Essays

The Role of Energy Communities in the Energy Transition

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Abstract

The paper aims to offer a legal framework for Energy Communities in the European and Italian contexts. Particular attention is given to the function of collective energy sharing introduced by lawmakers in the context of regulatory actions to implement the decarbonization goals set by the Paris Agreement. The modalities of State support to citizen initiatives operating as prosumers in the market for the beneficial impact of sharing energy and enhanced use of renewables are examined. In addition, the connection between energy and digital transition with the possible risks arising from this necessary interaction are considered.

I. Introduction

Global warming and climate change are now pressing threats to human, ecosystem, and biodiversity health. The threats have been known to society, but are now finding an ever more ready response in terms of legislative policy. Despite the gradual worsening of greenhouse gas emissions in recent years,[1] citizens and legislators have shown a common purpose to reverse course via a synergy that will produce concrete results within a reasonable timeframe. Serious commitments have in fact been taken, not just at the European level, to counter a global phenomenon that requires a coordinated effort by individuals and institutions. The Italian lawmakers even amended the Constitution in February 2022 to introduce environmental protection among the most prominent provisions in the national legal framework.[2]

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[1] For detailed information, see the official 'Sixth Assessment Report of the Intergovernmental Panel on Climate Change', available at https://tinyurl.com/2s3c9kdz (last visited 31 December 2022).

[2] Cf the current Arts 9 and 41 of the Italian Constitution, where the environment receives protection also in the interest of future generations and must be considered even in business activities. On this topic see P. Perlingieri, *Il diritto civile nella legalità costituzionale secondo il sistema italo-europeo delle fonti*, III, *Situazioni soggettive* (Napoli: Edizioni Scientifiche Italiane, 2020), 77; M. Pennasilico ed, *Manuale di diritto civile dell'ambiente* (Napoli: Edizioni Scientifiche Italiane, 2014), 15. Concerning the environmental impact of renewable energy consumption, A.A. Alola et al, 'The role of economic freedom and clean energy in environmental sustainability: Implication for the G-20 economies' *Environmental Science and Pollution Research*, 36612

However, the effort required for an effective ecological transition requires more than merely a technical effort. *Ad hoc* regulatory initiatives are insufficient; what is needed is, more generally, a change in people's values and morality leading to changes in daily lifestyles.[3] Thus the problem of environmental protection is close to the class of 'No Technical Solution Problems'[4] and it should be addressed accordingly. All tools – both informative and operational[5] - must be in place to increase social awareness of the harmful effects of individual behavior and take advantage of new instruments, including technological ones, to reduce its overall impact.

A global ecological transition entails above all an energy transition:[6] that is the transition from an energy production system based on fossil sources (coal, oil, natural gas) to a system mainly focused on renewable sources along with proper infrastructure (adequate grids and energy storage systems). The ultimate goal of the energy transition – and a fundamental step for the entire ecological one – is the so-called decarbonization or 'carbon neutrality': ie, the reduction of the carbon/hydrogen ratio in energy sources. Achieving this goal requires the rethinking of traditional energy production and consumption patterns and new behavior standards to be applied both in private life and business activities by citizens and economic operators. European lawmakers have prepared innovative

(2022). Cf F.V. Bekun et al, 'Toward a sustainable environment: Nexus between CO_2 emissions, resource rent, renewable and nonrenewable energy in 16-EU countries' 657 *Science of The Total Environment*, 1023 (2019). About the reform of Art 41 of the Italian Constitution, F. De Leonardis, 'La transizione ecologica come modello di sviluppo di sistema: spunti sul ruolo delle amministrazioni' *Diritto amministrativo*, 779 (2021). With reference to the link between european and Italian legal systems within the energy field see S. Quadri, 'Riflessioni sul rapporto tra diritto interno e ordinamento dell'Unione europea in tema di energia' *Rivista italiana di diritto pubblico comunitario*, 1031 (2012).

[3] 'Interestingly, people's value-based judgements of energy sources may affect their evaluations of various consequences of these energy sources, including consequences that should not be particularly important to them given their values': L. Steg et al, 'Understanding the human dimensions of a sustainable energy transition' 6 *Frontiers in Psychology* (2015), available at https://tinyurl.com/4f3832yw (last visited 31 December 2022).

[4] G. Hardin, 'The Tragedy of the Commons' 162 *Science New Series*, 1243 (1968). Cf also E. Ostrom, *Governing the Commons. The Evolution of Institutions for Collective Action* (Cambridge: Cambridge University Press, 1990), 1-28. On the 'Commons' issue, see at least S. Rodotà, 'Beni comuni e categorie giuridiche. Una rivisitazione necessaria' *Questione giustizia*, 237 (2011); U. Mattei, *Beni comuni. Un manifesto* (Roma-Bari: La Terza, 2011); S. Rodotà, *Il terribile diritto. Studi sulla proprietà privata e i beni comuni* (Bologna: il Mulino, 2013), 459-479.

[5] See L. Neij and K. Astrand, 'Outcome indicators for the evaluation of energy policy instruments and technical change' 34 *Energy Policy*, 2662–2676 (2016); cf also B.D. Solomon and K. Krishna, 'The coming sustainable energy transition: History, strategies, and outlook' 39 *Energy Policy*, 7428 (2011); M. Chang et al, 'Trends in tools and approaches for modelling the energy transition' 290 *Applied Energy*, 116731 (2021).

[6] See the SAPEA Science Advice for Policy by European Academies, *A Systemic Approach to the Energy Transition in Europe* (Berlin: SAPEA, 2021), available at https://tinyurl.com/2p93yw4m. With regard to renewable sources in the framework of property right, cf P. Laghi, 'Impianti fotovoltaici e distanze legali: osservazioni sulla "funzione sociale" della proprietà nell'era delle energie rinnovabili' *Rassegna di diritto civile*, 875 (2017).

social-cooperation instruments to encourage the spread of alternative ways of producing, consuming, and storing energy. Those instruments include the so-called Energy Communities. Such communities allow a peculiar method of energy fruition: energy sharing.[7]

In the following section, the historical background and the rationale behind the Energy Communities system are explained. In the third and fourth sections, the structures of collective 'Self-Consumers' and 'Renewable Energy Communities,' as well as the 'Citizen Energy Communities' are analyzed. Finally, the Italian Legal Framework of Renewable Energy Communities is described. In the conclusion, the inevitable conflict between the energy transition and the digital one are highlighted.

II. Historical Background: The Rationale Behind Energy Communities. Prosumption and Self-Consumption

The 'Green Revolution'[8] has been taking place remarkably for about a decade. In February 2015, the 'Energy Union Strategy' was outlined by the European Commission. In a communication addressed to the European Parliament and the Council, the Commission provided a plan for all EU member states enabling them to anticipate the Protocol which was to be negotiated in Paris at the end of that same year. That agreement would have involved all the world's major economies: Europe, China, and the United States of America. As an essential part of its Energy Union Strategy, the Commission proposed a fundamental transformation of the European energy system marked by maximum freedom of energy flow and diversification of resources employed for production. The main goals were: increasing renewable sources to reduce carbon dioxide (CO_2) emissions and

[7] Directive (EU) 2019/944 of the European Parliament and of the Council, 5 June 2019, on common rules for the internal market for electricity and amending Directive 2012/27/EU, Recital no 43: 'Distributed energy technologies and consumer empowerment have made community energy an effective and cost-efficient way to meet citizens' needs and expectations regarding energy sources, services and local participation. Community energy offers an inclusive option for all consumers to have a direct stake in producing, consuming or sharing energy'. On this topic see also Ferrero, 'Le comunità energetiche: ritorno a un futuro sostenibile' *Ambiente e sviluppo*, 677 (2020); A. Caramizaru and A. Uihlein, 'Energy communities: An overview of energy and social innovation' *JRC Science for Policy Report* (2020), available at https://tinyurl.com/4mwfvxyd (last visited 31 December 2022); J. Cuenca et al, 'Energy Communities and Sharing Economy. Concepts in the Electricity Sector: A Survey' *International Conference on Environment and Electrical Engineering* (2020), available at https://tinyurl.com/4baah5hn (last visited 31 December 2022); D. de São José et al, 'Smart energy community: A systematic review with metanalysis' 36 *Energy Strategy Reviews*, 100678 (2021).

[8] For an Italian perspective see the 'PNRR: rivoluzioneverde e transizioneecologica', available at https://tinyurl.com/y2wjjp5p (last visited 31 December 2022), and the 'Italy's National Energy Strategy 2017', available at https://tinyurl.com/473zujhf (last visited 31 December 2022).

enhancing citizen participation in energy production. In the Commission's view, citizens play a prominent role in the energy transition and can take advantage of new technologies to pay less and actively participate in the market.

The year 2015 saw effective international cooperation on the energy issue. In September of the same year, the '2030 Agenda for Sustainable Development' was signed by all one hundred and ninety-three member countries of the United Nations and approved by the UN General Assembly. That document consists of seventeen Sustainable Development Goals (SDGs),[9] among which are Affordable and Clean Energy (Goal no 7)[10] and Sustainable Cities and Communities (Goal no 11).[11] In December 2015, moreover, the Paris Agreement was signed by all member states of the United Nations. It was the world's first legally binding universal climate agreement that commits countries to build a 'climate-neutral' society by 2050. The agreement entered into force in October 2016. Between 2018 and 2019, the European Commission issued the 'Clean Energy Package' (CEP): a package of eight Directives to achieve the promised results.

In the field of Energy Communities, the 'RED Directive II' (Renewable Energy Directive II)[12] on promoting the use of energy from renewable sources and the 'IEM Directive' (Internal Electricity Market),[13] establishing common rules for the internal electricity market, are particularly important. Both of them were implemented in Italy only at the end of 2021, with decreto legislativo no 199 (Directive RED II) and decreto legislativo no 210 (Directive IEM). Pending the implementation of these European directives, however, the 'milleproroghe decree' of 2019 (decreto legge no 162 of 2019, converted into legge no 8 of 2020) intervened; its Art 42 bis deals precisely – in the field of technological innovation– with the so-called 'self-consumption from renewable sources'. It provided for the possibility, pending the transposition of the RED II Directive and in implementation of Arts 21 and 22 thereof, of 'collective self-consumption' from renewable sources or 'renewable energy communities'.

The self-consumption concept introduced by the rule is the one of prosumption[14] because the consumer can both consume and produce. To find a

[9] Cf R. Michaels et al eds, *The Private Side of Transforming our World. UN Sustainable Development Goals 2030 and the Role of Private International* (Cambridge: Intersentia, 2021), 3; R. Romàn-Collado and M. Economidou, 'The role of energy efficiency in assessing the progress towards the EU energy efficiency targets of 2020: Evidence from the European productive sectors' 156 *Energy Policy*, 112441 (2021).

[10] Goal and Targets all available at https://tinyurl.com/2p8a4sem.

[11] Goal and Targets all available at https://tinyurl.com/57vbd4cx.

[12] 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. Cf also the Directive known as 'RED I': Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources.

[13] 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.

[14] On this topic, see G. Ritzer and J. Nathan, 'Production, Consumption, Prosumption. The Nature of Capitalism in the Age of the Digital 'Prosumer' *Journal of Consumer Culture*, 14

difference between the two terms, we can consider that prosumption implies a kind of 'social fusion' of roles between professional and consumer so that the latter also acts in the community as a potential supplier of goods or services; the self-consumption concept instead has a predominant individual perspective. Thus the self-consumer produces and primarily consumes the good or service for himself. It must be noticed that legal scholarship indiscriminately mentions 'prosumption' and 'self-consumption' while the European legislature never adopts the former term. In the RED II directive, it always refers to 'self-consumers'; in the IEM directive, it exclusively refers to 'self-generated electricity'. In the Italian context, back in 2012, the AEEGSI (Autorità per l'Energia Elettrica, il Gas e il Sistema Idrico) used the term 'prosumption' to indicate a person who is both producer and final consumer of electricity.[15] The preferred solution appears to be the one adopted by the legal scholarship: that is accepting the semantic unification of the two terms as both of them have their essential core in the reference to a double operational role of the consumer regardless whether this benefits only himself or the whole community by sharing goods.[16] Moreover, mere nominalistic distinctions are not necessary even with a view to protecting people involved since in the Italian and European legal framework everyone finds fundamental protection simply as a human being.[17]

As highlighted in a 2017 EESC opinion,[18] there are several economic benefits

(2010). Concerning the 'Energy Prosumption', cf S.B. Jacobs, 'The Energy Prosumer' 43 *Ecology Law Quarterly*, 519 (2016), available at https://tinyurl.com/ypsjnew9 (last visited 31 December 2022); A.J. Bokolo, 'Smart City Data Architecture for Energy Prosumption in Municipalities: Concepts, Requirements, and Future Directions' 17 *International Journal of Green Energy*, 827-845 (2020); S. Bellekom et al, 'Prosumption and the Distribution and Supply of Electricity' 6 *Energy,Sustainability and Society*, 22(2016); R. Zafar et al, 'Prosumer Based Energy Management and Sharing in Smart Grid' *Renewable and Sustainable Energy Reviews*, 1675 (2018); L. Ruggeri ed, *Needs and Barriers of Prosumerism in the Energy Transition Era* (Madrid: Dykinson, 2021).

[15] Resolution of 18 May 2012 188/2012/E/com, available at https://tinyurl.com/3j87bmsp (last visited 31 December 2022). See lett h for the 'Prosumer' definition. See also on this theme M. Maugeri, 'Elementi di criticità nell'equiparazione, da parte dell'Aeegsi, dei «prosumer» ai «consumatori» e ai «clienti finali» '*Nuova giurisprudenza civile commentata*, 406 (2015).

[16] See R. Garetto, 'Overcoming Energy Poverty through Becoming a Prosumer?', in L. Ruggeri ed, *Needs and Barriers of Prosumerism* n 12 above, 49, who categorizes prosumers into different types according to the European Parliamentary Research Service (EPRS). The EPRS divides prosumers into four categories: residential prosumers, communities and citizen-led renewable energy cooperatives ('Res Coops'), commercial prosumers, and public prosumers.

[17] P. Perlingieri, 'La tutela del consumatore tra liberismo e solidarismo', in Id, *Il diritto dei contratti fra persona e mercato. Problemi del diritto civile* (Napoli: Edizioni Scientifiche Italiane, 2003), 308, where it is emphasized that producers and consumers are exclusively economic qualifications and that the consumer is, first of all, a person and only sometimes also a consumer. Cf also P. Perlingieri, *La personalità umana nell'ordinamento giuridico* (Camerino-Napoli: Edizioni Scientifiche Italiane, 1972), 7; P. Femia ed, *Drittwirkung: principi costituzionali e rapporti tra privati* (Napoli: Edizioni Scientifiche Italiane, 2018), 53.

[18] Opinion of the European Economic and Social Committee on 'Prosumer Energy and Prosumer Power Cooperatives: Opportunities and Challenges in the EU Countries', available at https://tinyurl.com/62wc4urb (last visited 31 December 2022).

of prosumption and self-consumption in the energy sector.[19] First of all, transmission costs are reduced since consumers produce in the same location where they consume. This allows savings in physiological grid losses. Moreover, the potential of local sources is enhanced by creating alternative sources based on the specific characteristics of a given location (eg, places highly exposed to sun or wind). Finally communities are directly involved; in fact, they are made more aware of the production and – especially – the consumption of energy. Moreover, prosumers are more efficient if they operate in groups. By sharing the expenses of a common plant and offering larger quantities of energy, groups can strengthen their market position and reduce production costs. For this very reason, the lawmakers have provided for several self-consumption collective arrangements: (a) Collective Renewable Energy Self-Consumption; (b) Renewable Energy Communities; and (c) Citizens' Energy Communities.

III. Structural Configuration of 'Self-Consumers' and 'Renewable Energy Communities'

Under European law, an energy self-consumer is an end-consumer operating in his own sites within defined boundaries in other places, as allowed by a member state. He produces renewable electricity for his consumption and may store or sell self-produced renewable electricity as long as these activities do not constitute his main commercial or professional activity.[20] Self-consumers are considered to act collectively when they establish a group of at least two self-consumers located in the same building or apartment building.[21] At an operational level, self-consumers are also permitted (both individually and through aggregators) to produce renewable energy for their own consumption, to store or to sell surplus renewable electricity using electricity suppliers, renewable electricity trading agreements, and peer-to-peer exchange ones. They may also install and manage electricity storage systems combined with renewable electricity generation facilities for self-consumption and receive remuneration also by

[19] J. Lowitzsch ed, *Energy Transition. Financing Consumer Co-Ownership in Renewables* (Switzerland: Palgrave Macmillan, 2019), 10. See also J. Lowitzsch, 'The Consumer at the Heart of the Energy Markets?', in Id ed, *Energy Transition* above, 59-74; B. Lennon at al, 'Citizen or consumer? Reconsidering energy citizenship' 22 *Journal of Environmental Policy & Planning*, 184 (2020); R. Fernandez, 'Community Renewable Energy Projects: The Future of the Sustainable Energy Transition?' *The International Spectator*, 87 (2021).

[20] Art 2, no 14, Directive (EU) 2018/2001. Cf M. Meli, 'Autoconsumo di energia rinnovabile e nuove forme di energy sharing' *Nuove leggi civili commentate*, 630-656 (2020); V. Raffa, *Generazione di energia distribuita e comunità energetiche* (Napoli: Edizioni Scientifiche Italiane, 2020), 11. See also M. Giobbi, *Il consumatore energetico nel prisma del nuovo quadro regolatorio italo-eurounitario* (Napoli: Edizioni Scientifiche Italiane, 2021), 64; S. Monticelli e L. Ruggeri eds, *La via italiana alle comunità energetiche* (Napoli: Edizioni Scientifiche Italiane, 2022), 9.

[21] Art 2, no 15, Directive (EU) 2018/2001.

means of access-support schemes[22] for self-generated renewable electricity fed into the grid.[23] In any case, they maintain their rights and duties as end consumers.

The same 2018 RED II Directive provides for the Renewable Energy Communities (REC) by defining them as legal entities based on open and voluntary participation and control by shareholders or members located near the renewable energy projects owned and developed by those legal entities (Art 2, no 16, lett a). Shareholders or members of renewable energy communities are natural persons, small and medium-sized enterprises (SMEs), or local authorities, including municipalities, whose main purpose is to provide environmental, economic, or social-community benefits to their shareholders or members or to the local areas, rather than financial profits.[24] The Italian legislative decree transposing the Directive specifies that participation in renewable energy communities is open to all consumers, including those from low-income or vulnerable households. Control is always in the hands of natural persons, small and medium-sized enterprises, local authorities, research and training institutes, religious organizations, third sector, and environmental-protection entities located in the same municipalities where the energy-sharing projects are.

As regards the methods of energy production and management, as established by the 2019 'milleproroghe decree,' in Italy the members of the renewable energy community must produce energy by powered renewable source plants with a total power of no more than two hundred kW. The plants must have come into operation after the law converting the decree (legge 28 February 2020 no 8) and within sixty days after the date of entry into force of the RED II Directive transposition measure.[25] Community members share the energy using the existing distribution network. Shared energy is equal to the difference, in each hourly period, between the electricity produced and fed into the grid by renewable energy plants and the electricity withdrawn from all associated end consumers. Consumers' withdrawal points and plants' feed-in points must be located on low-voltage electricity grids subtended on the date the community was created by the same medium/low-voltage transformer cabin.

Thus for the valid establishment of a renewable-energy community, several

[22] About the support schemes, see M. Romeo, 'Produzione di agroenergie, autoconsumo collettivo e comunità energetiche' *Diritto e giurisprudenza agraria alimentare e dell'ambiente*, 8-9 (2021).

[23] Art 21, Directive (EU) 2018/2001.

[24] Art 2, no 16, Directive (EU) 2018/2001. 'The well-being of the population is at the centre of the optimization of territorial planning. The community becomes the protagonist for the improvement of the environmental, economic, and social context of the district to which it belongs. The citizen is trained and informed in such a way as to be himself a promoter of territorial development': F. Ceglia et al, 'From smart energy community to smart energy municipalities: Literature review, agendas and pathways' 254 *Journal of Cleaner Production*, 12 (2020).

[25] The Directive (EU) 2018/2001 has been implemented by Decreto legislativo 8 November 2021 no 199. The sixty-day deadline implies that the plants have entered service by 8 January 2022.

elements must exist: a subjective one (the will to pursue a common goal other than financial profit), an objective one (the use of renewable sources), and a topographical one (the submission of the energy withdrawal and feed-in points to the same electrical voltage transformer cabin).

A clear function of CERs is to increase the flexibility of the electric grid, always maintaining a constant and perfect balance between energy demand and overall consumption. This goal is achieved through decentralization and peer interaction that allows a better functioning of the 'Demand-Response' (DR) mechanism by which the distribution of electricity in the grid works.[26] Indeed communities can respond to both immediate and future energy needs. They are equipped with facilities producing energy from renewable sources and also providing storage systems for later use. Self-produced energy is used primarily for instantaneous on-site self-consumption or for sharing with community members. Any excess can be stored and sold through renewable electricity-trading agreements. In any case, the REC can also produce other renewable-energy forms (different from electricity) to be used by members. It can also offer electric-vehicle charging services to its members and assume a retail company role as well as offer ancillary services to the national grid.

For all negotiations with third parties (including the Italian Gestore dei Servizi Energetici (GSE)) and for internal management by private contract, members can identify an entity responsible for both allocation of shared energy and payment and collection.

IV. The 'Citizen Energy Communities'

Renewable energy communities (RECs) are not the only ones existing at present. Shortly after the introduction of the institution in 2018, the European legislators had a real sense of the achievable advantages of energy sharing. In fact, in the introductory recitals of the 2019 IEM Directive, energy communities became

[26] A. Schneiders et al, 'Peer-to-Peer Electricity Trading and the Sharing Economy: Social, Markets and Regulatory Perspectives' *Energy Sources, Part B: Economics, Planning, and Policy*, 1-17 (2022). See also S. Karnouskos et al, 'Prosumer interactions for efficient energy management in smartgrid neighborhoods' (2011), available at https://tinyurl.com/3rzd3kd3 (last visited 31 December 2022); B.P. Koirala et al, 'Energetic communities for community energy: A review of key issues and trends shaping integrated community energy systems' 56 *Renewable and Sustainable Energy Reviews*, 722 (2016). Concerning 'Demand-Response' system, cf M.E. Honarmand et al, 'An Overview of Demand Response: From Its Origins to the Smart Energy Community' 9 *IEEE Power & Energy Society Section*, 96851-96870 (2021). On this topic see also N. O'Connell et al, 'Benefits and Challenges of Electrical Demand Response: A Critical Review' 39 *Renewable and Sustainable Energy Reviews*, 686-699 (2014); G. Gutiérrez-Alcaraz et al, 'Effects of Demand Response Programs on Distribution System Operation' 74 *International Journal of Electrical Power & Energy Systems*, 230-237, (2016); N.G. Paterakis et al, 'An Overview of Demand Response: Key-Elements and International Experience' 69 *Renewable and Sustainable Energy Reviews*, 871-891 (2017).

an effective and cost-efficient way to respond to citizens' needs and expectations regarding energy sources, services, and local participation.[27] Following in the wake of the initiative undertaken the previous year, it recognized a new form of cooperation between citizens or local actors: the 'Citizen Energy Community' (CEC).[28] However, the outlined cooperative schemes are not mandatory. The provisions introduced on energy communities do not preclude other worthy initiatives implemented through private law contracts.[29]

Citizens' energy communities can be established in the form of any legal entity (association, cooperative, partnership, nonprofit organization, small or medium-sized enterprise) as long as it can exercise rights and be subject to obligations in its name.[30] The Italian legislative decree implementing the European Directive for the Internal Electricity Market mentions as CEC members individuals, small businesses, local authorities and administrations, research and training entities, third sector and environmental protection, and religious entities. The main purpose of members – as with the REC – must always be to provide environmental, economic, or social community benefits rather than pursuing financial profits. The citizen community may participate in the generation, distribution, supply, consumption, aggregation, energy storage, energy efficiency services, electric vehicle charging services, or other energy services it may provide to its members or partners.

Energy communities can share any electricity by employing the existing distribution network, by leasing or purchasing portions of the network or newly constructed networks where there are specific technical reasons for so doing and a specific sub-concession agreement can be stipulated between the current distribution company and the community.[31] In cases of management of the

[27] Recital no 43, Directive (EU) 2019/944 of 5 June 2019.

[28] M.M. Sokołowski, 'Renewable and citizen energy communities in the European Union: how (not) to regulate community energy in national laws and policies' 38 *Journal of Energy & Natural Resources Law*, 289 (2020); A. Golla et al, 'Evaluating the impact of regulation on the path of electrification in Citizen Energy Communities with prosumer investment' 319 *Applied Energy*, 119241 (2022); A. Stroink et al, 'Benefits of cross-border citizen energy communities at distribution system level' 40 *Energy Strategy Reviews*, 100821 (2022).

[29] With regard to the freedom of contract and its limits cf P. Perlingieri, *Il diritto civile nella legalità costituzionale secondo il sistema italo-europeo delle fonti*, IV, *Attività e responsabilità* (Napoli: Edizioni Scientifiche Italiane, 2020), 19. With specific reference to the 'energy contracts' see C. Ferrari, 'Financial and Energy Contracts: New Demands for the Regulation and Categorization of Contracts' 3 *The Italian Law Journal*, 377 (2017); J. Rodriguez-Fernandez et al, 'Reputation Computational Model to Support Electricity Market Players Energy Contracts Negotiation', available at https://tinyurl.com/bddz2pyx (last visited 31 December 2022).

[30] According to E. Cusa, 'La cooperazione energetica tra tutela dei consumatori ed economia sociale di mercato' *Giurisprudenza Commerciale*, 663 (2015), in the energy sector, a regulation should be established which is truly proportional not only to the size of the regulated undertaking but also to the legal form of private enterprise, effectively promoting those forms (such as the cooperative) more consistent with Italian and European principles.

[31] Terna SpA has been a concessionaire for the transmission and dispatching of electricity throughout Italy since 2004, including the unified management of the national transmission

distribution networks by the latter, however, distribution networks by CECs are considered public ones with a third-party connection obligation. That ensures effective protection for end users. The community, as a sub-concessionaire of the deployed grid, is required to comply with the same obligations (eg, maintenance obligations) and conditions provided by law for the concessionaire entity. Citizen energy communities may participate, directly or through aggregators, in all markets for electricity and related services, in a non-discriminatory manner and subject to network security constraints. However, they are financially liable for any imbalances brought to the system (Art 14, para 10, lett a, decreto legislativo no 210 of 2021).

The conditions established by the Italian law for a valid creation of a citizen energy community are: (a) voluntary and open participation by all stakeholders; (b) all rights and obligations must be guaranteed to the community members according to their *status* as energy end-customers; (c) the shared electricity generation and storage facilities must result in the availability and control of the citizen energy community. Management, installation, operation, data processing, and maintenance may be delegated to a third party, but the powers of direction and control must remain with the community.

These therefore are the main identifiable differences between RECs and CECs: a first difference relates to the type of energy and sources involved. RECs involve power from renewable energy alone and its conversion into different energy carriers, such as electricity, thermal and cooling energy, while CECs can operate with any source (including non-renewable ones) but can produce only electricity. RECs also are restricted to the geographic perimeter of all energy withdrawal and input points to the same electrical voltage transformer cabin, while CECs are not subject to this constraint. Finally, another distinction concerns the possible activities performed and CECs' additional operational faculties in the electricity market. In fact, RECs are expected to make mandatory use of facilities coming into operation after the legislative change, while CECs are generally allowed to use the grid – both existing and newly built – to operate as a full-fledged energy distributor (possibly by leasing or purchasing portions of the grid). From the perspective of achieving European decarbonization goals, however, surely RECs seem to be the more useful energy communities because of the exclusive use of renewable sources. In fact, Italian and European lawmakers have outlined special support schemes for RECs to incentivize their deployment

network. For sub-concessions and contracts with third parties, see Art 12 of the Contract available at https://tinyurl.com/2t99wed7 (last visited 31 December 2022). A natural monopoly regime applies in the energy sector; as a rule, the construction of a new electricity network does not constitute an activity of a free enterprise. Cf F. Cemil Ozbugday and P.H. Nillesen, 'Efficiency and Prices of Regulation-Exempt Consumer-Owned Natural Monopolies: A First Look at Electricity Distributors in New Zealand' *Annals of Public and Cooperative Economics*, 361 (2013), according to whom consumer-owned natural monopolies might eliminate some of the inefficiencies associated with formal regulatory frameworks.

throughout the countries.

V. The Italian Legal Framework of Renewable Energy Communities: Enhancement and Incentive Service of Shared Electricity and Other Support Schemes

At present, the overall legal framework of energy communities is composed of several rules from distinct sources. First of all, reference must be made to the European sources giving rise to them: the Renewable Energy Directive (RED II) no 2001 of 2018 and the Internal Electricity Market (IEM) directive no 944 of 2019. Also indispensable are the 'milleproproghe decree' no 162 of 2019, converted into legge no 8 of 2020, and the decreti legislativi nos 199 and 210 of 8 November 2021, implementing the European Directives. Other measures are specifically dedicated to Renewable Energy Communities and the way in which they work in the Italian context. These are the Deliberation of the Autorità di Regolazione per Energia Reti e Ambiente (ARERA) no 318 of 4 August 2020;[32] the Decree of the Ministero dello Sviluppo Economico (MISE) of 16 September 2020,[33] and the Technical Rules of the Gestore dei Servizi Energetici (GSE) of 22 December 2020.[34]

The Resolution of the Autorità di Regolazione per Energia Reti e Ambiente (ARERA) no 318 of 4 August 2020 regulates the so-called shared electricity valorization and incentive service, establishing the procedures for regulating economic transactions related to electricity shared by a self-consumer group acting collectively or by members of a renewable energy community (REC). Art 3 of Annex A to the Resolution[35] establishes the criteria for access to the valorization and incentive service. As far as energy communities are concerned, it must be verified that: (a) the community is a legal entity (eg, an association, third-sector entity, cooperative, benefit cooperative, consortium, partnership, nonprofit organization) based on the established requirements;[36] (b) the members

[32] Available at https://tinyurl.com/ye39ej7b (last visited 31 December 2022).

[33] Available at https://tinyurl.com/2p9m4n9r (last visited 31 December 2022).

[34] Available at https://tinyurl.com/2s4zs2mw (last visited 31 December 2022).

[35] The text of the attachment to the resolution is available at https://tinyurl.com/4u8e47xy (last visited 31 December 2022).

[36] The community is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members who are located nearby the production facilities held by the renewable energy community. The members are natural persons, small and medium-sized enterprises, local authorities, or local authorities, including municipal administrations, provided that, for private enterprises, participation in the renewable energy community does not constitute the main commercial and/or industrial activity. The main objective is to provide environmental, economic, or social community-wide benefits to its shareholders or members, or to the local areas in which it operates rather than financial profits. These requirements are expressly stated in Art 1.1, lett c, of the Annex to the Resolution. Notice how – unlike what is established by the European legislature – the Italian authority seems to implicitly accept the possibility that for non-private enterprises participation in the renewable

are holders of connection points on low-voltage electric grids underlying the same medium/low-voltage transformer cabin; (c) the members have mandated the same contact person – coinciding with the renewable energy community – for the access application to the shared electricity valorization and incentive; (d) each shared electricity generation plant must have come into operation as a result of new construction from 1 March 2020, and within sixty days after the date of entry into force of the measure transposing Directive 2018/2001. It also must have a capacity of no more than two hundred kW and must be connected to low-voltage electricity grids underlying the same secondary cabin. The generation facilities must be owned by the renewable energy community and may be operated by the community itself or one of its members or by a third-party producer.

The shared electricity valorization and incentive service is provided by GSE (Gestore dei Servizi Energetici) through the mandated contact person. Parties who wish to benefit from the shared electricity valorization and incentive service apply to the GSE by a predetermined template approved by the Director of the Direzione Mercati Energia all'Ingrosso e Sostenibilità Ambientale of the authority. In the application, the contact person must attach the mandate received from the community members, make available the community's statute and any other documents useful for verifying the requirements for the valid establishment of the REC, communicate the list of individuals who are part of the configuration and certify that all the conditions for access to the service are met. The Gestore dei Servizi Energetici checks for compliance with all the eligibility requirements for the shared electricity valorization and incentive service and – if the requirements are satisfied – enters into a contract with the community contact person. Next, the GSE communicates to Terna (the energy transmission and dispatching concessionaire throughout Italy) the information about the communities for which the valorization service has been activated. It then calculates, for each community, the contribution for the hourly and monthly shared electricity amount,[37] and finally disburses the contribution – which is equal to the product between the shared electricity and the incentive tariff defined by the Ministero dello Sviluppo Economico – to the referent every month.

With the decree of 16 September 2020, the Italian Ministry identified the so-called incentive rate for the remuneration of renewable energy installations in energy communities and in collective self-consumption configurations. The incentive rate corresponds to a 'premium tariff' of one hundred and ten euros per Mwh of electricity produced in the case of energy communities (one hundred euros in the case of collective self-consumption). The community is entitled to the premium rate for twenty years from the contract date with the

energy community constitutes the leading commercial and/or industrial activity.

[37] The hourly and monthly shared electricity amount is equivalent to the sum of the hourly shared electricity amounts during the different hours of the month.

Gestore dei Servizi Energetici.

The Technical Rules drafted by the national operator in 2020 frame the regulatory context, identify the requirements for access to the shared electricity valorization and incentive service and specify how the service activation request must be submitted. In particular, a contract form for service recognition has been outlined. The contract for the economic match regulation shared by a renewable energy self-consumer group acting collectively or by a Renewable Energy Community contains several clauses that must be accepted by the Renewable Energy Community's contact person in order to obtain the incentive rate based on the electricity produced and shared. The contract consists of a general part concerning its subject matter coinciding with the service regulation of shared energy valorization and incentive, its commencement, and its duration. The incentive period duration is twenty years, but its effective date is stated in the individual order of acceptance by the GSE of the ERC's application. After the expiration of the incentive period, the contract may be tacitly renewed. The second part of the contract is devoted to the economic profiles: energy measurement, the fees recognized and disbursed by the operator, and the payment and billing method of the contribution. The third part is dedicated to the obligations of the parties; the national operator assumes the obligation of remuneration. No liability is provided for events relating to relations between the community and operators or third parties (eg, installers, suppliers, or technical referents). The community contact person is obliged to inform the GSE of any changes during the contract (possibly requesting an extension in writing at least six months before the expiration) and to submit any required documentation related to the plant, its operating characteristics, and the maintenance and verification operations that are carried out. The fourth and final part of the signed agreement deal with strictly contractual profiles. It is provided, among other things, that any assignment of receivables is effective against the GSE only upon its explicit acceptance and that the contract will be terminated for six pre-established reasons (eg, if the requirements for access to the incentive are no longer met or if controls by the operator are not allowed). The operator is allowed to terminate the contract at any time as long as he provides at least sixty days' notice.

The overall system enacted by Italy to regulate and foster relations with energy communities responds to the desire expressed by the European lawmakers to identify and apply in each state of the Union a 'Support Scheme' and appropriate 'Promotion Tools' for Renewable Energy Communities.[38] Art 4 of

[38] See Recital no 16 of Directive (EU) 2018/2001, which states, 'Support schemes for electricity from renewable sources or "renewable electricity" have been demonstrated to be an effective way of fostering deployment of renewable electricity. If and when the Member States decide to implement support schemes, such support should be provided in a form that is as non-distortive as possible for the functioning of electricity markets. To that end, an increasing number of Member States allocate support in a form by means of which support is granted in

the RED II Directive states in this regard that

> 'Support schemes for electricity from renewable sources shall provide incentives for the integration of electricity from renewable sources in the electricity market in a market-based and market-responsive way while avoiding unnecessary distortions of electricity markets as well as taking into account possible system integration costs and grid stability. Support schemes for electricity from renewable sources shall be designed to enhance the integration of electricity from renewable sources in the electricity market and to ensure that renewable energy producers are responding to market price signals and maximizing their market revenues. To that end, concerning direct price support schemes, support shall be granted in the form of a market premium, which could be, *inter alia*, sliding or fixed'.

Similar support schemes are not found in the IEM Directive for Citizen Energy Communities. This absence is probably justified because only the REC operates as a collective configuration based on renewable sources while the CEC can operate with any source of energy, including non-renewable ones. A REC, therefore – compared to a CEC – is a more effective means of achieving the decarbonization goals set by EU member states as it incentivizes the exclusive use of renewable energy sources.

Unlike a CEC, a REC can convert energy from renewable sources into different energy carriers. The Italian support scheme operates both for electricity and thermal energy production from renewable sources, biomethane, and technological and industrial development. The first source of support coincides with an incentive paid in the form of a tariff attributed only to energy share produced by the plant and shared within the configuration. Biomethane produced or fed into the natural gas grid, on the other hand, is incentivized through the disbursement of a specific tariff whose duration and value are defined by the decree of the Ministero della Transizione Ecologica. The biomethane producer is guaranteed the same level

addition to market revenues and introduce market-based systems to determine the necessary level of support. Together with steps by which to make the market fit for increasing shares of renewable energy, such support is a key element of increasing the market integration of renewable electricity, while taking into account the different capabilities of small and large producers to respond to market signals'. See also Art 2, no 5, which defines the 'support scheme' as 'any instrument, scheme or mechanism applied by a Member State, or a group of Member States, that promotes the use of energy from renewable sources by reducing the cost of that energy, increasing the price at which it can be sold, or increasing, by means of a renewable energy obligation or otherwise, the volume of such energy purchased, including but not restricted to, investment aid, tax exemptions or reductions, tax refunds, renewable energy obligation support schemes including those using green certificates, and direct price support schemes including feed-in tariffs and sliding or fixed premium payments'. Please note that support schemes must be adopted in accordance with the European law in the field of State aid. Cf A. Canepa, 'Corte di giustizia e interventi nel settore energia: recenti pronunce in materia di rinnovabili, sostegno alla produzione termica di energia, tassazione e gas naturale (settembre 2014-marzo 2015)' *Rivista italiana di diritto pubblico comunitario*, 997 (2015).

of incentive for use in the transportation sector and other uses, including the ones for the electricity and heat production in industrial cogeneration plants, also in connection with district heating and heat networks, and with the exclusion of non-cogeneration thermoelectric uses. ARERA defines the incentive disbursement modalities by coordinating that scheme with the one already provided by the Ministero dello Sviluppo Economico: 'Promotion of the use of biomethane and other advanced biofuels in the transport sector'. The National Authority is aware that – outside the incentive schemes – the current electricity and gas market model has limitations for European decarbonization goals. Therefore, Italian markets must be integrated with those of other European countries according to organic reform processes.[39]

VI. Conclusions: The Connections and Conflicts Between Energy and Digital Transition

As shown above, both individual citizens and the local community would benefit from the creation and diffusion of energy communities that would ultimately bring about positive effects on the global environment.[40] Therefore, in today's society, energy communities – and in particular Renewable Energy Communities – seem to be an important instrument of energy transition implementation. Their proliferation throughout Europe is undoubtedly desirable and they may one day constitute a device for energy decommodification.

However, the technological factor must also be considered. In fact, self-consumption and energy sharing can achieve their full potential by means of appropriate technological mechanisms that allow the transmission of information regarding the current consumption and the actual need for energy on the market. Any effective energy transition cannot actually take place without being accompanied by a contextual digital one. The use of new technologies is a parallel necessary tool to allow the operation of smart electricity grids. Blockchains, for example, would be a very effective means of facilitating peer-to-peer energy exchanges.[41] They operate as shared and distributed data structures that can

[39] See the new 'Testo Integrato del Dispacciamento Elettrico' (TIDE), developed by the Autorità di Regolazione per Energia Reti e Ambiente (ARERA) (available at https://tinyurl.com/2p9evubb (last visited 31 December 2022)) to lay the foundations for a new regulation, rational and solid, which allows the full participation in the electricity system of renewable sources, widespread generation, storage systems, aggregators and consumers, some of which are also producers (prosumers). Cf G. Le Treut et al, 'The multi-level economic impacts of deep decarbonization strategies for the energy system' 156 *Energy Policy*, 112423 (2021).

[40] Cf N. Li et al, 'Cost allocation in integrated community energy systems. A review' 144 *Renewable and Sustainable Energy Reviews*, 111001 (2021) who point out the 'long-term commitment of local community members' that affects the successful implementation and long-term development of the Integrated Community Energy Systems.

[41] C. Burger et al eds, *Blockchain in the energy transition. A survey among decision-makers in the German energy industry* (Berlin: German Energy Agency, 2016), 13; J. Hwang

securely store digital transactions without a central authority and also allow the automated execution of smart contracts in peer-to-peer (P2P) networks.[42] It would be useful to set up digital platforms, reachable through apps for smartphones, in order to share consumption data with members of configurations and to monitor energy needs.[43] In this way energy waste could be minimized and storage operations could be scheduled for later use on users' consumption habits. Indeed, similar platforms dedicated to managing energy sharing (so-called Energy Platforms) already exist today.

The interaction between new technologies and the energy market would not only bring beneficial effects but also risks to both people and society. Individual users would be exposed to profiling risks due to the data based on their needs and the analysis of their habits.[44] Such information, moreover, often concerns people's activities at their homes. Therefore, the question arises whether

et al, 'Energy Prosumer Business Model Using Blockchain System to Ensure Transparency and Safety' *Energy Procedia*, 194 (2017); M. Andoni et al, 'Blockchain technology in the energy sector: A systematic review of challenges and opportunities' 100 *Renewable and Sustainable Energy Reviews*, 143 (2019); S. Saraji and C. Khalaf, 'Blockchain Applications in the Energy Industry', in P.M. Tehrani, *Regulatory Aspects of Artificial Intelligence on Blockchain* (Pennsylvania: IGI Global, 2022), 159; Y. Wu et al, 'Towards collective energy Community: Potential roles of microgrid and blockchain to go beyond P2P energy trading' 314 *Applied Energy*, 119003 (2022).

[42] On this theme see A.M. Gambino and A. Stazi, 'Contract Automation from Telematic Agreements to Smart Contracts' 7 *Italian Law Journal*, 97 (2021). Concerning the use of smart contracts in the energy field cf M.R. Alam, 'Peer-to-peer energy trading among smart homes' 238 *Applied Energy*, 1434 (2019); L. Thomas et al, 'A general form of smart contract for decentralized energy systems management' 4 *Nature Energy*, 140 (2019); D. Han et al, 'Smart contract architecture for decentralized energy trading and management based on blockchains' 199 *Energy*, 117417 (2020). From an Italian perspective see M. Giaccaglia, 'Il contratto del futuro? Brevi riflessioni sullo smart contract e sulla perdurante vitalità delle categorie giuridiche attuali e delle norme vigenti del Codice civile italiano' *Tecnologie e diritto*, 113 (2021).

[43] See, for instance, the Italian Platform 'RealGrid' (available at https://tinyurl.com/4suvcks3) – open to users, entrepreneurs and Public Administration – that works through the digitalization of energy and technologies capable of communicating production, storage, and consumption assets of different users. About the current Italian energy community projects, see C. Candelise and G. Ruggieri, 'Status and Evolution of the Community Energy Sector in Italy' *Energies*, 1888 (2020). Concerning in general the so-called Energy Platforms, see S. Kloppenburg and M. Boekelo, 'Digital platforms and the future of energy provisioning: Promises and perils for the next phase of the energy transition' 49 *Energy Research & Social Science*, 68 (2019); M.M. Martìn Lopo et al, 'A literature review of IoT energy platforms aimed at end users' 171 *Computer Networks*, 107101 (2020). Cf also the official document (available at https://tinyurl.com/yc2h4ssf (last visited 31 December 2022)) of the National Agency for New Technologies, energy and sustainable economic development, for the design of a residential energy data collection platform. A.B. Gallo et al, 'Energy storage in the energy transition context: A technology review' 65 *Renewable and Sustainable Energy Reviews*, 802 (2016), describes the mechanical energy storage technologies.

[44] R. De Meo, 'Autodeterminazione e consenso nella profilazione dei dati personali' *Diritto dell'informazione e dell'informatica*, 587 (2013); C.M. Colombini et al, 'Digital scene of crime: Technique of profiling users' 3 *Journal of Wireless Mobile Networks, Ubiquitous Computing, and Dependable Applications*, 50 (2012); A. Vivarelli, 'The Crisis of the Right to Informational Self-Determination' 6 *Italian Law Journal*, 301 (2020) describing the phenomenon of 'hetero-construction' of identities achieved through user digital profiling.

these data on private and family life should be treated differently from other masses of data concerning the activities of companies or public administrations. As regards data processing, it should be noted that, according to the Technical Rules established by the Italian Gestore dei Servizi Energetici, the GSE qualifies as an 'Autonomous Controller' of data by virtue of the request for the valorization and incentive of self-consumption shared electricity. The GSE has no liability under the EU Regulation 679/2016 (GDPR) in case of events such as data misuse, illicit use, malicious or unauthorized events possibly suffered by third parties with whom the GSE interfaces for the requests management. Such a statute does not seem to guarantee effective protection for end users who may find great difficulty in identifying each third party with whom the operator has interacted. Data concerning the household and possibly minor subjects present in the place of the energy user should also be protected.

The need to use smart devices to benefit from economic reductions and share energy could also present additional drawbacks such as widening the digital divide and exacerbating any existing state of energy poverty.[45] Likewise, energy community participation in the market, as a seller of self-generated electricity, could distort competition among energy participants.[46] Therefore, it is necessary not to overlook the problematic aspects related to the spread of energy communities throughout Italy and Europe.

Undoubtedly, the enormous advantages they produce – in terms of stability and flexibility of the electricity grid, decentralization of energy production, increased use of renewable sources, and direct involvement of the citizen community – deserve a joint effort of society and institutions aimed at achieving a balance between the beneficial progress of innovation and the preservation of adequate standards of human protection. Only in this way will the energy transition truly be sustainable.

[45] S. Wang et al, 'The Impact of energy poverty on the digital divide: The mediating effect of depression and Internet perception' 68*Technology in Society*, 101884 (2022). Cf A. Reddy, 'Energy and social issues', in J. Goldemberg ed, *World Energy Assessment: Energy and the Challenge of Sustainability* (New York: United Nations Development Programme, 2000), 44 and M.M. Vanegas Cantarero, 'Of renewable energy, energy democracy, and sustainable development: A roadmap to accelerate the energy transition in developing countries' 70 *Energy Research & Social Science*, 101716 (2020). See also S. Carley and D.M. Konisky, 'The justice and equity implications of the clean energy transition' 5 *Nature Energy*, 569 (2020).

[46] On this theme, see M. Al-Gwaiz et al, 'Understanding How Generation Flexibility and Renewable Energy Affect Power Market Competition' 19*Manufacturing & Service Operations Management*, available at https://tinyurl.com/3cfwnfjy (last visited 31 December 2022). On the abuse of dominant position and the opening up of the market for the sale of electricity to competition, cf the important case C-377/20 *Servizio Elettrico Nazionale SpA, ENEL SpA, Enel Energia SpA* v *Autorità Garante della Concorrenza e del Mercato and Others*, Judgment of 12 May 2022, available at www.curia.europa.eu.