SET4BIO

RENEWABLE FUELS AND BIOENERGY FOR A LOW-CARBON EUROPE – ACCELERATING THE IMPLEMENTATION OF THE SET-PLAN ACTION 8

Horizon 2020, Grant Agreement no. 884524

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Task: 2.4 - Securing commitment of industry using a co-creation approach

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Executive Summary

This document, D2.4 *Report and documentation on commitment reached by industry stakeholders*, is part of Work Package 2 (WP2 – Industry Involvement and commitment).

Task 2.4 is dedicated to a convergent and coherent process of securing industry commitment. Based on matching the outcome of the scenario list (Task 2.3) and the need and gap analysis (Task 2.1), industry stakeholders were invited to join co-creation workshops, to deliberate and further develop scenarios into action plans to reach an agreement about the way forward to reach highest possible commitment on the way to support the IP8.

The stakeholder commitment was not achieved as expected during project development due the fact that the surrounding conditions did not develop ideally. The SET-Plan IP 8 has been in place since 2018, but has not been backed-up by concrete actions at national level and has also not been followed up at high intensity at EU level. The aim of the project was to spur interest and commitment for further investment from the private sector. However, the public side is not committing either, with targets for alternative fuels sized down or changing in focus constantly. It is a difficult environment to raise interest for private investment or other commitment if there is no good business case.

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1. Introduction

Task 2.4 is dedicated to a convergent and closing process of securing industry commitment. Based on matching the outcome of the scenario list (Task 2.3) and the need and gap analysis (Task 2.1), industry stakeholders were invited to join co-creation workshops, to deliberate and further develop scenarios into action plans to reach an agreement about the way forward to reach highest possible commitment on the way to support the IP8.

2. Methodology

The tasks within WP2 are not separate ones, but build on the previous task. The stakeholder database created in D2.1 was a basic building block for the need assessment carried out in D2.2, the results of which are included in this report. The interweaving of the individual tasks is shown in Figure 1.

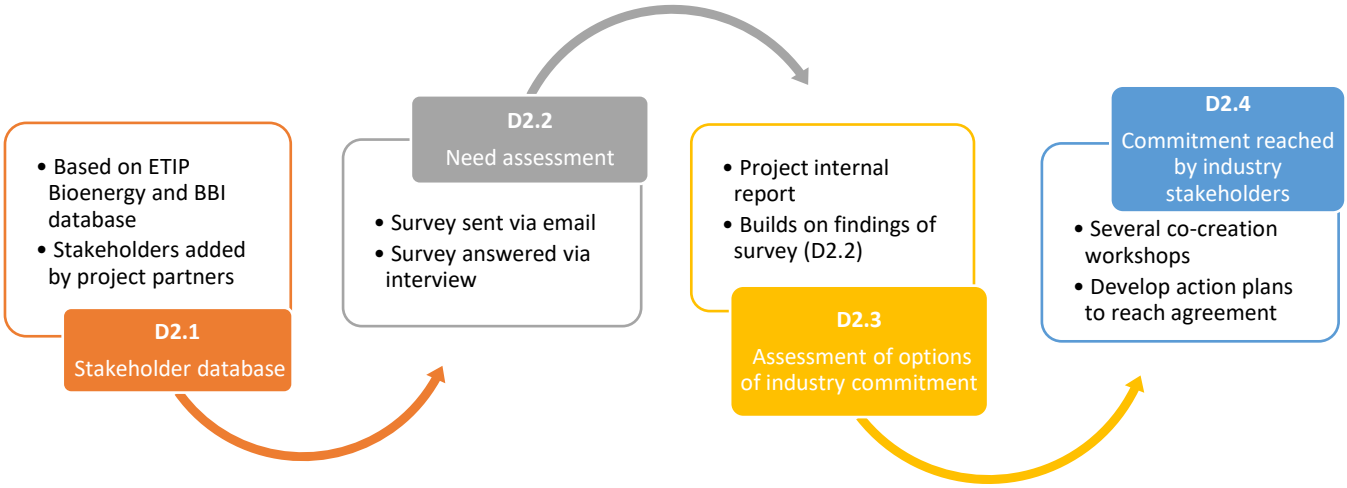

Figure 1: All tasks of WP2 and their value for each other.

The survey for the need assessment and gap analysis under D2.2 was sent to the contacts listed in the stakeholder database (D2.1). Aim of the survey was to categorize the companies and institutions according to the different R&I activities of the IP8. With their answers, the respondents provided information about the size of the company, their motivation to possibly participate in the SET4BIO project activity, their future goals for their company/institution, as well as their planned contribution to the Implementation Plan. Analysis of the results of the first round showed that 50% of the respondents were from the research sector. However, for this particular task, answers were mostly desired from industry players. Next, the participants of the Innovation Challenge (WP3) were interviewed using the questionnaire of the survey. The survey responses also provided information on which sectors the companies/entities are active in (fuel/energy, plant engineering, primary production/feed, transport, engine manufacturers and others) and which of the 13 R&I activities are already covered. This knowledge is also important for SET4BIO as it can be used to direct resources and support in directions where there is still potential for expansion. Detailed information on the structure of the survey and its results are described in D2.2.

For D2.3, the answers to the following survey questions were particularly important[1]:

- To which sector does your company/institution mainly belong?
- Which stakeholder category adheres most to your company/institution?
- Are you or is your company/institution familiar with the EU SET Plan?
- How and under which circumstances can you/your company/institution contribute to the Implementation Plan?

The survey showed that half of all respondents work in the research and about 28% in the industry sector. 70% of the industry respondents are SMEs and 50% are familiar with the SET Plan. The answers to the fourth question above formed the basis of the report, as they described the contribution stakeholders can make based on their professional experience.

The aim of D2.3 was to provide a list of possible options for stakeholder engagement based on the contribution options identified in D2.2, with varying degrees of stakeholder commitment to support the implementation of the SET Plan.

3. Forms and scenarios of industry commitment

Several forms and scenarios for industrial stakeholders to commit and engage to achieve the goals of the SET Plan and IP 8 have been described and assessed within the report for deliverable 2.3 "Preparing industry commitment to contribute to IP 8 goals". The different forms of engagement were ranked according to the degree of commitment. They reached from "high" in cases of a Public-Private-Partnership via "Medium" to "Low" which means e.g. signing a Declaration of Intent[2].

It was already apparent from the results of the other tasks of WP 2, especially from task 2.2, that the interest of stakeholders regarding the SET Plan seems rather low. The survey implemented under task 2.2 showed a rather low response rate. From more than 700 organisations that have been approached to participate in the survey, only 38 responded and filled in the survey. From those 38 organisations 11 stemmed from the industry sector while most of the responding organisations represented the research sector.

Being asked how the individual stakeholders could imagine to commit themselves for achieving the goals of IP 8 within the SET Plan, some promising answers were given[3]. It seems that there is a certain willingness of industrial stakeholders to commit to an achievement of the SET Plan - at least those industry stakeholders that participated in the survey. However, the majority of them seems not to be interested in any activities related to contribute to the achievement of the SET Plan IP 8.

For reasons that are elaborated under chapter 5 "Conclusions" it was hardly possible to increase the interest of especially industrial stakeholders in the SET Plan and its implementation during the project implementation time. Thus, the willingness of industrial partners to commit themselves

[1] SET4BIO: D2.2 "Survey, need and gap assessment, pp. 15-18
[2] SET4BIO: D2.3 "Assessment of options for industry commitment", p. 13
[3] SET4BIO: D2.2 "Survey, need and gap assessment, p. 8

to further activities in a way that could be considered as "ambitious" in its several expressions[4] can be considered as low.

4. Co-creation workshops with industry stakeholders

In order to secure the commitment of industry stakeholders it was planned to implement co-creation workshops in which the stakeholders deliberate and further develop scenarios into action plans to reach an agreement about the way forward to reach highest possible commitment on the way to support the SET Plan and IP8.

It has to be stated that the interest of the industry stakeholders was very low from the beginning and activation measures were unsuccessful. This is displayed impressively by the number of industry stakeholders willing to participate in the workshops. Possible reasons for such a low interest are discussed in chapter 5.

4.1 Workshop: Industry Priorities and Funding Opportunities for Bioenergy and Biofuels

SET4BIO organised a stakeholder workshop on 27 June 2022 to discuss industry priorities, important funding instruments and elaborate industrial needs in view of an update of the Implementation Plan. The workshop was held in a hybrid format, both in Brussels and online. In total, 36 stakeholders participated in the workshop, 16 of them on site in Brussels and 20 online. The presentations can be accessed via the SET4BIO website: https://www.etipbioenergy.eu/set4bio/news-and-media/workshop-funding-opportunities-for-bioenergy-and-renewable-fuels.

The event was structured as follows:

- A first session to learn about relevant funding instruments with experts from the EU Institutions.
- A second session to discuss industry priorities in the field of bioenergy and biofuels.
- A final brokerage event, where it was possible to hold bilateral meetings with the other participants.

In the introductory session on funding instruments, Paola Mazzuchelli, CIRCE – Centre of Research for Energy Resources and Consumption, provided an overview on financing opportunities to support bioenergy and biofuels projects. Following this, Maria Georgiadou, European Commission, DG Research and Innovation, held a presentation on research and innovation policy in renewable fuels and bioenergy with a focus on the REPowerEU Plan, the Fit for 55 package and the Horizon Europe work programme. Agata Prządka, CINEA – European Climate Infrastructure and Environment Executive Agency, outlined the key features of the Innovation Fund, results of the first calls for large- and small-scale projects as well as information on currently ongoing calls.

[4] Ibid.

Timo Ritonummi, Chair of the Implementation Working Group Action 8, addressed the current SET Plan Implementation Plan Action 8 – Bioenergy and Renewable Fuels for Sustainable Transport at the beginning of the second session. Subsequently, three speakers from industry presented ongoing projects that fit in the IWG8 Implementation Plan and discussed with the audience about industrial needs for an update of the Implementation Plan. Hendrik Steinort, Enviva Inc., spoke about industrial defossilisation and the need to defossilise a carbon-rich society and to strengthen the industrial bioeconomy. Enviva is dealing with, among others, Bioenergy with Carbon Capture and Storage (BECCS), which is supposed to deliver large amounts of negative emissions with geological storage, without land use change and at moderate cost.

Henrik Båge outlined the BTC technology (Biomass-fired TopCycle), which has been developed by Phoenix BioPower. The company aims to generate electricity by converting organic waste products from forestry and agriculture biomass residues. It is targeted to increase the efficiency by using the BTC technology in comparison to traditional stem cycle technologies. The biomass per unit to produce electricity and operating costs are intended to be cut almost by half. As a co-generation technology, waste heat from the process can be used for industrial and commercial uses to also replace fossil energy.

Felix Fischer presented a technology developed by Reverion that is supposed to achieve an efficiency of 80% in the generation of electricity from biogas, which corresponds to a doubling compared to common methods. To achieve this, the start-up relies on fuel cells in a novel system design that also allows them to be used reversibly. This means that Reverion plants can reverse electricity production into electricity use when needed, and thus use surplus electricity from wind and sun for an electrolysis process. The idea is to produce either green hydrogen or renewable natural gas, which could then be fed into the existing natural gas grid.

Concerning the development of bioenergy facilities, the capital intensity was mentioned as a major challenge, whereby most funding programmes would not cover the capital needs. Specific reference was made in this context to the Innovation Fund that would provide less than 50% of the required capital. The length of funding for biobased value chains is considered significant due to the high insecurity in long-term financing. Investor security would be required for a period of at least 10-15 years. Other participants even mentioned periods of 30 years.

The participants referred to the importance of politics in order to ensure the necessary security of regulations for the financing of bioenergy plants. The certainty that biomass is considered sustainable for the entire timeframe would be a necessary prerequisite. To make it easier for companies to apply for funding, it would be beneficial to shorten the application phases. The establishment of a close cooperation with the national contact points was repeatedly mentioned as helpful in the course of the discussion.

4.2 Workshop: Innovation Challenge light Brussels

A final innovation challenge light event was organized on 27th June 2023 in Brussels (BE). The event was also aimed at serving the targets of work package 2, i.e. increasing industrial stakeholder commitment. The online-event was organized by project partner RISE with support by FNR. The aim of the workshop was to present innovative technology approaches and ideas, and to discuss how barriers to the upscaling of innovative technologies could be overcome.

Industry stakeholders were invited to introduce their ideas and technologies from the bio-based sector. An international expert panel assessed these ideas and provided a judgement of the presented technologies on how to connect the technology development projects to the right financing instruments.

Stakeholders were given the opportunity to come forward with own suggestions on how the funding framework could be improved to increase investment into biofuels research and especially development and innovation. The agenda to this event is annexed to this report (Annex 1).

To attract a large number of participants from the industry to present their technologies and ideas, several efforts have been made. The event was advertised at the SET4BIO website and distributed broadly via the SET4BIO mailing list. Further, FNR distributed the invitation to more than 4,000 stakeholders from bio industries and spread the invitation via the social media channels of FNR such as the website and LinkedIn.

Despite these immense efforts and wide-ranging distribution activities, the response rates were very low and attendance rather poor. Thus, only one industry enterprise was willing to introduce its technology idea.

The meeting started with the presentation of five key policy recommendations from SET4BIO for bioenergy and biofuels" by Elina Mäki, VTT and Patrik Klintbom, RISE:

1. Align RDI strategies and funding programs on national and EU level and with industry
2. Harmonize data collection to facilitate monitoring and assessment of RDI contribution to targets
3. Support innovation action throughout the TRL scale
4. Clear, stable and predictable framework to guarantee the market pull
5. Enhance complementary collaboration at EU and global level.

For the next part, a brief introduction about the SET Plan Action 8 Implementation Plan was provided. It dates from 2018 and describes investment needs until 2030, amounting to 107 bn €. Of this amount, 104.3 bn € are earmarked for demonstration and scale-up of technologies. However, the SET-Plan is no funding programme on its own and relies on other financial sources. The analysis of SET4BIO shows that only funding for hydrogen has been overachieving significantly and the funding for "other renewable fuels" is more or less according to plan. For advanced biofuels, bioenergy and intermediates the actual funding is only a small portion of the estimated funding needs.

The industry experts Hendrik Brodin and René Venendaal shared practical experiences from their companies, which have scaled up innovative technologies successfully over many years. Some conclusions as follows:

- Knowing your technology well is of key importance but not sufficient. The full value chain, regulations, markets and social factors are of equal importance.
- Consider variable political, regulatory and market conditions in your business plan.
- The importance of the different financing sources (grants, loans, equity) varies with passing Technology Readiness Levels (TRL) and commercialisation stages. Fine tuning is key to success.
- Building trust among public and private financers is crucial and a long term endeavour.

- Be prepared to have a lot of staying power. Your development may take significantly longer than expected.

They also highlighted that key recommendation 4 – a clear, stable and predictable political framework, was not implemented in the EU in the past decade. This had severe consequences: Projects were not implemented at all, projects stopped before execution or projects stopped after successful ramp-up of production. They underlined the high capex and opex requirements for biofuel & bioenergy plants and made clear that, to contribute to the EU 2030 targets, only a short window of opportunity exists: It takes easily three years to construct a plant to achieve name plate capacity. E. g. for any plant expected to be operational in 2027, investment decisions have to be made now.

Another aspect was the competition between US and EU. US is an attractive market as it is not split up in 27 individual ones as in EU. In addition the US Inflation Reduction Act is a powerful incentive. However, many companies are globally oriented when it comes to consumption, for the actual biofuel production, one key condition is to be close to feedstock supply. So some warnings from stakeholders are not completely sincere, as it is always necessary to adapt to new political and market conditions.

Finally only one company presented its project, which is still at a rather early TRL of 3-5. A number of recommendations by the expert panel was given.

5. Conclusion

Already during the earlier implementation stages of the project it became apparent that the interest of the industrial stakeholders in both the activities of the project and in activities to implement the SET Plan and achieve its goals is to be considered rather low. This was reflected in particular in the very low response rate to the survey conducted as well as in the low participation of industrial stakeholders in the two workshops described under point 4. Especially at the one of the Innovation Challenge Light, which was conducted in June 2023, the number of participants remained in the lower double digits. This is all the more surprising given that the online event was extensively advertised and invitations were sent to more than 4,000 potential participants.

However, this low interest and engagement of industrial stakeholders seems to relate not only to the implementation of the SET Plan and IP 8 in particular, but also to the participation of industrial stakeholders in research and innovation activities related to bioenergy in general and advanced biofuels in particular.

A multifaceted chain of aspects on different levels has led to such a relatively low engagement and participation in research and innovation activities from the industry relating to bioenergy. A small number of committed actors is however active in market deployment, and commercial production plants are being constructed, but investments are at a significantly lower level compared to the identified needs in the SET-Plan. The conditions for industry to operate are of changing nature both on a national and international level, as science and opinions of stakeholders form the basis for new policies.

Bioenergy has been questioned from many aspects during recent years, ranging from risking food supplies, driving deforestation, eroding biodiversity to causing significant emissions from direct and indirect land use change. For any technology to thrive and contribute with its part in the

complex energy puzzle, there needs to be a technology neutral fact and science based, stable policy framework that will bridge the hurdles on the way to the market. For bioenergy the policy framework has been uncertain for many years and that has led to investor uncertainty and slow deployment on the market side. Since the Green Deal was introduced in 2019, many policy initiatives have been presented in the "Fit for 55" package and beyond. The overall ambition with the Green Deal cannot be of more importance, but the combined effect of the massive number of policies and the shortly upcoming foreseen revisions is hard to grasp and understand. Many of the policies that impact the bioenergy sector are inconsistent and uncoordinated, ultimately failing to support the rather significant volumes of bioenergy and biofuels that we also so desperately need for the energy transition. The SET-Plan is especially lacking integration with other energy related initiatives (REPowerEU, NZIA and more) which is very unfortunate at a time where energy security and domestically produced energy should be top priority.

Bioenergy is often wrongly seen as a solution that did not work and that there are better options such as electrification and hydrogen. Electrification of transport is truly a central piece of the puzzle for the energy transition in transport, it is however not an effective strategy for the existing fleets and future sales of vehicles with combustion engines. In addition, shipping and aviation as well as long haul road and high share of non-road mobile machinery (NRMM) applications will be hard or impossible to electrify. If the supply of sustainable biofuels is not prioritized for these vehicles/vessels, the European Union will remain dependent on fossil fuels with significant continued emissions of harmful CO_2 as a result. Bioenergy is in addition the only major technology that can contribute to negative CO_2 emissions with the BECCS process. Thus, negative emissions cannot be reached without bioenergy.

It can be concluded that the EU still has to strive for a comprehensive technology neutral long term energy strategy, which will pool all the sustainable alternatives and let them contribute with their respective shares in the market. Otherwise there is a risk of eroding European competitiveness, maintaining an unsound reliance on energy imports and non-achievement of the emission reduction targets. The policy framework in EU needs a consistent and fact-based update process, where the mindset is shifted towards support of a wide range of technologies based on their true merits. In addition, Europe needs a more comprehensive innovation policy that will foster solutions that we are not aware of today.

We recommend putting the SET-Plan as a center piece in the Green Deal and make sure that all technologies are prioritized with their own merits as basis. If this is not done it is hard to see how industry and Member States will prioritize and drive the implementation of the SET-Plan forward.

Annex 1: Invitation letter to Innovation Challenge light

Online-event Innovation Challenge Light and industry funding priorities

27th June 2023 / 13:00 – 18:00 (CET)

We invite stakeholders to get an expert judgment of their technologies and on how to connect their technology development projects to the right financing instruments. In the panel of experts we have people from the project and the European commission.

Prior to the event, participants prepare a pitch that describe their technologies and ideas. The pitch will be presented during the event.

We will give stakeholders the opportunity to come forward with own suggestions of how the funding framework could be improved to increase investment into biofuels research and especially development and innovation.

For registration or any question, please contact:

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About the SET4BIO Innovation Challenge

The SET4BIO Innovation Challenge 2021 edition has engaged promising and ambitious innovators all over Europe.

More information about the innovation challenge and the SET4BIO project:

etipbioenergy.eu/set4bio/innovation-challenge

Organized by

Patrik Klintbom, Chair of ETIP Bioenergy

Judith Sandquist, SINTEF: Biofuel production technologies

Paola Mazzucchelli, CIRCE: Financing instruments

Elina Mäki, VTT: Value chain integration

Birger Kerckow, FNR: Feedstocks

Maurizio Cocchi, ETA

Petri Söderena, VTT: End-use sector

Maria Georgiadou, European Commission DG, RTD: TBC

Agenda

13:00 – 14:00 Welcome and Introduction to Innovation Challenge

- **Foresight Bioenergy and Biofuels 2050**
  Johan Granberg, RISE Research Institutes of Sweden
- **Key Policy Recommendations from SET4BIO for Bioenergy and Biofuels**
  Elina Mäki, VTT
- **Need for adjusted funding instruments to contribute to SET-Plan targets – views from industry**
  Henrik Brodin (Södra Södra is a forest industry group (sodra.com))
  René Venendaal (BTG BTG Bioliquids | We replace fossil fuels (btg-bioliquids.com))

14:00 – 14:45 Interactive session on expectations towards funding and funding instruments

14:45 – 15:45 Pitch sessions

15 minutes break

16:00 – 17:00 Feedback session

17:00 – 18:00 Optional 1:1 meetings with our experts