D6.4 New Tools to Enhance Innovation Up-Scaling: Best Partnership Brokerage Practices

www.fire-res.eu

fire-res@ctfc.cat

Project Acronym: FIRE-RES

Project name: Innovative technologies and socio-ecological-economic solutions for fire resilient territories in Europe

Call ID: H2020-LC-GD-1-1-2020 (Preventing and fighting extreme wildfires with the integration and demonstration of innovative means)

Work Package: 6

Task Number: 6.4

Lead beneficiary: European Forest Institute

Contributing beneficiary(ies): Pau Brunet (CTFC), Christophe Orazio (IEFC)

This document was produced under the terms and conditions of Grant Agreement No. 101037419 of the European Commission. It does not necessarily reflect the view of the European Union and in no way anticipates the Commission's future policy in this area.

Publication

Publication date:

29/09/2025

Authors:

Anne Ackermann, EFI; Franciszek Kaczmarek, EFI; Inazio Martinez de Arano, EFI;

Abstract:

The FIRE-RES project, funded under the EU Green Deal, developed and tested innovative solutions to build wildfire-resilient landscapes across Europe and beyond, with a particular focus on extreme wildfire events. Recognising that up-scaling innovation requires more than technology alone, FIRE-RES established the Innovation Acceleration Hub to integrate place-based needs, multi-stakeholder engagement, and entrepreneurial pathways. The Hub drew on eleven Living Labs as real-world testing grounds, while fostering collaboration between project-internal Innovation Actions and external solutions recruited via an Open Innovation Challenge. Through a comprehensive acceleration programme, the Hub provided innovators with tools such as readiness self-assessments, skills training, business and exploitation planning, as well as tailored brokerage of partnerships with researchers, entrepreneurs, policymakers, communities, and end-users.

The project's partnership brokerage activities played a central role in linking solution seekers with solution providers. They included online visibility formats like Forestry Speed Dating and Innovation Action Webinars, in-person matchmaking events in the form of the Innovation Days series, and real-world innovation testing opportunities in Living Labs. Individualised brokerage – such as targeted introductions, customised coaching, and access to international institutions – further enhanced adoption likelihood and opportunities. These activities created an extensive community of wildfire innovation practice, supporting both societal and institutional integration, and market uptake of innovations.

Lessons Learnt:

- Centralised coordination through the Innovation Hub ensured effective and synergistic support.
- Living Labs proved essential for contextualising innovations, fostering adoption, and validating real-world applicability.
- A dual strategy of recruiting both research-driven and entrepreneurial innovations broadened scope and impact.
- Effectiveness and impact of partnerships brokerage are increased by combining broad matchmaking with tailored introductions for expertise building and business acquisition.

- Online pitching formats are cost-effective for visibility; in-person events enable more immediate deep engagement and collaboration.
- Embedding field visits and place-based testing significantly enhances feedback, learning, and stakeholder buy-in.
- Bringing multiple innovators together encourages collaboration rather than competition, opening new synergies.
- Testing in Living Labs confirmed the value of place-based co-creation and validation, benefiting both innovators and stakeholders, ultimately encouraging adoption.
- Business model development, IPR support, and investor access are crucial for moving from technical readiness to market maturity.

Key words:

Extreme Wildfire Events, Wildfire Risk Management, Innovation Acceleration, Up-scaling Partnerships Brokerage,

Quote as:

Ackermann, A., Kaczmarek, F., and Martinez de Arano, I.; (2025). FIRE-RES New Tools to Enhance Innovation Upscaling. Deliverable D6.4 FIRE-RES project. 41 pages. DOI: 10.5281/zenodo.17208433

DOI: 10.5281/zenodo.17208433

Dissemination level

[X] PU- Public: must be available in the website

[ ] CO- Confidential: Only for members of the Consortium and the Commission Services

[ ] CI – Classified: As referred in to Commission Decision 2001/844/EC

Document history

Edition	Date	Status	Author
Version 1	29/08/2025	Draft	Anne Ackermann, Franciszek Kaczmarek, Inazio Martinez (EFI)
Version 2	12/09/2025	Review	Sirpa Kallio (VTT), Jean-Baptiste Filippi (CNRS), Sergio de Miguel Magaña (CTFC)
Final version	26/09/2025	Revisions of reviewers incorporated.	Anne Ackermann, Franciszek Kaczmarek, Inazio Martinez (EFI)

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List of acronyms

CTFC – Centre de Ciència i Tecnologia Forestal de Catalunya

EC – European Commission

EU – European Union

EFI – European Forest Institute

EWE – Extreme Wildfire Event

FSD – Forestry Speed Dating

FWISE – FORESTWISE

IA – Innovative Action

IEFC - Institut Européen de la Forêt Cultivée

INESCTEC – Instituto de Engenharia de Sistemas e Computadores, Tecnologia e Ciência

IPR – Intellectual Property Rights

LL - Living Labs

NGO – Non-Governmental Organisation

OIC – Open Innovation Challenge

R&I – Research and Innovation

TRL – Technology Readiness Level

TSYLVA – Technosylva

UN – United Nations

WP – Work Package

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Disclaimer

The present text outlines the activities carried out in the FIRE-RES project to facilitate effective partnerships brokerage for the purpose of up-scaling the wildfire risk mitigation and management innovations developed within FIRE-RES and in association with it. As the effectiveness of such activities depends on contextual specificities as well as the nature of the innovation and the engagement of the innovator, the present paper is not a conceptual one aiming to review and assess commonly available practices or to recommend any of those as superior to others in general terms. Instead, it provides an outline and discussion of the practices carried out, and outcomes observed in this particular project. The lessons learnt from the experiences of the FIRE-RES context may be informative for future up-scaling oriented partnerships brokerage in comparable contexts of European Commission-funded innovation-focused projects.

1. Introduction

FIRE-RES is a Green Deal innovation action (Call ID: H2020-LC-GD-1-1-2020), with the mission to drive a socio-ecological transformation towards wildfire-resilient landscapes in Europe. Specifically, the project developed, tested and promoted innovation in wildfire risk mitigation – with a focus on extreme wildfire events–, facilitating a series of discursive and practical shifts across multiple domains. These shifts can be summarised as:

- From an approach to wildfire as an emergency to cope with, to a comprehensive consideration of social, economic, cultural and ecological factors in a full of government approach
- From a top-down disaster management decision making, to more inclusive, planning, practices and mechanisms, enabling adaptive strategies and community led initiatives
- From the conventional focus on suppression and response during fire events to paying equal attention to prevention and preparedness before, and recovery and adaptation after a wildfire, implementing 'better build back' principles
- From the long-standing focus and resource allocation on equipment and technologies, to the recognition of the need to support socio-political, socio-economic, socio-ecological initiatives, and nature-based solutions rooted in local communities.
- From a fear of overwhelm by fire (especially, increasingly frequent and intense Extreme Wildfire Events) to a confidence in the ability to live with them.

Promoting and up-scaling innovation in wildfire risk mitigation and management as conceptualised by the project, therefore, not only required provision of fresh ideas for advanced technologies, equipment and decision support systems tailored to the needs of firefighters and emergency services who are long-standing stakeholders in the field, but also the provision of a solid conceptual framework, and practical solutions across all the different policy domains, areas of expertise and stakeholder groups that are implicated in the generation of more resilient landscapes, and safer communities throughout the disaster management cycle.

Consequently, FIRE-RES has not only supported the development and upscaling of concrete wildfire risk management innovations, but has also fostered big-picture thinking among wildfire innovation stakeholders, and promote transdisciplinary and cross-sectoral collaboration, for the achievement of truly integrated wildfire management – both conceptually and in practical terms.

Specifically, innovations for practical application in the following fields were developed (IAs), identified (through the OIC), supported and included in the up-scaling efforts of the FIRE-RES:

- Decision support models and technologies to understand and manage wildfire risk, with a focus on extreme wildfire risks.
- Adaptive landscape design and territorial management, including solutions for better build back.
- Governance and participatory structures for wildfire resilient landscapes, including awareness raising and innovative economic incentives.

Definitions

For the purpose of this document, 'up-scaling' shall cover the notions of expanding reach, both in physical spread (i.e. geographical application) and conceptual acceptance (i.e. societal and institutional integration) terms. The reason for this is that the terms 'up-scaling', 'out-scaling' and 'deep scaling' often used to denote different elements of this unified interpretation lack agreed definitions and disambiguation, and all of the elements described therein are relevant here.

The notion of 'improvement' sometimes also connoted in the term 'up-scaling' is also highly relevant to the activities described in this document but captured separately as 'innovation development' and 'acceleration'. This allows for highlighting the impacts of FIRE-RES's partnerships brokerage activities vis-à-vis adoption likelihood and actual adoption rather than a focus on innovation specificities irrespective of likely adoption and impact creation.

FIRE-RES upscaling and partnerships brokerage approach

Context and rationale – Bringing together place-based innovation needs and wide-ranging innovation development and implementation provision allowed for an effective contribution to the development of resilient territories and communities.

FIRE-RES is organised around 11 Living Labs, conceptualised as multi-actor communities for innovating in wildfire risk management, including through testing and validating the locally relevant Innovation Actions developed inside the project, as well as other relevant innovation recruited at global level through the Open Innovation Challenge (OIC).

In order to support the development, uptake and upscaling of innovation at the interface of project internal innovations, external OIC-recruited innovators and the locally rooted Living Labs, a comprehensive innovation development, acceleration, upscaling and exploitation programme was designed and implemented as the FIRE-RES Innovation Hub.

The formalisation of an Innovation Hub also allowed a deeper collaboration with other activities and structures of the project, and notably the conceptual work around the resilient landscapes and safe communities in a context of extreme-wildfire events, the new knowledge created on economic incentives to activate action and landscape level, the broader project dissemination and exploitation activities, as well as the expertise and networks of the advisory board.

The FIRE-RES setup for innovation sourcing – Combining research and entrepreneurialism to create a comprehensive community of wildfire innovation practice

A two-pronged approach to sourcing innovations for development and up-scaling was adopted in the conceptualisation and implementation of the FIRE-RES project. On the one hand, this involved pre-devised innovations enshrined in the project as a set of 34 Innovation Actions that were then developed by appropriate project partners, spanning research institutions to private companies. On the other hand, a strong element of open innovation was included in the project's description of action. This was implemented via an international call for contributions in an Open Innovation Challenge held in the autumn of 2023, which returned 55 participating project-external innovators who participated in the Hub's acceleration programme from early 2024 until mid-2025.

Figure 1. FIRE-RES Innovation sourcing strategy.

This double strategy had the advantage of allowing the recruitment of a more comprehensive and more varied set of innovations to the project. It also complemented the strong research focus of some of the project-internal innovations with a larger number of more entrepreneurially oriented ones. This allowed the project to create strong links to the existing and ever-increasing private sector activities in this field, i.e to an important part of the relevant community of practice that addresses wildfire risk mitigation and management.

Partnerships brokerage through place-based co-creation and testing – Building a strong foundation for innovation adoption

At the foundation of all of FIRE-RES's activities were the eleven Living Labs FIRE-RES developed to identify and reach wildfire innovation beneficiaries in territories across Europe and beyond; they are located in Greece, Bulgaria, Norway and Sweden, Germany and The Netherlands, Italy (Sardinia), France (Nouvelle Aquitaine), Spain (Catalonia, Galicia and Canary Islands), Portugal, and Chile.

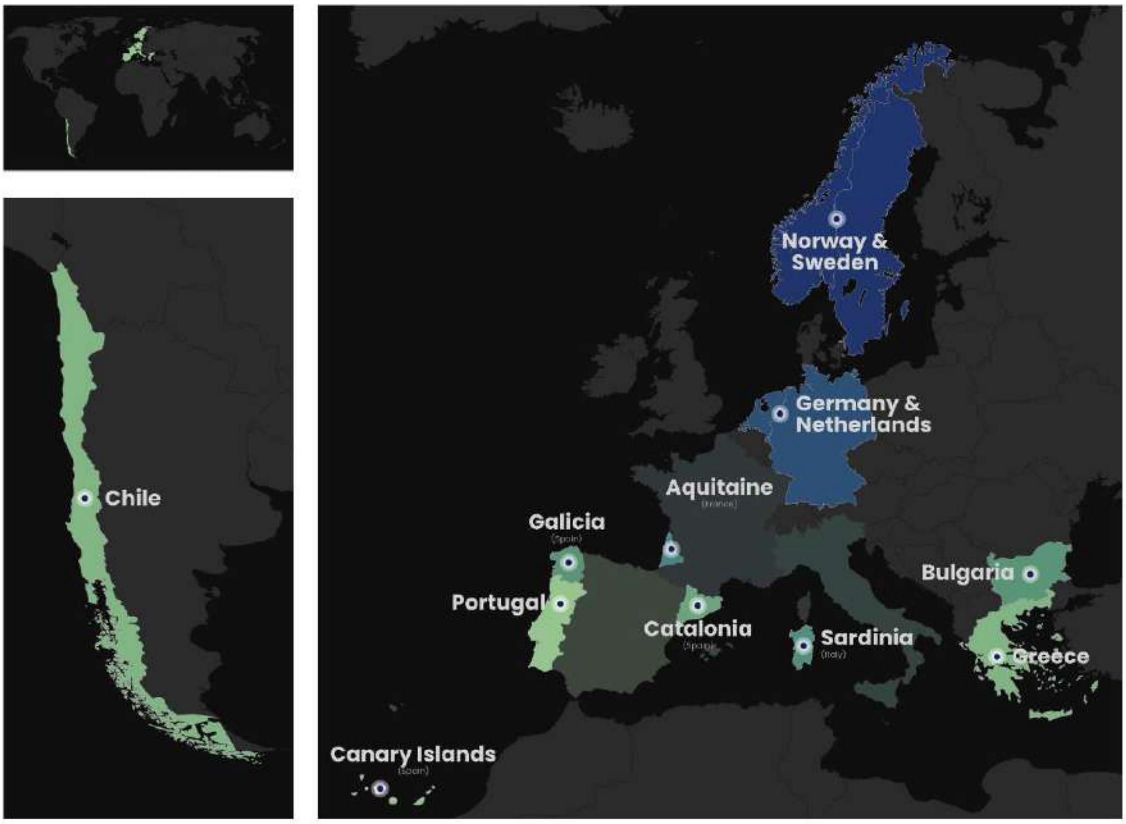

Figure 2. Eleven Living Labs across Europe and in Chile: real-world innovation co-creation and testing locations.

Each Living Lab was coordinated by a FIRE-RES project partner, creating a community of relevant local and regional stakeholders (the 'Communities of Wildfire Innovators': CWI), which to engage for the purpose of developing, demonstrating and deploying the project's innovations.

The Living Labs involved in the project were at different stages of development and coordinated by various partners, with some being pre-existing initiatives and others established specifically for the FIRE-RES project. This diversity justified our tailored approach and capacity-building efforts.

Table 1. Further information on Living Labs.

Living Lab	More information
Bulgaria	https://fire-res.eu/living-lab/living-lab-bulgaria/
Canary Islands – Spain	https://fire-res.eu/living-lab/living-lab-canary-islands/
Catalonia – Spain	https://fire-res.eu/living-lab/catalonia-spain/
Chile	https://fire-res.eu/living-lab/living-lab-chile/
Galicia – Spain	https://fire-res.eu/living-lab/galicia-spain/
Germany–The Netherlands	https://fire-res.eu/living-lab/living-lab-germany-the-netherlands/
Greece	https://fire-res.eu/living-lab/living-lab-greece/
Norway-Sweden	https://fire-res.eu/living-lab/living-lab-norway-sweden/
Nouvelle Aquitaine – France	https://fire-res.eu/living-lab/living-lab-nouvelle-aquitaine/
Portugal	https://fire-res.eu/living-lab/living-lab-portugal/
Sardinia – Italy	https://fire-res.eu/living-lab/living-lab-sardinia/

Beyond specific insight creation for each location and general knowledge sharing among the stakeholders of individual Living Labs as well as across them, which was coordinated by the respective project work package, these communities had two key functions: firstly, during the design of the Open Innovation Challenge, they were involved the identification of specific innovation needs (or challenges) in their location that guided the selection of innovations for development and up-scaling. Secondly, they provided testing and stakeholder engagement opportunities under realistic conditions that allowed innovators from both the Innovation Actions and the OIC cohort to advance the societal and institutional integration of their innovations and to increase the geographical application areas to market them in.

Empowering Living Labs to effectively co-design and implement to Open Innovation Challenge

Importantly, significant time and resources were invested in socialising the concept and approaches to Open innovation at monthly online coaching sessions celebrated during the first year of the project. During these sessions the different aspects and methodologies for the FIRE-RES open innovation challenges were presented and discussed and later fixed in the OIC manual that served as a reference document. An in-person full day *train the trainers* workshop was celebrated to transfer the methodology designed to identify the Open Innovation Challenge themes, that were to be define by the Living land stakeholders. The process to design the challenge themes was further supported through regular monthly meetings, fostering knowledge exchange, peer to peer support, and joint problem-solving.

Creating this common foundation is considered a necessary condition for a successful co-creation and implementation of the Open challenge.

All further steps in the process of implementing the OIC from the dissemination and recruitment of applicants to the evaluation and selection of solutions, to the implementation of demonstration and piloting activities were implemented in collaboration with the living labs

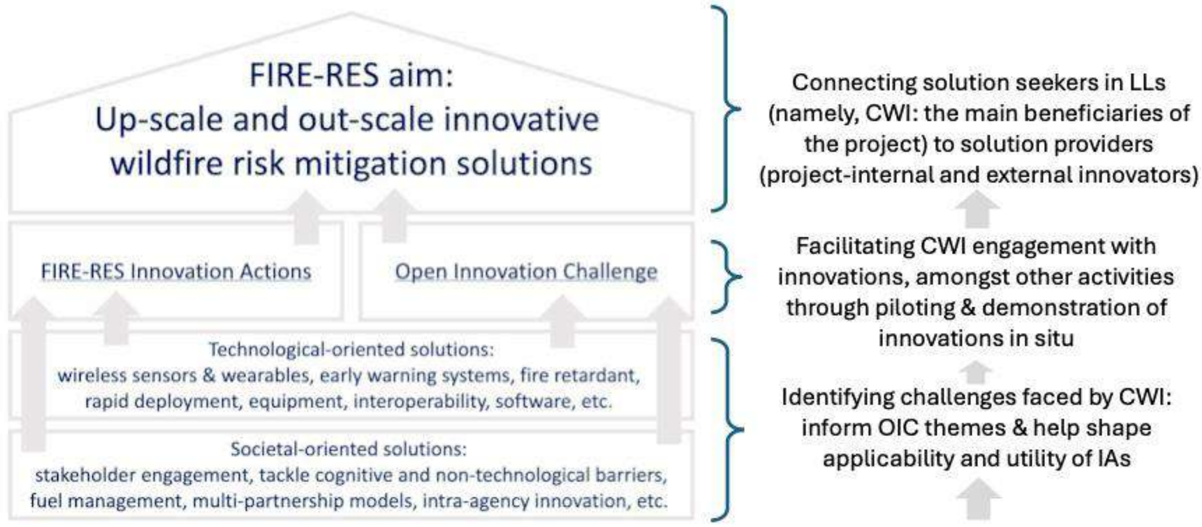

Figure 3. Overview of Living Labs interaction with innovations.

This input from the Living Labs ensured relevance of the innovations developed and advanced by FIRE-RES in a range of geographical and socio-cultural contexts and increased the likelihood of buy-in and adoption by potential later users in these contexts and beyond. Throughout the project, and especially as innovations associated with it matured, the Living Labs further engaged by providing innovators opportunities for and feedback to innovation presentation, testing, piloting and demonstration activities to assess their utility, local suitability and effectiveness, to facilitate improvement or adaptation, adoption support, further idea development, and so forth. In this way, local stakeholders were able to review and consider up-and-coming products, and innovators gained business contacts and market insights for up-scaling as well as technical feedback for product development and improvement.

2. Implementation of innovation support through the FIRE-RES Innovation Acceleration Hub

FIRE-RES innovation Hub in a nutshell

The conceptualisation of the Innovation Hub – not initially foreseen as such at the start of the project – allowed for a closer coordination of the different innovation support activities originally designed, and for the cross-fertilisation of internal and external innovations. It also required the development of tools to more precisely assess innovation support needs, and new support tools, in order to provide targeted support and to facilitate partnerships among a more diverse range of stakeholders.

The design parameters of the FIRE-RES Innovation Hub are:

- The Hub takes as the foundation the project's eleven Living Labs. These are innovation co-creation locations and test beds that provided real-world environments with contextually specific wildfire situations, innovation needs and stakeholder landscapes. They provided an opportunity for innovators to co-develop, showcase and validate their ideas, initiatives, products and services, and to source partners (e.g. advisors, collaborators, prospective clients, etc.) and end users – achieving societal and institutional integration as well as geographical spread.
- The Hub – initially designed for Open Innovation Challenge participants but, upon further consideration, opened to the Innovation Actions as well – supports and cross-fertilises both project internal innovations, as well as external ones recruited through the OIC
- The Hub brought together *solution seekers*, such as wildfire risk mitigation stakeholders from frontline operations, public administration and community engagement to research and policy making, etc., in the geographically and socially diverse locations of the Living Labs with solution providers ranging from early idea innovators and researchers to burgeoning entrepreneurs and established companies. As a result, the project created an extensive community of practice that effectively cross-fertilised each other's thinking and practice in the development and up-scaling of wildfire innovations and forms the basis of innovative action in the field long beyond the duration of the project.
- To achieve this in a cost-effective way, the design of the Hub allows for triage of innovations based on a self-assessment of the maturity and preparedness of each solution to be supported, based on a set of tools adapted from KTH's Innovation

Readiness Levels™ concept and toolbox[1]. This assessment of innovation readiness considered different dimensions such as technology, business model and IPR strategy, among other elements (see Figure 1) and allowed innovators to already identify their priorities for action, and their need for new partnerships, while simultaneously introducing them to the knowledge emerging from science and practice, and to suitable experts who could be approached for expert advice on an individual basis.

- Based on this assessment, the acceleration programme implemented through the FIRE-RES Hub offered a series of support activities –organised in six pillars, Figure 6 – ranging from training workshops for wildfire expertise, development of entrepreneurial skills (including business model ideation and IPR and knowledge transfer), to a variety of matchmaking set ups, including online and in-person pitching opportunities, in-situ piloting and demonstration activities, as well as tailored one-to-one coaching with sector experts and investors. It also provided targeted partnerships brokerage to help identify potential technology and data providers, investors, as well as early adopters and end users in different locations across Europe.
- Finally, the outcomes of the acceleration programme targeting open innovation applicants were co-evaluated with the innovators themselves and Living Lab stakeholders.

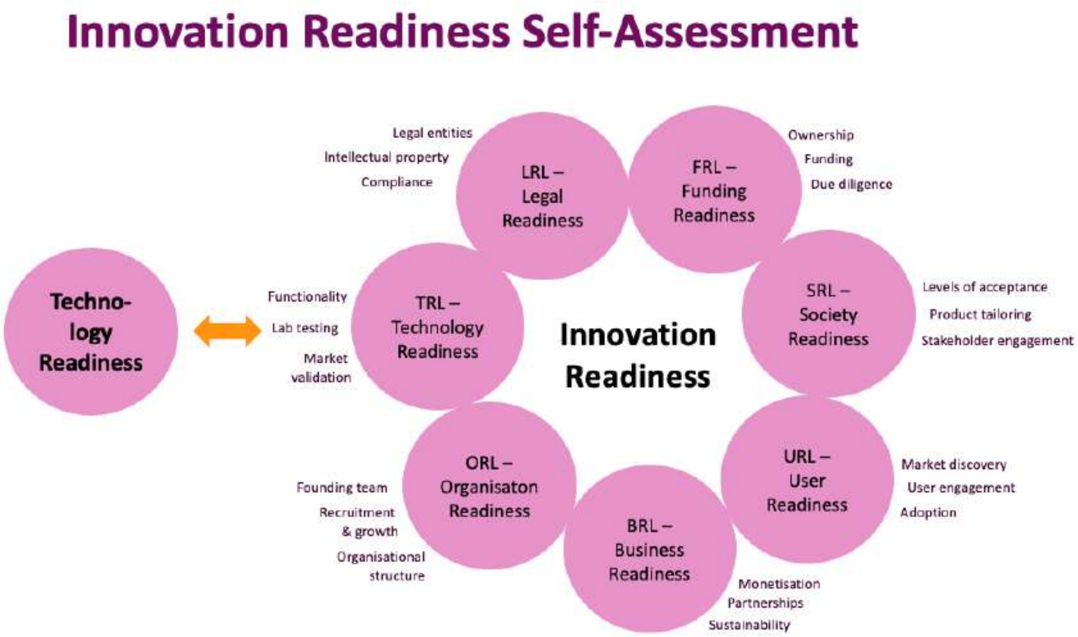

Figure 4. Seven dimensions of Innovation Readiness Self-Assessment contrasted with the singular focus of conventional TRL assessment (adapted from KTH Innovation Readiness LevelsTM)

[1] https://kthinnovationreadinesslevel.com

As a result of all of this, FIRE-RES went well beyond the more passive provision of booster platforms or matchmaking portals often utilised in EC-funded projects to develop a much more actively involved upscaling strategy.

The synergies created between the Living Labs and the innovators were only one benefit that the matchmaking activities of the FIRE-RES Innovation Hub facilitated. By extending its offer to both the OIC participants and representatives of the IAs in all its activities, the Hub also actively provided matchmaking opportunities among the two groups of innovators as well as between them and external actors. External innovators and project partners had the opportunity to meet, exchange information and ideas, and establish relationships through combined online and on-the-ground pitching and training opportunities. Connections between both IA and OIC innovators and relevant third-party contacts were facilitated through the Hub's training activities and dedicated introductions, which covered topic areas such as business model development coaching, IPR coaching, venture finance coaching and wildfire expertise coaching. Combining content and formats that were exclusively designed for the innovators associated with FIRE-RES to create an overarching offer that was specific to the wildfire field with on-demand individually tailored matchmaking with advisors and collaboration partners, was highly effective. By taking this approach, the Hub provided a central point of contact to support all innovators through a large variety of partnerships brokerage activities that amounted to a full acceleration programme for innovation development, up-scaling and exploitation support. The constituent activities are described in the following paragraphs.

Figure 5. Pillars of the Innovation Acceleration Programme.

3. Partnerships brokerage as part of the general acceleration programme

As the partnerships and up-scaling support needs of innovators vary depending on the setup of their endeavour (e.g. individual researchers versus fully fledged companies), the maturity of their innovation (e.g. early idea versus high technology or functional readiness), and local context (resources, competition, society readiness, etc.), partnerships brokerage should involve a variety of activities that allow innovators to cast the net widely for dynamic discovery of opportunities as well as to focus on achieving strategic objectives through dedicated introductions. The FIRE-RES Innovation Hub's offer covered activities to reflect this full spectrum.

Forestry Speed Dating

A half-year series of online pitching events open to a public audience gave the FIRE-RES innovators access to a broad visibility format at comparatively low resource requirements. Itself a partnership between FIRE-RES and the European Forest Institute's Bioregions Facility, the series was part of the latter's long-standing 'Forestry Speed Dating' series. This is a webinar series covering a variety of forest innovation topics, with an established and continuously growing audience, and a well-rehearsed publicity routine spanning pre-event innovation promotion on social media and impactful newsletters as well as compilation, post-event, of an online innovation repository. Six consecutive sessions featured 18 innovations, and covered topics relating to all phases of fire management circle. The series reached a total audience of 725 registered participants from Hongkong to Chile and from North America to South Africa and triggered many conversations exploring collaboration or new market introduction opportunities during and after the webinars themselves. It also highlighted to innovators the chance to join the broader Firelogue community of wildfire innovators and the Bioregions Facility's Forest innovation community and pursue further up-scaling opportunities and activities through them.

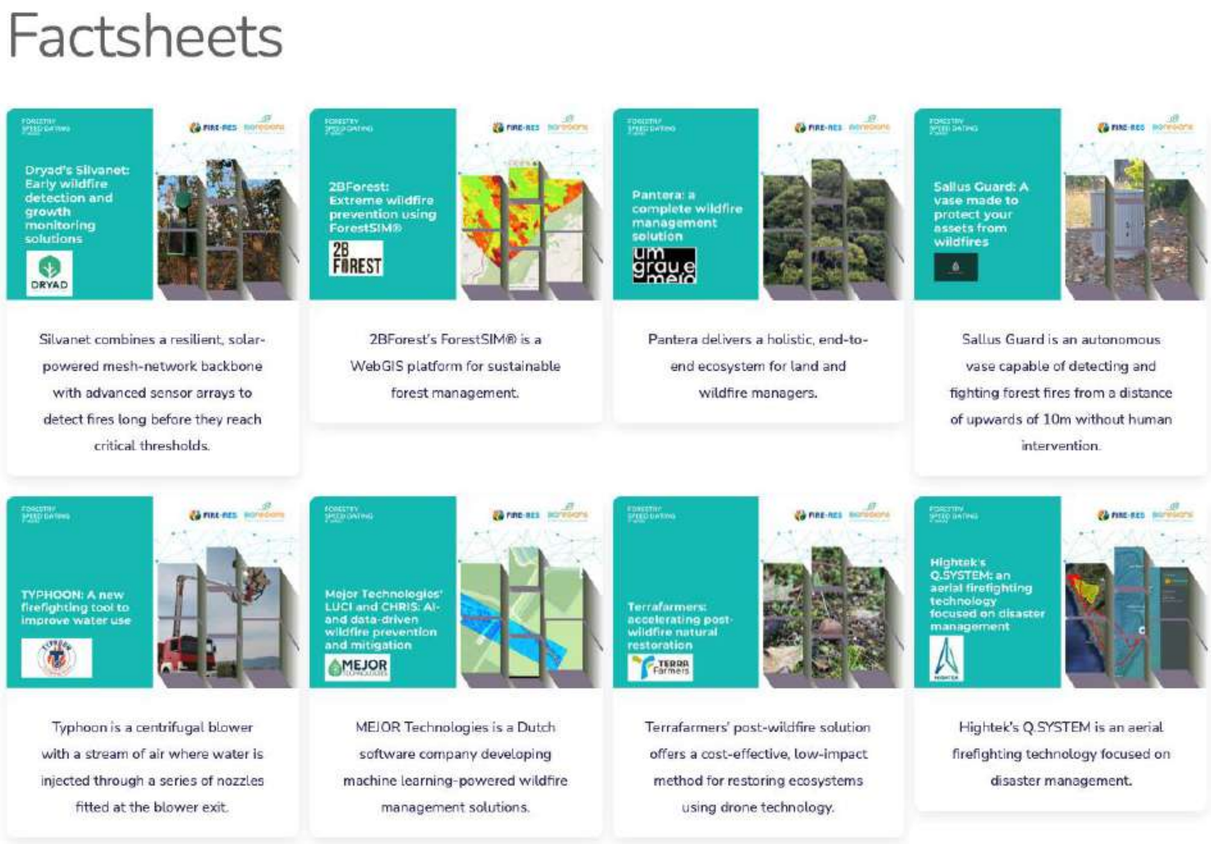

Figure 6. Factsheets on innovations featured in the Forestry Speed Dating series.

The FSD series successfully combined FIRE-RES innovations with the Bioregions Facility's established Forestry Speed Dating format. The experience proved worthwhile by connecting innovators with international networks, potential adopters, advisors, and collaborators. Overall, the evaluation shows that the series effectively delivered visibility, networking, and pathways for upscaling innovation in wildfire resilience.

Further information about the series and recordings of the Forestry Speed Dating webinar series can be found on the website here.

FIRE-RES Innovation Action Webinar Series

Within the FIRE-RES project, an additional webinar series was organised that was exclusive to the project's Innovation Actions. This was done to further their development by providing a regular feedback and co-creation platform in a setting of open and mutual sharing removed from considerations of potential market competition among familiar partners and 'friendly critics'.

The IEFC-led Innovation Action (IA) webinar series that has been designed to foster visibility and cross-work package interaction by showcasing the diverse range of IAs within FIRE-RES. To date, three sessions had been organised, featuring 16 out of the project's 34 Innovation Actions. The first webinar, held in April 2023, featured IAs focused on integrated fire management, innovative data acquisition through remote sensing, novel management practices, strategic suppression networks, and international collaboration tools. The second webinar in June 2023 highlighted advances in early-warning indicators, risk communication around human-caused ignitions, interoperability tools, and vegetation characterization using EO and AI. A year later, in April 2024, the third session presented predictive tools for fire risk, security in the wildland-urban interface, enhanced forest management in fire-prone areas, inclusive policy clinics, optimization of suppression techniques, and prototyping high-altitude platforms for resilience. A fourth webinar is being arranged at the time of writing, and it is planned for the late September 2025, continuing the series with five to six additional IAs. Feedback from the sessions was very positive and constructive, enabling innovators to refine their concepts, strengthen their implementation strategies, and identify new opportunities for collaboration.

Further information about the series and presentations of the Innovation Action webinar series can be found on the website [here.]

FIRE-RES Innovation Days Series

Complementing the online formats, a series of on-the-ground match-making events was organised under the heading 'FIRE-RES Innovation Days Series' and attendance at third-party events facilitated on a convenience basis (e.g. a project partner's conference session at Mediterranean Forest Week and Living Lab activities such as firefighter trainings).

Figure 7. Summary of FIRE-RES Innovation Day Series concept.

While these events facilitated similar innovation development and up-scaling opportunities as the online activities described above, it is important to note that first-hand experiences of and insights into a local context, and direct in-person connections, are qualitatively different to online encounters, and lead to stronger relationships and collaboration. This certainly justifies the comparatively higher resource expenditure they require.

The 'Innovation Days' relied on strong networks of the organising FIRE-RES partners among wildfire innovators and local stakeholder and user communities from the relevant Living Labs.

In Penafiel, Portugal, in October 2024, the first 'Innovation Days' event focused on innovations addressing extreme wildfires through technologies and methodologies, fire-smart communication, building resilient territories, and nature-based solutions. A highlight was the round table "A Boost for Financial Resilient Innovations in Wildfire Management," which drew lessons from California while integrating FIRE-RES innovations and Open Innovation Challenge solutions to strengthen resilience in European communities.

Across two days, 82 participants explored innovations through pitch presentations and hands-on showcasing workstations. The event was praised for its strong atmosphere, effective facilitation of contacts, and focus on practical implementation. A field trip in the Vale de Sousa region provided a valuable local perspective, while discussions around financial resilience offered strategic insights. Overall, the event was rated as a milestone in building bridges among FIRE-RES partners, the OIC innovators, CWI stakeholders, and local actors, setting the stage for concrete actions in wildfire management.