



IEA Bioenergy
Technology Collaboration Programme

Task 43

Sustainable Biomass Supply Integration for Bioenergy within the Broader Bioeconomy

Final Task Report
Triennium 2019-2021





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Sustainable Biomass Supply Integration for Bioenergy within the Broader Bioeconomy

Final Task Report
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Participating countries:
Australia, Belgium, Canada, Croatia, Finland, Germany,
Sweden, and the United States of America

Website:
<https://task43.ieabioenergy.com/>

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INTRODUCTION

The Task has explored technical and economic strategies to increase the quantity of biomass available, improve the quality of the biomass delivered for different energy purposes, and explore strategies to increase the value and foster confidence in biomass supply, for both direct and cascade use of biomass for bioenergy. The task has worked exclusively with terrestrial biomass sources including residues, by-product or co-product production from forest and agriculture production systems; residues, by-products or co-products from bio-based manufacturing industries; cellulosic biomass from post consume waste; as well as dedicated biomass crop systems as part of broader land management strategies. The Task focus will be on the production and supply of biomass feedstock for energy leading to value creation within the broader context of bioeconomy.

Further to the core work program, the task also delivered a special work package on the role of biohubs in sustainable biomass supply supported by surplus funds from previous triennium. The special work package focussed on documenting a best practice strategy for biomass supply centred around opportunities to manage quality, support new production and develop critical logistical mass through biomass amalgamation and pre-processing hubs. Workshops explored the strength, weaknesses, opportunities and threats for the establishment, development and growth of biomass hubs in support of a growing sustainable bioenergy supply for a country or region. With a focus on developing a better understanding and best practices that leverage the strengths, address the weaknesses, and develop the opportunities identified for biohubs.

The Task was organized in three areas that were each organized in a set of Task Activities. Research priorities included:

- Biomass production systems for sustainable bioenergy within the bioeconomy (WP1);
- Integrated supply chain and logistics for sustainable bioenergy within the bioeconomy (WP2);
- Best practice in biohubs for sustainable biomass supply (Special WP).

BACKGROUND

The Task focussed on technical and economic strategies to increase the quantity of biomass available, improve the quality of the biomass delivered for different energy purposes, and explore strategies to increase the value and foster confidence in biomass supply, for both direct and cascade use of biomass for bioenergy. We have considered solid biomass including residues, by-product or co-product production from forest and agriculture production systems; residues, by-products or co-products from bio-based manufacturing industries; cellulosic biomass from post consume waste; as well as dedicated biomass crop systems as part of broader land management strategies. The aim has been around production and supply of biomass feedstock for energy that lead to value creation within the broader context of bioeconomy.

Innovative biomass supply chains that facilitate transition of the bioenergy sector towards bioeconomy have been examined with case study approaches. Local stakeholder involvement to facilitate implementation, i.e. social acceptance among stakeholders involved or those directly impacted by supply chains, have been looked at by the Task with some specific investigation of Covid related impacts and roles for biomass in Covid economic recovery strategies.

To achieve the overall Task objective and the specific objectives within the Work Programs, collaboration with other Tasks within IEA Bioenergy were critical to understand how productions and logistics systems sustainably can deliver quantity, quality and value.

REPORT ON THE TASK'S OBJECTIVES

Task 43 worked towards four high level objectives through deployment, application and management of best practice in integrated biomass production and supply chains systems including:

- Develop, refine, compare and promote sustainable integrated land management strategies that contribute to increased, competitive biomass mobilisation through engaged stakeholder groups in existing and emerging agriculture and forestry lignocellulosic systems.
- Develop, refine, compare and promote innovative biomass supply chain and logistics systems through engaged stakeholder groups that more efficiently recover and deliver more high-quality biomass for multiple products and markets including bioenergy.
- Explore emerging bioeconomy supply chain and logistics systems to develop integrated solutions for the production and supply of more high-quality biomass.
- Foster international collaboration and shared views on strategies to increase quantity, quality, value, and reliability of biomass supply and logistics.

Work Package one - themes and activities

1. Exploration of strategies to integrate innovated biomass crops to leverage and expand existing residue and co-product supply chains
 - Explore with bioenergy technologies and within existing bioenergy supply chains opportunities to contribute new biomass sources that have scope to improve the quality and value of the overall supply chain - improve lower quality residue feedstocks.
 - Explore and identify biomass crops that show potential to deliver increased biomass volume in an integrated land management approach, while contributing a feedstock that improves the quality and value of the biomass as required by given bioenergy technologies
 - In collaboration with work package two explore innovative supply chain technology and methods to extend the scope of the identified innovative biomass crops and improve blending with the existing supply chains to achieve quality and value improvements of the biomass for given bioenergy technology
2. Explore and improve knowledge on the scale and scope of different biomass crops that can economically service a given bioenergy market/demand. The activity will particularly explore the difference between greenfield biomass production solutions with a given bioenergy facility versus integration to increase volume, value and quality of an existing supply chain. With work package two alternative supply chain models will be considered including the addition of pre-treatment/pre-processing solutions at different points in the supply chain.
3. Develop improved knowledge on the socioeconomic values of biomass crops as a part of a local, regional and national renewable energy strategies. Different local, regional and national renewable energy policies and strategies will be reviewed to understand how/if socioeconomic value is recognised and valued. These findings will then be assessed against representative case studies from participating countries on what the socioeconomic impact is of applied projects, with particular emphasis on the relative differences between different energy solutions.
4. Explore, in collaboration with other tasks the key drivers of sustainability for biomass crops and supply chains. Based on the identified drivers case studies will be carried out to explore options to positively influence sustainability of biomass supply as an integrated strategy increase volume, value and quality of feedstock.

Theme	Activity & Outputs	Significance & Impact
WP1.1	Novel regional and landscape-based approaches to govern sustainability of bioenergy and biomaterials supply chains TR2020-03 (https://task43.ieabioenergy.com/publications/novel-regional-and-landscape-based-approaches-to-govern-sustainability-of-bioenergy-and-biomaterials-supply-chains-tr2020-03/)	Applied strategies to develop sustainable biomass supply in effective landscape management strategies
	Sustainability Governance of Canada's Agriculture-based Bioeconomy TR2020-04 (https://task43.ieabioenergy.com/publications/sustainability-governance-of-canadas-agriculture-based-bioeconomy-tr2020-04/)	Effective strategies governance and management of biomass supply in agri-food production systems
	<i>Integrated biomass residue management in Sandalwood Plantations - David Lee and Sam Van Holsbeeck (report under review)</i>	Strategies to capture host tree biomass from high value sandalwood growing operations
WP1.2	Using "BEAST" to support the local dialogue on lignocellulosic cropping for energy use, climate protection and sustaining ecosystem services (Using "BEAST" to support the local dialogue on lignocellulosic cropping for energy use, climate protection and sustaining ecosystem services. TR2019-05)	Importance of integrating dedicated crops effectively with current biomass supply, supply chains and demand
WP1.3	Sustainable Landscape Management for Bioenergy and the Bioeconomy (https://task43.ieabioenergy.com/publications/sustainable-landscape-management-for-bioenergy-and-the-bioeconomy-report-from-joint-iea-bioenergy-task-43-fao-workshop-11-12th-october-2018-rome-italy-tr2019-07/)	Bioenergy is a co-product that can add value to a production and processing systems
	Woody pellets Sustainable Development Goals https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/05/Kline-et-al-2021-SE-woody-pellets-SDGs_IEA-Bioenergy-Rpt-template-final-07Apr2021.pdf	Wood pellet takes up a small value of overall woody biomass but sustainability requirements for bioenergy result in huge role for overall sustainability and industry value
	Southeast USA Pellets https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/08/Case_20_Southeast-US-wood-pellets_Summay-05Nov2020.pdf	
	The Role of Biomass Supply Chains for Bioenergy in the Post-COVID-19 Economy TR2022-01 https://task43.ieabioenergy.com/publications/the-role-of-biomass-supply-chains-for-bioenergy-in-the-post-covid-19-economy-tr2022-01/	Detailed strategies on how biomass can make strong contributions in Covid economic recovery

WP1.4	<p>Attractive Systems for Bioenergy Feedstock Production in Sustainably Managed Landscapes (https://task43.ieabioenergy.com/publications/attractive-systems-for-bioenergy-feedstock-production-in-sustainably-managed-landscapes-contributions-to-the-call/)</p>	<p>The role effectively integrated biomass production systems can play in positive environmental outcomes across a range of cases</p>
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Work Package two - themes and activities

1. With technology Tasks within IEA Bioenergy and existing bioenergy projects within participation countries explore and define, in applied sense, what influences quality of biomass supply for the different bioenergy technologies. The identified quality drivers for biomass supply will be reviewed and categorised based on whether there is an ability to influence them in the biomass production, with work package one, or influence them with the supply chain technology and management. Suggested best practices will be presented from the work.
2. Working with existing commercial biomass supply chains within participation countries the key limiting phase and/or technology will be identified and the aspects that influence that phase or technology will be explored. Alternative technology and methods for given limiting points in the supply chains from different countries or regions will be explored to clarify why and how they limit the quality and production of the supply chains. Based on the range of approaches found, best practices and innovative solutions will be recommended.
3. Opportunities to economically extend the range biomass supply chains through new and emerging biomass technology. In addition to exploring options to reduce costs the concept of adopting technology and designing supply chains to improve biomass quality and value will also be considered as means to extend biomass supply. In collaboration with other Tasks how these supply chains impact and influence both the socioeconomic and sustainability of the supply chain will be considered.
4. The role of pre-processing or pre-treatment of biomass at different points in the supply chain will be explored to increase the value and quality of biomass for given technologies. Priority will be given to commercial technology that can be deployed as a mobile solution and technically viable to be used at any point along the supply chain (point of capture, transfer or merchandising terminals, factory gate, etc.) . Linkage will be made to both how the quality features as defined with the technology tasks can be improved and how pre- treatment/pre-processing can be used as part of strategies to access more biomass.

Theme	Activity & Outputs	Significance & Impact
WP2.1	<p>Contribution of Biomass Supply Chains to the Sustainable Development Goals When Implemented for Bioenergy Production (https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/06/IEA-Bioenergy-2-page-SDG-paper-summary-Final.pdf)</p>	<p>Biomass adds value beyond SDGs for affordable clean energy that are primarily linked to social equity, health and education</p>
	<p><i>Report on end-users' preferences towards biomass and supply - Dan Bergstrom and Kalvis Kons (Under review)</i></p>	<p>Survey results defining how biomass value is determined in different supply chains and end uses</p>

WP2.2	Dry matter losses during biomass storage (https://task43.ieabioenergy.com/publications/dry-matter-losses-during-biomass-storage-measures-to-minimize-feedstock-degradation/)	Key applicable strategies to dry biomass more efficiently and with less dry matter loss
	Supply chain resilience during a pandemic (https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/05/Kline-et-al-2021-SE-woody-pellets-SDGs_IEA-Bioenergy-Rpt-template-final-07Apr2021.pdf)	Demonstrated resilience of biomass/bioenergy in the pandemic with continued growth while other economic sectors slowed
WP2.3	Innovative bio-based pile cover for biomass chip storage TR2022-02 (https://task43.ieabioenergy.com/publications/innovative-bio-based-pile-cover-for-biomass-chip-storage-tr2022-02/)	New pile cover technology was tested and found to be less effective than traditional plastic sheet approaches
	<i>Integrated land management using small-scale harvesting operations for biomass utilisation - Michael Berry (under review)</i>	Integrated harvesting solutions to capture biomass in small scale options
WP2.4	To be or not to be a biobased commodity - Wolter Elbersen (<i>Review complete - Ready to be loaded to website</i>)	Systems and technology to handle, sort and pre-treat biomass so it can be traded as a true commodity extending both the temporal and geographical range of the supply chain

Special Work Package Biohubs - themes and activities

1. Conduct expert guided consensus SWOT evaluation of Biohubs
2. Document and evaluate best practices in biohub deployment and management
3. Online documentation and presentation of biohub & biomass supply chain case studies

Theme	Activity & Outputs	Significance & Impact
SWP 1	<p>Bio-hubs as keys to successful biomass supply integration for bioenergy within the bioeconomy - Joint Task 43 and BioEast Initiative (https://task43.ieabioenergy.com/publications/bio-hubs-as-keys-to-successful-biomass-supply-integration-for-bioenergy-within-the-bioeconomy-joint-iea-bioenergy-task-43-and-bioeast-initiative-workshop-10-october-sopron-hungary/)</p>	<p>Clear expert perspective on the strengths, weaknesses, opportunities and threats of biohubs in sustainable biomass supply</p>
SWP 2	<p><i>Bioenergy in remote Indigenous communities - Sam Vam Holsbeeck, Mark Annandale and John Meadows (2 page summary finalised, manuscript being finalised)</i></p>	<p>Strategies to identify and deploy biohubs to effectively capture and use biomass from local mine explorations for remote community energy</p>
	<p><i>Development of Techno-economic Model for Assessment of Bio-hubs in Canada - Amit Kumar and Bruno Gagnon (Review complete - Ready to be loaded to website)</i></p>	<p>A methodology to effectively assess the techno-economic impact of a biohub in a biomass supply chain and the broader bioeconomy</p>
WP3	<p>Developing a webbased dashboard to merge SWOT analysis results from international biohub and supply chain case studies (https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/10/FINAL-REPORT-Web-based-dashboard-to-merge-SWOT-results.pdf) </p>	<p>A standardised web platform to geographically present biohub and biomass supply chain cases and best practice examples framed in identified strengths, weaknesses, opportunities and threats</p>

CONCLUSIONS AND RECOMMENDATIONS

Because of the broadness of the Task themes and of the activities (see above table with achievements), it has proved difficult to summarise or even define properly the key findings of our Task activities (these have been many and diverse).

As a general statement, several scenarios indicate that bioenergy will have to play an important role and increase drastically if ambitious climate goals are to be achieved. This increase will have to be a combined result of more efficient use of existing biomass resources but also with sustainable production of new biomass that will be used for energy and other purposes in the bioeconomy. Landscape management, effective supply chains, and governance issues are interrelated and need to be combined in optimal ways to implement sound bioenergy systems. Several such good examples have been brought forward during these years from the Task work and presented as examples for further extrapolated. At the same time, the development of an economy (for energy or other sectors) based on biomass resources faces several trade-offs, and several such examples have been presented, analysed and evaluated within the Task. Keeping in mind that it is crucial to find bioenergy solutions in the bioeconomy that achieve several other Sustainable Development Goals than the energy-related ones, the work conducted within Task 43 showed that this is feasible but careful management and design is necessary to optimize sustainable practices.

ADMINISTRATIVE TASK INFORMATION

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APPENDIX - ANNUAL REPORTS

2019

TASK 43: SUSTAINABLE BIOMASS SUPPLY INTEGRATION FOR BIOENERGY WITHIN THE BROADER BIOECONOMY

Overview of the Task

The Task will explore technical and economic strategies to increase the quantity of biomass available, improve the quality of the biomass delivered for different energy purposes, and explore strategies to increase the value and foster confidence in biomass supply, for both direct and cascade use of biomass for bioenergy. The task will work exclusively with terrestrial biomass sources including residues, by-product or co-product production from forest and agriculture production systems; residues, by-products or co-products from bio-based manufacturing industries; cellulosic biomass from post-consumer waste; as well as dedicated biomass crop systems as part of broader land management strategies. The Task focus will be on the production and supply of biomass feedstock for energy leading to value creation within the broader context of bioeconomy.

Participating countries:

Australia, Belgium, Canada, Croatia, Finland, Germany, Sweden, and the USA

Task Leader:

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Deputy Task Leader:

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Work Package leaders:

Biljana Kulisic - Work Package 1 Leader, Croatia

Évelyne Thiffault -Work Package 2 Leader, Canada

Task Secretary:

Kelly Murphy, USC Australia, Australia

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Mrs Shahana McKenzie, Bioenergy Australia, Australia

The Task leader, together with the Work Package (WP) leaders, manages the work of the Task. A Steering Committee (SC), consisting of the Task Leader, WP leaders and the National Team Leaders (NTLs), is responsible for reviewing progress and making overall priorities. Each NTL forms a national team of experts that support the NTL in making national contributions to the collaboration. Other associated experts are also involved.

For further details on Task 43 please refer to the Task website (<http://task43.ieabioenergy.com/>) and the IEA Bioenergy website (www.ieabioenergy.com) under 'Our Work: Tasks'.

Progress in R&D

Task meetings, workshops and webinars since last ExCo meeting

Event (What/Where)	When	Status/Result
Task Leadership Meeting 5/2019 via videoconference	25 September 2019	Minutes available upon request
Task Leadership Meeting 6/2019 in Sopron videoconference	11 October 2019	Minutes available upon request
Joint workshop with BioEast in Sopron, Hungary “ <i>Bio-hubs as keys to successful biomass supply integration for bioenergy within the bioeconomy</i> ”	10 October 2019	http://task43.ieabioenergy.com/publications/bio-hubs-as-keys-to-successful-biomass-supply-integration-for-bioenergy-within-the-bioeconomy-joint-iea-bioenergy-task-43-and-bioeast-initiative-workshop-10-october-sopron-hungary/
Task Leadership Meeting 7/2019 via videoconference	9 December 2019	Minutes available upon request
Task Leadership Meeting 1/2020 via videoconference	13 February 2020	Minutes available upon request
Task Leadership Meeting 2/2020 via videoconference	19 May 2020	Minutes available upon request
Task Leadership Meeting 3/2020 via videoconference	17 June 2020	Minutes available upon request
Task Leadership Meeting 4/2020 via videoconference	16 September 2020	Minutes available upon request
Task Leadership Meeting 5/2020 via videoconference	26 November 2020	Minutes available upon request

Targets reached and deliverables

Deliverable (What)	When	Status/Result
Sustainable Landscape Management for Bioenergy and the Bioeconomy - Report from Workshop	July 2019	Available online: https://task43.ieabioenergy.com/publications/sustainable-landscape-management-for-bioenergy-and-the-bioeconomy-report-from-joint-iea-bioenergy-task-43-fao-workshop-11-12th-october-2018-rome-italy-tr2019-07/
Attractive Systems for Bioenergy Feedstock Production in Sustainably Managed Landscapes - Contributions to the Call	July 2019	Available online: https://task43.ieabioenergy.com/publications/attractive-systems-for-bioenergy-feedstock-production-in-sustainably-managed-landscapes-contributions-to-the-call/
Bio-hubs as keys to successful biomass supply integration for bioenergy within the bioeconomy - Joint Task 43 and BioEast Initiative	October 2019	Available online: https://task43.ieabioenergy.com/publications/bio-hubs-as-keys-to-successful-biomass-supply-integration-for-bioenergy-within-the-bioeconomy-joint-iea-bioenergy-task-43-and-bioeast-initiative-workshop-10-october-sopron-hungary/
Dry matter losses during biomass storage: Measures to minimize feedstock degradation	January 2020	Available online: https://task43.ieabioenergy.com/publications/dry-matter-losses-during-biomass-storage-measures-to-minimize-feedstock-degradation/
Bio-hubs as keys to successful biomass supply integration for bioenergy within the bioeconomy	April 2020	Available online: https://task43.ieabioenergy.com/publications/bio-hubs-as-keys-to-successful-biomass-supply-integration-for-bioenergy-within-the-bioeconomy-tr2020-01/
Novel regional and landscape-based approaches to govern sustainability of bioenergy and biomaterials supply chains	September 2020	Available online: https://task43.ieabioenergy.com/publications/novel-regional-and-landscape-based-approaches-to-govern-sustainability-of-bioenergy-and-biomaterials-supply-chains-tr2020-03/

On-going key activities

The following Task 43 supports activities are continuing with reports due to be submitted over the next 12 months:

- *Developing a web-based tool to merge SWOT analysis results from international biohub and supply chain case studies* - Mohammad Ghaffariyan
- *Integrated biomass residue management in Sandalwood Plantations* - David Lee
- *Current and future biobased industrial raw material demand and supply* - Dan Bergstrom
- *Bioenergy in remote Indigenous communities* - Sam Van Holsbeeck
- *Innovative ecological pile cover for biomass chip storage* - Robert Prinz and Johanna Routa
- *Development of Techno-economic Model for Assessment of Bio-Hubs in Canada* - Amit Kumar
- *Agrarian bio-hubs* - Biljana Kulisic
- *Lessons learned from case studies of response of biomass supply chains to Covid-19 crisis* - Beth Hawkins
- *Forecast report on biomass supply in the post-COVID19 economy* - Biljana Kulisic
- *Assessment of a Bio-hub to facilitate a profitable bioeconomy for the Albany region, Western Australia* - Justine Edwards
- *Integrated land management using small-scale harvesting operations for biomass utilization* - Michael Berry
- *Biohub case study SE QLD* - Michael Berry
- *Sustainability assessment of biohub archetypes using life cycle assessment* - Rory Monaghan (inter-task activity)
- *The benefits of developing biobased commodities to bring biomass to markets* - Wolter Elbersen
- *Improving framework conditions for bioenergy supply chains within bioeconomy - an approach for shaping evidence-based policies* - Biljana Kulisic, Blas Mola, Ioannis Dimitriou and Jorg Schweinle

There are still two projects from the previous triennium that are in their final stages and will be completed within the next 2-3 months.

Website

The Task website (<http://task43.ieabioenergy.com/>) has been updated in line with changes of the IEA Bioenergy website. Extensive information concerning the Task 43 work is available and updated constantly.

Collaboration with Other Tasks/Organisations/Networking

The *Biohub in the development and deployment of efficient biomass supply chains* project will involve collaboration with Task 45 and a number of contributors to the previous triennium that have elected not to proceed as part of Task 43.

Deliverables

Work Package One

D1 - Strategies to integrate innovated biomass crops to leverage and expand existing residue and co-product supply chains

- Agrarian bio-hubs
 - Scientific paper - March 2021
 - Final Report - September 2021
 - Presentation - October 2021

- D2 - Scale of different biomass crops to economically supply bioenergy production as sole source and as an integrated contribution to residue supply chains
 - Integrated land management using small-scale harvesting operations for biomass utilization
 - Final Report - May 2021
 - Webinar and publication - June 2021
 - Inventory of LUC and ILUC in tools, instruments and policies
 - Final Report - December 2020 (draft received)

- D3 - Quantifying the socioeconomic values of biomass crops as a part of a local, regional and national renewable energy strategies.
 - Bioenergy in remote Indigenous communities
 - Findings published - March 2021
 - Forecast report on biomass supply in the post-COVID19 economy
 - Publication - September 2020
 - Workshop - November 2020
 - Assessment of a Bio-hub to facilitate a profitable bioeconomy for the Albany region, Western Australia
 - Webinar/presentation - 30 December 2020
 - Final Report - 31 March 2021
 - Improving framework conditions for bioenergy supply chains within bioeconomy - an approach for shaping evidence-based policies
 - Final report - June 2020

- D4 - Influencing biomass sustainability through strategies to increase volume, value and quality of biomass supply.
 - Integrated biomass residue management in Sandalwood Plantations
 - Draft report - August 2021
 - Final report and analysis - September 2021
 - IEA Webinar and published findings - October 2021
 - Sustainability assessment of biohub archetypes using life cycle assessment
 - Final Report - August 2022
 - If advanced biofuels assume biomass growing, how should we think when deciding about the optimal production system and what about the potential trade-offs?
 - Publication - December 2020

Work Package Two

- D5 - Key biomass quality drivers as they relate to bioenergy technology needs
 - Current and future biobased industrial raw material demand and supply
 - Final Report - 30 September 2021
 - Submission of manuscript to scientific journal - 30 December 2021

- D6 - Identifying and managing technology bottlenecks in biomass supply chains
 - Lessons learned from case studies of response of biomass supply chains to Covid-19 crisis
 - Template for data entry and case study summary - 31 October 2020
 - Final report - 31 January 2021

- D7 - Opportunities to economically extend the range of biomass supply chains through new and emerging biomass technology.
 - Development of Techno-economic Model for Assessment of Bio-Hubs in Canada
 - TEA Tool - 1 February 2022
 - Final Report - 1 March 2022

- Biohub case study SE QLD
 - Final Report - August 2021
 - Webinar and publication - September 2021
- The benefits of developing biobased commodities to bring biomass to markets
 - Journal article - 30 June 2021
 - Final Report - 30 June 2021

D8 - Improving biomass quality and value with pre-processing or pre-treatment within the supply chain. Deliverable specifics:

- Developing a web-based tool to merge SWOT analysis results from international biohub and supply chain case studies
 - Tool and user guide - 30 September 2021
- Innovative ecological pile cover for biomass chip storage
 - Peer reviewed journal article - 30 September 2021
 - Technical Report - 31 October 2021

Task documents List

Minutes from the Task meeting, September 2019.

Minutes from the Task meeting, October 2019.

Minutes from the Task meeting, December 2019.

Minutes from the Task meeting, February 2020.

Minutes from the Task meeting, May 2020.

Minutes from the Task meeting, June 2020.

Minutes from the Task meeting, September 2020.

Minutes from the Task meeting, November 2020.

Publications List

TR2019-01 - Economic and Social Drivers for Optimal Bioenergy Implementation (<http://task43.ieabioenergy.com/wp-content/uploads/2019/02/TR2019-01f.pdf>)

TR2019-02 - Report on expert workshop on variable demand for biofuels (<http://task43.ieabioenergy.com/wp-content/uploads/2019/03/TR2019-02.pdf>)

TR2019-03 - Forest biomass as part of silvicultural systems and its potential contribution to the lowcarbon transition of heavy industries (http://task43.ieabioenergy.com/wp-content/uploads/2019/05/Report_Forest-biomass-procurement-as-part-of-larger-forestry-and-industrial-systems-Part-1_compressed.pdf)

TR2019-04 - Governance of sustainable forest management and bioenergy feedstock harvesting in Ontario, Canada (<http://task43.ieabioenergy.com/wp-content/uploads/2019/06/TR2019-04r1.pdf>)

TR2019-05 - Using “BEAST” to support the local dialogue on lignocellulosic cropping for energy use, climate protection and sustaining ecosystem services (http://task43.ieabioenergy.com/wp-content/uploads/2019/05/TASK43-BEASTrev_fin_Formatted-2.pdf)

TR2019-06 - Attractive Systems for Bioenergy Feedstock Production in Sustainably Managed Landscapes ([http://task43.ieabioenergy.com/wp-content/uploads/2019/07/Contributions-to-the- Call_final.pdf](http://task43.ieabioenergy.com/wp-content/uploads/2019/07/Contributions-to-the-Call_final.pdf))

TR2019-07 - Sustainable Landscape Management for Bioenergy and the Bioeconomy (http://task43.ieabioenergy.com/wp-content/uploads/2019/07/FAO_T43_workshop_REPORT_final.pdf)

TR2019-08 - Dry matter losses during biomass storage (http://task43.ieabioenergy.com/wp-content/uploads/2020/01/EIA-Dry-Matter-Loss_Final.pdf)

TR2020-01 - Bio-hubs as keys to successful biomass supply integration for bioenergy within the bioeconomy (https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2020/04/TR2020_01-Sopron_T43_workshop_REPORT_final.pdf)

TR2020-02 - Bio-hubs as Keys to Successful Biomass Supply for the Bioeconomy (Canada) (https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2020/07/Canadian-Bio-hubs-Workshop-Report-Task-43-FINAL_LP-002.pdf)

TR2020-03 - Novel regional and landscape-based approaches to govern sustainability of bioenergy and biomaterials supply chains (<https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2020/09/Novel-regional-and-landscape-based-approaches-to-govern-sustainability-of-bioenergy-and-biomaterials-supply-chains.pdf>)

TR2020-04 - Sustainability Governance of Canada's Agriculture-based Bioeconomy (<https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2020/10/IEA-Bioenergy-Sustainability-Gov-Ag-Bioeconomy-full-copy-Final-Oct-26-2020.pdf>)

Please visit the Task website for the reports and original presentations:
<http://task43.ieabioenergy.com/>

TASK 43: SUSTAINABLE BIOMASS SUPPLY INTEGRATION FOR BIOENERGY WITHIN THE BROADER BIOECONOMY

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Biljana Kulisic - Work Package 1 Leader, Croatia

Évelyne Thiffault -Work Package 2 Leader, Canada

The Task is organised with 'National Teams' in the participating countries. The contact persons for 2019 (National Team Leader) in each country are listed below, an up-to-date list can be found on <http://task43.ieabioenergy.com/>

Country	National Team Leader	Institution
Australia	Mark Brown	University of the Sunshine Coast
Belgium	Lucas Gossiaux	ValBiom
Canada	Bruno Gagnon and Daniel Mazerolle (alternate)	Natural Resources Canada
Croatia	Veljko Vorkapic	Energy Institute Hrvoje Pozar
Finland	Johanna Routa	Natural Resources Institute Finland
Germany	Jörg Schweinle	Thünen Institute of International Forestry and Forest Economics
Sweden	Ioannis Dimitriou and Dan Bergström (alternate)	Swedish University of Agricultural Sciences
USA	Thomas Schuler	USDA Forest Service

2020

TASK 43: SUSTAINABLE BIOMASS SUPPLY INTEGRATION FOR BIOENERGY WITHIN THE BROADER BIOECONOMY

Overview of the Task

The Task will explore technical and economic strategies to increase the quantity of biomass available, improve the quality of the biomass delivered for different energy purposes, and explore strategies to increase the value and foster confidence in biomass supply, for both direct and cascade use of biomass for bioenergy. The task will work exclusively with terrestrial biomass sources including residues, by-product or co-product production from forest and agriculture production systems; residues, by-products or co-products from bio-based manufacturing industries; cellulosic biomass from post-consumer waste; as well as dedicated biomass crop systems as part of broader land management strategies. The Task focus will be on the production and supply of biomass feedstock for energy leading to value creation within the broader context of bioeconomy

Participating countries:

Australia, Belgium, Canada, Croatia, Finland, Germany, Sweden, and the USA

Task Leader:

Mark Brown, USC Australia, Australia

Deputy Task Leader:

Ioannis Dimitriou, SLU, Sweden

Work Package leaders:

Biljana Kulisic - Work Package 1 Leader, Croatia

Évelyne Thiffault -Work Package 2 Leader, Canada

Task Secretary:

Kelly Murphy, USC Australia, Australia

Operating Agent:

Mrs Shahana McKenzie, Bioenergy Australia, Australia

The Task leader, together with the Work Package (WP) leaders, manages the work of the Task. A Steering Committee (SC), consisting of the Task Leader, WP leaders and the National Team Leaders (NTLs), is responsible for reviewing progress and making overall priorities. Each NTL forms a national team of experts that support the NTL in making national contributions to the collaboration. Other associated experts are also involved.

For further details on Task 43 please refer to the Task website (<http://task43.ieabioenergy.com/>) and the IEA Bioenergy website (www.ieabioenergy.com) under 'Our Work: Tasks'.

Progress in R&D

Task meetings, workshops and webinars since last ExCo meeting

Event (What/Where)	When	Status/Result
Task Leadership Meeting 5/2019 via videoconference	25 September 2019	Minutes available upon request
Task Leadership Meeting 6/2019 in Sopron videoconference	11 October 2019	Minutes available upon request
Joint workshop with BioEast in Sopron, Hungary “ <i>Bio-hubs as keys to successful biomass supply integration for bioenergy within the bioeconomy</i> ”	10 October 2019	http://task43.ieabioenergy.com/publications/bio-hubs-as-keys-to-successful-biomass-supply-integration-for-bioenergy-within-the-bioeconomy-joint-iea-bioenergy-task-43-and-bioeast-initiative-workshop-10-october-sopron-hungary/
Task Leadership Meeting 7/2019 via videoconference	9 December 2019	Minutes available upon request
Task Leadership Meeting 1/2020 via videoconference	13 February 2020	Minutes available upon request
Task Leadership Meeting 2/2020 via videoconference	19 May 2020	Minutes available upon request
Task Leadership Meeting 3/2020 via videoconference	17 June 2020	Minutes available upon request
Task Leadership Meeting 4/2020 via videoconference	16 September 2020	Minutes available upon request
Task Leadership Meeting 5/2020 via videoconference	26 November 2020	Minutes available upon request

Targets reached and deliverables

Deliverable (What)	When	Status/Result
Sustainable Landscape Management for Bioenergy and the Bioeconomy - Report from Workshop	July 2019	Available online: https://task43.ieabioenergy.com/publications/sustainable-landscape-management-for-bioenergy-and-the-bioeconomy-report-from-joint-iea-bioenergy-task-43-fao-workshop-11-12th-october-2018-rome-italy-tr2019-07/
Attractive Systems for Bioenergy Feedstock Production in Sustainably Managed Landscapes - Contributions to the Call	July 2019	Available online: https://task43.ieabioenergy.com/publications/attractive-systems-for-bioenergy-feedstock-production-in-sustainably-managed-landscapes-contributions-to-the-call/
Bio-hubs as keys to successful biomass supply integration for bioenergy within the bioeconomy - Joint Task 43 and BioEast Initiative	October 2019	Available online: https://task43.ieabioenergy.com/publications/bio-hubs-as-keys-to-successful-biomass-supply-integration-for-bioenergy-within-the-bioeconomy-joint-iea-bioenergy-task-43-and-bioeast-initiative-workshop-10-october-sopron-hungary/

Dry matter losses during biomass storage: Measures to minimize feedstock degradation	January 2020	Available online: https://task43.ieabioenergy.com/publications/dry-matter-losses-during-biomass-storage-measures-to-minimize-feedstock-degradation/
Bio-hubs as keys to successful biomass supply integration for bioenergy within the bioeconomy	April 2020	Available online: https://task43.ieabioenergy.com/publications/bio-hubs-as-keys-to-successful-biomass-supply-integration-for-bioenergy-within-the-bioeconomy-tr2020-01/
Novel regional and landscape-based approaches to govern sustainability of bioenergy and biomaterials supply chains	September 2020	Available online: https://task43.ieabioenergy.com/publications/novel-regional-and-landscape-based-approaches-to-govern-sustainability-of-bioenergy-and-biomaterials-supply-chains-tr2020-03/
Sustainability Governance of Canada's Agriculture-based Bioeconomy	October 2020	Available online: https://task43.ieabioenergy.com/publications/sustainability-governance-of-canadas-agriculture-based-bioeconomy-tr2020-04/

On-going key activities

The following Task 43 supports activities are continuing with reports due to be submitted over the next 12 months:

- *Developing a web-based tool to merge SWOT analysis results from international biohub and supply chain case studies* - Mohammad Ghaffariyan
- *Integrated biomass residue management in Sandalwood Plantations* - David Lee
- *Current and future biobased industrial raw material demand and supply* - Dan Bergstrom
- *Bioenergy in remote Indigenous communities* - Sam Van Holsbeeck
- *Innovative ecological pile cover for biomass chip storage* - Robert Prinz and Johanna Routa
- *Development of Techno-economic Model for Assessment of Bio-Hubs in Canada* - Amit Kumar
- *Agrarian bio-hubs* - Biljana Kulisic
- *Lessons learned from case studies of response of biomass supply chains to Covid-19 crisis* - Beth Hawkins
- *Forecast report on biomass supply in the post-COVID19 economy* - Biljana Kulisic
- *Assessment of a Bio-hub to facilitate a profitable bioeconomy for the Albany region, Western Australia* - Justine Edwards
- *Integrated land management using small-scale harvesting operations for biomass utilization* - Michael Berry
- *Biohub case study SE QLD* - Michael Berry
- *Sustainability assessment of biohub archetypes using life cycle assessment* - Rory Monaghan (inter-task activity)
- *The benefits of developing biobased commodities to bring biomass to markets* - Wolter Elbersen
- *Improving framework conditions for bioenergy supply chains within bioeconomy - an approach for shaping evidence-based policies* - Biljana Kulisic, Blas Mola, Ioannis Dimitriou and Jorg Schweinle
- *There are still two projects from the previous triennium that are in their final stages and will be completed within the next 2-3 months*

Website

The Task website (<http://task43.ieabioenergy.com/>) has been updated in line with changes of the IEA Bioenergy website. Extensive information concerning the Task 43 work is available and updated constantly.

Collaboration with Other Tasks/Organisations/Networking

The *Biohub in the development and deployment of efficient biomass supply chains* project will involve collaboration with Task 45 and a number of contributors to the previous triennium that have elected not to proceed as part of Task 43.

Deliverables

Work Package One

- D1 - Strategies to integrate innovated biomass crops to leverage and expand existing residue and co-product supply chains
- Agrarian bio-hubs
 - Scientific paper - March 2021
 - Final Report - September 2021
 - Presentation - October 2021
- D2 - Scale of different biomass crops to economically supply bioenergy production as sole source and as an integrated contribution to residue supply chains
- Integrated land management using small-scale harvesting operations for biomass utilization
 - Final Report - May 2021
 - Webinar and publication - June 2021
 - Inventory of LUC and ILUC in tools, instruments and policies
 - Final Report - December 2020 (draft received)
- D3 - Quantifying the socioeconomic values of biomass crops as a part of a local, regional and national renewable energy strategies.
- Bioenergy in remote Indigenous communities
 - Findings published - March 2021
 - Forecast report on biomass supply in the post-COVID19 economy
 - Publication - September 2020
 - Workshop - November 2020
 - Assessment of a Bio-hub to facilitate a profitable bioeconomy for the Albany region, Western Australia
 - Webinar/presentation - 30 December 2020
 - Final Report - 31 March 2021
 - Improving framework conditions for bioenergy supply chains within bioeconomy - an approach for shaping evidence-based policies
 - Final report - June 2020
- D4 - Influencing biomass sustainability through strategies to increase volume, value and quality of biomass supply.
- Integrated biomass residue management in Sandalwood Plantations
 - Draft report - August 2021
 - Final report and analysis - September 2021
 - IEA Webinar and published findings - October 2021
 - Sustainability assessment of biohub archetypes using life cycle assessment
 - Final Report - August 2022
 - If advanced biofuels assume biomass growing, how should we think when deciding about the optimal production system and what about the potential trade-offs?
 - Publication - December 2020

Work Package Two

D5 - Key biomass quality drivers as they relate to bioenergy technology needs

- Current and future biobased industrial raw material demand and supply
 - Final Report - 30 September 2021
 - Submission of manuscript to scientific journal - 30 December 2021

D6 - Identifying and managing technology bottlenecks in biomass supply chains

- Lessons learned from case studies of response of biomass supply chains to Covid-19 crisis
 - Template for data entry and case study summary - 31 October 2020
 - Final report - 31 January 2021

D7 - Opportunities to economically extend the range of biomass supply chains through new and emerging biomass technology.

- Development of Techno-economic Model for Assessment of Bio-Hubs in Canada
 - TEA Tool - 1 February 2022
 - Final Report - 1 March 2022
- Biohub case study SE QLD
 - Final Report - August 2021
 - Webinar and publication - September 2021
- The benefits of developing biobased commodities to bring biomass to markets
 - Journal article - 30 June 2021
 - Final Report - 30 June 2021

D8 - Improving biomass quality and value with pre-processing or pre-treatment within the supply chain. Deliverable specifics:

- Developing a web-based tool to merge SWOT analysis results from international biohub and supply chain case studies
 - Tool and user guide - 30 September 2021
- Innovative ecological pile cover for biomass chip storage
 - Peer reviewed journal article - 30 September 2021
 - Technical Report - 31 October 2021

Task documents List

Minutes from the Task meeting, September 2019.

Minutes from the Task meeting, October 2019.

Minutes from the Task meeting, December 2019.

Minutes from the Task meeting, February 2020.

Minutes from the Task meeting, May 2020.

Minutes from the Task meeting, June 2020.

Minutes from the Task meeting, September 2020.

Minutes from the Task meeting, November 2020.

Publications List

TR2019-01 - Economic and Social Drivers for Optimal Bioenergy Implementation (<http://task43.ieabioenergy.com/wp-content/uploads/2019/02/TR2019-01f.pdf>)

TR2019-02 - Report on expert workshop on variable demand for biofuels (<http://task43.ieabioenergy.com/wp-content/uploads/2019/03/TR2019-02.pdf>)

TR2019-03 - Forest biomass as part of silvicultural systems and its potential contribution to the lowcarbon transition of heavy industries (http://task43.ieabioenergy.com/wp-content/uploads/2019/05/Report_Forest-biomass-procurement-as-part-of-larger-forestry-and-industrial-systems-Part-1_compressed.pdf)

TR2019-04 - Governance of sustainable forest management and bioenergy feedstock harvesting in Ontario, Canada (<http://task43.ieabioenergy.com/wp-content/uploads/2019/06/TR2019-04r1.pdf>)

TR2019-05 - Using “BEAST” to support the local dialogue on lignocellulosic cropping for energy use, climate protection and sustaining ecosystem services (http://task43.ieabioenergy.com/wp-content/uploads/2019/05/TASK43-BEASTrev_fin_Formatted-2.pdf)

TR2019-06 - Attractive Systems for Bioenergy Feedstock Production in Sustainably Managed Landscapes (http://task43.ieabioenergy.com/wp-content/uploads/2019/07/Contributions-to-the-Call_final.pdf)

TR2019-07 - Sustainable Landscape Management for Bioenergy and the Bioeconomy (http://task43.ieabioenergy.com/wp-content/uploads/2019/07/FAO_T43_workshop_REPORT_final.pdf)

TR2019-08 - Dry matter losses during biomass storage (http://task43.ieabioenergy.com/wp-content/uploads/2020/01/EIA-Dry-Matter-Loss_Final.pdf)

TR2020-01 - Bio-hubs as keys to successful biomass supply integration for bioenergy within the bioeconomy (https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2020/04/TR2020_01-Sopron_T43_workshop_REPORT_final.pdf)

TR2020-02 - Bio-hubs as Keys to Successful Biomass Supply for the Bioeconomy (Canada) (https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2020/07/Canadian-Bio-hubs-Workshop-Report-Task-43-FINAL_LP-002.pdf)

TR2020-03 - Novel regional and landscape-based approaches to govern sustainability of bioenergy and biomaterials supply chains (<https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2020/09/Novel-regional-and-landscape-based-approaches-to-govern-sustainability-of-bioenergy-and-biomaterials-supply-chains.pdf>)

TR2020-04 - Sustainability Governance of Canada’s Agriculture-based Bioeconomy (<https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2020/10/IEA-Bioenergy-Sustainability-Gov-Ag-Bioeconomy-full-copy-Final-Oct-26-2020.pdf>)

Please visit the Task website for the reports and original presentations:
<http://task43.ieabioenergy.com/>

2021

TASK 43: SUSTAINABLE BIOMASS SUPPLY INTEGRATION FOR BIOENERGY WITHIN THE BROADER BIOECONOMY

Overview of the Task

The Task will explore technical and economic strategies to increase the quantity of biomass available, improve the quality of the biomass delivered for different energy purposes, and explore strategies to increase the value and foster confidence in biomass supply, for both direct and cascade use of biomass for bioenergy. The task will work exclusively with terrestrial biomass sources including residues, by-product or co-product production from forest and agriculture production systems; residues, by-products or co-products from bio-based manufacturing industries; cellulosic biomass from post-consumer waste; as well as dedicated biomass crop systems as part of broader land management strategies. The Task focus will be on the production and supply of biomass feedstock for energy leading to value creation within the broader context of bioeconomy.

Participating countries:

Australia, Belgium, Canada, Croatia, Finland, Germany, Sweden, and the USA

Task Leader:

Mark Brown, USC Australia, Australia

Deputy Task Leader:

Ioannis Dimitriou, SLU, Sweden

Work Package leaders:

Biljana Kulisic - Work Package 1 Leader, Croatia

Évelyne Thiffault -Work Package 2 Leader, Canada

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Kelly Murphy, USC Australia, Australia

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Mrs Shahana McKenzie, Bioenergy Australia, Australia

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Progress in R&D

Task meetings, workshops and webinars since last ExCo meeting

Event (What/Where)	When	Status/Result
Task Leadership Meeting 1/2021 via videoconference	1 March 2021	Minutes available upon request
Task Leadership Meeting 2/2021 via videoconference	28 April 2021	Minutes available upon request
Task Leadership Meeting 3/2021 via videoconference	2 June 2021	Minutes available upon request
IEA Bioenergy Webinar - Resilient Biomass Supply Chains in the Post-COVID Recovery (online)	3 June 2021	https://task43.ieabioenergy.com/ieaevent/iea-bioenergy-webinar-resilient-biomass-supply-chains-in-the-post-covid-recovery/
IEA Bioenergy Workshop on co-benefits of biomass supply (online)	15-16 June 2021	https://task43.ieabioenergy.com/ieaevent/save-the-date-iea-bioenergy-workshop-on-co-benefits-of-biomass-
Task Leadership Meeting 4/2021 via videoconference	11 August 2021	Minutes available upon request
Task Leadership Meeting 5/2021 via videoconference	15 September 2021	Minutes available upon request
Task Leadership Meeting 6/2021 via videoconference	27 November 2021	Minutes available upon request
Task Leadership Meeting 1/2022 via videoconference	27 January 2022	Minutes available upon request

Targets reached and deliverables

Deliverable (What)	When	Status/Result
Open access publication: Effects of Production of Woody Pellets in the Southeastern United States on the Sustainable Development Goals	January 2021	Available online: https://www.mdpi.com/2071-1050/13/2/821
Summary Series: Woody pellets & Sustainable Development Goals: Southeast United States supply chain case study	May 2021	Available online: https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/05/Kline-et-al-2021-SE-woody-pellets-SDGs_IEA-Bioenergy-Rpt-template-final-07Apr2021.pdf
Summary Series: Contribution of Biomass Supply Chains to the Sustainable Development Goals When Implemented for Bioenergy Production	June 2021	Available online: https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/06/IEA-Bioenergy-2-page-SDG-paper-summary-Final.pdf
Summary Series: Supply chain resilience during a pandemic: Lessons from the Southeast United States wood-pellet supply chain response to Covid- 19	August 2021	Available online: https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/08/2021-Resilience-lessons-SE-woody-pellet-supply-chain_IEA-Bioenergy-summary-Aug2021.pdf

Open access publication: Resilience Lessons From the Southeast United States Woody Pellet Supply Chain Response to the COVID-19 Pandemic	August 2021	Available online
Case study: Woody Biomass from the Southeastern United States used for Bioenergy in Europe	August 2021	Available online: https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/08/Case_20_Southeast-US-wood-pellets_Summary-05Nov2020.pdf
Report: Developing a web-based dashboard to merge SWOT analysis results from international biohub and supply chain case studies	October 2021	Available online: https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/10/FINAL-REPORT-Web-based-dashboard-to-merge-SWOT-results.pdf

On-going key activities

The following Task 43 activities are in the final stages of completion and due to be wrapped up prior to the end of the current triennium:

- *Integrated biomass residue management in Sandalwood Plantations* - David Lee
- *Current and future biobased industrial raw material demand and supply* - Dan Bergstrom
- *Bioenergy in remote Indigenous communities* - Sam Van Holsbeeck
- *Innovative ecological pile cover for biomass chip storage* - Robert Prinz and Johanna Routa
- *Development of Techno-economic Model for Assessment of Bio-Hubs in Canada* - Amit Kumar
- *Agrarian bio-hubs* - Biljana Kulisic
- *Assessment of a Bio-hub to facilitate a profitable bioeconomy for the Albany region, Western Australia* - Justine Edwards
- *Integrated land management using small-scale harvesting operations for biomass utilization* - Michael Berry
- *Biohub case study SE QLD* - Michael Berry
- *The benefits of developing biobased commodities to bring biomass to markets* - Wolter Elbersen
- *Improving framework conditions for bioenergy supply chains within bioeconomy - an approach for shaping evidence-based policies* - Biljana Kulisic, Blas Mola, Ioannis Dimitriou and Jorg Schweinle

The following Task 43 activity will not be completed prior to the end of Triennium:

- *Sustainability assessment of biohub archetypes using life cycle assessment* - Rory Monaghan (inter-task activity)

Website

The Task website (<http://task43.ieabioenergy.com/>) has been maintained throughout 2021 and is currently being updated to reflect the new triennium. Information concerning Task 43 work is updated regularly.

Collaboration with Other Tasks/Organisations/Networking

Bruno Gagnon and other members of the Task 43 team have continued to collaborate with Task 45 on the *Biohub in the development and deployment of efficient biomass supply chains* project.

Deliverables outstanding

Work Package One

D1 - Strategies to integrate innovated biomass crops to leverage and expand existing residue and co-product supply chains

- Agrarian bio-hubs
- Final Report - March 2022

D2 - Scale of different biomass crops to economically supply bioenergy production as sole source and as an integrated contribution to residue supply chains

- Integrated land management using small-scale harvesting operations for biomass utilization
- Final Report - undergoing peer review
- Inventory of LUC and ILUC in tools, instruments and policies
- Final Report - March 2022

D3 - Quantifying the socioeconomic values of biomass crops as a part of a local, regional and national renewable energy strategies.

- Bioenergy in remote Indigenous communities
- Findings published - Manuscript has been submitted
- Assessment of a Bio-hub to facilitate a profitable bioeconomy for the Albany region, Western Australia
- Final Report - March 2022
- Improving framework conditions for bioenergy supply chains within bioeconomy - an approach for shaping evidence-based policies
- Final report - March 2022

D4 - Influencing biomass sustainability through strategies to increase volume, value and quality of biomass supply.

- Integrated biomass residue management in Sandalwood Plantations
- Final report - undergoing peer review
- Sustainability assessment of biohub archetypes using life cycle assessment
- Final Report - December 2022

Work Package Two

D5 - Key biomass quality drivers as they relate to bioenergy technology needs

- Current and future biobased industrial raw material demand and supply
- Submission of manuscript to scientific journal - March 2022

D6 - Identifying and managing technology bottlenecks in biomass supply chains

D7 - Opportunities to economically extend the range of biomass supply chains through new and emerging biomass technology.

- Development of Techno-economic Model for Assessment of Bio-Hubs in Canada
- Final Report - March 2022
- Biohub case study SE QLD
- Final Report - undergoing peer review
- The benefits of developing biobased commodities to bring biomass to markets
- Final Report - undergoing peer review

D8 - Improving biomass quality and value with pre-processing or pre-treatment within the supply chain. Deliverable specifics:

- Innovative ecological pile cover for biomass chip storage
 - Final Report - March 2022

Task documents List

Minutes from the Task meeting, March 2021

Minutes from the Task meeting, April 2021

Minutes from the Task meeting, June 2021

Minutes from the Task meeting, August 2021

Minutes from the Task meeting, September 2021

Minutes from the Task meeting, November 2021

Minutes from the Task meeting, January 2022

Publications List

Effects of Production of Woody Pellets in the Southeastern United States on the Sustainable Development Goals (<https://www.mdpi.com/2071-1050/13/2/821>)

TR2021-01: Woody pellets & Sustainable Development Goals: Southeast United States supply chain case study (https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/05/Kline-et-al-2021-SE-woody-pellets-SDGs_IEA-Bioenergy-Rpt-template-final-07Apr2021.pdf)

TR2021-02: Contribution of Biomass Supply Chains to the Sustainable Development Goals When Implemented for Bioenergy Production (<https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/06/IEA-Bioenergy-2-page-SDG-paper-summary-Final.pdf>)

Resilience Lessons From the Southeast United States Woody Pellet Supply Chain Response to the COVID-19 Pandemic (https://protect-au.mimecast.com/s/2jlzCGvmP3tAD8wyikCT5_?domain=links.email.frontiersin.org)

TR2021-03: Woody Biomass from the Southeastern United States used for Bioenergy in Europe (https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/08/Case_20_Southeast-US-wood-pellets_Summay-05Nov2020.pdf)

TR2021-04: Supply chain resilience during a pandemic: Lessons from the Southeast United States wood-pellet supply chain response to Covid-19 (https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/08/2021-Resilience-lessons-SE-woody-pellet-supply-chain_IEA-Bioenergy-summary-Aug2021.pdf)

TR2021-05: Developing a web-based dashboard to merge SWOT analysis results from international biohub and supply chain case studies (<https://task43.ieabioenergy.com/wp-content/uploads/sites/11/2021/10/FINAL-REPORT-Web-based-dashboard-to-merge-SWOT-results.pdf>)

Please visit the Task website for the reports and original presentations:

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TASK 43: SUSTAINABLE BIOMASS SUPPLY INTEGRATION FOR BIOENERGY WITHIN THE BROADER BIOECONOMY

Operating Agent:

Shahana McKenzie, Bioenergy Australia, Australia

Task Leader:

Professor Mark Brown, University of the Sunshine Coast, Australia

Deputy Task Leader:

Ioannis Dimitriou, SLU, Sweden

Work Package Leaders:

Biljana Kulisic - Work Package 1 Leader, Croatia

Évelyne Thiffault -Work Package 2 Leader, Canada

The Task is organised with 'National Teams' in the participating countries. The contact persons for 2020 (National Team Leader) in each country are listed below, an up-to-date list can be found on <http://task43.ieabioenergy.com/>

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Australia	Mark Brown	University of the Sunshine Coast
Belgium	Lucas Gossiaux	ValBiom
Canada	Bruno Gagnon and Daniel Mazerolle (alternate)	Natural Resources Canada
Croatia	Biljana Kulisic	Energy Institute Hrvoje Pozar
Finland	Johanna Routa	Natural Resources Institute Finland
Germany	Jörg Schweinle	Thünen Institute of International Forestry and Forest Economics
Sweden	Ioannis Dimitriou and Dan Bergström (alternate)	Swedish University of Agricultural Sciences
USA	Thomas Schuler	USDA Forest Service



IEA Bioenergy

Technology Collaboration Programme

Further Information

IEA Bioenergy Website
www.ieabioenergy.com

Contact us:
www.ieabioenergy.com/contact-us/