

Bioenergy News

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IEA Bioenergy
Technology Collaboration Programme

IEA article: What does net-zero emissions by 2050 mean for bioenergy and land use?



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On 18 May 2021 the International Energy Agency (IEA) published a new special report on how the global energy sector can reach net-zero emissions (NZE) by 2050. The full report 'Roadmap to Net Zero by 2050' is available [here](#).

Modern and sustainable forms of bioenergy play an important role in this roadmap. Bioenergy is a versatile renewable energy source that can be used in all sectors, and it can often make use of existing transmission and distribution systems and end-user equipment.

But there are constraints on expanding the supply of bioenergy, and possible trade-offs need to be made. IEA cooperated with the International Institute for Applied Systems Analysis (IIASA) to provide insights on bioenergy's supply, land use and net emissions.

Bioenergy supply

In the modelling, IEA aimed to ensure that the peak level of total primary bioenergy demand – including losses from the conversion of biomass into useful fuels – falls within the lowest estimates of global sustainable bioenergy potential in 2050, namely around 100 exajoules (EJ) per year.

60% of the global bioenergy supply in 2050 comes from sustainable waste streams that do not require dedicated land use. This includes agriculture residues, food processing residues, organic industrial and municipal waste, and residues from wood processing and forest harvesting.

The remaining 40 EJ requires land use. This includes 3 EJ from conventional energy crops; 25 EJ from short rotation cellulosic crops; and 10 EJ from sustainably managed forestry plantations

outside existing forestry land & agroforestry systems. Total land use for bioenergy crops would rise to 140 Mha in 2050. Of this, 70 Mha are on marginal lands or pastures, and 70 Mha are on cropland, an area the same as today's use of cropland for bioenergy production. Total land use for bioenergy in the NZE Scenario is below estimated ranges of potential land availability that take full account of sustainability constraints.

Bioenergy demand

Of the total global bioenergy demand in 2050, around 60% is solid bioenergy, almost 30% is liquid biofuels (including energy use for their production), and over 10% is biogases. Demand is concentrated in sectors that are either hard to electrify, or require a low-cost dispatchable source of renewable energy.

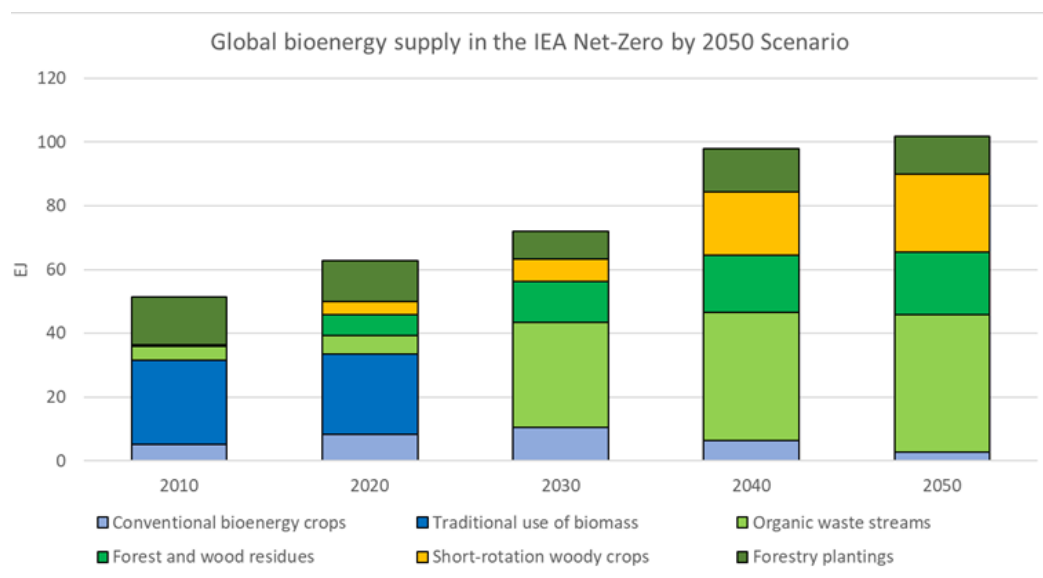


Figure 1: IEA All Rights Reserved

Traditional use of solid biomass for cooking will be completely phased out as it is inefficient, high polluting and often linked to deforestation.

Solid biomass provides only 5% of total **electricity** generation in 2050, but it is an important source of low-emissions flexibility to complement variable generation from solar PV and wind (which will be the dominant electricity production).

In **industry**, solid biomass is used to meet high temperature heat needs that cannot be easily electrified such as paper and cement production.

In the **buildings** sector, solid biomass is mostly used in emerging economies for improved cookstoves that replace unsustainable traditional uses of biomass.

Biogas provides a source of local renewable energy and clean cooking and also plays an important role in waste management. 60% of the produced biogas is expected to be converted to biomethane that is blended in gas networks. From there it will be used in industry, buildings and transport sectors.

Liquid biofuel consumption will grow more than threefold by 2030, mainly for use in heavy duty trucks. As electricity increasingly dominates road transport, the use of advanced liquid biofuels shifts to areas that are harder to electrify, such as shipping and aviation.

Bioenergy with carbon capture and storage (BECCS) plays a critical role in the NZE Scenario

by offsetting emissions from sectors where full decarbonisation is extremely difficult to achieve. In 2050, around 10% of total bioenergy is used in facilities equipped with carbon capture, utilisation and storage, and around 1.3 billion tonnes of CO₂ is captured using BECCS. Around 45% of this CO₂ is captured in biofuels production, 40% in the electricity sector, and the rest in heavy industry, notably cement production.

The full article is available [here](#).

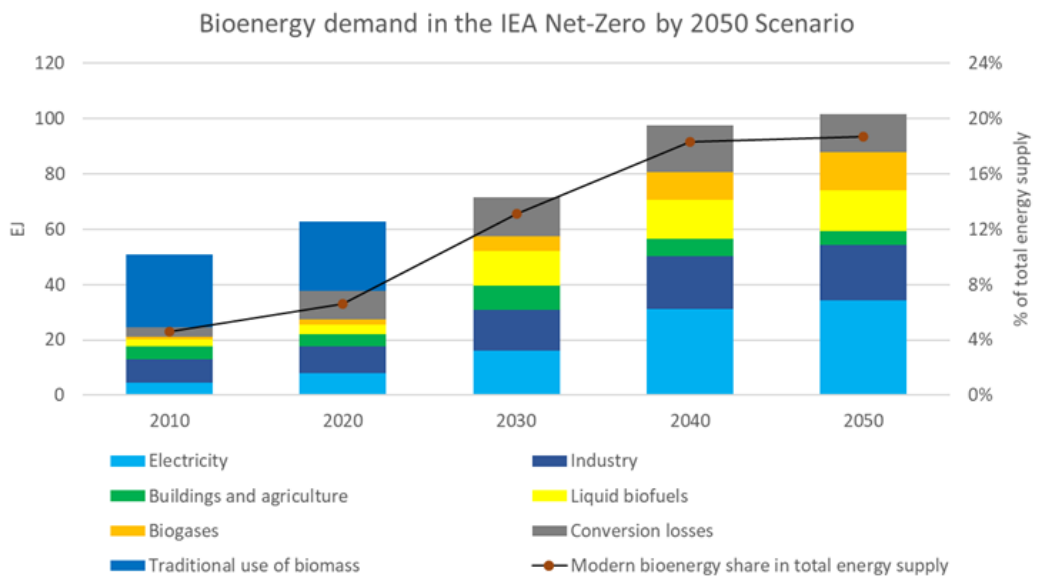


Figure 2. IEA All Rights Reserved



From the Secretariat



Pearse Buckley
ExCo Secretary

ExCo87, Virtual Meeting

With the continuing challenges posed by COVID-19, the IEA Bioenergy ExCo87 meeting was held as a Virtual Meeting in three separate sessions on 18-19 May 2021 with Paul Bennett as Chair, Dina Bacovsky and Sandra Hermle as Vice-chairs and Pearse Buckley as Secretary.

Changes to Executive Committee

A new Member for Brazil was Dr Pietro Adamo Sampaio Mendes: a new Alternate Member for Canada was Dr Daniel Mazerolle: a new Member for Croatia was Mr Andro Bacan: a new Member for the European Commission was Ms Maria Georgiadou: a new Alternate Member for the European Commission was Mr Eric Fee: a new Member for Finland was Mr Jussi Mäkelä: a new Alternate Member for India was Shri Kapil Verma: a new Alternate Member for New Zealand was Dr Florian Graichen.

ExCo87 Internal Workshop

A very successful internal online workshop themed 'Planning for the new triennium' was held on the 5th May in two sessions. Following the opening by the Chair, Paolo Frankl from IEA Headquarters gave an overview of IEA Key Areas of Interest for the information of the ExCo and Task Leaders. The discussion covered enhanced collaboration with IEA Headquarters and across TCPs. Detailed proposals for programmes of work for the triennium 2022-2024 were presented by Task Leaders for consideration by ExCo. New strategic projects as well as expansion of existing strategic projects were presented for consideration. The new triennium Tasks' proposals and the strategic projects would be further refined over the coming months and final proposals would be presented to ExCo88 in October 2021 for final decisions on participation by ExCo.

Progress with Current Initiatives

Inter-Task Project – The Role of Bioenergy in a WB2/SDG World

Following the first workshop held in November 2019, two additional workshops have taken place both as virtual events. The presentations from the Forests and the Climate Workshop held on 13-14 May 2020 can be downloaded [here](#). The workshop on Woody Biomass and Climate held on 15 April 2021 was organised together with the European Forest Institute and The Royal Swedish Academy of Agriculture and Forestry and a report with presentations would be made publicly available in the near future. A number of project publications would be issued and a final dissemination event would be held in the 3rd / 4th quarter of 2021.

Inter-Task Project – Bioenergy for High Temperature Heat in Industry

All case studies are finalised and available [here](#). The policy synthesis report is in preparation. It will provide information on market opportunities/potential and effective ways to address technical and non-technical barriers to implement bioenergy based process heat. This report will build upon the lessons learned in the case studies, but it will also provide a more generic analysis of the market potential, and how its implementation can be supported. The project will be completed in the 3rd quarter of 2021.

Inter-Task Project– Renewable Gas– Deployment, Markets and Sustainable Trade

This project aims to provide state-of-the-art overviews on prospects, opportunities and challenges for mechanisms that could help deploying biogas, biomethane and other renewable gases (RG) in IEA energy markets, and beyond. It will discuss technological and sustainability issues of RG from a deployment perspective to derive recommendations for policymakers. Good progress has been made and a synopsis of the responses from the countries involved was being prepared for presentation at a workshop in June 2021. A final synthesis report would be published by the end of 2021.

Task 41 Project II– Renewable Gas– Hydrogen in the Grid

This project aims to identify and discuss numerous challenges and hurdles for gradually replacing natural gas by renewable gas, with the emphasis on H₂ injection into existing gas grids and on new dedicated H₂ grids. The work involves collecting existing data, performance indicators and information on renewable gas studies and projects, and analysing national strategies. COVID-19 impacts have resulted in some delay and the project is expected to be completed in October 2021.

Inter-Task Project– Deployment of BECCUS Value Chains

The objective of this inter-task project is to analyse technological, political and economic aspects related to near-to-medium term deployment of systems used for capture and utilisation or storage of biogenic CO₂. The project outputs can be divided into two categories: a) case studies and b) system studies, where the case studies are brief but focused analyses of conditions in a specific sector whereas the system studies analyse issues that cut across sectors. Three of the five case studies have been published [here](#). The project will be completed in the 4th quarter of 2021 with a synthesis report.

Inter-Task Project– Lessons Learned – Biofuels

This Inter-Task project aims to evaluate the technical, economic, societal and political reasons underlying the past and ongoing booms and busts cycles of biofuel technologies development, demonstration, deployment and replication in order to identify technology successes and the best policy framework conditions and measures for stimulating increased future markets for production and consumption of sustainable transport biofuels. Two workshops have been held to date and an external workshop is planned for September 2021, most likely in hybrid format. A final report will be produced in October 2021.

Communication Strategy

The Communications Team has continued with regular online meetings to oversee communications' activities and review progress with ETA Florence. Five IEA Bioenergy webinars have been presented since ExCo86 and these can be viewed along with all previous webinars [here](#). A further five webinars have been planned to take place before year end. The social media statistics showed increased numbers of followers on both Twitter and LinkedIn and the website statistics displayed an increasing positive trend with weekday daily users in the range of 200-600. The process of extending the new IEA Bioenergy branding to the Tasks' websites was underway with three (Task 34, Task 44 and Task 45) completed by the end of May 2021.

Collaboration with other International Organizations

Collaboration with the IEA, other IEA TCPs and International Organisations has continued, in spite of the challenges posed by the COVID-19 pandemic. The collaboration with the Advanced Motor Fuels (AMF) TCP on the 'Transport Decarbonisation' Annex (IEA Bioenergy Task 41 Project 10) had been completed with the publication of the [final report](#). Other opportunities that were being explored included an AMF Annex on 'Sustainable Aviation Fuels (SAF) and an Annex on 'E-Fuels'. Active exchanges were ongoing with the Global Bioenergy Partnership (GBEP) particularly through Task 40 and Task 45 and with the International Renewable Energy Agency (IRENA). IEA Bioenergy was developing its collaboration with the Biofuture Platform including support of the Biofuture Initiative within the Clean Energy Ministerial. Mission Innovation also had a number of initiatives which would be examined by IEA Bioenergy as opportunities for collaboration. Further information:

Task Focus:

IEA Bioenergy Task 43 – Sustainable biomass supply integration for bioenergy within the broader bioeconomy

How Investments in biomass supply chains could contribute to the post-COVID-19 recovery?

In March 2020, an IEA Bioenergy Task 43 team started research to investigate how biomass supply chains could contribute to the post-COVID-19 recovery, without assuming the impact or the length of the pandemic. The team was led by Biljana Kulisic, agroeconomist, Energy Institute Hrvoje Pozar (EIHP), Croatia and strongly supported by an interdisciplinary social scientist, Heather MacDonald, Natural Resources Canada (NRCAN). The research team¹ had a much needed interdisciplinary and multidisciplinary profile to address the topic, covering 3 continents: Australia, North America, and Europe.

The aim of the research was to provide evidence-based advice, supported by expert opinion, that would aid policy framing related to biomass supply chains in a recovery programme and beyond.

The research continued the IEA Sustainable Recovery² World Energy Outlook Special Report, published in June 2020 in a response to calls from governments from around the world. The Report was looking into the actions that could be taken in the next three years, advocating that the pandemic gave to the governments a “once-in-a-lifetime opportunity to reboot their economies and bring a wave of new employment opportunities while accelerating the shift to a more resilient and cleaner energy future” (Dr. Faith Birol, IEA Executive Director). The Report was produced in co-operation with the International Monetary Fund (IMF) and looked at six key sectors (electricity, transport, industry, buildings, fuels and emerging low-carbon technologies), taking into account national and international objectives for long-term growth, jobs and sustainable development goals. As such, the Sustainable Recovery Plan focused on three main goals:

- boosting economic growth,
- creating jobs and
- building more resilient and cleaner energy systems.

The IEA Bioenergy Task 43 research adds to the Report by investigating how investments in biomass supply chains can contribute to the post-COVID-19 recovery in terms of affecting

those three goals in four possible futures (scenarios) that would occur in the short- (by 2023) and long- (by 2030) term.

The IEA Sustainable Recovery Report timeframe defined the first, short-term future time reference and the international policy milestones, such as the Agenda 2030, gave the long term time frame in the biomass supply chain related research.

Scenario planning for a post-COVID-19 world by Prof. M.R. Wade³ was among the first available research on how the pandemic could influence government policies, published on the OECD website in May 2020. The possible future scenarios were made as a combination of three factors:

1. How long would it take to have the virus under control: virus longevity (short vs. long term)?
2. How would people’s views of social, economic, and political boundaries be impacted by the virus: global mindset (global acceptance vs. global rejection)? and
3. How would people react to the wave of innovation and adoption of new digital technologies: digital adoption (digital acceleration vs. digital skepticism)?

The combination of these three factors provided the four scenarios where the contributions of the investments in biomass supply chains for bioenergy in the broader bioeconomy on economic growth, jobs and having more resilient and cleaner energy systems were investigated.

The future scenarios are:

1. Global Marketplace: short-term virus longevity; global acceptance; digital acceleration
2. Back to Basics: long-term virus longevity; global rejection; digital scepticism
3. Digital Reset: long-term virus longevity; global acceptance; digital scepticism
4. Walled Gardens: short-term virus longevity; global rejection; digital acceleration

Global Marketplace is the scenario that is the closest to the economic set-up before the pandemic breakout.

Study design was adapted to capture the development of the pandemic

The study design started with a SWOT analysis on the contribution of biomass supply chains to the economy, jobs and resilience in the absence of the pandemic (similar to the Global Marketplace scenario), from the supply and demand side. The SWOT analysis was the basis for developing a questionnaire for a foresight exercise on the possible effect of investments in biomass supply chains. The term “investment” covers a wide range of investments needed - from the investments in equipment and infrastructure to investments in R&D, know-how and education, soft loans and other types of market supports to facilitate a policy since any market intervention is coupled with a cost.

New confirmed cases, by date of report (n = 148,329,348)

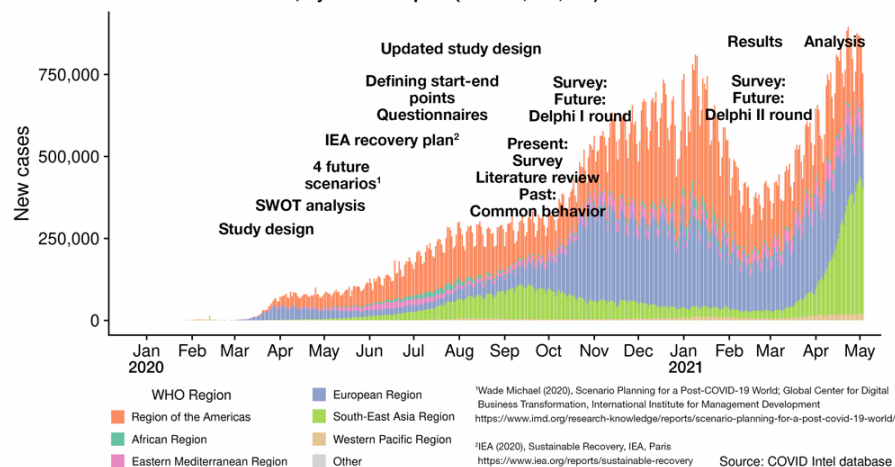


Figure 3. Timeline of pandemic and research activities (source: COVID Intel, WHO; accessed on May 30, 2021, and authors' contributions)

¹ Mark Brown, Task lead IEA Bioenergy Task 43; Deputy Director Forest Research Institute, USC, Australia; Bruno Gagnon (NRCAN, Canada), Joerg Schweinle (Thünen Institute, Germany), Ioannis Dimitriou (SLU, Sweden) and Jurica Simurina (Faculty of Economics and Business, University of Zagreb, Croatia)

² IEA (2020), Sustainable Recovery, IEA, Paris- Available at: <https://www.iea.org/reports/sustainable-recovery>

³ Wade Michael (2020), Scenario Planning for a Post-COVID-19 World; Global Center for Digital Business Transformation, International Institute for Management Development <https://www.imd.org/research-knowledge/reports/scenario-planning-for-a-post-covid-19-world/>

The original study design, focused on a 2-round Delphi study, was redesigned in quarter 3 of 2020 when it became evident that COVID-19 would continue to shape our lives and limited the options and decisions we made. In the absence of hard facts about the future, and time series to provide a statistical evidence base on the current impact of pandemics on the biomass supply chains, both ends of the Delphi study were unknown, not only the future. For that, a worldwide survey was sent out to detect behaviour of biomass supply chains in pandemics by asking the network of bioenergy experts to report if there were any disturbances in biomass supply and demand in their countries. The study design allowed building conclusions on different research streams (past, present and future).

In the research, the consensus of the expert opinion was considered as a compass to point towards a general direction of the investment, with a consensus range provided descriptively by a five-point Likert scale [e.g., definitively yes (5), probably (4), possibly (3), probably not (2), definitively not (1)] for each question.

Only one question in the survey was related to the geographical origin of the expert, asking if the current national bioenergy policies were sufficient to deal with pandemic. The experts clearly sent the message by forming a consensus:

- Under "Global Marketplace" scenario: yes (moderately sufficient to quite sufficient)
- Under more challenging future scenarios: to be improved (insufficient to sufficient)

An ideal portfolio for investments in biomass supply chains to contribute to the post-COVID-19 recovery

The experts' opinion indicates that the strongest impact from investment in biomass supply chains would be in economic growth, followed by contribution to the resilient and cleaner energy systems and job creation. Contribution to jobs from investments in biomass supply chains would be the least affected dimension of the post-COVID-19 recovery and expected only in the long term timeframe. Although bioenergy generates more jobs than the other renewable energy sources, especially in the part of biomass supply, this is not the greatest contribution that investments in biomass supply would generate. Experts anticipate stronger impacts from investments in biomass supply chains in economic growth and resilience of energy systems. On the other side, increased bioenergy demand contributes to the increased resilience of the energy system, given its local availability as a renewable biofuel.

Investments that experts have flagged with the most impact to the recovery are investments that improve biomass material efficiency and circularity, in particular from forestry and agriculture biomass short-supply chains, in the longer time frame, including dedicated crops:

- Investments in small scale, decentralised bioenergy facilities, coupled with substitution of fossil fuel use, fit for a local supply chain;
- Investment programs for preferred bioenergy technologies coupled with targeted biomass supply chains;
- Investments in biomass logistic-distribution centres (bio-hubs);

- Investments in upgrading the existing agricultural collection and processing centres (e.g. flour mills, oil mills, vineries, dry fruits and nuts...) into bio-hubs.

Similar to the IEA Recovery Report, this research provides advice on what governments can do and what would be the probable effects if certain investments in biomass supply chains are made.

The research team would like to thank the 23 anonymous bioenergy and bioeconomy experts from three continents that have recorded their opinions and made this research possible.

This article was prepared by Biljana Kulišić of Task 43.

For more information please visit: <https://task43.ieabioenergy.com>



Figure 4: Geographical coverage of the study was focused on countries with a modern bioenergy use

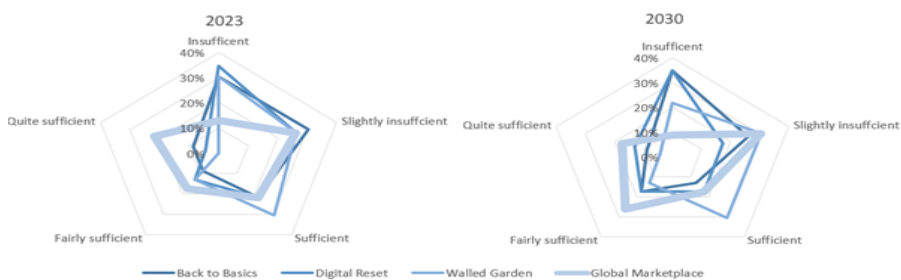


Figure 5: Expert opinion if the current bioenergy policies are sufficient to deal with pandemic under the four future scenarios

Notice board

Task 32 Biomass Combustion

Task 32 held a webinar titled Residential Wood Combustion – Towards Low Emission Systems to present the most recent findings from ongoing work within Task 32 on design guidelines for wood stoves and real-life test methods. Presentations and recording are available [here](#).

Task 33 Gasification of Biomass and Waste

On the 24th of February 2021, Task 33 organized a webinar with the title: "Gasification: A crucial technology for the energy transition. A global perspective". This webinar showed nicely the different developments ongoing globally related to gasification, covering India, China, Europa and the United States of America. The webinar was well attended and can be viewed online [here](#). The presentation can be found online as well [here](#).

The Task published a report on emerging gasification technologies and how to evaluate technology, of which little is known. The report provides a nice methodology to perform this evaluation and it also gives a nice overview of about 10 emerging technologies world-wide. The report can be downloaded via the following [link](#).

Task 36 Material and Energy valorisation of waste in a Circular Economy

During 2021, Task 36 will publish a case study compilation exploring lessons learned on material and energy valorisation of waste. The set of cases will cover social and public acceptance aspects, barriers in Waste-to-Energy (WtE) implementation, success stories for decentralized solutions and integration of WtE within material and nutrient recovery, among others. The purpose of these case studies is to showcase examples from which countries can get inspiration and support in implementing suitable policies and solutions in the waste/resource management and WtE sector that would facilitate their transition towards circularity. The first case study of this series "Waste-to-Energy and Social Acceptance: Copenhill WtE plant in Copenhagen" was published in May and it is available [here](#).

On the 10th of June, a webinar in which IEA Bioenergy Task 36 members participated on "Transitioning towards a decarbonised circular economy: Focus on Waste to Energy" was held within the SABIA NATIONAL BIOGAS CONFERENCE 2021 (online from South Africa). Task 36 was represented by Daniel Roberts (CSIRO, Australia) who presented the Australian experience in the development of the "Hydrogen Economy" and on the application of next generation Waste to Energy technologies. Beau Hoffman (Dept. of Energy, USA) detailed the lessons learned by the USA Government in developing the USA Waste to Energy Roadmap, and stressed the importance of good stakeholder engagement in ensuring the success of the roadmap. The Task Leader of Task 36, Inge Johansson (RISE, Sweden) spoke about



the effectiveness of incentives' schemes for the successful application of bioenergy from waste in Sweden and the European Union. Cristina Trois (UKZN, South Africa) presented the key elements of the Waste to Energy roadmap that she is developing for the South African Department of Minerals, Resources and Energy. Click [here](#) for a short summary of the webinar and access to the presentations. A workshop report will be published in August 2021.

Task 39 Commercialising Conventional and Advanced transport Biofuels from Biomass and Other Renewable Feedstocks

Task 39 contributions to the Biofuture Summit II / BBEST2021 Virtual Conference (24–26 May 2021)
Task 39 continues to actively organize and participate in virtual webinars and conferences with the goal of sharing the networks insights on how decarbonization of the transport sector can contribute to a "green economic recovery". On 23–24 May 2021, Glaucia Mendes Souza, Brazil's representative to Task 39 and her colleagues, Luiz Augusto Horta Nogueira and Renato Godinho co-chaired [The Biofuture Summit II / BBEST2021 Virtual Conference](#). The conference was organized by the Brazilian Ministry of Foreign Affairs via the Biofuture Platform, the Bioenergy Research Program, (BIOEN) of the State of São Paulo Science Research Foundation (FAPESP), with support from the APEX-Brazil trade promotion agency and the International Energy Agency (IEA), as well as several other partners. The opening session, the wrap-up final session, closing ceremony and the four major keynotes are publicly available [through YouTube](#). More than 640 attendees and 212 speakers from 40 countries participated in the event.

The IEA Bioenergy Task 39 session within the meeting was entitled, "the commercialization

of biofuels". Topics included, (1) Co-processing as a way of making lower carbon intensive fuels such as more sustainable aviation fuels (SAF); (2) Further CO₂ reductions when making corn-derived-ethanol; (3) Comparison and harmonization of the LCA models used to measure the carbon intensity of biofuels; (4) Comparison of electrification, improvements in efficiency and use of biofuels in the transport sector, and (5) Overview of the power-to-gas options. The session is available through Whova, on the YouTube BBEST-Biofuture open channel.

Task 40 - Deployment of biobased value chains

Our Task 40 [newsletter](#) was published in February 2021 with topics on a new [intertask](#) (Assess Successes and Lessons Learned for Conventional / Advanced Biofuels Deployment) and a new [internal project](#) (Circular Bioeconomy Synergies), a well-attended [webinar](#) and other Task activities.

As [one of three contributions](#) to the intertask project "Deployment of bio-CCUS value chains", a case study on bio-CHP was published in May 2021. The case studies provide deeper insights into the key aspects relevant for companies that are in the process of establishing value chains for the capture, transport and sequestration or use of biogenic CO₂. [The Task 40 study](#) presents the HOFOR Amager CHP plant in Copenhagen, Denmark, in more detail. Although HOFOR is still in the early stages of exploring its Bio-CCUS project, the company is confident that the technological challenges related to the deployment of the CO₂ capture component of the value chain can be overcome, but there are still more questions. For example, what are the ways to generate revenue to cover the additional investment and operating costs of the CO₂ capture system, where policy incentives related to the Danish national climate change targets could also come into play.



Task 42 Biorefining in a Circular Economy

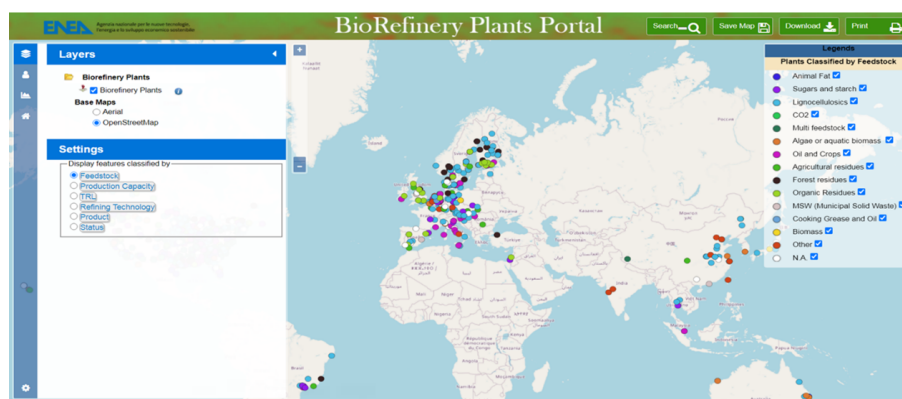
Progress on new deliverables of Task 42 'Biorefining in the circular economy'
In this third year of the current triennium several new Task 42 results are nearing their completion date. Firstly the report 'Sustainable lignin valorization' is in the stage of final review, and will most likely be published in September 2021. The report will provide information on lignin, one of the important platforms of many biorefineries. It contains i) lignin descriptions and current global interest, ii) a mapping and description of international networks and projects on lignin, iii) lignin derived products, and iv) a techno-economic assessment of lignin valorization to target products. This work was done in cooperation with the LignoCOST network.

Another upcoming publication that will be ready by the end of November is the 'Global biorefinery status report 2021'. It aims to give an overview of recent biorefinery developments. It will contain i) a description of the recently updated biorefinery classification method ii) an analysis of the deployment status of biorefineries, iii) major technical and non-technical deployment barriers & potential solutions, success stories and best practices and finally iv) key examples of Biorefineries in the Task 42 countries. A summary of the results will be presented at the End-of-Triennium Conference.

Furthermore, Task 42 is finalizing a database on biorefineries that can be accessed through a Biorefinery Plants Portal. This will be launched in the 3rd quarter of 2021 on our website. A draft interface of the portal is shown in the illustration.

Follow the publications of Task 42 [here](#).

Illustration:



Task 44 Flexible Bioenergy and System Integration

Report on Expectation and implementation of flexible bioenergy in different countries

Task 44 released a [report](#) *Expectation and implementation of flexible bioenergy in different countries* in March 2021. The report gives an overview on the status and the potential of flexible bioenergy in eleven OECD countries (Australia, Austria, Denmark, Finland, Germany, Ireland, Italy, Netherlands, Sweden, Switzerland and the United

States of America) to see different approaches for flexible bioenergy, and summarizes drivers and barriers. The report describes the role of bioenergy in the power, heating and cooling, and transport sectors, followed by an outline of the transition towards renewables and the related status of flexible bioenergy regarding policy framework, obstacles and bottlenecks, as well as the incentives. As a conclusion, technological barriers are not seen to be a major challenge, but an economically feasible integration of the technologies in the overall energy system. Coherent policy support to integrate flexible bioenergy in the energy system is considered as necessary. To unlock the potential benefits, the report proposes a stronger link between flexible bioenergy and other options for flexibility, such as demand side management, energy storage, power-to-X and also green hydrogen. Additionally, it came out that the framework conditions for flexibility depend on many country specific factors, and describing and promoting best cases serves as an additional important aspect of acceleration of implementation.

Webinar on Flexible bioenergy in renewable energy systems

Task 44 held a webinar titled Flexible bioenergy in renewable energy systems to present recent findings of the Task, which aims at creating a clearer picture on the role of bioenergy as a flexible resource. Bioenergy can play multiple roles in the energy system with growing shares of variable renewable energy (VRE), both during the transition phase and in the long-term. Flexible bioenergy concepts have potential to provide low-carbon dispatchable resources in terms of long-term storage, peak demand/back-up and demand response. However, the flexibility of bioenergy as well as attractive business cases motivating flexibility provision need to be developed. In addition to understanding the technical maturity, market status and R&D

needs of different concepts, it is also important to identify the framework conditions affecting the prioritization of the different solutions. The webinar presented the findings on technical options for providing flexibility from bioenergy and framework conditions and expectations in different countries. Presentations and recording are available at [IEA Bioenergy website](#).

Task 45 Climate and Sustainability Effects of Bioenergy within the broader Bioeconomy

On April 15, Task 45 organized a virtual workshop on woody biomass and climate, in collaboration with the European Forest Institute and the Swedish Royal Academy of Agriculture and Forestry. About 40 participants discussed the roles of forests, forestry and forest-based bioenergy in the transition towards the Paris climate target. The report "The use of woody biomass for energy production in the EU" (<https://publications.jrc.ec.europa.eu/repository/handle/JRC122719>) was first presented by the authors, affiliated with EC-Joint Research Center (JRC). The subsequent discussions was further supported by presentations focusing on key issues: Bioenergy and the EU LULUCF regulation (Robert Matthews, UK Forest Research), Climate smart forestry and ways to avoid the "lose-lose options" (Gert-Jan Nabuurs, WUR), Forest-based sector responses to changes in demand for bioenergy and other forest products - consequences for forest carbon balances? (Brent Sohngen, Ohio State University), and Southern forest markets: pellets and forest carbon (Bob Abt, NC State University).

Applying a science-based systems perspective to dispel misconceptions about climate effects of forest bioenergy

The scientific literature contains contrasting findings about the climate effects of forest bioenergy, partly due to the wide diversity of bioenergy systems, but also due to differences in assessment methods. An open-access article was recently published in the Journal GCB Bioenergy, applying a science-based systems perspective to dispel misconceptions about climate effects of forest bioenergy. The paper was produced by 28 scientists with expertise in forestry, climate and energy, coordinated by IEA Bioenergy Technology Collaboration Programme Task 45 'Climate and Sustainability Effects of Bioenergy within the broader Bioeconomy'.

The paper examines debated aspects related to climate impacts of forest bioenergy, in applications including heat production, electricity generation and transport. It identifies factors that are relevant to understanding the climate effects of forest bioenergy, and misconceptions that can lead to conclusions that exaggerate or underestimate the effects. The objective is to reduce confusion arising from publication of diverging studies on forest bioenergy, to inform policy development, business decisions and the public debate on bioenergy.

[Available open access.](#)

IEA Bioenergy Webinar Series

The IEA Bioenergy Webinar Series is continuing with 34 completed. All of the webinars, including recording and presentation slide-deck, can be viewed [here](#).

Publications

Applying A Science-Based Systems Perspective to Dispel Misconceptions about Climate Effects of Forest Bioenergy

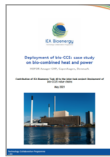
This open-access article, recently published in the Journal GCB Bioenergy, examines debated aspects related to climate impacts of forest bioenergy, in applications including heat production, electricity generation and transport.



[Read more](#)

Deployment of Bio-CCS: Case Studies

The IEA Bioenergy project "Deployment of Bio-CCS/CCU Value Chains" strives to provide insights about the opportunities and challenges pertaining to taking Bio-CCS/CCU from pilots to full-scale projects.



[Read more](#)

Wood Pellets and Sustainable Development Goals – Southeast United States Supply Chain Case Study

This paper, produced within the frame of IEA Bioenergy Task 43 (Biomass Supply), evaluates the effects of pellet production and the supply chain on selected Sustainable Development Goals using industry information, available energy consumption data, and published research findings.



[Read more](#)

IEA Bioenergy Annual Report 2020

The IEA Bioenergy Annual Report 2020 includes a special feature article 'Technical, ecological and economic assessment of biorefinery cases' prepared by Task 42. The Annual Report also includes a report from the Executive Committee and a detailed progress report on each of the Tasks.<https://>



[Read more](#)

Conceptual Framework for Increasing Legitimacy and Trust of Sustainability Governance

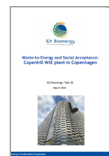
This article develops conceptual tools to improve the understanding of legitimacy crises, as well as the barriers and facilitating factors that allow sustainability governance to play a role in the transitioning to profoundly more sustainable societies. Bioenergy is used throughout the paper as an example to aid contextually in understanding the theoretical and abstract arguments.



[Read more](#)

Waste-to-Energy and Social Acceptance: Copenhill WtE Plant in Copenhagen

This report describes technical and economic aspects of the Copenhill plant, and how the owners of Copenhill and the residents in the city of Copenhagen found a way to share a common area, contributing to a more sustainable city while being a profitable business case.



[Read more](#)

Expectation and Implementation of Flexible Bioenergy in Different Countries

This report, produced by IEA Bioenergy Task 44 (Flexible Bioenergy and System Integration), gives an overview of the status, approaches and expectations of flexible bioenergy in 11 different countries, thereby also considering drivers and barriers.



[Read more](#)

Emerging Gasification Technologies for Waste & Biomass

This report, developed by IEA Bioenergy Task 33, provides a closer examination of a number of emerging gasification technologies, i.e. technologies that are novel or have different characteristics than state-of-the-art gasification technologies.



[Read more](#)

Campaigns Questioning the Use of Woody Biomass for Energy are Missing Key Facts

There are concurrent media campaigns and publications questioning the use of woody biomass for renewable energy production. Several of them misrepresent on-the-ground forestry practise and bioenergy systems, and associate the use of woody biomass for energy with overexploitation of forests, even permanent deforestation, and "the burning of trees".



[Read more](#)

Round Robin Results of Biomass Liquefaction Oils

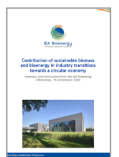
In the frame of IEA Bioenergy Task 34, a round robin study was performed to evaluate the analysis of biomass liquefaction oils from fast pyrolysis and hydrothermal liquefaction, receiving data from 14 laboratories in 7 countries in order to assess the current status of analytical techniques for the determination of nitrogen, sulphur, and chlorine content in biomass liquefaction oils and to evaluate potential differences in origin.



[Read more](#)

Exco86 Workshop: Contribution of Sustainable Biomass and Bioenergy in Industry Transitions towards a Circular Economy – Summary and Conclusions

This publication provides the summary and conclusions from the eWorkshop 'Contribution of sustainable biomass and bioenergy in industry transitions towards a circular economy' held in conjunction with the Virtual meeting of the Executive Committee of IEA Bioenergy on 19–20 October 2020.



[Read more](#)

IEA Bioenergy Events

Executive Committee

ExCo88 will be held online in three 2-hour sessions on 11 / 13 / 14 October 2021

Task Events

Due to COVID-19 travel restrictions Tasks currently hold online meetings on a regular basis. Physical meetings will be considered when circumstances permit.

IEA Bioenergy Conference 2021

Bioenergy – A Critical Part of the Path to Carbon Neutrality,

Online, 29 November – 9 December 2021.

The conference will be held as a series of online sessions spread over two weeks between 29 November and 9 December 2021. The central theme will be the role of biomass in the transition towards a carbon neutral society. There will be topical days (with two sessions per day) on feedstock mobilization / sustainability governance; transport biofuels; green gas; circular bioeconomy and industry; and biomass in the energy system. Three high level panels, including leading experts from international organisations and major industrial players, will be interspersed among the technical sessions and will examine (i) Implications of COP26 for future bioenergy & bioeconomy, (ii) Long term markets for biomass and biofuels and (iii) How can biomass/ bioenergy aid the transformation towards carbon neutrality and what actions are needed.

[Further information](#)

Webinars

Sustainable Aviation Fuel/Biojet Technologies – Commercialisation Status, Opportunities and Challenges

13 July 2021 at 4.30 p.m. CEST/ 3:30 p.m. BST/ 10:30 a.m. EDT

Additional webinars are scheduled on Hydrogen and Renewable gas (September 2021) and Sustainable Lignin Valorisation (October 2021). Exact dates and titles will be announced in due course.

Other Events

Refer to <https://www.ieabioenergy.com/iea-bio-energy-task-events/other/>

Other Items

Expo Biogaz

1-2 September 2021, Location: Metz (FR)

[website](#)

Svebio Fuel Market Day

7 September 2021, Location: Online

[website](#)

Biogas Power On 2021

15-16 September 2021, Location: Copenhagen (DK)

[website](#)

Regatec 2020

20-21 September 2021, Location: Weimar, (DE)

[website](#)

Expobiomassa 2021

21-23 September 2021, Location: Valladolid (ES)

[website](#)

Advanced Biofuels Conference 2021

21-23 September 2021, Location: Online

[website](#)

Progress in Biogas V

22-24 September 2021, Location: Online

[website](#)

2021 Algae Biomass Summit

28 September – 27 October 2021, Location: Online

[website](#)

All Energy 2021

4-8 October 2021, Location: Online

[website](#)

Future of Biofuels 2021

5-6 October 2021, Location: Copenhagen, (DE)

[website](#)

Biofuels International Conference & Expo

19-20 October 2021, Location: Brussels, (BE)

[website](#)

International Biomass Congress & Expo

19-20 October 2021, Location: Brussels, (BE)

[website](#)

International Biogas Congress & Expo

19-20 October 2021, Location: Brussels, (BE)

[website](#)

ABLC 2021

27-29 October 2021, Location: San Francisco, (USA)

[website](#)

COP26 (26th UN Climate Change Conference of the Parties)

31 October-12 November 2021, Location: Glasgow, (UK)

[website](#)

Wastecon 2021

1 November 2021, Location: Orlando, FL, (USA)

[website](#)

Future of Biogas Europe

24-25 November 2021, Location: Berlin, (DE)

[website](#)

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