers in order to begin biogas production in Södermøre. A production plant would be able to provide all the private cars in the area with fuel made from local manure.
- * In Mönsterås the municipal commissioner's private car runs on biogas and the municipality runs 10% of its own fleet on biogas.
- * Vimmerby municipality ordered 15 biogas vehicles when the first filling station in the municipality became a reality in the spring 2020.
- * Borgholm Municipality promised (2018) to exchange around 40 diesel and petrol cars for biogas within four years under the condition that a stakeholder builds a filling station for vehicle gas in the municipality.

- * In 2020 Kalmar Municipality awarded Widéns Åkerier the Municipality's climate prize for ordering four trucks run on liquefied biogas.
- * Mönsterås, Mörbylånga, Oskarshamns and Kalmar municipalities are all members of Biogas Sydost working together for more biogas.
- * Every municipality in the county is collaborating in the form of developing common information and marketing and working together to achieve goals in the Biogas Boost project.

Kalmar early with export of biogas technology

Kalmar company Wärtsilä Puregas Solution has its own patented technology for upgrading raw biogas to vehicle gas. They are building production plants, in container-sized modules, which are being installed in Sweden and elsewhere in Europe. The company originally began working in the wastewater biogas sector under its former owner Läckaby Water/Purac which was previously owned by Kjell Axelsson. He is currently chair of More Biogas, a company he founded in 2013.

Purac was founded in 1956 as a part of Tetrapak and often delivers biogas reactors. In conjunction with Wärtsilä Puregas Solution's upgrading technology the two companies have succeeded in pushing their way into the international market. They are two of the small number of Swedish companies in the biogas sector which have been successful with exports.

One of the prerequisites for More Biogas was a collaboration agreement with KSRR regarding food waste. The next prerequisite was that we, through the KLT procurement, which was to take place in 2016, should get full market on both plants, thus also Kalmar Biogas.

Kjell Axelsson, More Biogas

Biogas Boost is a wonderful opportunity to get everyone on board.

Gun Lindberg, Västerviks Municipality

In the next procurement we can have 100 percent biogas as a requirement!

Karl-Johan Bodell, County Director of Transport, 2016

More Biogas – farmers in profitable industrial work

More Biogas began as a traditional study circle and is today a profitable biogas plant which supplies Kalmar County with vehicle fuel and the farmers, who are also involved, with KRAV certified manure.

In Kalmar collaboration is a given. A number of farmers to the north of Kalmar became curious about biogas and set up a study circle. This led to the project to investigate whether there was any financial viability in producing vehicle gas in a shared production plant. The idea of each farmer having a production plant on their own farm was unrealistic.

– I was contacted in 2012 by a group of five or six farmers who had got together, though in the end there were over 20 of them. A consultant from LRF (The Federation of Swedish Farmers) was helping them and I came in at the point when they needed someone who knew about the technology, something which I have experience of, says Kjell Axelsson, dynamic entrepreneur and biogas enthusiast. We created a joint company in 2013, and Famax became the largest individual owner, he continues.

The company More Biogas Småland was founded, clear goals were set: the gas must be sold before the construction started, the numbers had to tally, and capital arranged. E.ON and Kalmar Biogas AB were involved at an early stage.

– I have been working in areas related to the environment for virtually my whole life and understand how important, not to say crucial for the future the environment is. In this work the transfer to fossil free fuels is extremely important and currently there is nothing better than biogas, points out Kjell Axelsson. In 2013 construction of the biogas plant

in Mosekrog, 10 km north of Kalmar, began on property which previously housed Läckeby Water. 18 farmers are participants along with the Kalmar company Purac AB, Famax AB (previously owned by Kjell Axelsson, and now by his son Magnus and which Lackeby and Kalmar Biogas are part of), Kalmar Energi and a number of private individuals. Almi Invest was also a part owner during the first five years. The raw materials consist of manure from the farmers' farms, from chickens, pigs and cattle, slaughterhouse waste, and food waste from nearby municipalities. The farms are located an average of 7.5 km from the production plant. Sanitised manure is returned to the farms while E.ON takes care of the gas. The biogas is upgraded to vehicle gas on site and sold. One recipient is the filling station next to the plant owned by the group. More Biogas has a capacity of over 4 million cubic metres vehicle gas per year, equivalent to approximately 40 GWh.

– We achieved our goal, but the road to More Biogas was a little bumpy. We got some good advice from Roland Nilsson at E.ON. He told us we should arrange it so that we spoke with one voice with one interest, concludes Per-Göran Sigfridsson, enterprising spirit, part owning farmer and executive at More Biogas.

Beginning in August 2020 the **BalticWaters2030 foundation** will implement environmental projects based on applied research, contributing to a healthier Baltic Sea. The foundation will also disseminate knowledge and build opinion so that decisions get taken and measures get implemented. The Swedish University of Agricultural Sciences is taking part in one of the demonstration projects looking at better nutrient cycling for animal manure. The pilot plant, technical development and implementation will take place at the agricultural cooperative **More Biogas** in Kalmar.



Hagelsrum – produces biogas and owns four filling stations

Hagelsrum currently produces 10–12 GWh with just the manure from two farms. Most of this is delivered to Hagelsrum's partner E.ON. The biogas operation is a subsidiary of Hagelsrums Gård AB whose core operation is milk production, with its approximately 600 dairy cows and 500 hectares of land.

– Because we believe in biogas, we have tripled our production capacity since the beginning, building 5 km of gas piping plus three – soon to be four – filling stations, says Tom Birgersson who is the project leader and in charge of production.

The Birgersson family has owned Hagelsrums gård since 2008. Back then they submitted one application for increased animal production and another to be able to produce biogas. Most of the family are involved in the family business.

– The father, Åke, is CEO and he had always thought that biogas is the best way of dealing with human waste products - animal husbandry is clearly there to provide food for humans. My brother is in charge of crop growing and machinery and my sister takes care of the animals. Myself, I run the biogas production – and I am always on call, says Tom laughing heartily. This is a way of life for us all, for better or for worse.

The first farm-based digestion plant started operation in 2011.

– It did well on the industrial level – expensive but good, especially the control system. The calculations were based

on electricity prices in previous years, but unfortunately these took a nosedive. It didn't make a profit.

Everything came good when Kalmar Länstrafik with their mandatory requirement that their transport all along the coast should be run on biogas, explains Tom. As new plant for purified gas for fuel gradually arrived, we produced more than was needed for the buses. In 2018 Åke Birgersson put it like this in Dagens Hultsfred: "Currently we are delivering gas to E.ON on a trial basis, who in their turn are selling to the bus companies from whom KLT then procures journeys and buses. In the long term it is KLT's procurement which has contributed to their being a market for biogas." Tom points out that above all it is long contracts with E.ON along with state support via Klimatklivet which is making all the pieces of the puzzle fit together. However they did not have the backing of E.ON in the issue of a need for more public filling stations inland, where the farm is located. Even with the support of the Swedish Environmental Protection Agency project Klimatklivet, Hagelsrum was faced with having to put a lot of their own financial resources in along with major technical challenges. In 2020 all four of the planned filling stations were up and running – in Målilla, Hultsfred, Vimmerby and Högsby. A fifth is on its way in Eksjö.

– We think that it is worth flagging up Hagelsrum and the input and investment that goes with environmental thinking and alternative fuels. Their biogas operation is a really good example of environmentally friendly energy production, notes Lars Rosander, Centre Party Municipal Commissioner in Hultsfred.



In Västervik fish waste becomes biogas and fertiliser

Gun Lindberg is sustainability strategist in Västervik Municipality. She likes to cite Amanda, the world-famous train as evidence of the desire to innovate and the commitment to biogas in Västervik. Gun Lindberg begins our conversation about what is happening in Västervik by talking about the great commitment to the pilot project regarding the biogas train called Amanda which ran between 2006 and 2010.

– The train ran between Västervik and Linköping, attracting a huge amount of attention at home and internationally.

Problems with refuelling and other technical issues as well as a fall in profitability meant that the project was put in mothballs, explains Gun Lindberg who continues:

– Many of those who have since been very active in driving biogas issues, such as Bruno Nilsson, formerly head of Environment and Urban Planning (samhällsbyggnad in Swedish) and Rikard Wester of Västervik Miljö & Energi were involved. Getting a biogas train running again is enticing, but there are other interesting initiatives which have been and are now in full flow.

– Behind everything lie the regional initiatives such as No oil – a fossil fuel free county by 2030 – which kind of became part of the backbone of everything. The project Biogas Boost is a commendable initiative, which provides the opportunity to get "everyone" on board. The municipality's vehicle unit, for example, arranged an open house at the biogas filling station which is owned by Svensk Biogas with activities for both municipal employees and the public, says Gun before continuing:

– Västervik was very quick to open a biogas filling station, following hot on the heels of Kalmar who were the first. We have done a lot around biogas, which can also contribute to a cleaner Baltic Sea, with, for example, attempts to

make biogas from reeds and the reduction of sticklebacks for biogas production.

Gun Lindberg maintains that biogas is probably the most environmentally friendly fuel currently around:

– When it is produced from manure it yields negative emissions. It reduces nutrient leakage into the Baltic, it is a perfect example of circular economy whereby the waste from one activity becomes an ingredient of another.

People driving around in a biogas car are also cleaning a coastline.

Anna Thore (S), Kalmar Municipality

Manure from cows is not the only good substrate, fish residues also work extremely well. This was written by Monica Westman of Linköping University in an article entitled "Nya substrat från havet" [New substrate from the ocean] a couple of years ago. In the article she wrote:

Biogas became the solution to the problem of slimy, foul-smelling water from the fish industry in Västervik. Today this slurry produces both vehicle fuel gas and prime fertiliser. Västervik is also trying out other marine substrates; the goal is to clean the Baltic Sea, but there are many other benefits.

The article also discusses the project, partly financed by the Swedish Energy Agency, to make biogas from three-spined sticklebacks, a fish which is arriving in increasing numbers to the coastlines during the warm half of the year and which contributes greatly to algae in the Baltic Sea.

– If we can make biogas from three spined sticklebacks it will improve the quality of the water and we can return the nutrients to the agricultural land, says Bruno Nilsson in the article.



Much ado about biogas at Linnaeus University

Ulrika Welandar, professor at Linnaeus University, how is it that there is a lot going on with biogas at the University?

– Here we have both education and research which directly or indirectly have to do with biogas. As an example of the research, I would particularly like to mention the Seafarm project. This was about exploiting farmed micro algae as renewable raw materials to extract, for example, proteins, polymers (for manufacture of environmentally friendly material) and energy.

By extraction of energy did you mean biogas?

– Yes, in the lab I have built up here at LNU we have carried out studies on biogas production, including with macro algae. The fact is sea based raw materials such as macro algae are particularly interesting for energy extraction since they absorb carbon dioxide as well as nitrogen and phosphorus when they grow. So harvesting algae can contribute to reducing climate impact and reduced over-fertilisation. What is left over after energy production can be used as fertiliser in agriculture.

– Just now there is a lot going on with sustainability and it is not just research from a technological perspective but also about economics and other disciplines spanning the sustainability field.

– I would like also like to mention that we in the lab are currently able to test digest substrate on a large scale. This means that we would like to collaborate with various stakeholders who might be interested in testing a substrate.

And how about the education side?

We have, for example, an undergraduate engineering programme in energy and environment, and a Master programme in Sustainable energy processes and systems which both contain parts which look at different aspects of biogas. In recent years we have also had a number of students doing interesting theses and they are not just engineering students from the energy and environmental area, but also electro technology students.

– We should also bear in mind that there are also other courses for those interested in working with biogas, even if they're not engineers or scientists. Every workplace requires a skilled workforce who have studied marketing, communication and behavioural science and other "soft" disciplines.



Lessons that Kalmar County would like to pass on

During the compilation of facts for this document a group of “certified intraperitoneal spirits” were asked what experience and concrete advice they would like to share with the regions, municipalities and other stakeholders who would also like to “Do like Kalmar”. Here are some examples:

Elvira Laneborg, Kalmar Municipality:

- See the whole picture around biogas, link environment, health, commercial development, preparedness etc. in the same project. Analyse how the parts join together and invite people to a broad dialogue and collaboration.
- Set a target and communicate it often and loud. The more people know about it the more people can contribute to it and the fewer people can avoid taking action.
- Start from the idea that there is always a need for information. Simplify this information – better to have short, simple messages than long explanations with a lot of text. Feel free to use humour and images (“Biogas is better than crap alternatives”).
- Use pilot drivers and test drives. When someone drives a gas-powered car, they understand how easy it is. Try using (local) celebrities.
- Celebrate small victories and milestones, use the media to get attention. For example we had an “Electric car party” where 25 electric cars were delivered and a Biogas ballot where 16 biogas cars were presented to operational areas.

Johan Laurell, Project Manager, Drive LBG:

- Dare to choose a path that works for you – and hold fast to it this! There’s a tremendous need to find alternatives to fossil fuels. All of these are better than fossil fuels if an infrastructure is built up for, for example, biogas, ethanol or something else, don’t be in a hurry to swap it with, say, electricity or hydrogen gas. You might end up going back to square one, even though you may already have an alternative which is much better than fossil fuels. Dare to think long term!
- Be realistic. Oil gets pumped up from a hole in the ground without any real production costs at all. It is hard to find alternatives which are as cheap as that. Acknowledge that replacing oil with, for example, a locally produced alternative like biogas will entail an increase in costs. It’s not that biogas is expensive, it’s that oil is cheap.
- Look at the overall picture. Biogas will probably replace a limited amount of the fossil fuels which are currently used. That is not an argument against biogas, but rather for biogas. In the same way that it is an argument for all fossil free alternatives. All of them are needed simply because we currently use so much fossil fuel, which must be replaced. Not just because of the climate, but also because oil is a finite resource. It will never be used up completely, but it will become so ex-

pensive to extract that it will, in practice, become inaccessible for large parts of the world who are unable to pay for it. For this reason those of us who can afford it now must invest our way out of oil dependency so that the poorest countries are not the hardest-hit by energy shortages in the future.

Carolina Gunnarsson, Region Kalmar County

- Build a broad, well-informed foundation, bottom-up – get all the facts and talk with many people.
- Think long term and develop a common, solid target/strategy/plan.
- Bring together interested stakeholders from different areas/different parts of the sector – those who want to move forward. Potential substrate owners, producers, component manufacturers, distributors, transport purchasers and so on.
- Try to create good conditions for private stakeholders.
- Invite yourself to visit important stakeholders, (e.g. decision-makers) in order to share information with them, even if there is not a great interest at the beginning. The more people know the more interested they usually become.
- Lobby at a high level (nationally/EU) to build for the long-term.

Stefan Halldorf, biogas consultant:

- Make an inventory of what potential different substrates have. Manure is the substrate which is most difficult to turn into profitable production, and therefore the least competitive. Plants based on manure can boost their production using other, more energy-rich substrates.
- Use every means possible to stimulate the creation of a local market and demand, for both compressed and liquefied biogas.
- Find private entrepreneurs who are prepared to build either production plants or filling stations. They can do this in collaboration with established companies in the biogas sector, but local ownership and engagement are invaluable. A biogas plant can be a proper local going concern.
- Buses and vehicles for public transport are key. The trend is now for city buses increasingly to be electrified, but long-distance coaches should be priorities for the change to biogas.
- The public transport authorities have to lead the way, by setting compulsory requirements for biogas in procurements. Large-scale procurers of freight transport should, in the same way, be able to set mandatory requirements for biogas for heavy goods vehicles. In this way the demand for biogas would increase very rapidly.
- Every filling station should have a foundation of at least 100 cars (1 GWh) when it is completed, and then it should just increase. The first biogas cars should, therefore, be ready before the filling station. Filling stations for liquid gas should rapidly turn over large volumes, provided the haulage companies begin to run on liquefied biogas.

The Kalmar County Biogas Journey – moving forward...

A lot of really positive things have happened in Kalmar in terms of biogas initiatives – but a huge amount remains to be done. As the saying goes: “When all is said and done – there is a lot more said than done.”

It's really quite simple: Kalmar County, like the rest of the world, is extremely dependent on fossil fuels for its transport. You don't realise how great this dependency is, until you begin to work with a renewable fuel such as biogas.

Thanks to the single-minded commitment to biogas shown by Kalmar Länstrafiks (KLT), a large proportion of its public transport now runs on biogas. But it could be even higher. KLT has, nonetheless, made things very clear in Kalmar County: on its buses and other vehicles it either says “Biogas in the tank” or “Fossil free in the tank”. So biogas has been placed in a very special position, which it is worth copying.

So far only 1 - 2% of other types of transport use biogas. The potential for production in the county would cover 10 to 20% of total transport, while locally on Öland or SöderMøre, biogas production would be able to cover almost 100% of the need for cars.

1% of cars and light trucks are owned by municipalities, while 14 % are company cars and 85% are privately owned. Despite the small proportion owned by the municipalities, their input is incredibly important for getting the use of biogas locally in each municipality started. Some municipalities, such as Oskarshamn say they have gone as far as they can in the purchase of biogas vehicles. Emmaboda, on the other hand, say that within a year that they will buy so many vehicles that between 50 and 60% will run on biogas.

In addition to the municipalities going first, companies and private individuals must begin to realise that when buying a new car, the first questions should be: what renewable fuels are there to choose from? And which is best in the short and long term? Which are good for my own wallet, the local economy and the environment? When these questions have sunk in, biogas will be a natural choice for many. Which municipality will be the first to have 10% of its car fleet running on biogas? This figure also shows that other renewable alternatives such as electricity and hydrogen are not competitors, but necessary complements in order to reach a 100% fossil free status.

Heavy vehicle traffic can also begin a serious transformation. Biogas is a very good choice for trucks which operate over

longer distances. Liquefied gas can also be exported outside the county, if the demand is greater elsewhere. There is also large potential for distribution vehicles, that is those operating over smaller distances, to run on compressed gas. If this gets off the ground the use of biogas could increase rapidly.

Increased demand means increased opportunities for increased production. The greatest potential is with manure as substrate. There is a lot of manure in Kalmar County, and hence a surplus of phosphorus. This means that it is extremely positive that the BalticWaters2030 foundation provided a large grant to SLU and RISE to work with the phosphorus issue linked to biogas production. The practical trial location is More Biogas outside Kalmar. The aim is to find methods to concentrate phosphorus and to be able to export it to areas in Sweden with small amounts of animal husbandry, and the associated deficit of phosphorus.

In 2012 I wrote a report called “Why doesn't every municipality make biogas from its food waste?” And now every municipality in Kalmar County collects food waste for biogas production – even if there are still challenges to be met, such as that of plastic. This shows that change is possible! In Denmark there are already municipalities where one hundred percent of all manure in the municipality passes through a biogas plant. When will we be able to say the same thing in Kalmar County?

Beyond the strong demand, a clear will to invest in biogas is necessary from the state. We need conditions in Sweden like they have in Denmark. Even if manure is a good substrate in many ways, it is also, for natural reasons, poor in energy content. Most of the energy has of course been absorbed by the animal it has passed through. This means that manure might be the most difficult substrate to turn a profit from. If manure-based biogas production is to become strong, targeted investments will be needed.

The most significant explanation for why we have come as far as we have in Kalmar County is that individuals and enterprising spirits, such as the farmers in More Biogas, Hagelsrums Biogas and Runes Bensin dared to invest and expand. But if these initiatives are to be profitable and to still be going a few years down the line, everyone has to take responsibility – for the environment and the climate in Kalmar County! Then Kalmar can be an even clearer example for other parts of the country and the world to follow!

Stefan Halldorf, biogas consultant

More enterprising spirits

Foto: Olandsposten



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It is unique to have so many different operators running filling stations in one region.

Stefan Halldorf, biogas consultant

Bergkvarabuss building a filling station and bus depot in Mörbylånga is a fine example of good collaboration between the public sector (municipality) and the private sector (bus company) arranging common funding.

Elvira Laneborg, Kalmar Municipality

I would like to highlight our farmers. It is they who ventured into an area unknown to them, invested their money in biogas plants and took the risk. They are my heroes.

Hannele Johansson, Energy Agency for Southeast Sweden

In the interplay between the public and private sectors I always say it's like dancing arm in arm, arm in arm, arm in arm.

Anna Thore (S), Kalmar Municipality

In the next procurement we can have 100 percent biogas as a requirement!

Karl-Johan Bodell, County Director of Transport, 2016

It's all about making an economically sustainable circular economy throughout the whole chain: availability of waste materials – biogas production plant – distribution of vehicle gas – consumers (buses, cars etc.) – recipients of biofertilisers (spreading area). If one link is missing, the whole concept goes missing. For this reason long written agreements must be signed between all of the links, the same dates and the same durations.

Kjell Axelsson, More Biogas