Prosumers for the Energy Union:
mainstreaming active participation of
citizens in the energy transition

A multi-dimensional typology of
collective RES prosumers across Europe

(Deliverable N° 2.2)

Horizon 2020 (H2020-LCE-2017)
Grant Agreement N°764056

Lead partner for deliverable	DRIFT
Document type	Report
Due date of deliverable	31.08.2019
Actual submission date	30.08.2019
Dissemination level	Public (PU)
Author(s)	Julia M Wittmayer (DRIFT), Maria Fraaije (DRIFT), Lanka Horstink (UPorto), Flor Avelino (DRIFT)
Reviewer(s)	Lars Holstenkamp (Leuphana), Ines Campos (FC.ID), Arthur Hinsch (ICLEI), Tessa de Geus (DRIFT), Bonno Pel (DRIFT), Kiat Ng (UPorto)

Summary of PROSEU

PROSEU aims to enable the widespread adoption of the renewable energy prosumer phenomenon in Europe, as a key condition for the Energy Union. Prosumers of renewable energy sources (RES) are active energy users who both consume and produce energy from renewable sources. The growth of RES prosumerism all over Europe challenges current energy market structures and institutions. PROSEU's research focuses on collective forms of RES prosumers and will investigate how these are influencing and interacting with new business models, market regulations, infrastructures, technology scenarios and energy policies across Europe. Besides surveying collective RES prosumer initiatives, the transdisciplinary research team will work together with a selection of them (15 Living Labs), as well as policymakers and other stakeholders from nine countries, following a quasi-experimental approach to learn how RES prosumer initiatives of all types are dealing with the challenges, and to determine what incentive structures will enable the mainstreaming of RES prosumerism, while safeguarding citizen participation, inclusiveness and transparency. Moving beyond a case-by-case and fragmented body of research on RES prosumers, PROSEU will build an integrated knowledge framework for a socio-political, socioeconomic, business as well as financial, technological, socio-technical and socio-cultural understanding of RES prosumerism and coalesce into a comprehensive identification and assessment of incentive structures for its mainstreaming in the context of the energy transition.

Summary of PROSEU's Objectives

Eight key objectives at the foundation of the project's vision and work plan:

- **Objective 1:** Document and analyse the current state of the art with respect to (150-200) RES Prosumer initiatives in Europe.
- **Objective 2:** Identify and analyse the regulatory frameworks and policy instruments relevant for RES Prosumer initiatives in nine participating Member States.
- **Objective 3:** Identify innovative financing schemes throughout the nine participating Member States and the barriers and opportunities for RES Prosumer business models.
- **Objective 4:** Develop scenarios for 2030 and 2050 based on in-depth analysis of technological solutions for RES Prosumers under different geographical, climatic and socio-political conditions.
- **Objective 5:** Discuss the research findings with 30 relevant stakeholders in a Participatory Integrated Assessment and produce a roadmap (until 2030 and 2050) for mainstreaming RES Prosumerism.
- **Objective 6:** Synthesise the lessons learned through experimentation and co-learning within and across Living Labs.
- **Objective 7:** Develop new methodological tools and draw lessons on how the PROSEU methodology, aimed at co-creation and learning, can itself serve as an experiment with institutional innovation.
- **Objective 8:** Create an RES Prosumer Community of Interest.

PROSEU Consortium Partners

Logo	Organisation	Type	Country
FCiências ID	FCIENCIAS.ID	Private non-profit association	Portugal
U.PORTO FEUP	UPORTO	University	Portugal
ICLEI	ICLEI EURO	Small and medium-sized enterprise	Germany
ClientEarth	CLIENTEARTH	Non-governmental organisation	United Kingdom
UNIVERSITY OF LEEDS	UNIVLEEDS	University	United Kingdom
drift for transition	DRIFT	University	the Netherlands
FSB	UNIZAG FSB	University	Croatia
LEUPHANA	LEUPHANA	University	Germany
eco-union	ECO-UNION	Non-governmental organisation	Spain
IÖW	IÖW	Private non-profit limited company	Germany
CE Delft	CE Delft	Small and medium-sized enterprise	the Netherlands

Table of contents

List of Tables

List of Figures

Glossary

- **Aggregator**: a demand service provider that combines multiple short-duration consumer loads for sale or auction in organised energy markets (Directive 2012/27/EU: European Parliament and Council, 2012). Also defined as "a market participant that combines multiple customer loads or generated electricity for sale, for purchase or auction in any organised energy market" (2017 recast proposal for a new EU Electricity Directive: (European Commission 2017)

- **Energy from renewable sources or Renewable energy:** energy from renewable non-fossil sources, namely wind, solar (solar thermal and solar photovoltaic) and geothermal energy, ambient energy, tide, wave and other ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas, and biogas (RED II Directive).

- **ESCo**: Energy Service Company, according to the European Commission this is a new intermediary in the changing energy market, different from the traditional energy consultants, equipment suppliers or energy utilities. They have evolved in response to the growth in renewable energy production, including prosumerism and may mediate between entities interested in prosuming and the financiers, project developers and energy utilities.(Joint Research Centre (EC) 2019)

- **Hybrid organisation:** a hybrid organisation or entity combines different, sometimes contradictory, goals and logics (economic, social, environmental, etc.) at the core of their activities (Bauwens, Huybrechts, and Dufays 2019).

- **Peer-to-Peer**: "peer-to-peer trading" of renewable energy means the sale of renewable energy between market participants by means of a contract with pre-determined conditions governing the automated execution and settlement of the transaction, either directly between market participants or indirectly through a certified third-party market participant, such as an aggregator (RED II Directive).

- **Prosumer (in energy)**: a 2016 review of prosumer collectives defines an energy prosumer as "a consumer of energy who also produces energy to provide for their needs, and who in the instance of their production exceeding their requirements, will sell, store or trade the surplus energy" (Ford, Stephenson, and Whitaker 2016). This review alone mentions 20 definitions of prosumers, but does not touch upon the different interpretations in different legislations in EU countries.

- **RES Prosumer Initiative**: in the PROSEU study a RES Prosumer Initiative is a collective energy actor that produces energy from renewable sources with the primary objective of providing in its own energy needs and/or those of its members, and in some cases selling excess energy to clients, thereby actively participating in the energy markets. Examples of such a collective energy actor are: cooperatives; informal collectives; not-for-profit organisations (including socio-cultural or sports associations and NGO's); companies in different sectors; public institutions (whether municipalities or schools and retirement homes) and public-private or other forms of partnerships.

- **Legal Form:** the legal structure of an organisation that regulates its purpose, its governance and ownership structure, taxation as well as liability issues.

- **Institutional logic:** frames of references within which collective or individual actors operate and with which they interact (Thornton, Ocasio, and Lounsbury 2012).

- **Prosumerism mainstreaming**: the process through which prosumerism becomes part of incumbent energy systems and the dominant ways of doing, thinking and organising (Wittmayer et al. 2019).

Executive summary

This report is part of Work package 2 (WP2) of the PROSEU project - *Baseline analysis and Characterisation of Renewable Energy Sources (RES) Prosumer Initiatives*, which set out to establish an understanding of the characteristics and challenges of collective renewable energy prosumer initiatives. The present report, Deliverable D2.2, reports on the results of *Task 2.3: Developing a typology of prosumer initiatives*, with the goal of "*develop(ing) a typology that reflects the variety of RES prosumer initiatives in Europe*".

The proposed typology of collective RES prosumers distinguishes five primary types, namely **Market-focussed RES Prosumers, Community-focussed RES Prosumers, Non-Profit-focussed RES Prosumers, State-focussed RES Prosumers and Hybrid RES Prosumers**. It distinguishes these along their choice of formalisation and nature of motivation. The last type, the Hybrid RES Prosumer covers a large group of collective RES prosumers who are motivated by socio-ecological concerns and are formalised as either for- or non-profit ventures. Taking the variables organisational structure and governance, this report further differentiates four types of Hybrid RES Prosumers, namely Participative Volunteers, Participative Professionals, Distanced Volunteers and Distanced Professionals.

In developing this typology, this report explores the proposition that the potential of collective RES prosumers to contribute to energy transitions lies for a significant part in their ability to challenge, alter, and/or replace dominant institutions in the energy systems—be it the centralised organisation, the domination of large utilities, or the profit orientation. We use the Multi-actor Perspective and insights from institutional theory to distinguish between different institutional logics and their operationalisation along our five typology variables (formalisation, motivation, organisational structure, governance and beneficiaries). Using this analytical frame, we analysed the answers of close to 200 respondents to the PROSEU survey on collective RES Prosumers (Horstink et al. 2019) to arrive at our final "four plus four" types. This analysis showed how different types of collective RES prosumers interact with and combine different institutional logics, thereby potentially transforming the energy system.

The discussion touches upon the transformative potential of collective RES prosumers as well as highlights some of the main limitations and potential follow-ups including a focus on RES prosumer stakeholders, hybrid constellations, and informal groups. The report closes with recommendations for other PROSEU work packages.

1. Introduction

This report is part of Work package 2 (WP2) of the PROSEU project - *Baseline analysis and Characterisation of Renewable Energy Sources (RES) Prosumer Initiatives*. The main task of WP2 was to respond to the project's first objective and support subsequent work packages, by establishing an understanding of the characteristics and challenges of collective renewable energy prosumer initiatives, including a baseline review of the state of the art of RES self-consumption in the EU and the design and implementation of a European-wide survey aimed at a diversity of RES prosumer initiatives. Deliverable 2.1 (Horstink et al. 2019) provided a detailed overview of the RES prosumerism phenomenon in the EU, in particular zooming in on nine EU countries. It also presented the results of the survey conducted in these countries, focusing on a characterisation of RES prosumer initiatives along a broad number of markers including general demographics, use of technology, governance, organisation, finance, motivation, and main hindering and facilitating factors. The present report, Deliverable D2.2, reports on the results of *Task 2.3: Developing a typology of prosumer initiatives*, thereby responding to the fourth and final objective of the Work package as per Grant Agreement to "*develop a typology that reflects the variety of RES prosumer initiatives in Europe*" (see textbox below). Concluding the research of WP2 by performing a comparative analysis of the survey data guided by a heuristic (the Multi-actor Perspective), this report outlines a multi-dimensional typology of collective RES prosumers across nine European countries.

The backdrop for the PROSEU project's research and the analysis presented in this report is the rise of so-called self-consumption initiatives in Europe, spurred on the one hand by the greater accessibility of renewable energy technology (Lavrijssen and Parra 2017) and on the other hand by the EU's strong commitment to "lead the clean energy transition, not only adapt to it" (European Commission 2016), which has resulted in a more fertile legal and political landscape for the production of energy from renewable energy sources and a greater role for RES self-consumers/prosumers, as exemplified by the now completed Clean Energy Package of policies (European Commission 2019a). However, as pointed out by Toporek and Campos (2019), there are considerable disparities in legislative and policy support for RES self-consumption across EU countries. Horstink et al. (2019) find different speeds of prosumer development in different countries, undoubtedly in part as a result of the differing legal and policy contexts, but also, as their research appears to indicate, a result of the particular cultural and historic contexts of each country, as well as possible new social dynamics that are emerging, which in turn might reveal common threads in the RES prosumerism phenomenon across Europe.

In particular, the European Commission (EC) has been developing definitions for entities (e.g. renewables self-consumer, renewable energy community) that do not have a corresponding legal form, even though this legal form will condition their access to resources and their position in/access to the energy market. While deliverable D2.1 does a good job of reclassifying the enormous variety of legal forms and identifying the broad collective RES prosumer actors and their respective interpretative challenges (i.e. energy cooperatives, energy communities, public and private organisational prosumers, and partnerships), it was not within its scope to come up with a new classification solution that could reveal and hopefully overcome the tension

between the legal forms currently available for collective forms of RES prosumerism and the existing EU legislative/policy framework. D2.1 also warns of "volunteer fatigue" and a lack of professionalisation that are inherent to what they describe as community, or civic-focussed initiatives and that constitute a serious barrier to the development of truly civic-inspired, decentralised, democratically controlled, fair, and inclusive RES prosumer initiatives, that effectively control the energy grid and respective (and crucial) IT energy infrastructures (Horstink et al. 2019, 83). This puts not only the values of the Energy Union in jeopardy, but also the feasibility of a fully decentralised, fully carbon neutral, fully integrated energy network. The understanding of such socio-political and socio-cultural dynamics and their relation to the EU's legal and policy framework for RES self-consumption is at the heart of PROSEU's research, which concentrates on the incentive structures enabling the mainstreaming of RES prosumerism.

Building on these insights by deliverables D2.1 and D3.1., the present deliverable develops a typology that relates RES prosumerism to energy transitions. It explores the proposition that the potential of collective RES prosumers to contribute to energy transitions lies for a significant part in their ability to challenge, alter and/or replace dominant institutions in the energy systems (Haxeltine et al. 2017). We take a broad understanding of institutions to refer to forms of social organisations and patterned interactions (cf. Lowndes and Roberts 2013): formal as well as informal structures, cultures, and practices of a certain system in question. Such institutions are embedded in institutional logics, and it is in challenging those that the transformative potential of collective RES prosumers can come to bear. This includes ambitions such as that of changing the energy system to one based on decentralised, community-inspired, and innovative business models (Bertram and Primova 2018; Horstink, Wittmayer, and Ng 2019). When we refer to institutional logics, we mean the frames of references within which collective or individual actors operate and with which they interact (Thornton, Ocasio, and Lounsbury 2012). Scholars distinguish numerous institutional logics, with the most interesting ones for discussing changes in the energy system being the state logic, market logic, non-profit logic and community logic. We use the Multi-actor Perspective (Avelino and Wittmayer 2016), which distinguishes between these logics, to analyse how different types of collective RES prosumers interact with and combine different institutional logics.

The collective RES prosumer typology aims at understanding the different types of collective RES prosumers[1] by identifying a number of key variables along which to distinguish them. These are: formalisation, beneficiary, motivation, organisational structure and governance. Our work is of an exploratory nature and intends to:

- explore the breadth of different types of collective RES prosumers (rather than going in-depth into specific examples);
- explore which institutional logics are challenged by the different types of collective RES prosumers;
- provide an overview of different types of collective RES prosumers and their respective differentiating attributes to inform the formulation of incentive structures in PROSEU

---

[1] Writing on how to develop typologies, Collier, LaPorte, and Seawright (2012) refer to this as the overarching concept.

WP6, and more in general the Living Lab work (WP7) and the Business model work (WP4).

This report kicks off by providing a succinct introduction to the theoretical backgrounds in which this work is situated. In Section 2, it will establish our understanding of RES prosumerism, its relation to sustainability transitions as well as to the prevailing understanding of RES prosumerism actors to date. Here we also introduce the Multi-actor Perspective (MaP), a heuristic for analysing the relations between actors by distinguishing different institutional logics. Subsequently, in Section 3, the methodology for freshly analysing the PROSEU survey data with the aim to develop a typology of collective RES prosumers is introduced. This analysis combines five variables to establish clusters that allow us to understand which elements of institutional logics are challenged by collective RES prosumers. The overall sample is then categorised into five main types of collective RES prosumer initiatives, of which one has four sub-types, which are described in more detail. The final section (Section 5) discusses the results—providing some recommendations for the subsequent PROSEU Work packages as to the uptake of the results, highlights the limitations of this study, and suggests avenues for further research.

Textbox 1.1: Task and deliverable description (Source: PROSEU Grant Agreement)

Task 2.3: Developing a typology of prosumer initiatives (Month 12-18) (Lead: DRIFT; UPORTO; LEUPHANA; ZAGREB FSB; UNIVLEEDS; ClientEarth; Eco-Union; ICLEI EURO)

This task will provide a comparative analysis of the findings under Task 2.2, and a characterisation and typology of RE prosumer initiatives for different locations, social contexts and governance frameworks, characterising the dimensions underlying the broad variety of prosumer experiences across Europe. The typology will provide a framework for a meaningful comparison of RE prosumer drivers, barriers, challenges, opportunities and incentive structures across Europe (in WP6 and WP7).

Deliverable 2.2:
This deliverable will report on the results of Task 2.3. Based on a comparative analysis of the data collected through the survey of 150-200 RE Prosumer initiatives in task 2.3, this deliverable will develop a typology of prosumer experiences in Europe, according to different variables to be determined at early stages of WP2, which should include: location, socioeconomic contexts and governance frameworks, types of business and organisational models, new spaces created, economic data (i.e. number of employees, number of beneficiaries, number of jobs created), technologies used, socioeconomic and environmental drivers, barriers and challenges, and incentives.

---

2. A Multi-actor Perspective on RES prosumerism

In this section, we start by shortly introducing RES prosumerism and its role in energy transitions. We then turn to taking stock of how RES prosumerism actors have been differentiated to date in literature, before we explain the Multi-actor Perspective as a heuristic to distinguish between different types of actors at different levels of aggregation. We conclude this section by providing an analytical frame for our analysis.

2.1 Sustainability transitions and RES prosumerism

The conceptual basis for the work in this report lies in sustainability transitions research as well as energy-related social sciences and humanities. Sustainability transitions are described as long-term systemic changes in the structure, culture, and practices of societal sub-systems— such as energy—needed to address the current unsustainabilities of these systems (Grin, Rotmans, and Schot 2010; Loorbach, Frantzeskaki, and Avelino 2017). Transitions in the energy system are discussed in terms of a number of trends, mainly decarbonisation, decentralisation, and digitalisation (Di Silvestre et al. 2018) and are envisaged to lead to a low-carbon and more decentralised energy system (European Commission 2015, 2018).

Renewable energy sources (RES) prosumerism in this context refers to the phenomenon of active energy citizens and energy communities that are producing, self-consuming energy, and/or participating in energy markets (Kotilainen and Saari 2018). There is special attention for the potential of RES prosumerism, next to other means, to make energy transitions more inclusive, just, and democratic (Bertram and Primova 2018; Burke and Stephens 2018). The prevalence and form of RES prosumer initiatives are, among other things, shaped by subsidy frameworks such as feed-in-tariffs or net billing, the requirements of the actual physical infrastructure, and the availability or re-invention of business models (Hall and Roelich 2016; Kooij, Lagendijk, and Oteman 2018; Miceli, Favuzza, and Genduso 2013). The mainstreaming of RES prosumerism, by which we mean the process through which it becomes part of incumbent energy systems and the dominant ways of doing, thinking and organising, has the potential to lead to a reshuffling of the rules of the game (Wittmayer et al. 2019). Considering our focus on agency, it also means that new actors enter energy markets (e.g. peer-to-peer platforms), the roles of existing ones will change (e.g. energy utilities), while others might disappear (Castaneda et al. 2017; Hall and Roelich 2016). Such mainstreaming of RES prosumerism can also be taken as a normative ideal, i.e. an energy future and societal future to strive towards (Ruotsalainen et al. 2017). On the other hand, research on transition governance has highlighted how further practical translation of such ideals tends to involve negotiation, compromises, and a certain watering down (Pel 2016; Smith 2007). RES prosumerism faces challenges of 'normative resilience': as it takes shape in institutionally rather crowded contexts, it is not so easy to maintain the core values of the individuals and collectives initiating it (Heldeweg 2017).

2.2 Actors in RES prosumerism

Much of the literature on RES prosumerism focuses on individuals or individual households as the unit of analysis—since it is there that RES technologies such as heat pumps or solar panels are being installed (see e.g. EU-funded research projects ENERGISE, ENTRUST and EMPOWER, or Bleicher and Gross 2015; Ellsworth-Krebs and Reid 2016). It is also the unit where much of the research about behavioural change for energy transitions is being conducted (e.g. GfK Belgium Consortium 2017). However, there is an increasing focus on collective forms of prosumerism and their potential to contribute to the mainstreaming of more decentralised, sustainable and just energy systems (Bertram and Primova 2018; Ford, Stephenson, and Whitaker 2016; Jenkins, Sovacool, and McCauley 2018; Seyfang, Park, and Smith 2013). When going beyond the more modest stream of research that has an explicit focus on prosumerism, we find a vibrant scholarship on collective forms of action in energy systems, which have been studied under a variety of labels and from a multitude of perspectives. These include renewable energy communities (Dóci et al 2015), grassroots innovations (Seyfang and Haxeltine 2012; Smith et al. 2016), community energy (Hargreaves et al. 2013; Walker and Devine-Wright 2008), or energy cooperatives (Bauwens, Huybrechts, and Dufays 2019; Yildiz et al. 2015).

Policy-makers have also picked up on these developments. In light of the ambitious goals of the Energy Union (European Commission 2019b), the European Commission has stressed the importance of reaching individual citizens as active participants that can contribute to emissions reductions, higher energy efficiency, more democratic control in energy markets, the decentralisation of energy, as well as grid management (European Commission 2019a). In addition to the focus on the individual, the EU Clean Energy Package[2] also brings collective actors into the spotlight and provides a legal definition for them (European Commission 2019a). In Table 1, the different definitions for individual as well as collective RES prosumers are presented.

In addition to the definitions of RES prosumers provided in RED II, the recast Electricity Directive (European Parliament and Council 2019) also presents the concept of the "Civic Energy Community" or CEC. In terms of governance and mission requirements, the CEC is practically identical to the RECom, in the sense that large and medium-sized enterprises are excluded from effective control and that benefits revert to the community. However, this designation is used exclusively for activities related to electricity generation and storage and does not require the energy sources to be renewable. As such, the CEC concept is not equivalent to that of an RES prosumer, even though some CECs may be prosumers of electricity from renewable energy sources and, likewise, some REComs or energy cooperatives may need to operate as CECs (for example when legislation mandates that REComs or energy cooperatives provide full energy services, including heating or cooking by gas when no alternatives are yet in place). Curiously, CECs are not limited geographically (they may also cross borders), whereas REComs require geographical proximity of all

---

[2] The EU Clean Energy Package includes a recast of the Renewables Directive (RED II), the new Governance Regulation of the Energy Union and Climate Action, the new Energy Efficiency Directive and the recast of the Electricity Directive.

members. For a discussion of the similarities and differences between CECs and REComs, see (Frieden et al. 2019).

Table 1: RED II Directive prosumer definitions (based on European Parliament and Council 2018)

Focus	Renewable Energy Prosumer	RED II Directive Definitions
Individual	Renewables self-consumer	A final customer operating within its premises located within confined boundaries or, where permitted by a Member State, within other premises, who generates renewable electricity for its own consumption, and who may store or sell self-generated renewable electricity, provided that, for a non-household renewables self-consumer, those activities do not constitute its primary commercial or professional activity.
Collective	Jointly acting renewables self-consumers	A group of at least two jointly acting renewables self-consumers in accordance with point (14) [of the RED II Directive, defining "renewables self- consumer"] who are located in the same building or multi-apartment block.
	Renewable energy community (RECom)	A legal entity: a) which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity; b) the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities; c) the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits.

In order to guide our research into **collective forms** of RES prosumerism, the focus of PROSEU, we adopted the following working definition based on early database analysis under WP2: "*A RES prosumer initiative in the PROSEU study is a collective energy actor that produces energy from renewable sources with the primary objective of providing in its own energy needs and/or those of its members, and in some cases selling excess energy to clients, thereby actively participating in the energy markets*" (Horstink et al. 2019, 24). Examples of such collective energy actors include, among others, energy cooperatives, renewable energy communities, not-for-profit organisations, companies, different types of public institutions or different kinds of partnerships. For this work, we differentiated between those actors actually prosuming (i.e. producing and consuming energy from renewable energy sources, whether as an entity or through members) and the many actors influencing RES prosumerism (i.e.

facilitating, promoting, financing, supporting, benefitting from, or even hindering) (Horstink et al. 2019).

There have been a number of attempts towards clarifying the different types of agents and actors that engage in collective forms of action in energy systems, and which in differing degrees overlap with our aim of developing a typology of collective RES prosumers. In Table 2 below, we provide an overview of those studies providing insights into the overarching concept that the types are derived from, the variables according to which the types are constructed, and the suggested types. The typologies presented below are descriptive typologies in that they provide a characterisation of different types within an overarching concept (Colin 2005): e.g. different types of community energy projects. All of these studies are based on empirical observation and analysis.

Table 2: Overview of characterisations and typologies of collective actors in RES prosumerism

Overarching concept	Typology Variables	Suggested types	Authors
Community energy projects	Levels of community participation & levels of (financial) benefit flowing into the community	Not labelled - Four types that result from a combination of Low/high participation and low/high levels of benefit	Walker and Devine-Wright (2008); Callaghan and Williams (2014); Strachan et al. (2015)
Community energy projects	Ownership and business models	Ownership: Stand-alone community-led projects; partnership between community and other parties (joint venture and other partnership arrangements) Business model: local development organisation or development trusts; energy cooperatives or similar.	Haggett et al. (2013)
Community energy projects (Scotland)	Date founded, legal body, type of organisation, asset ownership, ownership model, technology, size of installation, link generation – use, percentage of projects operational and primary motivations	Combines these variables to arrive at 5 types: Small is beautiful (small, volunteer-run groups who own or manage a single material asset); Community developers (i.e. Scottish "Development Trust" model); Innovators (forefront of technological innovation); Energy cooperatives; Transition towns.	van Veelen (2017)
Community energy	Organisational type (and separately along energy type)	Organisational type: REScoops, Community Development Trusts, Local Government Projects with citizen participation, public-private partnerships, private companies, other grassroots initiative	Hewitt et al. (2019)
Clean energy communities	Structure of Clean Energy Communities	Centralized communities, decentralized communities and distributed communities	Gui and MacGill (2018)
Energy cooperatives	Organisation; financing; membership; technology, level of value addition, historical development and regional distribution; primary activities.	Outlines characterisations for each of these variables (rather than combining them). Exemplary is the one along the primary activities: Cooperatives focusing on generation/production, distribution/transmission, trading, others)	Yildiz et al. (2015)

Renewable energy cooperative (REScoop)	Organisational mission	Distinguishing a focus on: mutual benefit (the benefit of its members) and general benefit (the benefit of 'external' target groups, the public)	Bauwens, Huybrechts, and Dufays (2019)
Users in the energy system	Activities that users perform in their environment with regards to "new, low-carbon or energy efficiency technologies"	User-producer; User-LegimitatorsLegitimators; User-intermediaries; User-citizens; User-Consumers	Schot, Kanger, and Verbong (2016)
Prosumer collectives	Locality & ownership/management	multi-site community initiatives; focal-site community initiatives; multi-site third-party initiatives; focal-site third-party initiatives; and dispersed-site third-party initiatives.	Ford, Stephenson, and Whitaker (2016)
Business models in renewable energy supply	Value proposition & capture	Corporate national utility; Local white label; Local aggregator; Local pool and sleeve; Municipal utility; Municipal ESCo; MUSCo; Peer to peer; Peer to peer with Local balancing ;Unit	Hall and Roelich (2016)

Even though this overview is by no means intended to be exhaustive, it provides us with some important insights to inform our approach to typifying collective prosumers in renewable energy. Firstly, studies have specifically focussed on classifying either community energy (projects), energy cooperatives, or users in the energy system. They thus each focus on specific (differently defined) sub-sets of actors. With our focus on collective RES prosumers, we are interested in a larger set that includes other collectives besides energy cooperatives and energy communities, such as public institutions or utilities that engage in energy prosumption. Secondly, besides the more generally descriptive variables (date founded, locality, scale, etc.), we can distinguish some key variables that tend to carry the most weight in the above developed typologies, including:

- Variables indicating ownership and beneficiaries/financial flows.
- Variables indicating business models (value capturing) and activities.
- Variables indicating motivations and missions.
- Variables indicating governance aspects such as membership or level of community participation.
- Variables indicating legal form or more general organisational types.
- Variables relating to technology and installed production capacity.

These recurring key variables are potential dimensions along which to develop our types of collective RES prosumers. But before we decide on our final variables, we will first introduce our sensitising heuristic for exploring the transformative potential of different types of RES prosumers.

2.3 A Multi-actor Perspective

The Multi-actor Perspective (MaP) (Avelino and Wittmayer 2016, 2019) was developed as a heuristic to distinguish between different types and levels of actors in sustainability transitions, and in doing so to specify (shifting) power relations between them. Based on insights from Third Sector studies and other institutional literature (Evers and Laville 2004; Pestoff 1992; Thornton and Ocasio 2008), the MaP distinguishes between four institutional logics along the following three axes: 1) informal – formal, 2) for profit – non-profit and 3) public – private. The state is characterised as non-profit, formal, and public; the market as also formal, but private, and for-profit; and the community as private, informal, and non-profit. In addition, the MaP distinguishes the 'hybrid sphere', an intermediary sector in between the three others that includes the 'non-profit sector' that is formalised in private, but also intermediary organisations that cross the boundaries between profit and non-profit, private, and public, formal and informal. Examples include social enterprises or cooperatives.

Figure 1: Multi-actor Perspective (adapted from: Avelino and Wittmayer 2016)
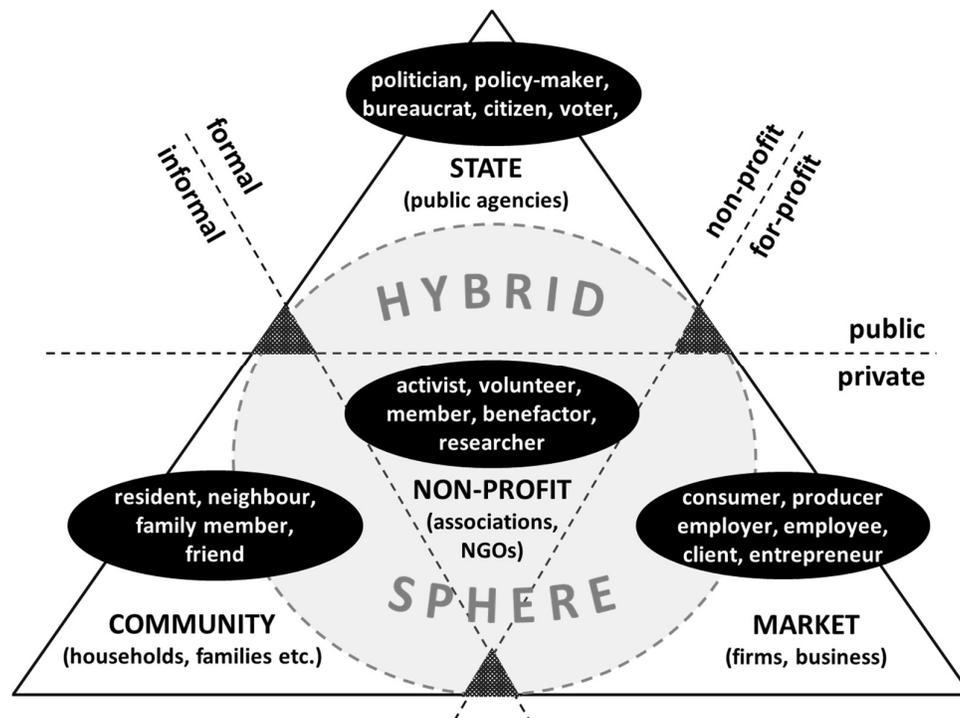
Institutional logics are frames of references within which collective or individual actors operate and with which they interact (Thornton, Ocasio, and Lounsbury 2012). These logics are not separate but interact, and they are not balanced, rather their boundaries are contested, blurring, shifting, and permeable – there is thus an ongoing contestation on how institutional logics relate (Figure 1). In any socio-technical system, such as the energy system, which can

be considered an organisational field, all logics may simultaneously have a bearing on actors and practices (cf. Fuenfschilling and Truffer 2014).

Besides distinguishing between institutional logics, the MaP distinguishes actors at different levels of aggregation: 1) sectors (i.e. state, market, community), 2) organisational actors (e.g. organisations, groups) and 3) individual actors (e.g. entrepreneur, consumer, policy maker). There is a discursive framing of sectors 'as actors' in many public discourses, while the intentionality and strategic agency of such broad entities can be questioned. Sectors are thus considered actors, but also institutional logics and as such frames of reference and spaces of interaction (e.g. the state as interaction between politicians, voters, and policy makers). There are different organisational actors associated with each of the institutional logics, the ideal typical organisational actors for each of the four logics are considered to be: private firm (market logic), public agency (state logic), association (non-profit logic), and households (community logic) (cf. Pestoff 1992). In each institutional logic, individual actors tend to be constructed in a different manner and thus assigned different roles in different institutional logics, ranging from 'resident' or 'neighbour' to 'citizen' or 'consumer'.

2.4 Towards a multi-dimensional typology for collective RES prosumers

In line with the focus of PROSEU, as well as the emerging policy focus on prosuming collectives, our typology aims to identify and characterise different kinds of collective RES prosumers. As a descriptive typology, it aims to depict these different types to some detail and provide empirical examples.

Our starting point is that we are interested in exploring the relation of collective RES prosumers to existing institutions and institutional logics, specifically the (elements of) institutional logics that they challenge or reconsider (i.e. their transformative potential). Against this background, we first matched the overview of promising variables harvested from the review of previous typologies with the data available from the PROSEU survey. This led us to focus on the following typology variables or dimensions: formalisation, motivation, beneficiary, organisational structure, and governance. Even though RES prosumerism relies heavily on available and affordable RES technology, this variable was not found to distinguish significantly between PROSEU's survey respondents, even when taking into account climate and population profiles of the different countries. Although wind energy is either the top number one or number two RES technology invested in so far by most countries (except those with excellent hydric conditions), solar-powered electricity is unequivocally the top RES technology that the initiatives in our survey are investing in, whether in the North or South of Europe (Horstink et al, 2019, p. 84).

Having thus come up with five key dimensions/variables, we then made a first attempt to operationalise these in light of the four institutional logics suggested by the MaP (see Table 3). For this operationalisation we relied on writings about institutional logics (especially for the state and market logic: Thornton and Ocasio 2008; Thornton, Ocasio, and Lounsbury 2012). For the operationalisation of the non-profit and community logics, we additionally relied on the

welfare model discussions (Brandsen and Pestoff 2006; Pestoff 1992) and our knowledge of the energy system. In the following we outline each of these variables in turn.

Table 3: The typology variables operationalised in four institutional logics

		State	**Market**	**Non-profit**	**Community**
MaP/Welfare model distinctions		**Public, non-profit, formal**	**Private, profit, formal**	**Private, non-profit, formal**	**Private, non-profit, informal**
Formalisation		Those formalising public ventures	Those formalising for-profit ventures	Those formalising non-profit ventures	Those not formalising
	Associated organisational forms	Public agency	Private firm	Voluntary association, non-profit organisation	Informal community groups
Motivation		Increase public good	Increase efficiency and profit	Increase shared interest and goals	Increase community good
Beneficiary		Citizens, public (good)	Self interest	Shared interest group members	Community, community members
Organisational structure		Bureaucrats, citizens	Paid staff, employees, clients	Paid staff, volunteers, members	Volunteers, community members
Governance		Hierarchy	Merit	Democratic control	Member control

Formalisation

By formalisation of the (prosumer) initiative, we mean the way the latter chooses to legalise its organisational status—i.e. the legal form of its venture—in terms of the outstanding features of one or more of the four institutional logics. For the market logic, the outstanding feature is the for-profit orientation—therefore what is formalised in this logic is a 'for-profit venture'. Likewise, in the state logic what is formalised is a public venture and in the community logic formalisation is actually avoided (informality maintained). Finally, in the non-profit institutional logic, we postulate that what is being formalised is a non-profit venture. Pestoff (1992) relates archetypical legal forms to institutional logics, e.g. the private firm with a market logic combines private, for-profit, and formal elements, while an association with a non-profit logic combines private, non-profit, and formal elements, and a public agency with a state logic will combine public, non-profit, and formal elements.

In taking this variable along in our collective RES prosumer typology development, we explore whether and how collective RES prosumers blur ideal-typical understandings of formalisation and associated institutional logics. As an example, postulating 'social enterprise' as a type, as suggested by Hewitt et al. (2019), would imply defining a type that blurs institutional logics: for-profit orientation typical from the market logic is blended with the motivation for shared interest, broader community, and/or public good. A social enterprise can thus be construed as a hybrid legal form. Researchers refer to organisations as hybrid when they "combine different goals and logics (economic, social, environmental, etc.) at the core of their activities" (Bauwens et al. 2019, p. 1). Conversely, we may also find private organisations that are governed by member control, such as the cooperative. This particular legal form can combine a for-profit orientation with democratic control and informal elements, as well as combining a non-profit

logic, even though technically private, with a motivation to contribute to the public/community good.

Motivation

The motivation behind RES prosumer initiatives, in particular in its collective form, is a key variable in the PROSEU research. Motivation, in very general terms, is a need or want that directs behaviour towards a particular goal. It could also be construed as the type and level of ambition. In collective ventures, motivation is one of the drivers behind the implementation of the project and will shape the organisational structure that supports the venture. It is generally accepted that the key driver within the market logic is the pursuit of profit and/or increasing efficiency, although other, non-financial, drivers may complement the mission of commercial legal forms. Conversely, a private association is generally motivated by the shared interests of its members, a public institution will pursue the public good, and a community initiative will wish to increase the community good.

As reported in deliverable D2.1 (Horstink et al. 2019), motivation is a key distinguishing characteristic of prosumer initiatives. However, as also underlined in D2.1 and expanded upon here, the appropriate legal form for expressing the motivation may not always be available to the initiative. Studies of energy cooperatives in Belgium have shown that community-focussed prosumer initiatives are overwhelmingly motivated to be independent energy actors, in control of the (clean) energy choices of their community (Bauwens, Gotchev, and Holstenkamp 2016). So-called community energy projects also have as their primary motivation to benefit their community, whether through revenues, self-sufficiency enhancement, or as a contribution to the clean energy transition (Brummer 2018). In studies on hybrid organisational forms, competing motivations (e.g. mutual vs general interest) are usually pointed out as the reason for rather heterogeneous business strategies (see for example Bauwens, Huybrechts, and Dufays 2019). Collective RES prosumers often find themselves operating across a duality of social and commercial logics, which is why motivation will help us typify them more accurately.

Beneficiary

The beneficiary of a RES prosumer initiative is the individual, group, or entity that the initiative ultimately intends to benefit. Those ventures operating in the state logic will intend to benefit citizens in general and/or the public good, whereas firms from the market logic generally pursue their own (self) interest. A private association operating in the non-profit sector aims to benefit the shared interests of its own members, while a group operating in the community logic seeks to benefit their community as a whole, and/or its members. Transporting this reasoning to our research, a RES prosumer initiative set up as a cooperative will primarily aim to satisfy its members and or broader community, a RES prosumer initiative set up as for-profit company will have to satisfy the organisation's bottom-line, while a community energy project aims to improve its community and/or the members of this community. The institutional logics get blurred in RES prosumerism when a municipality sets up a company to produce electricity from renewable energy sources for its citizens, or a company sets up a cooperative with other companies to supply RES, with the primary aim of benefitting the companies. The beneficiary is therefore an important distinguishing variable for our collective RES prosumer typology.

Organisational structure

By organisational structure, we understand the social make-up of the venture or initiative, which in turn will affect organisational action and inform the organisation's operating procedures and how it relates to its environment. The organisational structure can enable or constrain the organisation's ambitions, depending among other things on how well the structure matches the ambition. Ventures operating within the state logic will tend to have a bureaucratic structure, answerable and to a certain degree permeable to citizens, as the primary beneficiaries of public agencies. For those ventures working within the market logic, the organisational structure will consist primarily of employees, organised in different roles, often also in hierarchies, and who are to a certain degree answerable to the organisation's clients, whose well-being impacts the health of the organisation. Within the non-profit logic, the social structure may vary more: some organisations will have paid staff and members, perhaps organised in executive and working groups, others will only have members, who volunteer at the same time, while yet others work with volunteers besides their members, and finally, some will work with all three. Besides these agents, many non-profit organisations may have to answer to donors or sponsors. Finally, within the community logic, it is more common to see a structure based on the relations between community members, some of which may be volunteers in the venture, while in some cases volunteers may come from outside of the community. The members may be natural persons, but also organisations or public agents.

Many RES prosumer initiatives work with members and/or volunteers (one has but to look at the map of REScoop initiatives in Europe, currently around 1,500), placing them within the non-profit and community logic. However, there are also RES prosumer initiatives that make a profit and can afford to employ paid staff, all the while maintaining the member and/or community spirit, thus, once again, blurring institutional logics. Likewise, institutions prosuming within the state logic (i.e. schools, retirement homes), will often have a community focus. Of the companies in the PROSEU survey, 30% actually reported working with volunteers, an unusual occurrence in the for-profit sector (Horstink et al., p. 69). Deliverable D2.1 reported significant complaints from initiatives operating within the non-profit and community logic about volunteer fatigue (as well as dearth) and the lack of professionalisation/difficulty to professionalise in these organisations, which was put forward as a limiting factor for the growth and adaptation not only of these organisations but of civic-focussed RES prosumerism in general.

Governance

Although the term governance is usually employed in the broader sense of the structures and methods set in place to coordinate and manage an initiative, in our typology work we use the term to refer to the decision-making style of the organisation/initiative. As such, ventures that operate within a state logic will typically employ a hierarchical style of decision-making; those working within the market logic may either opt for a hierarchical or a matrix form of decision-making, based on merit rather than seniority; within the non-profit logic decisions tend to be taken democratically (involving all affected parties); and finally, within the community logic, decisions are taken by community members according to the prevailing community customs. Governance is a key variable in collective RES prosumerism, because only the more

participative and transparent decision-making styles are expected to guarantee high degrees of fairness and inclusiveness in the clean energy transition, two key goals of the European Energy Union. The more democratically controlled the RES prosumer initiatives are, the more citizens and their communities can effectively drive the clean and fair decentralisation of energy production and distribution (Bertram and Primova 2018).

Hybridisation of decision-making is on the rise, in particular where different types of organisations and/or groups choose or are forced to work together for a common purpose, as in the case of partnerships between municipalities and local organisations and citizens. Decision-making styles become mixed, moving between less involved at the unit level to highly participative at the aggregated level.

The preceding overview of the typology variables and their operationalisation along four institutional logics provides the starting point for the analysis of the survey answers, the methodology for which is presented in the next section.

3. Methodology

For this study, we rely primarily on the results of a self-administered online questionnaire answered by collective RES prosumers as part of the PROSEU work. A long-list (close to 1,000) of RES prosumer initiatives was created through sampling efforts by project partners in nine EU countries. A total of 198 respondents answered the questionnaire, which included questions regarding general information on the initiatives, operational information, organisational capacity and resources, governance, and motivation. For more information regarding the survey methodology and the resulting characterisation of collective RES prosumers, please consult D2.1 (Horstink et al. 2019). In order to arrive at the different types of collective RES prosumers, we took the following steps:

From the 198 respondents, 14 were excluded from further analysis, since they did not constitute collective RES prosumers according to the PROSEU definition. These included non-entities, subsidy schemes, consortia and RES technology producers (i.e. energy suppliers), initiatives that responded to the survey more than once or did not fully complete the survey, initiatives from outside the scope of the PROSEU project, and actors whose activity as collective RES prosumer we could not verify.

3.1 Typology variables and their operationalisation

We then operationalised the typology variables with specific survey questions. To this end, we identified survey questions that could help us approximate and operationalise the typology variables. These included Q3, Q14, Q18, Q19, Q20, Q27, Q30, and Q32, which were matched with specific typology variables as indicated in Table 5. For some questions we clustered the answering options differently than was anticipated in the survey (e.g. Q27), while for others, we were not so much interested in the numerical results for each category but rather whether a category was applicable or not (e.g. Q18, 19). We also tried to match more than one question with each variable to increase the validity of the results (e.g. different answer options in Q30, as well as Q14 and Q32 for motivation). Since ours is an exploratory study, we also made use of the open answers provided. Table 5 provides an overview of this second operationalisation step, presenting for each typology variable the survey question(s) they were matched with and our answer classification according to each of the four institutional logics.

Formalisation

In order to operationalise this variable to run on the existing PROSEU survey data, we chose to focus on 'legal form'. By legal form, we mean the legal structure of an organisation that regulates its purpose, its governance, and ownership structure, as well as taxation and liability issues, i.e. the official organisational form by which it is registered. Survey respondents reported on their legal form in an open entry field. For all unclear entries or entries that did not designate an official legal form in the country in question, the researchers checked the websites of the initiatives to find the official legal form. Legal forms were then classified according to the different institutional logics, while always keeping in mind that many legal forms *can* be used to generate profit but do not need to. For example, an energy cooperative

in Germany that is legally structured as eG and can function quite similarly to a citizen-owned GmbH & Co. KG or AG (equivalents to limited company) – however it can also choose the form of an AG. Our classification is 'neutral' in relation to the destination of the profit.

Table 4: Legal forms in the data set categorised according to institutional logics

[1]For these legal forms, beneficiaries are either the broader community or public. [2]For these legal forms, beneficiaries are shared interest groups, broader community, or public. For the remaining forms, beneficiaries can be self-interest, shared-interest groups, broader community, or public.

Logics		Legal forms
Market logic	Those formalising for-profit ventures	BE: société coopérative à responsabilité limitée (SCRL[2], SCRL FS[1], SCRL A[2])/ coöperatieve vennootschap met beperkte aansprakelijkheid (CVBA) CR: Energetska zadrug[2], Mali poduzetnik DE: Gesellschaft mit beschränkter Haftung (GmbH), Gesellschaft mit beschränkter Haftung & Compagnie Kommanditgesellschaft (GmbH & Co.KG), Gesellschaft bürgerlichen Rechts (GbR), Aktiengesellschaft (AG), Eingetragene Genossenschaft (e.G.)[2] ES: Cooperative society S.c.c.L, Limited Company S.L. FR: Société par actions simplifiée (S.A.S.), Société coopérative d'intérêt collectif (S.C.I.C.)[2], Societe à responsabilité limitée (SARL) GB: Limited company, Registered society incl. formerly known as Industrial & provident society (IPS)[2], Community Benefit Society (CBS)[1], Community Development Trust[1], Community Interest Company (CIC)[1] IT: Società Cooperativa[2] NL: Besloten Vennootschap (b.v.), Coöperatie u.a[2], Coöperatie i.o[2]
State logic	Those formalising public ventures	Schools[1]universities[1], municipalities[1] Includes for DE: Körperschaft des öffentlichen Rechts (K.d.ö.R.)[1]
Non-profit logic	Those formalising non-profit venture	As market logic, but also: DE: Eingetragener Verein (e.V.)[2] FR: Association privee non speculatives[2] IT: Association[2] NL: Vereniging[2], Vereniging van Eigenaren (VvE)[2]
Community logic	Those not formalising	Informal groups[2] UK: Incorporated community groups[2]

Motivation

In the PROSEU survey, Q30 enquires into the reasons for starting the initiative. From the survey analysis (Horstink et al. 2019), we know that overall the following motivations were the strongest (by order of importance):

1) Tackling the climate change problem;
2) Be part of the clean and low carbon transition;
3) Decentralise energy production;
4) Create a sense of community;
5) Take advantage of new RES technologies
6) Reduce energy costs.

Many of these motivations of prosumer collectives combine public good (state logic), community good (community logic) and good for a shared interest group (non-profit logic). The motivation of 'tackling climate change', or 'contributing to the clean energy transition' can be motivated from either of these logics. The formulation of such motivations in essence already blurs the logics and leads to a collapsing together of three logics. Thus, while in theory we can

nicely distinguish between the different ways that institutional logics manifest in terms of motivations, in practice this is less evident.

Respondents could answer these questions using a Likert Scale ranging from 1 – strongly disagree to 5 – strongly agree. For our typology development, we were interested both in ecological as well as social considerations. Therefore, we took the answer options 'tackling the climate change problem' (Q30.8) and 'create a sense of community' (Q30.14) as starting points. We clustered answer categories 1-2 on the Likert Scale into a new category 'low motivation' and categories 3-5 into the category 'high motivation'. We also used the answers for Q14.8.—indicating that one of the services offered by the initiative is community organising—to strengthen the validity of the Q30.14 classification. In the case of a contradiction between Q30.14 and Q14.8, a positive answer in one was counted as an overall positive. We then created a combined socio-ecological motivation score to be used for the typology development: a 'high' in both aspects, or a 'high' in just one of them, were counted as an overall 'high'. We also used the answers to the open questions Q3 and Q32 to clarify motivation.

If a respondent answered with 'prefer not to say' or 'Not Applicable' (NA) in Q30.8 or Q30.14, we collapsed the answer into 'NA'. When constructing the combined socio-ecological score from Q30.8 and Q30.14, NA's in either question were omitted and only the answer of the other question was used for further analysis.

Beneficiary

The PROSEU survey did not include a direct question asking for the beneficiaries of the initiative, even though respondents were asked whom they produced for (leaving aside other services and not specifying all possible beneficiaries). Therefore, this variable, although important, plays a more passive role in our analysis, as a controlling variable. We approximated the beneficiaries through the legal forms, since many legal forms have "natural" beneficiaries, as in the case of the public agency that serves citizens and/or the public good, or the association that looks out for the shared interest of its members. For an overview of legal forms and their relation to different institutional logics, see Table 4. In addition, information on beneficiaries was complemented by information provided by respondents in Q3 and Q32, as well as information on prosumer initiatives' websites for selected entries.

Organisational structure

To operationalise organisational structure, the survey answers provided insights into whether an organisation is membership-based (Q20), has paid staff (Q18) and/or works with volunteers (Q19). Since we were less interested in the numerical results for each category than whether a category was applicable or not, we reclassified the answers into 'apply' (yes, has members/paid staff/volunteers) and 'not apply' (no, does not have members/paid staff/volunteers). We validated the answers to Q20 with the answer to Q23 about the initiative's financing choices, registering those initiatives that financed themselves through member participation fees or member loans. In case a respondent did not mention a number for volunteers or paid staff members, or when respondents indicated a 'NA' to the answer, we assumed that the question did not apply to them.

Governance

In order to operationalise governance, the survey provided insights into the initiatives' decision-making style through Q27, which enquires about the level of involvement of non-management staff and/or teams in strategic decision-making. Since we were interested in whether there is high participation in decision-making (through attributing staff a meaningful role, decision by consent, or joint decision making with non-management staff) rather than low participation (informing non-management staff), or participation according to 'business as usual' (staff is merely asked for inputs, or consulted), we decided to differentiate between 'low' (answer options 27.1-4) and 'high' (answer options 27.5-7) involvement in decision making.

If a respondent answered Q27 with 'NA', or 'prefer not to say', we collapsed the answer into 'NA'. In those cases where a description was given in the 'other' answer category, we reclassified the answer into a 'high' or 'low' participation level.

Table 5: Overview of typology variables and matching survey questions

When we refer to a specific respondent, we refer to it with its ID# in the survey database. We use the abbreviation Q to refer to Question.

	State	Market	Non-profit	Community	Question	Options
Formalisation	**Those formalising public ventures**	**Those formalising for-profit ventures**	**Those formalising non-profit ventures**	**Those not formalising**		
Legal form	See Table 4	See Table 4	See Table 4	See Table 4	Q3, own search	Classified legal forms according to their ability to make profit
Motivation	**Increase public good**	**Increase efficiency, profit**	**Increase shared interest**	**Increase community good**		
Motivation 1: Tackle climate change	Equals 3 to 5	Equals 1 or 2	Equals 3 to 5	Equals 3 to 5	Q30.2: reasons for starting the initiative	Answers provided as Likert scale (1-5)
Motivation 2: Create (a sense of) community	Equals 1 or 2 Not apply	Equals 1 or 2 Not apply	Equals 3 to 5 Apply	Equals 3 to 5 Apply	Q30.14: reasons for starting the initiative; Q14.8. Are you offering or planning to offer the beneficiaries of your initiative other services?	Q30.14: Answers provided as Likert scale (1-5) Q14.8: Answer option: apply/not apply
Motivation 3: open	ID834, ID867		ID834, ID867, ID712		Q32	Classified open answers
Organisational structure	**Bureaucrats, citizens**	**Paid staff, employees, clients**	**Paid staff, volunteers, members**	**Volunteers, community members**		
OS1: Paid Staff	Apply	Apply	Apply	Not apply	Q18: "What is the number of staff/employee who are paid?"	Clustered answers into apply/not apply
OS2: Volunteers	Not apply	Not apply	Apply	Apply	Q19: "What is the number of staff/employee who are volunteers"	Clustered answers into apply/not apply
OS3: Members	Not apply	Not apply	Apply	Apply	Q20: "If your initiative functions by membership, how many members do you have?" Q23: How did you finance the activities of your initiative?	Q20: Clustered answers into apply/not apply Q23: Focussed on options 'member participation fees' and 'member loans'

	State	Market	Non-profit	Community	Question	Options
Governance	**Hierarchy**	**Merit**	**Democratic control**	**Member control**	**Q27**	
Governance 1: Level of involvement in decision making	Low	Low	High	High	Q27: "What is the level of involvement of non-management staff and/or teams besides the core team in strategic decision-making in your initiative?"	Clustered the 7 answer options in low (1, 2, 3, 4) and high (5-7) and classified as indicated
Governance 2: Open comments relating to decision making		ID908 (run as SAS)	ID823, ID803 (run cooperatively), ID368 (run as non-profit)		Q3	Open answers
Beneficiary	**Citizens, public (good)**	**Self interest**	**Shared interest group members**	**Community, Community members**		
Beneficiaries 1	See Table 4	See Table 4	See Table 4	See Table 4	Q3, own search	Classified legal forms according to ability to be beneficial to outlined groups
Beneficiaries 2	Owned by public body: ID140, ID617, ID828		Owned by and/or profit goes to association, charity or cooperative: ID574, ID245, ID798, ID999, ID475, ID828		Q3, Q32	Classified open answers

3.2 Typology development based on the chosen variables

Informed by the results of a hierarchical cluster analysis run by the programme *R*, based on all variables, as well as based on works outlining methodological considerations for typology development (Bennett and Elman 2006; Collier, LaPorte, and Seawright 2008, 2012; Doty and Glick 1994), we conducted a ***first-level clustering*** using the variables formalisation and motivation.

At this first level analysis, the expressions for the variable 'socio-ecological motivation' are either 'high' or 'low', with 'high' corresponding with the state, non-profit, and community logics, and 'low' with the market logic. The expressions for the variable 'formalisation' are four different types of formalisation, one for each institutional logic (see Table 3 for details on the different logics). Cross-tabulating these two variables in a matrix resulted in eight possible types. Our next steps were to, first, logically reason whether these types are empirically observable in general, and second, match these with the PROSEU survey data. The result of these steps is a distinction between five types of collective RES prosumers – see Figure 2 below.

Figure 2: Overview of different types of collective RES prosumers taking motivation and formalisation into account

Formalisation		Socio-ecological motivation		
		High		*Low*
	Public	4 State-focussed RES Prosumers		n/a
	For-profit	n/a	5 Hybrid RES Prosumers	1 Market-focussed RES Prosumers
	Non-profit	3 Non-Profit focussed RES Prosumers		
	Informal	2 Community-focussed RES Prosumers		n/a

While Types 1 to 4 are clearly demarcated and easily grasped, Type 5 refers to a rather big and diffuse group. We therefore used the remaining variables—organisational structure and governance—to further differentiate this type in a ***second-level clustering***.

The variable 'organisational structure' can be subdivided into volunteers (apply/not apply), members (apply/not apply), and paid staff (apply/not apply). Analysing the data, we found that the most relevant distinction is between whether or not an initiative has paid staff cross-analysed with whether or not it has either volunteers or members. Therefore we made a combined score of volunteers/members which we collapsed into 'apply' when either one of the categories was scored 'apply'. The expressions for the variable 'governance' are two levels of participation in decision-making, either 'low participation' or 'high participation'. We cross-

tabulated these two variables in a matrix leading to eight possible sub-types of Type 5. We then reduced these to four sub-types by assessing whether the types are empirically observable/relevant in general, and/or in the PROSEU survey data. Cross-tabulating the options in a matrix leads to four observable types. Figure 3 provides an illustration of the cross-tabulation.

Figure 3: Overview of sub-types of Type 5 of collective RES prosumers

Organisational structure		Governance	
Paid Staff	**Volunteers/ members**	High	Low
Apply	Apply	Participative Professionals	Distanced Professionals
Not Apply	Apply	Participative Volunteers	Distanced Volunteers
Apply	Not Apply	n/a	n/a
Not Apply	Not Apply	n/a	n/a

The resulting typology thus consists out of five main types, of which one has four sub-typestypes. These will be discussed in the following results section.

4. Results

Based on a clustering of the PROSEU survey data along the variables 'formalisation' and 'motivation' in a first analysis and 'organisational structure' and 'governance' in a second analysis, we propose to distinguish between five main types of collective RES prosumers, of which one has four subtypes (see **Table 6**). Four of these types represent more or less 'pure' institutional logics (Types 1-4), while the last one represents hybrid actors and is further sub-divided into four types that are blending different institutional logics in different ways (Types 5.1-5.4).

Table 6: Overview of different types and their characteristics along the chosen variables

[1] Sample size too small; [2] Social: creating a sense of community, community organising activities; Ecological: Tackling climate change; Likert scale answers; [3] Involvement of management staff in decision making; [4]For the sub-types of the Hybrid RES Prosumers, we have put 'self-interest' between brackets to indicate that it was present even if to a very small extent.

	Formalisation	Motivation[2]	Organisational Structure	Governance[3]	Beneficiary[4]
1: Market-focussed RES Prosumers	Non- and for-profit ventures	low, n/a	n/a[1]	n/a[1]	n/a[1]
2: Community-focussed RES Prosumers	Informal	high	no paid staff, volunteers[1]	n/a[1]	Broader community
3: Non-Profit-focussed RES Prosumers	Non-profit ventures	high	Members, mainly volunteers, also paid staff	High	Shared interest group, community or public
4: State-focussed RES Prosumers	Public ventures	high	No members, mainly paid staff, also volunteers	Low and high	Broader community or public
5: Hybrid RES prosumers	**Non- and for-profit ventures**	**high**			
5.1: Participative Volunteers			No paid staff, member-based, volunteers	High	(Self-interest), hared interest groups, community or public
5.2: Participative Professionals			Paid staff, member-based, volunteers	High	Self-interest, Shared interest groups, community or public
5.3: Distanced Volunteers			No paid staff, member-based, volunteers	Low	Shared interest group, community or public

5.4: Distanced professionals			Paid staff, member-based, volunteers	Low	(Self-interest), Shared interest groups, community or public

4.1   Type 1: The Market-focussed RES prosumers

- Formalised as for-profit or non-profit ventures.
- Tackling climate change and/or creating a sense of community are not part of the reason to start the venture.

This category of collective RES prosumers generally takes RES activities as a business opportunity. An example is a retail company that collaborated with the local energy cooperative to have PV installed and maintained on the company's roof. The company is self-consuming the electricity and excess energy is fed to the grid, while the PV installation is owned by the cooperative. However, this type could also include RES project developers, who are acting more out of self-interest or other motivations than social-ecological ones.

Methodological concerns: There is only a small sample of this type in our PROSEU data set, therefore we cannot further detail the description at this point. Reasons for inclusion are that we estimate that it is a more wide-spread type but that this group is less likely to answer a survey, in particular a community energy/collective energy focussed survey, or to get invited to do so.

4.2   Type 2: The Community-focussed RES prosumers

- Organized informally – thus not registered with any legal form and not able to enter into contracts with third parties.
- Motivated by socio-ecological concerns—specifically tackling climate change and/or creating a sense of community.
- No paid staff but run by volunteers.

Since this type refers to informal community initiatives or groups, logically there is no paid staff involved. One example is a UK community group that aims to invest in community-owned energy storage. Currently they own electric vehicles and engage in energy efficiency activities, while the financing comes from private donations or trust funds. This type could also refer to Transition Movement initiatives in cities and neighbourhoods—many of which are informally organised and of which there are over 1,000 local initiatives across several continents (Longhurst and Pataki 2015).

Methodological concerns: There is only a small sample of this type in our PROSEU data set, therefore we cannot further detail the description at this point. Reasons for inclusion are that we estimate that it is a more wide-spread type but that the groups are less professionalised

and thus might not have a website or other communication means to get noticed and invited to fill in a survey.

4.3   Type 3: The Non-Profit-focussed RES prosumers

- Formalised as non-profit ventures.
- Motivated by socio-ecological concerns, specifically climate change and/or creating community.
- Organised as member-based organisations.
- High involvement of non-management staff/team in the decision making.

The majority of this sample group is not motivated by both social and ecological concerns, but also by increasing the revenue for their organisation through engaging in RES activities. The majority of the sample group is run by volunteers and they all share the legal form of association. They thus focus on beneficiaries such as shared interest groups in first instance but it can also be the broader community or public.

One example is an ecovillage in the Netherlands that has formed an association of home owners. They have installed RES technology in their communal housing project and are currently investigating energy storage facilities. Another example is an association in Germany that was formed to install PV on the roof of a public building, which then self-consumes the energy.

4.4   Type 4: The State-focussed RES prosumer

- Formalised as public ventures.
- Motivated by socio-ecological concerns.
- RES activities are mainly run by paid staff without volunteers.
- Decisions are taken in various ways including low as well as high involvement of non-management staff.

Initiatives of this type are formalised as a public body and thus their beneficiaries are the broader community or public (depending on the reach of the public body). All respondents indicated to be motivated by tackling climate change, and about half of them are motivated by creating community, while increasing the revenue of the public body through engaging in RES activities also plays a role. Many of the examples are public bodies that invest in RES, including schools, universities, or hospitals that install PV installations for self-consumption, or that design their new buildings in such a way that energy bills decrease close to zero. Such public bodies can also support or collaborate with others towards RES production.

4.5   Type 5: The Hybrid RES Prosumers

- Formalised as non-profit or profit ventures.
- Motivated by socio-ecological concerns.

We have further differentiated this group according to their organisational structure (whether or not they have paid staff in combination with volunteers/members) and governance style (whether they have low or high participation of non-management staff in the decision-making), into the following types:

Type 5.1: Participative Volunteers

- Formalised as non-profit or for-profit ventures (market and non-profit logic).
- Motivated by socio-ecological concerns (state, non-profit, community logic).
- Membership-based without paid staff (non-profit, community logic).
- High involvement of non-management staff/team in decision making (non-profit, community logic).

This category differs from other hybrid RES prosumers in that it does not have paid staff while it exercises a high level of participatory decision making. This implies that initiatives of this type are wholly managed by volunteers and members. The overwhelming majority of this sample group relies on volunteers to run the activities and has chosen the legal form of cooperative (in its many different versions across the different countries)[3]. In addition, nearly all initiatives of this sample group are motivated by both social and ecological concerns. Initiatives of this type are mainly active in the local environment and source their financing from local stakeholders and/or members and local subsidy schemes. An additional motivation is the improvement of revenues of participating members by investing in the local environment (i.e. through local subsidy investment schemes, such as the *zip code rose* subsidy in the Netherlands).

This type is rooted in a non-profit logic (participatory decision making, volunteer and member-based as well as a focus on shared interest, community or public goals) but combines this with a market logic (making profit) and a community logic (strong rooting in the community).

Type 5.2: Participative Professionals

- Formalised as for profit or non-profit ventures (market, non-profit logic).
- Motivated by socio-ecological concerns (state, non-profit, community logic).
- Membership based with paid staff (state, market, non-profit logic).
- High involvement of non-management staff/team in decision making (non-profit community logic).

---

[3] More than two thirds of the overall number of respondents has the legal form cooperative—which skews the answers towards this legal form.

This category differs from other hybrid RES prosumers in that it has paid staff combined with a high level of participatory decision making process. An overwhelming majority of this sample group next to paid staff also relies on volunteers and has chosen the legal form of cooperative (in its many different versions across the different countries)[4]. Like the former type, initiatives in this group focus mainly on investing in the local community. The main difference is their ability to afford paid management staff members. They tend to act more professional—e.g. visible through their web appearance and how they communicate with their members. This type includes for example a municipally-owned energy company, but also more classic cooperatives that produce RES energy for their members.

This type combines a non-profit/community logic (participatory decision making, member based, focus on shared interest, community or public goals) with professionalisation through paid staff (market logic, but also non-profit, state) and making profit (market logic).

Type 5.3: Distanced Volunteers

- Formalised as for profit or non-profit ventures (market, non-profit logic).
- Motivated by socio-ecological concerns (state, non-profit, community logic).
- Membership-based without paid staff, instead driven by volunteers and/or members (non-profit, community logic).
- Engages in a low level of participatory decision-making outside the management staff (state, market logic).

This category differs from other hybrid RES prosumers in that it does not have paid staff combined with a low level of participatory decision making. Whereas members are consulted and/or informed of decisions in yearly general assemblies, the main decisions are taken by a board of volunteer managers.

Initiatives in this cluster often focus on the local environment, sourcing financing mainly from members and subsidy schemes. An archetypical example of this type is a Dutch cooperative that sells certificates to local residents, companies, and public bodies, and invests the capital in PV installation. The energy is sold directly to the consumer or to an energy company and the profit is either paid to the members or reinvested in new projects and installations. The legal forms opted for in this sample group tend to have shared-interest groups, the broader community, or the public as beneficiaries.

This type combines a non-profit/community logic (volunteer and member based as well as a focus on shared interest, community, or public goals) with decision-making that is concentrated in the hands of a few (market, state logic) and making profit (market logic).

---

[4] More than two thirds of the overall number of respondents has the legal form cooperative—which skews the answers towards this legal form.

Type 5.4: Distanced Professionals

- Formalised as for-profit or non-profit ventures (market, non-profit logic).
- Motivated by socio-ecological concerns (state, non-profit, community logic).
- Membership based with paid staff (state, market, non-profit logic).
- Low involvement of non-management staff/team in decision making (state, market logic).

This category differs from other hybrid RES prosumers in that it has paid staff combined with a low level of participatory decision making. The overwhelming majority of this sample group also relies on volunteers and is motivated by generating additional revenue through RES activities.

Whereas other clusters focus mainly on greening the local environment through cooperative-like organisational structures, initiatives of this group are also focussed on the national or international level. Examples include an energy company in the Netherlands that is owned by a local cooperative to ensure the profit is reinvested or flows back to the community. In terms of legal forms, only about half of the initiatives of the sample have chosen the cooperative form—the other half includes amongst others limited companies and different forms of the UK registered societies.

This type combines a non-profit logic (volunteer and member based, as well as a focus on shared interest, community, or public goals) with making profit (market logic), the professionalisation through paid staff and decision-making that is concentrated in the hands of a few (market, state logic).

5. Discussion and concluding thoughts

The database analysis and the survey that preceded the present typology analysis revealed the contradictions between legal and organisational forms of collective RES prosumer initiatives, as well as the difficulty in typifying the different resulting energy actors in a manner that can inform EU policies in this field. This report proposed a typology of collective RES prosumers differentiating five primary types, namely Market-focussed RES prosumers, Community-focussed RES prosumers, Non-Profit-focussed RES prosumers, State-focussed RES prosumers, and Hybrid RES Prosumers (Participative Volunteers, Participative Professionals, Distanced Volunteers, and Distanced Professionals). The typology does not stop at identifying a large group of collective RES prosumers that are motivated by socio-ecological concerns and are formalised as either for- or non-profit ventures. Rather, by further dividing this type into sub-types, by clustering them along the variables 'organisational structure' and 'governance', this typology goes the extra mile to draw a more differentiated picture of the current collective RES prosumer landscape. In doing so, it hopes to have accomplished the following:

- Providing a useful reflection on RES prosumerism and on the kind of (collective or individual) agency upon which it rests.
- Theoretically and empirically unpacking in which distinct (institutionally hybrid) forms of agency prosumerism is acted out. Thereby in turn informing prospective (PROSEU) research on the different kinds of prosumerist futures that could arise.
- Contributing to the field of fast-moving research on RES prosumerism beyond the anecdotal and beyond small sample sizes.

There are certainly limitations to our study, including questions that this deliverable can only raise but not answer—some of these have been touched upon already, others will be reflected upon in the following points for discussion.

5.1 Transformative potential of collective RES prosumers

This deliverable set out to explore the proposition that the potential of collective RES prosumers to contribute to energy transitions lies for a significant part in their ability to challenge, alter, and/or replace dominant institutions in the energy systems (Haxeltine et al. 2017). The proposition includes that the reconsideration of the institutional logics within which such institutions are embedded represents such transformative potential.

The resulting typology identifies four types that, more or less, act within one of the described logics and thus do not challenge them. Rather, these four types act as expected within that certain logic. They include Market-focussed RES prosumers, Community-focussed RES prosumers, Non-Profit-focussed RES prosumers, and State-focussed RES prosumers. By way of example, State-focussed RES prosumer initiatives are public bodies motivated by public goals such as tackling climate change or creating community. They govern their activities in a

more hierarchic way and for the majority rely on paid staff. One of the propositions that comes from institutional theory is that, as long as these types stay within a certain logic, the barriers they encounter will be less severe than for types that challenge boundaries. Confirming or refuting this proposition is one of the follow-up steps we recommend, especially in light of the PROSEU work focussing on institutional drivers and barriers. Initiatives of these types can contribute to energy transitions by taking advantage of the status quo.

The last type, Hybrid RES Prosumers is the group that challenges institutional logics. This type constitutes a rather big group of the overall sample. Specifically, it includes those hybrid organisations that are motivated by social-ecological concerns and do not necessarily let themselves be pinned down on whether and for which beneficiary they make profit. It includes what is commonly referred to as the classic hybrid organisations such as the 'social enterprises' but also 'cooperatives' and 'private firms'. This shows that legal form is a less straightforward operationalisation than it appears on the surface: while it helps determine whether or not a venture is formalised, it comes up short as an operationalisation of the for-profit ambition of an initiative. As outlined, a big category of legal forms can be used to formalise either for-profit ventures or non-profit ventures—that therefore can be used to make money but do not need to. Take for example the Dutch legal form of 'besloten vennootschap'—it is the equivalent of the UK Limited company and can be used to generate profit (and more often than not is the legal form chosen to do so) but does not need to. It can therefore be used to formalise for-profit and non-profit ventures. However, the different legal forms for cooperatives or community benefit societies (UK) are also legal forms through which profit can be generated—what differentiates these is that they are legally more constrained in the ways that their profit is to be used.

This Hybrid RES Prosumer type thus blurs the distinction between for-profit (market) and non-profit (state, community, non-profit) that the MaP heuristic introduces, as well as between self-interest (market) and shared-interest group, community, and/or public interest (state, community, non-profit) by combining for-profit with the interest of a broader group. Such organisational hybridity is a well-researched phenomenon in third sector studies, social entrepreneurship studies, organisational studies, and is also taken up by literature on energy transitions (e.g. Bauwens, Huybrechts, and Dufays 2019; Huybrechts and Haugh 2018; Raven 2007). According to Bauwens, Huybrechts, and Dufays (2019), a hybrid organisation or entity combines different, sometimes contradictory, goals and logics (economic, social, environmental, etc.) at the core of their activities. Throughout the last years, it has come to an institutionalisation of hybridity through the creation of legal forms for 'social enterprises' in certain countries or the recognition for 'REScoops' as a broad collection of organisations or groups that commit to cooperative principles (cf. Huybrechts and Haugh 2018). To better understand this cluster and the ways it challenges different dimensions of institutional logics, we have further differentiated four subtypes that tell us more about the variety of the degree of professionalisation and the degree of involvement in decision-making. This further differentiation has allowed us to refine which institutional logics are blurred by each of the different types.

Follow up research could focus on further carving out the different types through more in-depth case studies that make each of the types better graspable (possibly PROSEU WP7). Such in-

depth analysis combined with additional survey analysis could also increase our understanding of the specific enabling and constraining factors that each of these types encounters in engaging in their RES activities. Based on these, policy and practice recommendations can be coined that can enable the further mainstreaming of RES prosumerism (as in PROSEU WP6).

5.2   Agency in RES prosumerism: Limitations and ways forward

To develop this typology, we have set ourselves a number of boundaries, which we discuss and challenge in the following.

RES prosumer stakeholders

Firstly, we developed a typology for collective RES prosumers defined as follows: "*A RES prosumer initiative in the PROSEU study is a collective energy actor that produces energy from renewable sources with the primary objective of providing in its own energy needs and/or those of its members, and in some cases selling excess energy to clients, thereby actively participating in the energy markets*" (Horstink et al. 2019, 24). As such, the sample did not include other actors in the broader RES prosumerism field. Specifically, it did not include what we refer to as prosumer stakeholders in the PROSEU project, those actors that make it possible for others to prosume. This category of actors includes aggregators, peer-to-peer platforms, RES project developers, and energy service companies or large utilities (i.e. in Portugal a large utility is offering the service of setting up a RES installation for individual prosumers or companies). Our typology does not paint a complete picture of the RES prosumerism landscape, but focusses on collective RES prosumers only. Other research could take up the question of mapping the complete (and changing) RES prosumerism landscape focussing more on the interactions and relations between the actors and also the redefinition of roles (such as those of energy utilities).

Hybrid constellations

Secondly, we focussed on single actors rather than on actor constellations, as such we have excluded both informal and formal consortia, collaborations, and partnerships as units of analysis. However, in addition to challenging institutional boundaries through combinations of institutional logics across formalisation, motivation, governance, and organisational structure, single actors also relate to others in ways that challenge institutional logics and help us rethink dominant institutions.

The survey data shows at least two different ways in which such hybrid constellations work out. On the one hand, we have certain types of legal forms setting up another entity of a different legal form to engage in RES activities. On the other hand there are partnerships between more than two actors that already have or strive for legally binding agreements.

Firstly, there are entities with legal forms pertaining to a non-profit logic (association or municipality) that own an entity with a legal form that can make profit through which they

formalise their RES activities. However, we also see combinations, such as cooperatives owning limited companies—here it seems that it is not the for-profit aspect that is at stake, but rather the work involved and time needed for higher degrees of participatory decision-making and organisational structure. The majority of the limited companies involved in such constellations also blur boundaries since they combine the for-profit orientation with a socio-ecological motivation rather than pure self-interest.

Secondly, there are partnerships between different actors, such as municipalities, local organisations, and individual citizens. Such energy communities are sometimes supported by regional agreements and/or local/regional agencies. In very few countries do these types of partnerships constitute a legal form, yet these collective RES prosumers will behave as an entity, albeit not a "legally recognised" one. These partnerships are thus enabling the collaboration of actors aligned with different institutional logics. The survey data included at least two main types of such partnerships: temporary ones, which mainly concerned partnerships funded through public (research) money, and more permanent ones. The latter ones included for example a collaboration between a municipality, energy cooperative, and an association to make an island energy self-sufficient.

This was no more than a glimpse into the hybridisation through constellations and there are many interesting examples of networking and collaboration strategies in the RES prosumerism field worthy of exploring to enrich our picture of the overall actor structure of the RES prosumerism landscape.

Informal actors

Thirdly, informal groups and energy communities are underrepresented in our sample but do deserve attention. Not only does the proposed typology have a separate type to accommodate for that (Community-focussed RES prosumers), researchers such as Hewitt et al. (2019) also include one type that is specifically about informal groups in their typology of social innovation initiatives in community energy. This type called "grassroots movement" includes local initiatives such as eco-villages, occupied villages, projects allied to the transitions towns movement, and citizen energy platforms and the authors argue that "*legal form is less relevant in these cases, being largely a matter of convenience, if it exists at all*" (Hewitt et al. 2019, 16). Thus, while the degree of institutionalisation of the RES prosumerism field is increasing (Huybrechts and Haugh 2018), there are many informal aspects and searches for meaningful formalised forms (and constellations thereof).

As also outlined by Deliverable 2.1, the legal form adopted by the initiative says more about the legislation, history, or culture of the country in question (in particular legislative limitations that collective RES prosumers encounter) than about the organisational form the initiative has adopted and even less about their "prosumer ambition" (Horstink et al. 2019). Each regulatory context has its own range of possible legal forms that initiators can choose from. The 'social enterprise' for example is a recognised legal form in the UK but not in the Netherlands, and the 'cooperative' can take many different legal forms in the UK or France. In addition, there are rights as well as obligations that come with different legal forms that may motivate collective RES prosumers to choose one or the other; e.g. different legal forms require different

procedures and resources to be set up and different legal forms can access different resources (e.g. for-profit companies have easier access to bank loans in the Netherlands, whereas cooperatives in Germany cannot access certain subsidies).

Through the latest EU legislation—the Clean Energy Package—the EU has made it mandatory for REComs and CECs to have a legal entity and they will therefore need to formalise. This might result in a formal entity running the revenue-generating energy activities for the community and public good with a broader group being involved in decision-making and thus more hybridisation. Many countries do (not yet) have legal forms in place that accommodate the formalisation of REComs or CECs. The early characterisation of collective actor types in PROSEU WP2 found that energy communities are either run by a cooperative, an association, a municipality, or different types of partnerships (Horstink et al. 2019, pp. 25-27). In some cases, energy communities will set up a private firm to facilitate their engaging in the energy market (Ibid, p. 85). Several reports on the development of RES prosumerism (Bertram and Primova 2018; Rescoop 2017) warn of the need to adequately protect/positively discriminate the community initiatives if the goal is inclusive and just energy transition, since increasingly for-profit energy companies are setting up legally indistinguishable collaborative initiatives that do not "adhere to the cooperative principles and are not in citizens' hands" (REScoop, 2017, pp. 54-57). The PROSEU survey found that in Croatia, predominantly companies were able to access the subsidies available for RES prosumerism, since the minimum production capacity was set at 1 MW (Horstink et al., p. 61), a bar set higher than most local cooperatives will be able to attain. And, although excluded from our analysis, some of the RES prosumer stakeholders introduced above, could very well be recognised by the EU as RES prosumer actors (e.g. peer-to-peer platforms, RES aggregators), even though they are mere service providers for RES prosumers.

In terms of future research, we should also extend the meaning of informality beyond its relation to legal form to also include the unwritten and intangible. Surely, when initiatives are 'in-between' logics, they cannot rely solely on formalised legal forms, but will also fall back on informal norms, rules, relations, etc.. In doing so, they challenge the current formalisation of a logic and with time, this can give rise to new formal (and legal) forms (such as the current negotiation in the Netherlands about recognising the social enterprise as a legal entity in itself).

Indeed, the importance of the informal dimension of processes of institutionalisation in innovation and change, such as in mainstreaming energy prosumption, requires us to explicitly look beyond only formalised legal forms. Phenomena like social movements are by definition informal as they manifest as "*informal* networks of interaction, based on shared beliefs and solidarity, mobilised around contentious themes through the frequent use of various forms of protest" (della Porta and Diani 1999). In the field of social enterprise, of which a large part has focussed on formalised legal forms, there is an increasing attention for the role of informality in collective initiatives. The exclusion of the informal logic is problematic, as it inherently also excludes 'epistemologies of the South', where the informal economy i.e. 'popular economy' plays an important role in people's livelihoods (Eynaud et al. 2019). Focusing only on the formalised dimensions of initiatives reproduces the hegemony of a public-private logic of formalisation and standardisation, and further isolates the informal sphere as a possible space for collective action to solve societal challenges. Even if collective prosumption initiatives in a

European context almost always include a formalised legal dimension, there is still a whole assembly of informal dimensions (and/or linkages to informal networks and communities) that are equally (if not more) important to understand if prosumption is to be mainstreamed.

5.3   Moving PROSEU forward

This typology and the underlying theoretical considerations as well as survey data analysis can provide input for PROSEU's on-going activities. In the following are some suggestions for a way forward:

- For PROSEU WP4's finance and business models, it might be interesting to take the typology as a variable for their business model analysis: do different types have different business models? Are business models another distinctive variable? Also, the 'governance' elements that were highlighted in the typology development could provide sensible input for the further analysis and development of business models.
- For PROSEU WP6's Participatory Integrated Assessment of Incentive Structures, it might be interesting to understand whether different types correspond with different enabling and constraining factors, and whether the typology could also serve as a guide for the design of the Participatory Integrated Assessment (e.g. functioning as an actor map to consider for inviting stakeholders, for performing a participatory stakeholder analysis, for writing recommendations for different types of prosumers, etc).
- For PROSEU WP7, the Living Labs research, it might be interesting to test the relevance of the typology in specific living labs. The Living Labs research might offer some in-depth insights on the hybrid constellations, RES prosumer stakeholders, as well as the more informal initiatives, which have been either out of scope or underrepresented in the survey sample. WP7 research could help clarify the roles and interactions in specific case environments and provide policy recommendations on how to integrate different types of collective prosumers in energy markets.

6. References

Avelino, Flor, and Julia M. Wittmayer. 2016. "Shifting Power Relations in Sustainability Transitions: A Multi-Actor Perspective." *Journal of Environmental Policy and Planning* 18(5): 628–49. http://dx.doi.org/10.1080/1523908X.2015.1112259.

———. 2019. "The Transformative Potential of Plural Social Enterprise: A Multi-Actor Perspective." In *Theory of Social Enterprise and Pluralism: Solidarity Economy, Social Movements, and Global South*, eds. P. Eynaud et al. Oxfordshire: Routledge, 193–220.

Bauwens, T., B. Gotchev, and L. Holstenkamp. 2016. "What Drives the Development of Community Energy in Europe? The Case of Wind Power Cooperatives." *Energy Research & Social Science* 13: 136–47.

Bauwens, T, Benjamin Huybrechts, and Frédéric Dufays. 2019. "Understanding the Diverse Scaling Strategies of Social Enterprises as Hybrid Organizations: The Case of Renewable Energy Cooperatives." *Organization & Environment*: 1086026619837126. https://doi.org/10.1177/1086026619837126.

Bennett, Andrew, and Colin Elman. 2006. "QUALITATIVE RESEARCH: Recent Developments in Case Study Methods." *Annual Review of Political Science* 9(1): 455–76. http://www.annualreviews.org/doi/10.1146/annurev.polisci.8.082103.104918.

Bertram, R., and R Primova, eds. 2018. *Energy Atlas 2018: Facts and Figures about Renewables in Europe*. Heinrich Böll Foundation, FOEE, EREF, Green European Foundation.

Bleicher, Alena, and Matthias Gross. 2015. "User Motivation, Energy Prosumers, and Regional Diversity: Sociological Notes on Using Shallow Geothermal Energy." *Geothermal Energy* 3(1): 12. https://doi.org/10.1186/s40517-015-0032-6.

Brandsen, Taco, and Victor Pestoff. 2006. "Co-Production, the Third Sector and the Delivery of Public Services." *Public Management Review* 8(4): 493–501. https://doi.org/10.1080/14719030601022874.

Brummer, V. 2018. "Community Energy – Benefits and Barriers: A Comparative Literature Review of Community Energy in the UK, Germany and the USA, the Benefits It Provides for Society and the Barriers It Faces." *Renewable and Sustainable Energy Reviews* 94: 187–96. https://doi.org/10.1016/j.rser.2018.06.013.

Burke, Matthew J., and Jennie C. Stephens. 2018. "Political Power and Renewable Energy Futures: A Critical Review." *Energy Research and Social Science* 35(October 2017): 78–93. https://doi.org/10.1016/j.erss.2017.10.018.

Callaghan, G, and D. Williams. 2014. "Teddy Bears and Tigers: How Renewable Energy Can Revitalise Local Communities." *Local Economy* 29(6): 657–74.

Castaneda, Monica et al. 2017. "Myths and Facts of the Utility Death Spiral." *Energy Policy*.

Colin, Elman. 2005. 59 International Organization *Explanatory Typologies in Qualitative Studies of International Politics*.

Collier, David, Jody LaPorte, and Jason Seawright. 2008. "Typologies: Forming Concepts and Creating Categorical Variables." *The Oxford Handbook of Political Methodology* (January).

———. 2012. "Putting Typologies to Work: Concept Formation, Measurement, and Analytic Rigor." *Political Research Quarterly* 65(1): 217–32.

Doty, D Harold, and William H Glick. 1994. "Typologies as a Unique Form of Theory Building : Toward Improved Understanding and Modeling Author (s): D . Harold Doty and William H . Glick Source : The Academy of Management Review , Vol . 19 , No . 2 (Apr ., 1994), Pp . 230-251 Published by : Acad." *Academy of Management Review* 19(2): 230–51.

Ellsworth-Krebs, Katherine, and Louise Reid. 2016. "Conceptualising Energy Prosumption: Exploring Energy Production, Consumption and Microgeneration in Scotland, UK." *ENVIRONMENT AND PLANNING A-ECONOMY AND SPACE* 48(10): 1988–2005.

European Commission. 2015. *Energy Union Factsheet (MEMO/15/4485)*. Brussels.

———. 2016. "Commission Proposes New Rules for Consumer Centred Clean Energy Transition." https://ec.europa.eu/energy/en/news/commission-proposes-new-rules-consumer-centred-clean-energy-transition (July 25, 2019).

———. 2017. *Proposal 2016/380 (COD) for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Common Rules for the Internal Market in Electricity*. https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/COM-%0A2016-864-F2-EN-MAIN-PART-1.PDF.

———. 2018. *A Clean Planet for All A European Strategic Long-Term Vision for a Prosperous, Modern, Competitive and Climate Neutral Economy (COM(2018) 773 Final)*. Brussels.

———. 2019a. "Clean Energy for All Europeans Package Completed: Good for Consumers, Good for Growth and Jobs, and Good for the Planet." https://ec.europa.eu/info/news/clean-energy-all-europeans-package-completed-good-consumers-good-growth-and-jobs-and-good-planet-2019-may-22_en (July 25, 2019).

———. 2019b. *The State of the Energy Union Explained (MEMO/19/1875)*. http://europa.eu/rapid/press-release_MEMO-19-1875_en.pdf.

European Parliament and Council. 2018. *Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the Promotion of the Use of Energy from Renewable Sources*. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.328.01.0082.01.ENG&toc=OJ%3AL%3A2018%3A328%3ATOC.

———. 2019. *Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on Common Rules for the Internal Market for Electricity and Amending Directive 2012/27/EU (Text with EEA Relevance.) PE/10/2019/REV/1*.

Evers, A., and J. L. Laville, eds. 2004. *The Third Sector in Europe*. Cheltenham: Edward Elgar Publishing.

Eynaud, P. et al., eds. 2019. *Theory of Social Enterprise and Pluralism: Solidarity Economy, Social Movements, and Global South*. Oxfordshire: Routledge.

Ford, R., J. Stephenson, and J Whitaker. 2016. *Prosumer Collectives: A Review. Report for the Smart Grid Forum*. Dunedin, New Zealand.

Frieden, D. et al. 2019. *Collective Self-Consumption and Energy Communities: Overview of Emerging Regulatory Approaches in Europe. Working Paper.*

Fuenfschilling, Lea, and Bernhard Truffer. 2014. "The Structuration of Socio-Technical Regimes—Conceptual Foundations from Institutional Theory." *Research Policy* 43(4): 772–91. https://www.sciencedirect.com/science/article/pii/S0048733313001893?via%3Dihub (May 3, 2019).

GfK Belgium Consortium. 2017. *Study on "Residential Prosumers in the European Energy Union"*

JUST/2015/CONS/FW/C006/0127. Brussels. https://ec.europa.eu/commission/sites/beta-political/files/study-residential-prosumers-energy-union_en.pdf.

Grin, John, Jan Rotmans, and Johan Schot. 2010. *Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change*. New York: Routledge.

Gui, Emi Minghui, and Iain MacGill. 2018. "Typology of Future Clean Energy Communities: An Exploratory Structure, Opportunities, and Challenges." *Energy Research & Social Science* 35: 94–107.

Haggett, C. et al. 2013. *Community Energy in Scotland: The Social Factors for Success. Report for ClimateXChange, Edinburgh*.

Hall, Stephen, and Katy Roelich. 2016. "Business Model Innovation in Electricity Supply Markets: The Role of Complex Value in the United Kingdom." *Energy Policy* 92: 286–98. http://dx.doi.org/10.1016/j.enpol.2016.02.019.

Hargreaves, T., S. Hielscher, G. Seyfang, and A. Smith. 2013. "Grassroots Innovations in Community Energy: The Role of Intermediaries in Niche Development." *Global Environmental Change* 23(5): 868–80.

Haxeltine, Alex et al. 2017. *Towards a TSI Theory: A Relational Framework and 12 Propositions*. Transit Working Paper #16.

Heldeweg, Michiel A. 2017. "Normative Alignment, Institutional Resilience and Shifts in Legal Governance of the Energy Transition." *Sustainability* 9(7). https://www.mdpi.com/2071-1050/9/7/1273.

Hewitt, Richard J et al. 2019. "Social Innovation in Community Energy in Europe: A Review of The." *FRONTIERS IN ENERGY RESEARCH* 7.

Horstink, Lanka, Guillerme Luz, Mark Soares, and Kiat Ng. 2019. *Review and Characterisation of Collective Renewable Energy Prosumer Initiatives. PROSEU-Prosumers for the Energy Union: Mainstreaming Active Participation of Citizens in the Energy Transition (Deliverable 2.1). Horizon 2020 (H2020- LCE-2017) Grant Agreeme*.

Horstink, Lanka, Julia M. Wittmayer, and Kiat Ng. 2019. *Defining the Role of Collective Renewable Energy Prosumers in the EU's Clean Energy Transition: A Critical Perspective. Working Paper*.

Huybrechts, Benjamin, and Helen Haugh. 2018. "The Roles of Networks in Institutionalizing New Hybrid Organizational Forms: Insights from the European Renewable Energy Cooperative Network." *ORGANIZATION STUDIES* 39(8): 1085–1108.

Jenkins, Kirsten, Benjamin K. Sovacool, and Darren McCauley. 2018. "Humanizing Sociotechnical Transitions through Energy Justice: An Ethical Framework for Global Transformative Change." *Energy Policy*.

Joint Research Centre (EC). 2019. *Energy Service Companies (ESCos)*. https://e3p.jrc.ec.europa.eu/communities/energy-service-companies.

Kooij, H -J, A Lagendijk, and M Oteman. 2018. "Who Beats the Dutch Tax Department? Tracing 20 Years of Niche-Regime Interactions on Collective Solar PV Production in The Netherlands." *Sustainability (Switzerland)* 10(8). https://www.scopus.com/inward/record.uri?eid=2-s2.0-85054931762&doi=10.3390%2Fsu10082807&partnerID=40&md5=250c59a87540d07a2ead340320bf991b.

Kotilainen, Kirsi, and Ulla A. Saari. 2018. "Policy Influence on Consumers' Evolution into Prosumers-Empirical Findings from an Exploratory Survey in Europe." *Sustainability (Switzerland)* 10(1).

Lavrijssen, Saskia, and Arturo Carrillo Parra. 2017. "Radical Prosumer Innovations in the Electricity Sector and the Impact on Prosumer Regulation." *SUSTAINABILITY* 9(7).

Loorbach, Derk, Niki Frantzeskaki, and Flor Avelino. 2017. "Sustainability Transitions Research: Transforming Science and Practice for Societal Change." *Annual Review of Environment and Resources* 42(1): 599–626. http://www.annualreviews.org/doi/10.1146/annurev-environ-102014-021340.

Lowndes, Vivien, and Mark Roberts. 2013. *Why Institutions Matter: The New Institutionalism in Political Science*. Houndmills: Palgrave Macmillan UK.

Miceli, Rosario, Salvatore Favuzza, and Fabio Genduso. 2013. "A Perspective on the Future of Distribution: Smart Grids, State of the Art, Benefits and Research Plans." *Energy and Power Engineering* 05(01): 36–42.

Pel, Bonno. 2016. "Trojan Horses in Transitions: A Dialectical Perspective on Innovation 'Capture.'" *Journal of Environmental Policy & Planning* 18(5): 673–91. https://doi.org/10.1080/1523908X.2015.1090903.

Pestoff, Victor. 1992. "Third Sector and Co-Operative Services – An Alternative to Privatization." *Journal of Consumer Policy* 15: 21–45.

della Porta, Donatalla, and M. Diani. 1999. *Social Movements: An Introduction*.

Raven, Rob. 2007. "Niche Accumulation and Hybridisation Strategies in Transition Processes towards a Sustainable Energy System: An Assessment of Differences and Pitfalls." *Energy Policy* 35(4): 2390–2400. https://www.sciencedirect.com/science/article/pii/S0301421506003351 (August 30, 2019).

Rescoop. 2017. *RES202020-Report on Financial Barriers and Existing Solutions [Deliverable 4.1] [Intelligent Energy Europe Programme of the European Union]*.

Ruotsalainen, Juho, Joni Karjalainen, Michael Child, and Sirkka Heinonen. 2017. "Culture, Values, Lifestyles, and Power in Energy Futures: A Critical Peer-to-Peer Vision for Renewable Energy." *Energy Research and Social Science*.

Schot, Johan, Laur Kanger, and Geert Verbong. 2016. "The Roles of Users in Shaping Transitions to New Energy Systems." *Nature Energy* 1(May).

Seyfang, Gill, and Alex Haxeltine. 2012. "Growing Grassroots Innovations: Exploring the Role of Community-Based in Governing Sustainable Energy Transitions." *ENVIRONMENT AND PLANNING C-GOVERNMENT AND POLICY* 30(3): 381–400.

Seyfang, Gill, Jung Jin Park, and Adrian Smith. 2013. "A Thousand Flowers Blooming? An Examination of Community Energy in The." *ENERGY POLICY* 61: 977–89.

Di Silvestre, Maria Luisa, Salvatore Favuzza, Eleonora Riva Sanseverino, and Gaetano Zizzo. 2018. "How Decarbonization, Digitalization and Decentralization Are Changing Key Power Infrastructures." *Renewable and Sustainable Energy Reviews* 93(June): 483–98. https://doi.org/10.1016/j.rser.2018.05.068.

Smith, Adrian. 2007. "Translating Sustainabilities between Green Niches and Socio-Technical Regimes." *Technology Analysis & Strategic Management* 19(4): 427–50. https://doi.org/10.1080/09537320701403334.

———. 2016. "Making the Most of Community Energies: Three Perspectives on Grassroots." *ENVIRONMENT AND PLANNING A* 48(2): 407–32.

Strachan, Peter A. et al. 2015. "Promoting Community Renewable Energy in a Corporate Energy World."

Sustainable Development 23(2): n/a-n/a.

Thornton, P.H., and W. Ocasio. 2008. "Institutional Logics." In *The Sage Handbook of Organizational Institutionalism*, eds. Royston Greenwood, Christine Oliver, Roy Suddaby, and Kerstin Sahlin-Anderson. SAGE PUBLICATIONS LTD, 99–129.

Thornton, P.H., W. Ocasio, and M Lounsbury. 2012. *The Institutional Logics Perspective. A New Approach to Culture, Structure and Process*. Oxford: Oxford University Press.

Toporek, Martha, and Ines Campos. 2019. *Assessment of Existing EU-Wide and Member State-Specific Regulatory and Policy Frameworks of RES Prosumers (Deliverable 3.1)*.

van Veelen, Bregje. 2017. "Making Sense of the Scottish Community Energy Sector–An Organising Typology." *Scottish Geographical Journal* 133(1): 1–20.

Walker, Gordon, and Patrick Devine-Wright. 2008. "Community Renewable Energy: What Should It Mean?" *Energy Policy* 36(2): 497–500. https://www.sciencedirect.com/science/article/pii/S0301421507004739 (May 20, 2019).

Wittmayer, Julia M., Flor Avelino, Bonno Pel, and Ines Campos. 2019. *Hybridising Energy? Mainstreaming the Prosumerism of Renewable Energy across Institutional Logics. Working Paper.*

Yildiz, Özgür et al. 2015. "Renewable Energy Cooperatives as Gatekeepers or Facilitators? Recent Developments in Germany and a Multidisciplinary Research Agenda." *Energy Research & Social Science* 6: 59–73.

PROSEU

info@proseu.eu