Supporting local bioenergy development

A Policy Brief from the Policy Learning Platform on Low-carbon economy

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Interreg Europe

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Table of contents

Summary

Bioenergy is one of the most flexible renewables, with the possibility to convert biomass into many different end-products for different applications. Whilst national and international frameworks support bioenergy generation, there is significant scope for regional authorities to act, with bioenergy development being dependent on local conditions, stakeholders, resources and action plans. Interreg Europe projects have found a number of relevant good practices that could be replicated in other regions to provide sustainable bioenergy for communities, whilst also creating new employment and supporting regional development. Regions interested in supporting bioenergy should consider existing good practices and available resources, and can make use of the significant number of support funds and platforms for implementing their projects.

The regional benefits of bioenergy

Bioenergy, the 'overlooked renewable' accounts for around 10% of global primary energy supply (five times more than wind and solar PV), and 1.5% of global power generation. The main benefit of biomass is its high flexibility. Unlike wind or solar energy, it can be reserved for when it is needed, and can be transformed into heat, electricity, liquid fuels and biogas, depending on what conversion processes and biomass resources are used.

Whilst using biomass as an energy resource does release CO_2 into the atmosphere, it releases carbon that is already a part of the carbon cycle, rather than releasing new carbon, as happens when fossil fuels are burned. Biomass acts as a store of solar energy, generating chemical energy from light through photosynthesis, which is stored as carbohydrates (consisting of carbon, hydrogen and oxygen) and which can be released via various processes as energy again.

What is important in ensuring that bioenergy is renewable is the source of the biomass, and whether it is being sustainably managed. Raw materials are either specifically grown for bioenergy application, or are instead the wastes and residues of other industries and activities (forestry, agriculture, biodegradable municipal solid waste). Since resources are widely available, they can have very short, local value chains, bringing benefits to the regions in which they are used. As well as providing energy, local biomass helps to keep money in the region by diminishing fuel imports, and diversify income for biomass producers (primarily forest owners and farmers). Local energy systems also create new jobs in the region, through installation, operation and maintenance of the required infrastructure and local biomass value chains.

Bioenergy development can also be integrated into rural development and redevelopment plans. The intrinsically local nature of bioenergy means that its application must be planned and developed locally, with new governance structures and co-operations. This can have positive spill-overs in regional development, as clustering relevant stakeholders together to work on plans, often finding new and innovative business ideas beyond those foreseen by the regional authorities.

Modern bioenergy

Bioenergy can provide electricity, heating and transport fuels, by being converted into different end-products via a number of conversion processes. Direct combustion is the most widely used –

burning biomass to produce heat, a process which is hundreds of thousands of years old and remains vital for heating and cooking in much of the developing world. Most definitions of **modern bioenergy** do not include this traditional use, instead focusing on liquid biofuels, biogas and processed biomass (such as wood pellets).

> "Modern bioenergy refers to biomass use alongside modern **heating** technologies, **power** generation and **transport** fuels as opposed to traditional wood-burning methods commonly used for heating and cooking in developing countries." – International Energy Agency [1]

The sheer scope of possibilities with bio-energy means that there are many different conversion processes and applications. The following is an inevitably truncated overview of some key aspects related to regional production.

Solid biomass can be purpose-grown, or can be the residues of industry (wood chips, sawdust), agriculture (animal dung, straw, prunings), or the organic component of municipal solid waste. Solid biomass resources can be burned directly (woods, agricultural residues, and wastes) or processed before combustion to be more energy dense or easy to store. Purpose-grown biomass is usually converted into pellets or briquettes, which are more energy dense than untreated biomass, with air and water removed through drying and torrefaction (low-temperature pyrolysis), before shaping. Being of a standard size, pellets and briquettes are also easier to transport and store, and manufacturers of boilers and stoves can design their products to these standards.

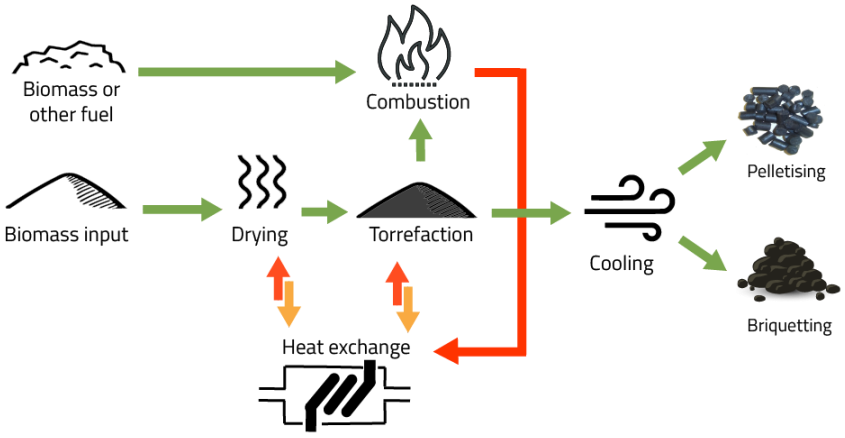


Figure 1 - Overview of torrefaction process [2]

Gaseous biofuel refers mainly to biogas, which can be produced by the anaerobic breakdown of organic matter (typically sewage, animal wastes, the organic fraction of municipal solid waste and purpose grown crops), resulting in a mixture of methane (CH_4) and other gases (CO_2, O_2, H_2, N_2), though the composition can be altered by the production process and refinement. Biogas is mostly used to power CHPs to generate electricity and heat. Biogas is less energy dense than solid biomass, but is easy to store and transport via pipelines. It can also be compressed into compressed natural biogas (bio-CNG or CBG) and bottled for use as alternative transport fuel for trucks and buses.

[1] International Energy Agency
[2] Source: IEA Bioenergy Task 32

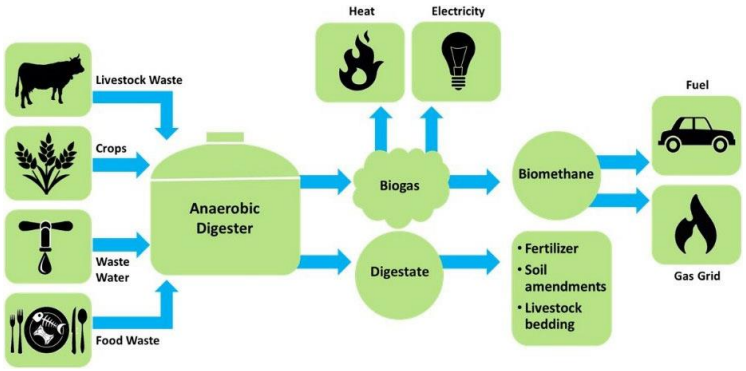


Figure 2 - Production of biogas [3]

Biogas production throughout Europe is driven not only by a desire to produce renewable energy, but also to manage waste, with some countries producing most of their biogas from agricultural crops, and others being almost entirely reliant on landfill and sewage. *Syngas* (synthetic gas) – a mixture of H_2, CO and CO_2 – is produced by the gasification of biomass at very high temperatures, avoiding combustion. It is sometimes used directly as a fuel to power turbines, but can be used to produce liquid biofuels.

Liquid biofuels are comprised mainly of *bioalcohols* (primarily ethanol, but also some propanol and butanol), produced by fermentation of sugars and starches, and *biodiesel*, which is refined from vegetable oils and animal fat, or from processed corn. There have been considerable concerns related to the sustainability of first-generation biofuels which use possible feed resources (cereals and sugars), with research increasingly focusing on biofuels that can be produced using non-food crops, commonly referred to as advanced biofuels (see Figure 3). These conversion processes are not yet producing commercially viable biofuels, and the market is dominated by first generation fuels which are produced at large scale using purpose-grown feedstocks. Until such a time as conversion processes are more advanced, and compatible vehicles are widely used, there is little role yet for regional policy-makers except in the most advanced regions, requiring instead further development of national and international frameworks.

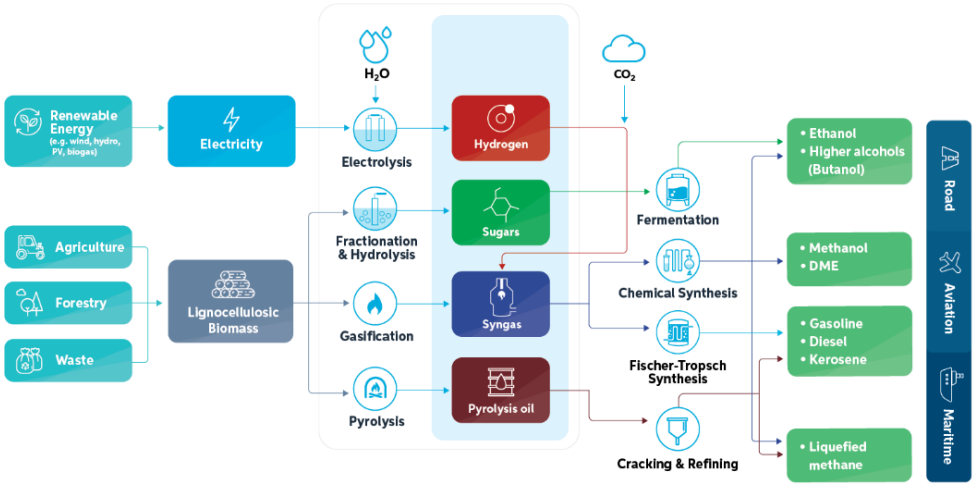


Figure 3 - Indicative conversion processes for advanced biofuels [4]

[3] EESI https://www.eesi.org/papers/view/fact-sheet-biogasconverting-waste-to-energy
[4] Source: ADVANCEFUEL Project

Bioenergy applications

As a result of the many ways of processing biomass, there are various applications for bioenergy, and it can play a role in all sectors – heat, electricity and transport. Europe's modern bioenergy use is split, roughly 50-50, between large scale plants – power, heat, biogas, bioliquid and combined heat and power (CHP) plants – and small scale conversion – boilers and stoves. Around 75% of bioenergy output is heat, around 15% is electricity, and 10% is transport fuel.[5]

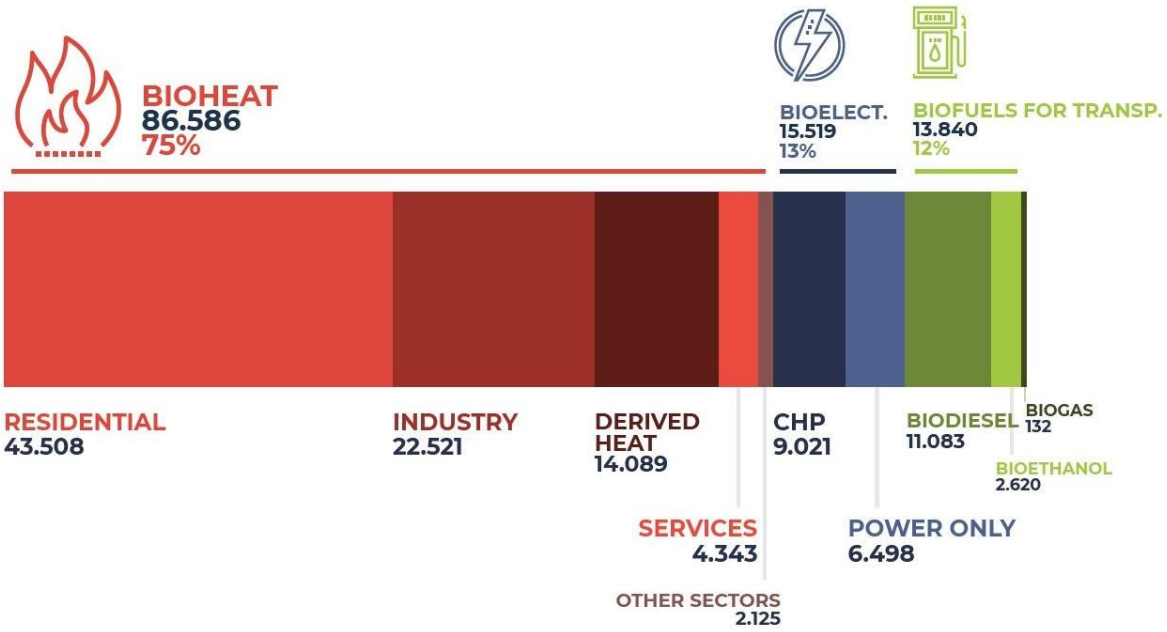


Figure 4 - EU28 Bioenergy market sectors (2016)[6]

Heating and Cooling forms 48% of the EU's energy consumption, including 79% of household consumption and 73% of industry consumption, making it a major contributor to carbon emissions and a sector that is urgently in need of being decarbonised.[7] As of 2019, 26.5% of EU heat demand is supplied by renewables, mostly from solid biomass.[8] Modern bioenergy applications provide a number of heat solutions – making use of solid (treated) biomass, renewable municipal waste, biogas and liquid biofuels. Most bioheat is provided from boilers and stoves that can burn biomass or biogas to produce heat for individual buildings, but district-scale solutions are also used, with large boilers producing heat to be distributed to multiple buildings in a district.

Electricity makes up 21% of total EU energy consumption, around 70% of which is still produced from non-renewable sources. Hydropower and wind energy are the main contributors, with 5% of electricity provided by bioenergy. Most of this (60%) is produced by co-generation producing combined heat and power (CHP) – frequently this uses steam turbines powered by biomass combustion, with the generated heat used for space and water heating, or for cooling via absorption chillers. Combined cycle electricity uses a gas turbine system that captures heat to produce steam, which then powers a steam turbine to produce more electricity, thus increasing overall efficiency.

[5] https://bioenergyeurope.org/about-bioenergy.html
[6] Bioenergy Europe Statistical Report 2018
[7] https://ec.europa.eu/energy/en/topics/energy-efficiency/heating-and-cooling
[8] EU Energy in Figures – Statistical Pocketbook 2019

Transport makes up the last 31% of EU final energy consumption, with biofuels making up 4.6% of total transport fuels. The EU has set a target for 14% of total transport energy consumption to be from renewable resources (biofuels, renewable electricity and biogas) by 2030, with a sub-target of 3.5% advanced biofuels. Many transport modes can be electrified, but there is also a significant role for biofuels, since is also possible to adapt existing fuel infrastructure for biofuels, and bioethanol and biodiesel are 'drop-in fuels' – fuels which can function in existing engines, either alone, or after blending with fossil fuels. Additionally, natural gas vehicles are becoming more common, using compressed natural gas (CNG).

Challenges for regional bioenergy

Providing sustainable bioenergy relies on overcoming a number of challenges across the bioenergy value chain, bringing together different actors and stakeholders, from the identification and collection of feedstock, to conversion processes, distribution and end-use, all whilst ensuring environmental, social and economic sustainability.

Figure 5 - Indicative bioenergy value chain

- **Feedstock provision** – Identifying available regional biomass resources and potentials – including new crop growth – as well as identifying the required stakeholders to provide feedstock;
- **Collection & Storage** – Organising the collection of biomass – harvesting from field, collecting wastes, etc. – and storing before conversion;
- **Conversion** – Drying solid biomass, or converting into biogas or bioliquids. This phase can be particularly resource intense, depending on conversion pathway;
- **Distribution** – Getting energy to customers and end-users with new infrastructure often needed;
- **End use** – Ensuring sufficient customers for the final fuel, including infrastructure required for use (stoves, boilers, etc.).

Ensuring the sustainability of the resources can be a challenge, and for bioenergy to be effective at greenhouse gas emissions, all stages of the process can present challenges – sustainability of the biomass feedstock, logistics for collection and distribution (fossil fuel consumption required for transport), overall efficiency of the conversion process. Additionally, there is a need to consider competition for biomass supplies, ensuring that other uses are negatively impacted by bioenergy provision.

One approach for this is the concept of cascading use – ensuring higher grade use of the biomass, with highest economic and social value. This is indicated in the image below, with volume giving an indication of the amount of biomass suitable for each application.

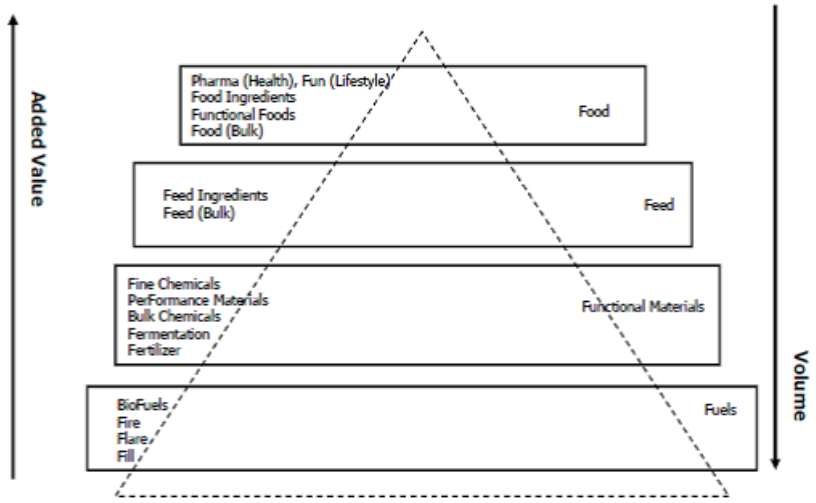


Figure 6 - Cascading use of biomass (Source: AGRIFORVALOR project)

Ensuring the sustainable use of biomass requires new governance structures and initiatives, bringing together new sets of stakeholders, who may not have previously worked together and who require new skills and expertise. In many cases, regions need to work within strict national frameworks, which can limit their room for manoeuvre. In particular, financing the energy transition, particularly at regional level, can be difficult without national, or European, financial support.

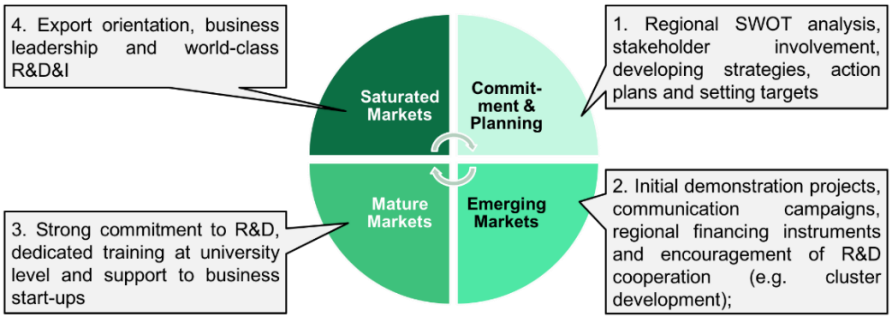
Regional support for bioenergy

Bioenergy, as with all renewables, is also fostered within the EU's broader enabling framework. Under the revised Renewable Energy Directive (RED II), the EU is committed to achieving 32% renewable energy use by 2030. The accompanying Governance Directive also required each EU member state to establish a ten year National Energy and Climate Plan (NECP), with final plans delivered by the end of 2019. These NECPs set out targets and actions for the member states, including planned support instruments for bioenergy development (though some have been advised to revise plans to avoid unsustainable biomass use), indicating a strong future for bioenergy development in Europe. A full assessment of the NECPs is expected by June 2020.

National governments play a vital role in development of renewables, being responsible for establishing feed-in-tariffs, quotas, and renewable obligation certificates, (ROCs) amongst others, which primarily support renewables based on cost alone, not taking account of other benefits such as local employment and synergies. This is the space in which local authorities can act, finding synergies with forestry management, regional development and waste and sewage management, in particular. The type of instrument to be used in a region depends significantly on political competencies open to them, as well as funding availability. Despite these restrictions, regions and municipalities are well placed to support transition, being most aware of local conditions – a region with no bioenergy use will be in a very different starting position to those with a longstanding, independent industry.

Regional development of renewable energies is strongly linked to political and financial support. EurObserv'ER, which monitors renewable energy development in Europe, has investigated policy

support at the regional level and established four phases of renewable development.[9] These phases were further elaborated within the Interreg IVC Capitalisation Exercise on Renewable Energy, to define the following four phases: **commitment and planning** (setting targets and establishing enabling conditions); **emerging markets** (supporting replication and take-up of existing technologies); **mature markets** (support for research and innovation into new technologies and applications); **saturated markets** (supporting export of technologies and expertise).



A region in the **commitment and planning** phase is just beginning to focus on renewable energy development. For bioenergy development, commitment and planning also entails the vital step of calculating biomass availability, which should be done in tandem with the stakeholder mapping and engagement step. Without an awareness of available resources, there is no way to ensure that bioenergy can be provided locally, and may lead to the development of a system that relies on (sometimes unsustainable) imports of biomass. Efforts also need to be made to communicate with the public and potential end-users, to ensure that collected biomass can be used locally.

BIO4ECO
Interreg Europe

GOOD PRACTICE: Territorial biomass supply plan

Territorial biomass supply plans (PATs) are decision support tools to provide data on local timber and biomass supplies, taking account of available forest and logistics data as well as local stakeholder expertise. Input is gathered from regional industry representatives, forest owners, the national forest office, environmental associations and local municipalities. The PAT concept was developed by the French Federation of Forest Municipalities to demonstrate regional biomass availability and the feasibility of development programmes – specifically, the roll-out of wood boilers in rural areas. Since launch, 52 PATs have been developed and have supported the installation of more than 530 wood boilers throughout France.

For more information, visit the BIO4ECO website.

Given that biomass is a local resource, an analysis of the regional market must follow, including a mapping of all relevant stakeholders, and organisation of debates and discussions with them to develop a regional strategy and policy. Regions may also choose to set targets, to ensure mid- to long-term security for investors and project developers. There should also be a process of taking

[9] EurObserv'ER – The State of Renewable Energies in Europe 2011

account of regional policies and policy instruments to determine where changes are needed to ensure that all are pulling in the same direction. This can also involve changing forestry laws, landfill taxes and operational programmes for European funds.

In the **emerging markets** phase, public authorities can lead the way by installing demonstration technologies, or supporting demonstration projects, and implementing awareness raising strategies. Capacity building exercises can bring new skills to the community and is vital for the development of new value chains and industries – these activities need to take place across the entire value chain, from farmers and harvesters, to processors and end-users. Public authorities can in particular use the power of public procurement to create first demonstration projects and early markets by, for instance, planning to install boilers and stoves in public buildings to make use of local biomass supplies or encouraging the construction of a new local district heating network.

GOOD PRACTICE: Local biomass heat network in Yunquera municipality

The town of Yunquera, in the Province of Málaga, has installed a heat network for municipal public buildings, making use of forestry biomass from the local area. The project was initiated by TRAGSA (the state-owned Agricultural Transformation Company) and Yunquera City Council to provide a pilot experience of sustainable forest management and bioenergy use. A biomass boiler was designed and built in the City hall and provides hot water to several public buildings, including two schools, a nursery, a cultural centre and the city hall itself. The boiler replaced five diesel boilers, with a fuel cost saving of 64% and virtually zero CO2 emissions.

For more information, visit the SUPPORT website.

GOOD PRACTICE: Community production of bio-briquettes

The village of Told, in Hungary, has implemented a novel community initiative to help overcome its fuel poverty challenges: the community production of bio-briquettes. Under the leadership of Hungarian NGO, 'The Real Pearl Foundation', the twenty families in the village now enjoy provision of local biomass for heating, sold at 70% of market price for heating fuel. The Real Pearl Foundation has provided education and skill development for participants, to collect biomass wastes from local farms and convert them into bio-briquettes. An initial investment of 2,000 EUR was provided by the foundation for manual production methods, and a second stage investment of 10,000 EUR was made for a machine to enable the biomass to be chopped, dried and made into briquettes with higher energy density. As well as providing heating fuel for the full village, two full-time jobs were created.

For more information, visit the COALESCCE website.

Regions in emerging market phase may also choose to develop clusters or institutions, such as energy agencies or business accelerators, to provide advice and support for value chain development, including regulatory advice. These will often have as an aim the establishment of new companies. Co-operative set-ups are good ways of bringing a number of stakeholders into the process, as are jointly owned initiatives, bringing different farmers and companies to work together. Synergies should also be sought with waste management frameworks, where bioenergy can act as a solution to handle organic wastes,

GOOD PRACTICE: Biomethane from anaerobic digestion of agricultural wastes

The company AgriBioMéthane (ABM) was established in 2014 in Vendée (Pays-de-la-Loire, France) by four farms which were looking to improve nutrient management in the region. The farms set up a biogas plant to convert livestock slurry and agri-food industry waste into biomethane (which is sold into the gas grid), with resulting residues used to replace more than 70 tonnes of chemical fertilisers each year. Other farms in the region are also able to sell their residues to ABM, gaining an income from their wastes. The plant produces around 450,000 normal cubic metres (NM3) of biomethane each year, which is consumed locally by businesses, with a BioNGV (natural gas vehicle) service station foreseen in the next years, for refuelling buses and lorries. As well as the investment of local farmers, the project was also supported by the National Waste and Energy Agency, the Vendée district council and the European Regional Development Fund.

For more information, visit the BIOREGIO website.

GOOD PRACTICE: Utilisation of biowaste streams - bio-based industrial symbiosis

In Päijät-Häme, Finland, the municipal waste and water companies have established a joint venture – LABIO biogas and composting plant – to produce biogas and fertiliser from municipal and industrial biowaste. Organic waste, if not properly managed, can lead to the creation of methane in landfills, contributing to greenhouse gas emissions. The plant benefits from industrial symbiosis, being located in the region's waste treatment centre, with the produced biogas being transported by pipe to an upgrading facility and then distributed via the gas grid. As well as tackling the region's biowaste issues, the practice has created 14 full time jobs and produced a profitable company that generates income from both selling the gas and manure produced via anaerobic generation, but also through 'gate fees' – the cost charged for processing organic waste.

For more information, visit the BIOREGIO website.

Most regions implementing sustainable energy projects will rely on existing and proven technologies, though these always need to be adapted to regional contexts. **Mature Markets** are those regions which are beginning to view renewable energy as an international business opportunity, recognising that they can use their expertise to advise other regions and develop new technologies for export. Mature regions will have a strong commitment to research and innovation, integrating bioenergy into their Smart Specialisation Strategies and developing triple-helix (research, public sector, private sector) clusters. Knowledge institutions will play a key role in the local (and international) market, training highly qualified professionals who can manage complex value chains and develop large scale businesses that require high investments.

GOOD PRACTICE: Sirkkala Energy Park

Sirkkala Energy Park, owned by the Karelia University of Applied Sciences (Finland), is a research, demonstration and educational platform that promotes renewable energy use. It works with enterprises to increase knowledge on energy solutions and support uptake of new energy technologies. The park provides technical solutions for testing and development of new energy solutions, including a CHP unit with real-time monitoring, a combined wood log & pellet boiler, a wood fuel dryer and laboratories. The output of the research centre includes cost structures of renewable energy production and maintenance, demonstrating the business opportunities for bioenergy use. The park also creates synergies between enterprises, education and research to support innovation and knowledge sharing. It was funded through three ERDF co-funded projects, and is a nationally unique centre for hybrid-energy systems that also contribute to national and international research.

For more information, visit the BIO4ECO website.

European support for bioenergy

As well as the REDII, the EU is supporting renewable energy through a number of initiatives. In early 2020, the EU has set out its plan for the European Green Deal, boosting climate ambition, including a proposal to amend the 2030 energy targets. The EGD also presents an aim to mainstream sustainability into all EU policies, including regional and structural policy and research and innovation. More details will be available on all of these aspects through 2020. The EU's long-term targets are supported by a number of initiatives and instruments, as set out below.

The main investment tools of the EU are the **European Structural and Investment Funds** (ESIFs) for promoting regional development and infrastructure development. Under the current ESIFs, Investment Priority 4 ('supporting the shift towards a low-carbon economy in all sectors') can support bioenergy development. Although the current budget period for both the ESIFs and Horizon 2020 are coming to an end, both will be renewed in 2021-2027 with slightly adapted priorities. Regional Development and Cohesion Policy in 2021-2027 will focus on five priorities, with opportunities for bioenergy development in the priority, 'Greener, carbon free Europe'.

A key role is played by rural development policy under the Common Agricultural Policy, which provides support for farm activity diversification via the **European Agricultural Fund for Rural Development** (EAFRD). For this fund, each country develops Regional Development Programmes, which can include projects for renewable energy installations. Additional information on available support can be found via national Farm Advisory Systems, and inspirational projects can be identified via the European Innovation Partnership on Agriculture (EIP-Agri).

To help contribute to technological development and innovation, the EU has adopted the **Sustainable Energy Technologies (SET) Plan** with a 2050 view for limiting climate change to two degrees and reducing greenhouse gas emissions by 80-95%. The SET Plan is accompanied by the SET Information System (SETIS) and the European Technology and Innovation Platform (ETIP) on Bioenergy, and its own Strategic Research and Innovation Agenda.

Horizon 2020 is the EU's research and innovation programme, providing funding to bring new and innovative technologies to market by supporting basic research, and applied research for industrial leadership and tackling societal challenges. This includes the challenge, 'secure, green and efficient energy', where final calls for proposals will close between April and September 2020. The follow-up programme, Horizon Europe (2021-2027) will also provide significant support for sustainable energy development, though the strategic planning is ongoing at the time of writing. Information on projects successfully funded under Horizon 2020 can be found at the CORDIS and INEA websites.

The **Bio-Based Industries Joint Undertaking** (BBI-JU), a public-private-partnership between the EU and the Bio-based Industries Consortium (BIC), co-funded under Horizon 2020, also supports projects for bio-economy projects, focusing on feedstock and new supply chains, biorefineries, and market development. The final BBI-JU calls of the 2014-2020 period are open until 3 September 2020.

The **LIFE Programme** is the EU's funding instrument for environment and climate action, co-financing pilot and demonstration projects that can contribute to EU goals, including the roll-out of renewable energy. LIFE has funded projects to demonstrate new technologies and methodologies to exploit renewable energy sources, including bioenergy projects to replace fossil fuels with sustainable biofuels and bioliquids; biogas projects that demonstrate innovative anaerobic digestion and gasification techniques using waste as a feedstock, and projects for producing high quality pellets from wood residues. The 2020 call for proposals will be open from 2 April 2020.

European Local Energy Assistance (**ELENA**), provided by the European Investment Bank and European Commission, grants technical assistance to renewable energy projects to finance costs related to feasibility and market studies, programme structuring, business plans, energy auditing, financial structuring and preparation of tendering processes and contractual arrangements. Projects can be related to integration of renewables into the built environment, as well as local infrastructure development and renovating, extending or building new district heating networks, including those based on CHP.

InnovFin, also from the European Investment Bank, provides loans, loan guarantees or equity-type financing for innovative energy demonstration projects. Projects should demonstrate the commercial viability of pre-commercial technologies or services, or enhance the competitiveness of manufacturing processes, and be able to demonstrate possible 'bankability'.

Recommendations

As a renewable energy resource, bioenergy provides some unique benefits, being especially suitable for rural regions and by being able to provide intermittent energy. Almost any region can benefit from sustainable use of biomass resources – whether sustainable forestry, residues or wastes – keeping some guidelines in mind:

- **Focus on regional strengths and take a long term view**. Every region has some kind of renewable potential (of course, bioenergy may not be the most cost-competitive in your region, so consider also other renewable technologies).Take stock of local resources, working with stakeholders – the territorial biomass supply plans of France are a good example (p. 8);
- **Engage stakeholders to set a long-term targets**, explaining the socio-economic benefits of bioenergy development. Targets must be accompanied by a clear strategy, developed in co-operation with stakeholders from across the full value chain, with each able to clearly see their own potential benefits;
- **Consider the role of bioenergy in tackling other regional challenges**, such as energy poverty and economic diversification. Bioenergy is the most 'local' renewable – short value chains can keep benefits in the region and support even small, rural communities and towns. The biobriquettes practice from Hungary (p. 10) is an excellent example of bioenergy helping to tackle regional poverty;
- As in Päijät-Häme (p.11), **give a role to anaerobic digestion** as optimum treatment method for separately collected biowaste as your draw up regional or municipal waste management plans in line with the new EU-wide obligations for separate collection of the organic fraction of municipal solid waste;
- **Public procurement is a powerful tool for the roll out of bioenergy**, with the force of the public authority helping to create new value chains. Once these initial chains are created, there are incentives for others to adapt and for the firms along the value chain to continue to expand their activities. See the Yunquera district heating system practice (page 10) for a demonstration of public procurement;
- **Look for synergies between businesses** which can be used to encourage larger scale bioenergy installations. Individual farmers and businesses can achieve more together than apart, so co-operative structures can be encouraged (see our policy brief on community energy initiatives), and new joint companies, as in Vendée (p.11);
- **Help the local community in developing the required skills** – both technical and administrative – for managing new value chains and infrastructure. Investment should not be only in technology, but also capacity building.
- View bioenergy not only as an energy provider, but also as a **business opportunity**. The Sirkkala Energy Park (p.12) not only improves regional energy performance, but also exports expertise, bringing in new regional income;
- **Make use of European financial support to support projects**. With Operational Programmes for 2021-2027 being written now, there is chance to influence spending of ESIFs by contacting your Managing Authority.
- Explore not only proven case studies and good practices, but also the **innovative knowledge and technologies** generated from European research projects, via CORDIS and other available portals.

Sources and further information

- Bioenergy Europe Statistical Report 2019 – Biomass for Heat
- S. Hunkin, K. Krell & A. Severin – Interreg IVC Analysis Report – Renewable Energy (2014)
- S. Hunkin, K. Krell – Policy brief on Renewable Energy Communities (2018)
- EU Energy in Figures – Statistical Pocketbook 2019
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Cover image source: Pixabay

#lowcarbon #bioenergy
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