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Project acronym: ReSolve

Project Title: Renewable solvents with high performance in application and improved toxicity profile

D6.6 – Stakeholder Workshop

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Type			Dissemination Level		
R	Document, report	☒	**PU**	Public	☒
DEM	Demonstrator, pilot, prototype	☐	**CO**	Confidential, only for members of the consortium (including the Commission Services)	☐
DEC	Websites, patent fillings, videos, etc.	☐			
OTHER		☐			

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Contents

1 Executive summary

Deliverable D6.6 describes the stakeholder workshop organised within the ReSolve project. In order to ensure knowledge transfer towards the target groups, such as industrial partners and research institutions, the stakeholder workshop was coordinated by nova and UOY, and was held in Brussels on 30 September 2019. The workshop was a pre-conference event at EFIB 2019 (The European Forum for Industrial Biotechnology and the Bioeconomy). The document provides the results of the stakeholder workshop. The project partners gave talks about the project results and engaged with attendees from industries worldwide.

2 Introduction

Deliverable D6.6 describes the stakeholder workshop organised within the ReSolve project. In WP6, task 6.2 'Internal and External communication' led by nova aims at promoting the project concept and its results through various dissemination activities and tools. In this context, a stakeholder workshop was planned to take place by month 30 of the project. The consortium decided to organise a stakeholder workshop linked to a bigger event to disseminate the project results in the scientific community.

The objectives of the stakeholder workshop were:

- to transfer the knowledge towards relevant industry stakeholders
- to promote the project concept and highlight results among stakeholders
- to generate scientific discussions and build industrial network

The ReSolve stakeholder workshop, coordinated by nova and UOY, was held in Brussels on 30 September 2019 as a pre-conference event at EFIB 2019. Scheduled at month 28, the workshop was timed to provide the latest advances from the project, whilst still offering the opportunity for the ReSolve partners to implement feedback from the event.

3 ReSolve stakeholder workshop

3.1 Organisation

The stakeholder workshop was coordinated by nova and UOY, with nova leading the dissemination of the workshop within the scientific and industrial community. The workshop was a pre-conference event at EFIB 2019, so the practical organisation was implemented together with the EuropaBio team, the organisers of the EFIB conference. nova and UOY created the programme and EFIB published the event on their website. For the registration, two options were available: through the EFIB 2019 conference site and through the project website for those wishing to attend only the workshop.

A teaser flyer for social media was created by nova and shared by the project partners through their networks including via Twitter and LinkedIn. The event was advertised to the EFIB 2019 attendees, more widely through the EFIB network and also through the nova and EuropaBio newsletters.

Figure 1: Flyer designed for the ReSolve stakeholder workshop

Figure 2:Example social media posts for advertising the workshop

Information and the programme of the stakeholder workshop was disseminated through the EFIB website (https://efibforum.com/programme/resolve-stakeholder-workshop/) (figure 3) and through the ReSolve project website (http://resolve-bbi.eu/stakeholder-workshop/) (figure 4).

Figure 3: Workshop registration page at EFIB 2019 website

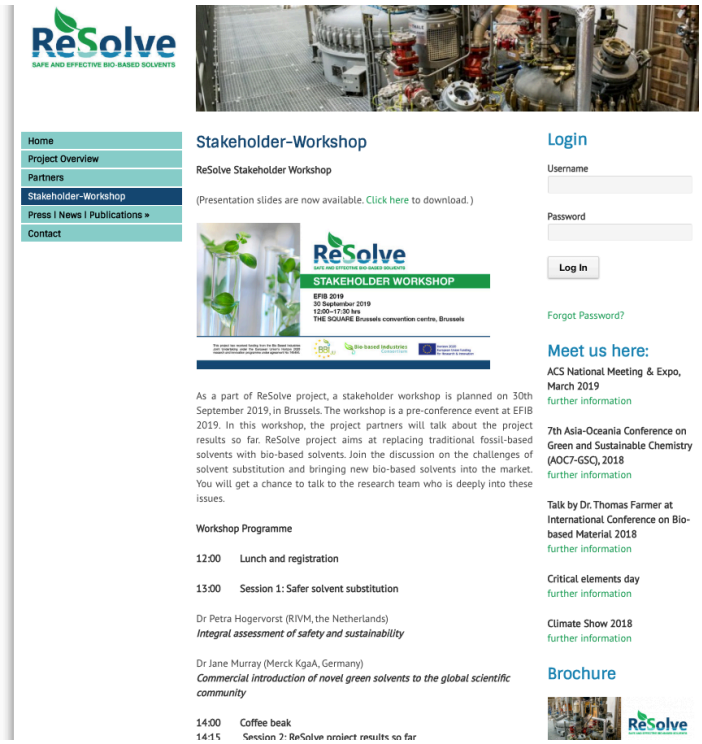

Figure 4: Workshop information page at the ReSolve website

The costs linked to the stakeholder workshop (organisation fee for EFIB) were covered from the nova project budget. Other ReSolve partners taking part in the event as speakers and for organisation used ReSolve dissemination budget to support their travelling fees. Attendance at the workshop was free for all participants, with priority for places given to EFIB 2019 attendees.

3.2 Programme

The programme was divided into three parts: session 1 - Safer solvent substitution, session 2 - ReSolve project results so far and session 3 - Feedback and discussion session. In session 1, external speakers Dr. Petra Hogervorst (RIVM) and Dr. Jane Murray (Merck KgaA) provided the context for the project. In session 2, five members of the ReSolve consortium presented the project results. A detailed programme is shown in figure 5.

12:00-13:00 **Lunch and registration**

13:00-14:00 **Session 1: Safer solvent substitution**

13:00 – *Integrated assessment of safety and sustainability*
Dr Petra Hogervorst, Netherlands National Institute of Public Health and the Environment

13:30 – *Commercial introduction of novel green solvents to the global scientific community*
Dr Jane Murray, Merck KgaA

14:00-14:15 **Coffee break**

14:15-16:00 **Session 2: ReSolve project results so far**

14:15 – *Introduction and highlights*
Prof James Clark, University of York

14:30 – *An integrated testing strategy to evaluate toxilogical safety issues of candidate solvents*
Dr Barbara van Vugt-Lussenburg, BioDetection Systems

15:00 – *Safer and high performing bio-based alternatives to NMP*
Dr Fabien Deswarte, Circa Sustainable Chemicals Ltd
– *TEE and LCA of the most promising NMP and Toluene alternatives*
Dr Ángel Puente, nova-Institut GmbH (combined talk with Dr Deswarte and Dr Byrne)

15:30 – *Safer and high performing bio-based alternatives to Toluene*
Dr Fergal Byrne, University of York

16:00-17:00 **Session 3: Feedback and discussion session**

Challenges of solvent substitution and bringing new solvents to market

17:00-17:30 **Wrap-up**

18:00 **EFIB 2019 Welcome Reception**, Panoramic Hall, THE SQUARE

All workshop attendees are invited to the EFIB 2019 Welcome Reception

Figure 5: ReSolve workshop final programme

3.3 Results

The audience of the ReSolve stakeholder workshop were an international public of 39 participants from 13 countries. A list of organisations is provided at Appendix 1. Initially 65 participants registered for the event through registration at the EFIB and project websites.

Most of the participants originated from industry in various disciplines include biotechnologies, organic chemistry and process engineering. In addition, some participants came from academic institutions.

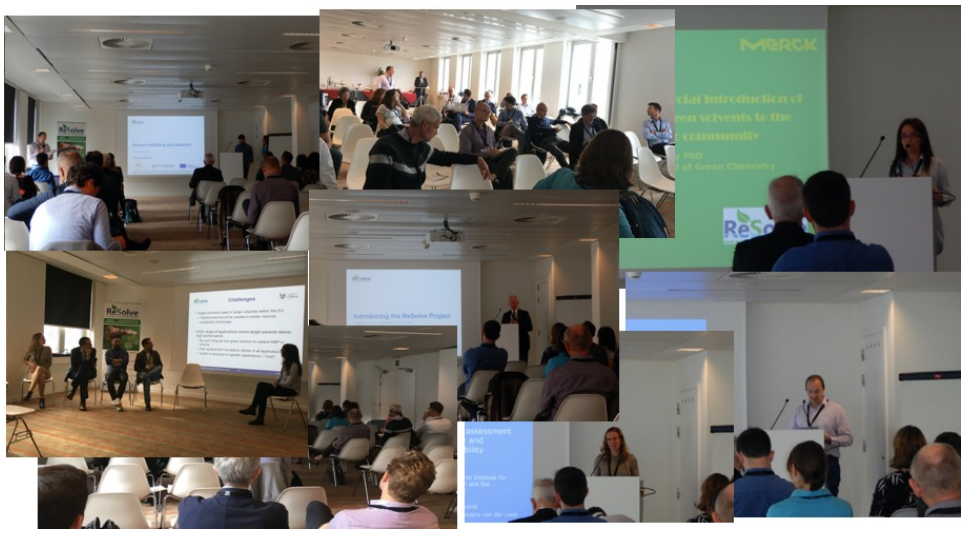

Figure 6: Selected pictures from the workshop

The workshop provided an opportunity not only to highlight and disseminate results from the project but also to stimulate in-depth discussions between partners and stakeholders. Questions to the speakers were taken following each presentation and during the wider discussion panel session.

The project shared some lessons learnt, including: the benefits of early toxicity screening to focus research efforts, matching the properties of a solvent does not necessarily give matching performance and there is no one green solution to replace NMP or toluene.

Discussion points included a consideration of what the priorities are: e.g. safety, sustainability and environmental impact, bio-based. The general consensus was that safety was the most important to end-users, with high performance also a major consideration. Bio-based was less important, although attendees noted that this would become more important through the need to move to a more circular economy. One attendee recommended that the project should focus on open systems, as closed systems do not have the same safety concerns.

Questions included whether there was sufficient demand for replacing toluene as a solvent. Large companies such as Walmart have set targets to remove toluene, showing this is an area of interest for the market. Another question focused on the importance of boiling point for the solvents considered. It was noted that this is specific to the application in question, for example if recovery/solvent removal is necessary or not. The project was asked whether gamma-valerolactone was being considered. As a lot of work is being done with this solvent, the project is focusing on other platforms. Particularly as it is currently only available in small volumes within the EU. A brief discussion on the use of solvent mixtures reflected on the opportunities and challenges this would bring. More detailed investigations using a solvent mixture would be application dependent, with perhaps greater opportunities where it was not necessary/possible to recover the solvent e.g. paints and coatings.

There was significant interest in the two lead solvent candidates in the project, Cyrene and TMO, including availability of the solvents. For Cyrene, earlier in 2019 Merck launched its commercial sale. Experiences from both sides of the commercialisation process were shared with the attendees. For TMO, it was explained that evaluation samples are available once a Material Transfer Agreement is in place. There was also interest in availability of the CALUX assays for industry. BDS provide this analysis as a commercial service.

Due by the end of the project, completing and reporting the outcome of testing TMO in an industry application at pilot scale will increase industry interest. Further publications, currently in preparation, will also be key for getting the market interested in the project outcomes.

All the PowerPoint presentations from the workshop are available at the project website (http://resolve-bbi.eu/press/news/) and were sent to all registered attendees and the ReSolve consortium by email. Copies of the presentations are included as Appendix 2 to this report.

The EFIB team created a post-conference survey for the workshop and the attendees' impressions of the workshop were favourable. The overall feedback from the attendees were very positive and 92% attendees would recommend this event to their colleague. Also, the rating provided by the attendees was positive, with >90% of responses 'good' or 'excellent'. These analytics are shown in figure 7.

The questionnaire outcomes supported the fact that the event was successful in building new contacts, and for some of them the event was an eye opener to know more about the developments to bring sustainable solvents to the industry. Some impressions are depicted in figure 8.

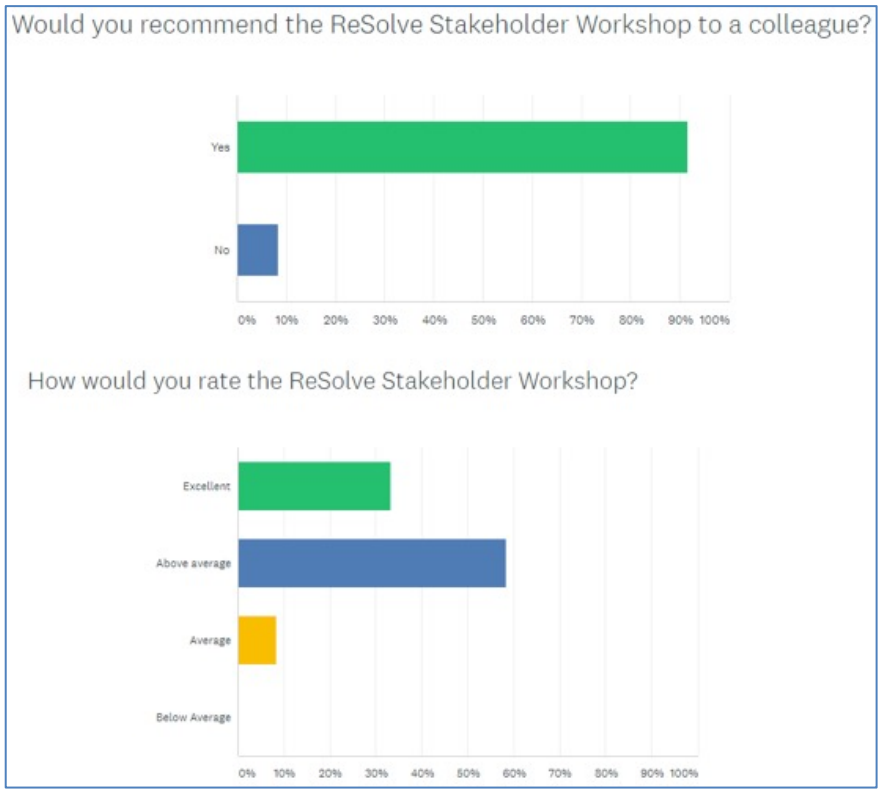

Figure 7: Results from the feedback survey

Q7 What did you like most about the workshop?

Answered: 9 Skipped: 69

#	RESPONSES	DATE
1	Hearing from different members of the project.	10/9/2019 12:56 PM
2	The new information and the new contacts I have gained	10/9/2019 11:47 AM
3	I liked that the subjects discussed have a direct application in the industry. I was a little disappointed at not seeing a projected use, re-use and waste discussion. I would have like to see some industry and business input - e.g. from introducing the new products to R&D, how do the developers and commercialising firm see the work continue.	10/7/2019 12:33 PM
4	Good overview of the EU project and its most important results	10/7/2019 11:47 AM
5	The spirit of partnership between companies and the university (York), even in the presentations and discussions.	10/7/2019 1:56 AM
6	Was an eye-opener for someone coming from a fermentation background	10/4/2019 1:18 PM
7	The parallel between presentations and meetings. All within a nice context	10/4/2019 11:14 AM
8	each part of the project have been explained by different speakers, all well connected between them.	10/3/2019 5:17 PM
9	the description of the methodology applied in the project	10/3/2019 5:15 PM

Figure 8: Response to survey question: What did you like most about the workshop?

4 Conclusions

The ReSolve stakeholder workshop planned was planned and delivered on time within the project. It was successful in regard to attracting relevant attendees and based on their feedback. The event was helpful for the consortium in terms of building industry networks and to take note of what to consider for a follow-up project or next steps.

5 Appendix 1: Organisations attending the workshop

Organisation	Country
Abstraction bio-based opportunities	The Netherlands
AVA Biochem	Switzerland
Bio Base Europe Pilot Plant	Belgium
BioDetection Systems	The Netherlands
Capricorn	Belgium
Cefochim	Belgium
Chart Biotechnology	Denmark
Circa	Australia and UK
dieWurmfarm	Austria
ENI Corporate University	Italy
Enzymaster	Germany
FGen	Switzerland
FHNV	Switzerland
Givaudan	Switzerland
Green Rose Chemistry	United Kingdom
Hermetia Baruth GmbH	Germany
Holiferm	United Kingdom
IBC Finland ry	Finland
Institute of Chemical and Engineering Sciences	Singapore
Karel de Grote Hogeschool	Belgium
LAMBIOTTE & Cie. S.A.	Belgium
Merck	United Kingdom
nova-Institute	Germany
RIVM	The Netherlands
SEPPIC	France
SuikerUnie	The Netherlands
Syngulon	Belgium
Tech Manage Corp.	Japan
TNO	The Netherlands
University of York	United Kingdom
Vienna Textile Lab	Austria
Wageningen University & Research	The Netherlands

6 Appendix 2: Presentations from workshop

1: Integral assessment of safety and sustainability - Dr Petra Hogervorst, RIVM.

2: Commercial introduction of novel green solvents to the scientific community – Dr Jane Murray, Merck KgaA.

3: Introducing the ReSolve project – Prof. James Clark, University of York.

4: An integrated testing strategy to evaluate toxicological safety issues of candidate solvents – Dr Barbara van Vugt-Lussenburg, BioDetection Systems (introduced by a brief summary of the solvent modelling and selection process by Dr Fergal Byrne)

5. Safe and high-performing bio-based alternatives to NMP – Dr Fabien Deswarte, Circa and Dr Ángel Puente, nova Institut.

6. Safe and high-performing bio-based alternatives to toluene – Dr Fergal Byrne, University of York and Dr Ángel Puente, nova Institut.