



# **DELIVERABLE 2.2.1 ECOSYSTEM MAP**

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**Abstract:**

The deliverable presents the results of activity AT 2.2 Ecosystem analysis. The deliverable describes the mapping methodology and discuss the various application of value maps in analysing and developing business models. To illustrate the proposed approach, we provide and exemplary case study from Finnish region.



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## 1. Introduction

The following deliverable (DT 2.2.1- Ecosystem map) presents the results of the second activity (AT 2.2-Ecosystem analysis) of the work package T2 (WP T2)- Creating Hydrogen Utilization Business Models. The activity’s objective is to develop understanding of existing (or projected) business ecosystem and create a map depicting business actors and value streams between them. The map is therefore the continuation of AT 2.1. Stakeholders analysis and utilizes the results presented in DT 2.1.1-Stakeholder value analysis.

The report provides mapping approach with illustrative example from Finnish case study. Maps for other regional cases will be presented in further deliverable (DT 2.5.1-Case study scenarios) together with the overall case studies descriptions. The methodology of data collection and preparation have been already presented in deliverable DT 2.1.1- Stakeholder value analysis therefore in current report we focus only on specific aspects related to the map creation. Same applies to the case study description, in the current report we present only a brief overview of the case while the extended version with additional details is available in DT 2.1.1. The revised version of the case will be presented in the final deliverable DT 2.5.1.

In the following parts we first describe the mapping methodology, next present illustrative example of its practical application with case study. In the final part we provide the summary of the conducted work.

## 2. Mapping methodology

The ecosystem maps utilised the data collected during activity AT 2.1-Stakeholder analysis (see DT 2.1.1 Stakeholder value analysis for details). Having identified the business actors (stakeholders from the supply side and customers), value streams between them the map representing these relationships can be created. The create the multi-organization value stream map we follow the approach proposed in Pynnönen et al (2008).

The starting point for map creation is a stakeholder analysis table where all ecosystem stakeholders are listed and classified. Depending on the available information and required degree of resolution the number of considered business actors may vary by including or excluding actors situated further upstream or downstream the supply chain (see figure 1).

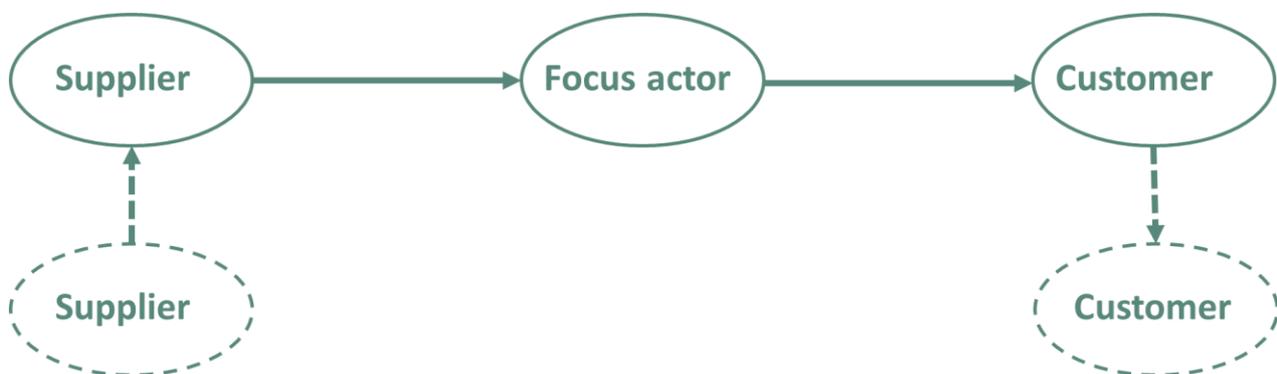


Figure 1. Extending the map upstream/downstream

The value stream consists of company offering and respective reward received from customer. The offering can be classified into products, services, information etc. and reward can be monetary or non-monetary. Similarly, as with the number of actors considered the number of included offerings may vary depending on the mapping objectives. In other words, if the company has multiple various offering only those which play role in the current ecosystem need to be considered.

The finalized ecosystem map describes the relationships between business actors and can be utilized for identifying missing actors/resources thus signaling the business opportunities and for refining the business model of focus organization. In the second case, the map provides systematized input for commonly used business model developing tools such as e.g. Business Model Canvas by Osterwalder (Osterwalder and Pigneur, 2010)

### 3. Case study example

To illustrate the mapping approach, we use Finnish case study. The case study has been thoroughly described in previous deliverable (DT 2.1.1 Stakeholder value analysis) consequently we will omit non-critical aspects and present here just the main details in order to remind the case topic and make the presented map clearer.

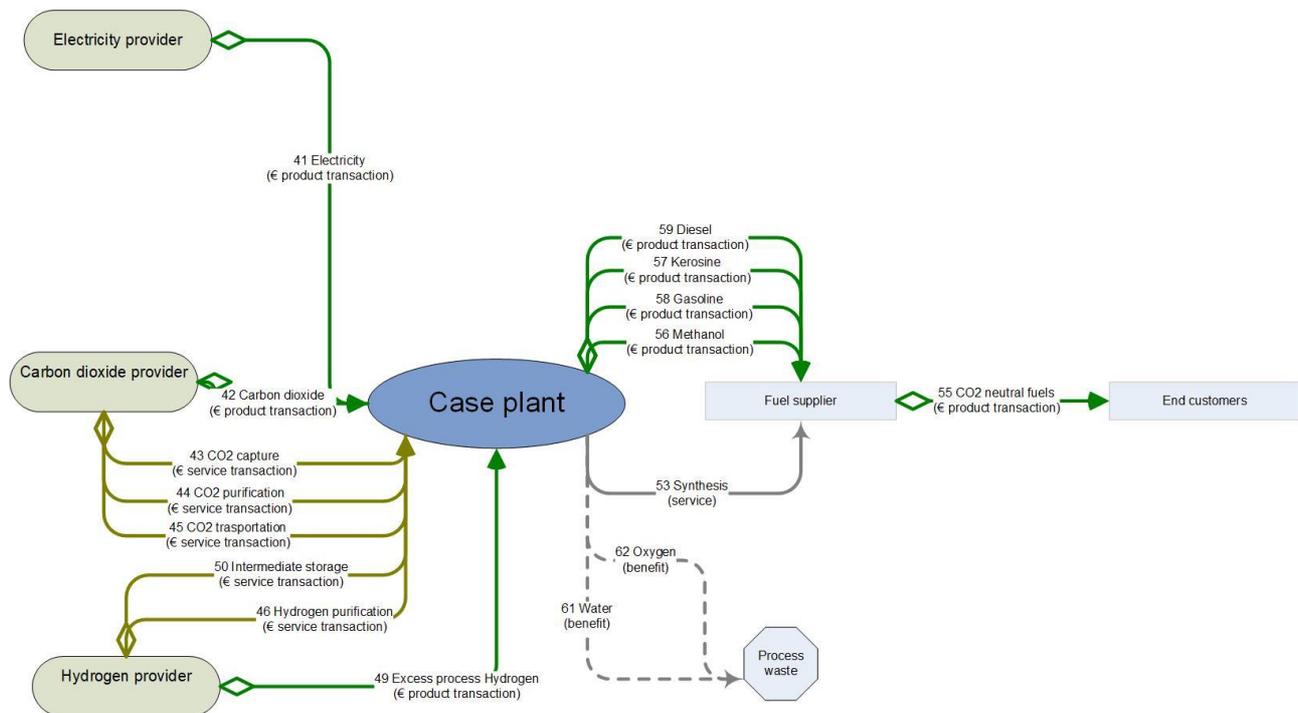
The idea of the case study is to build a plant capable to produce synthetic fuel utilising a by-product hydrogen and CO<sub>2</sub> (emissions) delivered from local manufacturing companies. In addition to already mentioned actors the ecosystem contains also an electricity provider, a customer buying the synthetic fuel and an intermediary company providing services for CO<sub>2</sub> capture, preparation, storage and transportation. Each of these actors has been described in DT 2.1.1 in greater details. We present the stakeholder analysis table as a final outcome of previous stage and the main input for the mapping.

Table 1. Summary of value analysis (from DT 2.1.1)

Business actor	Role in ecosystem (supply side)	Value inflow	Value outflow	Resources required
Synthetic fuel plant	Central (focus actor)	Electricity Hydrogen CO <sub>2</sub> Monetary reward	Monetary reward Monetary reward Monetary reward Synthetic fuel	Technological know-how Equipment and infrastructure
Electricity supplier	Supplier	Monetary reward	Electricity	Green electricity generation capacity
Hydrogen supplier	Supplier	Monetary reward	Hydrogen (by-product)	Technical equipment and infrastructure
CO <sub>2</sub> supplier	Supplier	Reputation Emission payments savings	CO <sub>2</sub>	Technical equipment and infrastructure
CO <sub>2</sub> capturing and handling	Intermediary service	CO <sub>2</sub> Monetary reward	Monetary reward CO <sub>2</sub> (processed, purified, etc.)	Technical equipment and infrastructure

Energy company	Customer	Synthetic fuel	Monetary reward	Technical equipment and infrastructure
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The map is a visual representation of the table, showing the value streams between actors. The map below was drawn in Microsoft Visio.



## 4. Conclusion

The following deliverable describes the mapping process and illustrate it with the case study example. The presented map describes the relationships between business actors within the specific case study ecosystem. The map can be used as such for developing the better understanding of business environment, identifying the business opportunities and serve as an input for developing or modifying the business model with other tools such as Business Model Canvas.

It should be noted that the mapping is an iterative process and after the developing the initial map it should be verified by pilot partners and if necessary updated. Depending on the case study progress the actual business actors (stakeholders and end-users) can be also involved (see data collection methodology in DT 2.1.1). The mapping therefore is a continuous activity which can be adjusted depending on case study development stage and updated as the case study progresses.

## References

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons.

Pynnonen, M., Hallikas, J., & Savolainen, P. (2008). Mapping business: Value stream-based analysis of business models and resources in information and communications technology service business. *International Journal of Business and Systems Research*, 2(3), 305-323.