Sharing Energy

Dealing with Regulatory Disconnection in Dutch Energy Law

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The sharing economy has become a reality in many sectors, including energy. Energy consumers are increasingly able and willing not only to produce their own energy and thus become prosumers, but also to sell this energy on the local or national energy market along with 'traditional' energy market players. Thus, the role of prosumers is de facto extended as to include the parallel roles of consumers, producers, suppliers and traders. Against this background, this article inquires whether it is possible for prosumers to share energy under the current Dutch regulatory framework. This question has been evaluated from the theoretical perspective of the regulatory disconnection between innovation and regulation.

I. Introduction

With two million Uber rides taken daily by the customers worldwide,[1] hardly anyone could argue that sharing economy is not an important part of our lives. Indeed, 'sharing economy is here to stay',[2] and it provides 'massive efficiencies, including facilitating more intense use of assets as well as improved convenience, information, better pricing, and more'.[3] Because of the focus on the physical assets, the discussions on sharing economy often circle around companies like Uber and Airbnb, which allow people to share respectively their cars and their spare bedrooms with other people in temporary need of them, by the means of an online platform matching the two parties. [4] But sharing economy could equally apply to goods and services purchased from the people producing them. Meal sharing platforms such as Feastly, Mealsharing, and EatWith allow their users to act both as 'hosts' who offer a cooked meal, and as 'guests' who purchase such a meal.[5] Similarly, Etsy brings together creative entrepreneurs and shoppers interested in specialized and hand-made items,[6] and TaskRabbit allows people to outsource household and repair tasks to handymen and women in the neighborhood.[7] In such context, the sharing of energy becomes increasingly relevant, as it also fulfils the criteria of sharing economy.[8]

Whereas in the past the dominant energy supply model was vertical – from energy producer (often fossil) to wholesale trader to energy supplier and finally to energy consumer – the current situation is slowly changing.[9] An increasing number of consumers is able and willing to generate energy (usually renewable) themselves, and to supply it to other energy con-

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1 See <http://www.businessinsider.com/uber-completes-62-million-trips-july-2016-8?international=true&r=US&IR=T>, accessed 2 November 2016.

2 Stephen R. Miller, 'First Principles for Regulating the Sharing Economy' (2016) 53 Harvard Journal on Legislation 156.

3 Benjamin G.Edelman and Damien Geradin, 'Efficiencies and Regulatory Shortcuts: How Should We Regulate Companies like Airbnb and Uber?' (2016) 19(2) Stanford Technology Law Review 1.

4 Sofia Ranchordás, 'Does Sharing Mean Caring? Regulating Innovation in the Sharing Economy' (2015) 16 Minnesota Journal of Law, Science & Technology 414; Edelman and Geradin (n3).

5 See <http://www.businessinsider.com/what-its-like-to-use-a-meal-sharing-app-2015-5?international=true&r=US&IR=T>, accessed 2 November 2016.

6 See <http://www.forbes.com/sites/mnewlands/2015/07/17/the-sharing-economy-why-it-works-and-how-to-join/#48faae411fc3>, accessed 2 November 2016.

7 See <https://www.taskrabbit.com/about>, accessed 2 November 2016.

8 The definitions of sharing economy extectedly differ, but most of them refer to an economic model, in which people are able to use (e.g. rent, borrow) assests owned by other people, who systematically have excess capacity of such assets, possess a 'sharing attitude or motivation', and for whom 'transaction costs related to the coordination of economic activities within specific communities are low'. See Ranchordás (n4), at p. 4.

9 Saskia Anna Catharina Maria Lavrijssen, 'The different faces of the energy consumers: Towards a behavioral economics approach' (2014) 10(3) Journal of Competition Law and Economics.

sumers.[10] Thus, the energy supply model is shifting to a more horizontal design, where the distinctions between energy producers, traders, suppliers and final consumers are not so stark as they used to be.[11] The evolution of the energy supply model is due to a number of parallel developments. First, the decreases in price and increases in efficiency of 'hard' technology, such as energy supply installations (e.g. solar panels) and small-scale storage equipment (e.g. home batteries), lead to energy consumers increasingly becoming prosumers of sustainable energy.[12] Second, the development of 'soft' digital technology, such as smart meters and appliances, online platforms, etc., make it more accessible for consumers to act as prosumers, as well as suppliers and traders.[13] Moreover, this evolution could also be partially attributed to increasing environmental awareness and changes in the population's preferences towards their energy demand.[14]

Due to the sharing economy trend emerging in the energy sector, the role of the final energy consumers effectively expanded to include the parallel roles of energy consumers, producers, traders and suppliers.[15] In this expanded role the prosumers engage in innovation that could potentially have disruptive consequences for the current set-up of energy market. For example, dramatic increase of locally produced and locally consumed energy could lead to a drop in the share of imported and fossil energy in the national energy mix, thereby significantly impacting incumbent energy traders and suppliers who often provide fossil energy. Furthermore, the activity of prosumers on the local energy market, which presumes that energy is both produced and consumed within the same geographical region and at the same time, is endorsed as the preferred scenario at both European and Dutch national levels.[16] This is due to the fact that such local market for prosumer-generated sustainable energy is not only contributing to reaching the policy goals of security of supply and sustainability, but also because it is efficient from the perspective of total energy system costs.[17] Against this background a question arises, and namely: To what extent is it possible for prosumers to share energy under the current Dutch regulatory framework? This question represents the main research aim of the current paper.

In order to answer this question, the match between the current developments on the Dutch energy market (prosumers assuming an expanded role) and respective regulation is assessed from the perspective of regulatory disconnection.[18] The latter could arise when innovation in the market develops in a faster tempo or differently than envisaged compared to respective regulation. The regulatory disconnection is not problematic *per se*, but in certain cases it could lead to regulatory failure and should be eliminated. The regulatory approaches to bridging the gap between innovation on the one hand and regulation on the other hand could be roughly divided into three distinct categories: those addressing the horizontal dimension of disconnection by the means of adjusting the timing of regulatory intervention, those addressing the vertical dimension by changing the level of regulatory generality, and those pertaining to the institutional dimension by introducing regulatory agencies and by performing regulatory updates and reforms.[19] In the same vein, and in order to be able to answer the main research question posed earlier, the current paper also aims to assess whether there is indeed problematic regulatory disconnection between innovation and regulation, and which regulatory approaches are chosen by the Dutch government to address this disconnection.

This article is organised as follows. The second section of the article discusses the new and expanded role of the energy prosumers and the impact of such role on the Dutch energy market. Section three presents the theoretical framework applied in the cur-

10 Simone Pront-van Bommel, 'De elektriciteitsconsument centraal?', in Simone Pront-van Bommel (ed.), *De consument en de andere kant van de elektriciteitsmarkt*, (Centrum voor Energievraagstukken, Universiteit van Amsterdam, 2010).

11 Lavrijssen (n9).

12 Annelies Huygen, 'De consument en de (on)vrije elektriciteitsmarkt', in Simone Pront-van Bommel (ed.), *De consument en de andere kant van de elektriciteitsmarkt*, (Centrum voor Energievraagstukken, Universiteit van Amsterdam, 2010).

13 Huygen (n12).

14 Lavrijssen (n9).

15 Lavrijssen (n9).

16 Commission Staff Working Document, Best practices on Renewable Energy Self-consumption, Brussels, 15.7.2015, SWD(2015) 141 final; Sociaal- Economische Raad, Energieakkoord voor duurzame groei, available online (in Dutch) <http://www.energieakkoordser.nl/energieakkoord.aspx>, accessed 2 November 2016.

17 Best practices on Renewable Energy Self-consumption (n16).

18 Roger Brownsword and Morag Goodwin, *Law and Technologies of the Twenty-First Century*, (Cambridge University Press 2012); Roger Brownsword and Han Somsen, 'Law, Innovation and Technology: Before We Fast Forward- A Forum for Debate' (2009) 1(1) Law, Innovation and Technology.

19 Anna Butenko and Pierre Larouche, 'Regulation for Innovativeness or Regulation of Innovation?' (2015) 7(1) Law, Innovation and Technology.

rent paper – and namely the concept of regulatory disconnection – and illustrates its relevance to the issue in question. The fourth section analyses the presence of disconnection between the prosumers' expanded market role and the respective Dutch energy regulation. The same section identifies whether any regulatory approaches are employed to address the regulatory disconnection and assesses the effectiveness and appropriateness of these measures. This article concludes with general observations in the final section.

II. Sharing Energy by Energy Prosumers

1. Energy Prosumers

Whereas the first humans to use energy were self-sufficient (gathering wood and making fire), in the course of history we came to increasingly rely on the market to deliver our energy: first wood, then coal, and now electricity and gas. However recently the trend is reversing again – a small, but steadily increasing, number of energy consumers is longing for self-sufficiency and independence from energy suppliers, and engaging in the production of own energy.[20] The consumers that produce (a part of) their energy demand are called prosumers,[21] and they are becoming more and more common by the day.

Energy produced by prosumers is referred to as local energy.[22] Besides producing local energy individually at own premises (e.g. by the means of installing solar panels or heat pumps in their houses), prosumers could produce energy collectively.[23] It is estimated that currently the Netherlands counts around 500 energy prosumers' collectives, and their number is constantly growing.[24]

Whereas self-sufficiency is cited as one of the main reasons to engage in energy prosumption,[25] in practice energy prosumers are rarely self-sufficient.[26] In reality prosumers often generate too much or too little compared to their total energy demand over a given time. Moreover, the time of energy production does not always coincide with the time of energy consumption. For example, the solar panels produce most energy during the day, when energy demand is relatively low. On the other hand, in the times of energy demand peak (mornings and evenings), the energy produced by solar panels is often not sufficient to cover the demand of the consumers.[27] In fact, only around one third of produced energy is consumed at the time of production.[28]

The mentioned discrepancy could have a number of potentially negative consequences. First, it significantly diminishes the potential for the so-called grid parity – 'the situation where an expected unit cost of self-generated renewable electricity matches or is lower than the per-kWh costs for electricity obtained from the grid'.[29] Second, the absence of combination in time of local sustainable electricity production and consumption could create imbalances in the electricity networks (when there is more produced and injected than there is consumed). These imbalances could result in higher energy prices for energy consumers.[30] Finally, structural imbalances in a

20 Lavrijssen (n9).

21 Pront-van Bommel (n10), at p. 24.

22 Huygen (n12), at p. 101.

23 Whereas the focus of the current paper is on the prosumers producing electricity (as it is a more frequent occurence), it is noted that prosumers could also produce gas, for example by the means of producing biogas at their farm, and upgrading it to biomethane, with quality equivalent to natural gas.

24 See <http://www.hieropgewekt.nl/faq-page#n2305>, accessed 2 November 2016;<http://www.hieropgewekt.nl/initiatieven>, accessed 2 November 2016.

25 Rijksoverheid, Visie lokale energie, 8 November 2013, available online (in Dutch) at <https://www.rijksoverheid.nl/documenten/rapporten/2013/11/08/visie-lokale-energie>, accessed 2 November 2016; Netbeheer Nederland, De Proeftuin 'Decentrale Duurzame Collectieven', Van realisatie naar de toekomst. Energieke burgers, duurzaam decentraal en de betekenis voor de netbeheerders en netbeheer, 30 September 2013, available online (in Dutch) at <http://nbn-assets.netbeheernederland.nl/p/32768//files/Onderzoek%20Decentrale%20Markten.pdf>, accessed 2 November 2016.

26 Self-sufficiency means that self-generation of the prosumers covers 100% of their energy demand (e.g. on a yearly, monthly, daily basis). Best practices on Renewable Energy Self-consumption (n16).

27 Self-consumption refers to the share of self-generation that is instantly (at the moment of production) consumed by the prosumers. Best practices on Renewable Energy Self-consumption (n16).

28 Self-consumption usually does not exceed 30% for small and medium consumers in the absence of local energy storage. Visie lokale energie (n25), at p. 3.

29 Best practices on Renewable Energy Self-consumption (n16), at p. 2.

30 The prosumers have no financial incentive to balance their production and consumption and instead pass the imbalance to the market parties (e.g. energy suppliers), who assume the the balancing responsibility on their behalf. The costs incurred by market parties on behalf of the prosumers are recovered through the energy price paid by the final energy consumers. See Simone Pront-van Bommel and Gerrit Buist, *Balanceren - naar een nieuw evenwicht tussen aanbod en vraag in energie*, (Centrum voor Energievraagstukken, Universiteit van Amsterdam, 2014), available online (in Dutch) at <http://dare.uva.nl/record/1/434359>, accessed 2 November 2016.

section of the network could lead to congestion (a situation when the existing network capacity is not sufficient), which would need to be solved by the means of heavier networks, and hence more investment in expansion and maintenance of networks.[31] Therefore, the combination in time of local sustainable electricity production and consumption (also referred to as 'local balancing')[32] is a desirable development from the perspective of general social welfare.

This combination could be attained by two main mechanisms:

– By the means of energy storage (e.g. battery), which would enable consumers to effectively decouple 'time of generation and consumption';[33]
– And by the means of local energy markets, where energy is both produced and consumed locally (sharing energy).

The former solution has rather technical nature, and it is not currently available on large-scale in the Netherlands due to its relatively high costs for energy prosumers.[34] The latter solution – sharing energy on local energy market– is discussed below, as an alternative option to achieve the benefits of local balancing.

2. Local Energy Market

Most prosumers are not self-sufficent, and as the result they also remain energy consumers in parallel with being energy producers. It could be plausibly assumed that in their role as energy consumers, the prosumers have a preference for energy that is affordable, reliable, sustainable, and most importantly self-produced. When self-produced energy is not sufficient, it is logical to expect that (at least some of) the prosumers would turn to the second-best alternative, and namely local sustainable energy produced by other prosumers in the same or a neighboring region.[35] For such consumers local sustainable energy is not a substitute for sustainable energy offered by the energy suppliers, as the former has distinct characteristics that differentiate it from the latter in the eyes of these consumers.

The wishes of this energy consumers' group are driving the sharing of energy (e.g. among prosumers, or between prosumers and consumers), as well as development of market for local sustainable energy. Indeed, whereas originally the focus of both individual and collective prosumers in the Netherlands has been on local sustainable energy production, in the recent years it is slowly-but-surely shifting towards a market-participating model.[36] Such model implies that prosumers are able to not only produce own energy, but also to sell it to the buyer of their choice, as well as to supply it to e.g. other consumers, thus engaging in transactions on the national wholesale market and peer-to-peer transactions on the local energy market (sharing economy).

'Local' is the smallest geographic denominator of a market, and local markets are defined as markets that are 'geographically proximate'.[37] In other words, these are the markets where production and consumption take place within close proximity to each other (e.g. town, village, neighborhood, street). Markets could be local 'because of product characteristics, branding and marketing strategies, tastes and preferences and distribution systems'.[38]

The relevant geographic market for local sustainable energy is indeed largely defined by the characteristics of the product in question. Renewable energy produced by consumers either individually or collectively can only be referred to as 'local' when it is not only produced, but also consumed locally. The same energy could be sold and consumed nationally, however then it cannot qualify as local any longer. For example, prosumers could choose to sell it to large energy suppliers, who in turn would sell it as renewable energy in their portfolio. To adopt a parallel, it could be said that the alternative choices of

31 Congestion is addressed by the distribution system operators (DSO), who finance the grid expansion and renovation though the socialized network tariffs paid by the energy consumers as part of their energy bill.

32 Pront- van Bommel and Buist (n30).

33 Best practices on Renewable Energy Self-consumption (n16), at p. 6.

34 See <https://www.greentechmedia.com/articles/read/aurecon-residential-battery-storage-doesnt-make-sense>, accessed 2 November 2016.

35 Of course other types of consumers could also have a preference for local sustainable energy, while not being prosumers themselves.

36 De Proeftuin 'Decentrale Duurzame Collectieven' (n25).

37 Simi Kedia and Xing Zhou Kedia, 'Local market makers, liquidity and market quality' (2011) 14(4) Journal of Financial Markets 4.

38 Competition Policy Brief, Market definition in a globalised world, Issue 2015-12, March 2015, at p. 4, available online at <http://ec.europa.eu/competition/publications/cpb/2015/002_en.pdf>, accessed 2 November 2016.

local sustainable energy producers are comparable to the choices of local organic food producers, who could either sell their products on the local Sunday market to the customers valuing the local origin of the products and the associated benefits (e.g. taste, freshness, health contribution), or sell them to a large supermarket chain who may or may not label the products as organic. Thus, there are two possible marketing channels that could be used by the prosumers: local market for local renewable energy or wholesale national market for renewable (or even fossil) energy.

Prosumer-generated energy is 'rubber-stamped' as a desirable and a positive development on the EU level, as it contributes to reaching both sustainability, and security of supply goals of the European energy policy.[39] Moreover, it is recognized that local market, where energy is produced and consumed locally, has a number of advantages in comparison to the scenario when such energy is sold on the national market. Such advantages include an increased 'market integration of distributed renewable energy generation',[40] more 'consumer empowerment by allowing active participation and profit from energy markets, as well as encouraging smarter consumption patterns', reduced network costs, and financial contribution to the energy transition.[41] Besides these benefits, the participation of prosumers in local markets has positive impact on innovation: prosumerism is an 'innovation by consumers [that] is also resulting in innovation for consumers and opens up new business models'.[42]

3. Observations

The current section could be concluded by stating that a still marginal but steadily increasing number of energy consumers are able and willing to produce (a part of) their own energy. Such prosumers are rarely self-sufficient, and therefore remain energy consumers in parallel with their role as energy producers. In their role as energy consumers, (most) prosumers have a preference towards energy that is cheap, sustainable and self- or locally-produced. Prosumers increasingly want to be able to share energy that they themselves do not need with other consumers, and to access the energy produced by other prosumers in order to complement their own demand when they need it. In other words, both individual prosumers and collectives display an obvious ambition to act as market players engaging besides energy production also in trading and supply. Thus, the role of prosumers is effectively broadened as to include the parallel roles of consumers, producers, market players, suppliers and traders, be it on the national or on the local energy market.

As previously noted, the current paper aims to address the main research question as to the extent to which it is possible for prosumers to share energy in the Netherlands. In order to answer this question, the prosumers' access to respectively national wholesale and local energy markets as provided for in the respective Dutch regulatory framework is analyzed. The theoretic perspective underlying such analysis is presented in the next section of the current paper.

IV. Regulatory Disconnection

Innovation in the energy sector can be attributed to a multitude of factors, such as technology development, behavioural changes of technology users, as well as market, economic, political and regulatory aspects. All these factors are simultaneously shaping innovation and are being shaped by it: at any given moment in time, the institutional and market structures reflect a certain set of assumptions regarding technological developments, political, economic and social preferences.[43] If one of these factors changes

39 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Progress towards completing the Internal Energy Market, COM(2014) 634; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank, Energy Union Package, A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy, Brussels, 25.2.2015, COM(2015) 80 final;
Best practices on Renewable Energy Self-consumption (n16).

40 Best practices on Renewable Energy Self-consumption (n16).

41 Best practices on Renewable Energy Self-consumption (n16), at p. 3.

42 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions, Delivering a New Deal for Energy Consumers, Brussels, 15.7.2015, COM(2015) 339 final, at p. 6.

43 Rolf W. Künneke and John Groenewegen, 'Challenges for readjusting the governance of network industries', in Rolf W. Künneke, John Groenewegen and Jean-François Auger (eds), *The governance of network industries. Institutions, technology and policy in reregulated infrastructures*, (Edward Elgar Publishing 2009).

while the rest do not (e.g. innovation progresses, while the regulatory system stays behind), a discrepancy between them inevitably arises. The situation when technology develops faster than the corresponding regulation, while the latter is falling behind, is commonly referred to as 'pacing problem' in the US-originating academic literature.[44] The same situation is referred to as 'challenge of regulatory connection' or 'regulatory disconnection' in the European-based scholarship,[45] and it is commonly described as the widening gap between the current regulatory environment based upon the 'technological landscape of the past' and the occurring innovations revolutionizing this landscape.[46] The challenge of regulatory connection can manifest itself in a number of ways, including regulatory obsolescence, regulatory void or gaps, ambiguity in the application of existing regulations, and/ or regulatory over- or under-inclusiveness.[47]

The challenge of regulatory connection is neither inevitable, nor inherently negative. Indeed, many innovations fall within the scope of existing regulations.[48] One could even argue that falling behind the technologic and socio-economic reality to some extent could be expected from regulation, due to its inherent goal of legal certainty.[49] However, the situation when it leads to regulatory failure is negative and should be eliminated sooner rather than later. Allowing it to persist is 'undesirable relative to considerations of regulatory effectiveness and/ or regulatory economy'.[50] Regulatory failures could be identified by the presence of inefficient regulatory outcomes, commonly described as 'futility', 'jeopardy', and 'perversity'.[51] Futility outcome is described as 'no change to the existing problem [...] regardless of regulatory intervention'.[52] Jeopardy could occur in the situation when 'despite the worthwhile character of a particular regulatory instrument, its deployment would risk wider achievements and/ or lead to a chain of undesirable side-effects'.[53] Finally, perversity concerns the result in which the 'regulatory interventions achieve the exact opposite of their intended outcomes'.[54]

There is currently no academic consensus as to the most appropriate way to solve the challenge of regulatory disconnection.[55] The regulatory approaches for addressing the gap between innovation and regulation available in the academic literature could be roughly divided into three main categories, and namely: horizontal, vertical, and institutional.[56]

Horizontal dimension of regulatory approaches to disconnection implies adjusting the timing of regulatory efforts.[57] The approaches that fall under this category include precautionary principle,[58] risk-based regulation,[59] as well as experimental and temporary legislation.[60]

Vertical dimension of regulatory approaches to disconnection is best illustrated by technology-neutral regulation.[61] It is noted that whereas technology-neutral rules are in principle preferable over the

44 Gary E. Marchant, Kenneth W. Abbott, Braden R. Allenby (eds), *Innovative Governance Models for Emerging Technologies*, (Edward Elgar Publishing 2013); Gary E. Marchant, Braden R. Allenby, and Joseph R. Herkert (eds), *The Growing Gap between Emerging Technologies and Legal-Ethical Oversight. The Pacing Problem*, (Springer 2011).

45 Brownsword and Goodwin (n19); Brownsword and Somsen (n18).

46 Lyria Bennett Moses, 'How to Think about Law, Regulation and Technology: Problems with 'Technology' as a Regulatory Target' (2013) 5(1) *Law, Innovation and Technology* 1.

47 Lyria Bennett Moses, 'Agents of Change: How the Law 'Copes' with Technological Change' (2011) 20(4) *Griffith Law Review* 1.

48 Brownsword and Goodwin (n19); Bennett Moses (n48); Bert-Jaap Koops, 'Ten Dimensions of Technology Regulation: Finding your Bearings in the Research Space of Emerging Technologies', in Morag Goodwin, Bert-Jaap Koops and Ronald Leenes (eds), *Dimensions of Technology Regulation*, Conference proceedings of TILTing Perspectives on Regulating Technologies, (Wolf Legal Publishers 2010).

49 Sofia Ranchordás, *Constitutional Sunsets and Experimental Legislation: A Comparative Perspective*, (Edward Elgar Publishing 2014).

50 Brownsword and Goodwin (n18).

51 Albert O. Hirschman, *The Rhetoric of Reaction: Perversity, Futility, Jeopardy*, (Belknap Press 1991).

52 Robert Baldwin, Martin Cave, and Martin Lodge, *Understanding Regulation. Theory, Strategy and Practice*, (Oxford University Press 2012) 73.

53 Baldwin, Cave and Lodge (n52) at 73.

54 Baldwin, Cave and Lodge (n52) at 73.

55 Butenko and Larouche (n19).

56 Butenko and Larouche (n19).

57 Butenko and Larouche (n19).

58 See Cass Sunstein, *Laws of Fear: Beyond the Precautionary Principle*, (Cambridge University Press 2005); Ronnie Harding and Elizabeth Fisher, *Perspectives on the Precautionary Principle* (Federation Press 1999).

59 Risk-based regulation generally refers to 'the prioritizing of regulatory actions in accordance with an assessment of the risks' and the goal of such regulation is 'principally to control relevant risks, not to secure compliance with sets of rules'. See Baldwin, Cave and Lodge (n52).

60 Ranchordás (n49).

61 Butenko and Larouche (n19); Bennett Moses (n46); Bert-Jaap Koops, 'Should ICT Regulation be Technology-Neutral?', in Bert-Jaap Koops, Miriam Lips, Corien Prins, Maurice Schellekens (eds), *Starting Points for ICT Regulation. Deconstructing Prevalent Policy One-liners*, (Asser Press 2006).

technology-specific ones as a default option in the context of emerging innovative technologies, the actual degree of specificity/ neutrality should be decided upon while taking into account the innovation in question, as well as the (socio-economic) environment in which it is applied.

Whereas 'the horizontal and vertical dimensions of [regulatory approaches to addressing] disconnection concern mostly the substance of the law', the institutional dimension is primarily concerned with the law's form.[62] An example of a regulatory approach addressing disconnection that falls under this category would be 'a softer form of law',[63] described as 'a governance process rather than intractable regulatory rules'.[64] Another example could be co-regulation, where non-government actors take up regulatory roles on-par with the government.[65] Regulatory substantive changes, in the format of regulatory reforms[66] and updates,[67] also qualify as the approaches in the institutional dimension.

In the current paper, the theoretic perspective of regulatory disconnection is applied to address the main research question, and namely whether peer-to-peer transactions in energy between prosumers are possible under the current Dutch regulatory framework.

III. Sharing Energy in Dutch Energy Law

1. Dutch Energy Policy

Prosumer-generated energy is currently marginal in the Netherlands and only represents around 0,5% of total Dutch energy demand.[68] However the Dutch government and market participants proclaimed avid support for its development, and set ambitious future targets. The so-called SER Accord indicates the ambition of reaching self-sufficiency for at least one million small and medium energy consumers in 2020,[69] which translates into 6-fold increase in the contribution of local sustainable energy production to the total Dutch electricity demand.

In the same year the Dutch Ministy of Economic Affairs published a policy document entitled Vision on Local Energy ('Visie Lokale Energie' in Dutch).[70] The letter from the Minister of Economic Affairs of the Netherlands accompanying the policy document states that local energy has a bright future, since more and more citizens want to produce renewable energy collectively in their neighbourhood or village.[71] Moreover, this letter states that the government wants to support these citizens in their ambition, not only to increase the share of renewable energy, but also to raise the support of the general public for sustainability and energy efficiency.[72] The letter also echoes the ambition of the energy market parties regarding at least one million small and medium energy consumers being fully (or for a substantial part) self-sufficient in terms of their energy demand (due to consuming self-produced renewable energy) in 2020, voiced earlier in the SER Accord.[73]

The policy document defines local energy as the combination of sustainable energy production with energy consumption in close proximity to each other (neighbourhood- or village-level).[74] In other words, the Dutch government presents a vision where local energy is produced and consumed within the same restricted geographical area and thus coincides with the earlier presented discussion regarding the local sustainable energy market for sharing energy. This vision also echoes the preference towards local di-

62 Butenko and Larouche (n19).

63 Brownsword and Goodwin (n18).

64 Gregory N. Mandel, 'Regulating Emerging Technologies' (2009) 1(1) *Law, Innovation and Technology* 75.

65 Gregory N. Mandel, 'Emerging technologies governance', in Gary E. Marchant, Kenneth W. Abbott, Braden R. Allenby (eds), *Innovative Governance Models for Emerging Technologies*, (Edward Elgar Publishing 2013); Diana M. Bowman, 'The hare and the tortoise: am Australian perspective on regulating new technologies and their products and processes', in Gary E. Marchant, Kenneth W. Abbott, Braden R. Allenby (eds), *Innovative Governance Models for Emerging Technologies*, (Edward Elgar Publishing 2013).

66 Regulatory reforms presume 'enacting entirely new regulatory regimes or substantially overhauling existing laws'. See Mandel (n65).

67 Regulatory update refers to the change in regulation, introduced to accommodate a change in technology, which is not paired with the change in societal norms and values. See Bennett Moses (n48).

68 Visie op lokale energie (n25) at 3.Total electricity demand in the Netherlands amounted to 412,47 PJ in 2013 according to CBS, see <http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=70846NED>, accessed 2 November 2016

69 Energieakkoord voor duurzame groei (n16).

70 This is a policy vision statement of the government, and it therefore does not have the status of a legal document. Visie Lokale Energie (n25).

71 Rijksoverheid, Kamerbrief over visie op locale energie, 8 November 2013, available online (in Dutch) at <https://www.rijksoverheid.nl/documenten/rapporten/2013/11/08/visie-lokale-energie>, accessed 2 November 2016.

72 Kamerbrief over visie op locale energie (n71).

73 See Kamerbrief over visie op locale energie (n71); Energieakkoord voor duurzame groei (n16), at 79.

74 Visie op lokale energie (n25), at 3.

mension of market for prosumer-generated energy expressed on the EU level and discussed earlier in the current paper.

On the general level, it could be concluded there is no regulatory disconnection between innovation – in this case referring to innovative business models adopted by prosumers, such as peer-to-peer energy sharing on the local market – and regulatory goals. Indeed, the energy policy vision presented by the Dutch government supports the production of local energy and its simultaneous consumption on the local market, which could be achieved by the means of sharing local energy among prosumers and consumers. This echoes the ambitions of individual and collective energy prosumers to effectively expand their role and participate in the market as traders and suppliers.

However, it would be premature to provide a definitive answer as to the presence of disconnection between innovation on the one hand (illustrated by sharing energy) and Dutch energy regulatory framework on the other hand. First, it is necessary to look at the actual measures in place in the Netherlands that facilitate market access for prosumers. In the following sub-sections the possibilities available to both individual and collective prosumers to act as market actors on the local and wholesale national energy markets are regarded.

2. Sharing Energy as Individual Prosumers

As noted earlier, two alternative options for prosumers to dispose of the generated energy that is not self-consumed are imaginable: First, prosumers could fulfil the role of suppliers, selling their energy directly to (other) final consumers either in the same or in a different region (respectively locally or nationally). In such situation the prosumers would essentially be engaging in peer-to-peer transactions, or sharing energy. Second, prosumers could trade such energy on the local sustainable energy market (in other words, sell such energy within the respective geographic region), or even on the national wholesale or retail market for renewable or fossil energy. In such case prosumers would, in fact, be acting in a role similar to that of 'traditional' energy producers and traders, who sell the energy they produced (or bought) on the market to the parties of their choice and for the price they find acceptable. In both situations prosumers would act as potential competitors to the existing market players. Legal obstacles, such as licensing requirements, legal monopolies, intellectual property rights, etc., could represent the so-called market entry barriers for potential competitors to the existing market players.[75] This seems to be the case in the Netherlands, meaning that the above-described alternative options remain hypothetical and do not materialize in practice. The barriers for individual prosumers to access both local and national wholesale energy markets are discussed below.

a. Access to Local Energy Market

Whereas the prosumers do not need a supplier's license in order to self-generate and consume own energy, the Dutch energy legislation forbids supplying energy to small and medium consumers in the absence of such license.[76] Thus, individual prosumers wishing to act as energy suppliers, be it locally or nationally, would need to apply for such a license from the Dutch national regulator ACM.[77] Whereas theoretically possible, in practice obtaining such a license is often outside the reach of individual prosumers, as they need to demonstrate that they possess the minimum organizational, financial and technical characteristics necessary for a good performance of their tasks as energy suppliers.[78] Moreover, and perhaps most importantly, the energy suppliers have to comply with the universal service obligation, meaning that they have an obligation to supply any consumer who so desires.[79] This represents an obvious obstacle for the individual prosumers wishing to supply e.g. their neighbors locally or family members nationally – due to limited supply, they cannot always guarantee supply to other consumers.

Whereas in theory individual prosumers could act as suppliers under the current Dutch energy law provisions, in practice this is not possible due to the ex-

75 Richard Whish and David Bailey, *Competition Law* (Oxford University Press 2012), at 184. Communication from the Commission 2009/C 45/02, Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings, para. 17.

76 See Article 95a of the Dutch Electricity Act 1998, and Article 43 of the Dutch Gas Act 2000.

77 See <https://www.acm.nl/nl/onderwerpen/energie/energiebedrijven/vergunning-aanvragen-bij-acm/>, accessed 2 November 2016.

78 See Article 95d.1 of the Dutch Electricity Act 1998.

79 See Article 95b.1 of the Dutch Electricity Act 1998.

isting supplier's license requirements that are 'geared' towards traditional large energy suppliers operating on the national retail market, and do not take into account smaller size and capabilities of such prosumers. In such conditions individual prosumers lack access to local (and national) energy market in the capacity of suppliers. This precludes the possibility of energy prosumers' engaging in peer-to-peer energy transactions, and as such is indicative of regulatory disconnection. To elaborate: it has been previously argued that regulatory disconnection takes place when there is a gap between innovation on the one hand and regulation on the other hand. Moreover, it has been argued that such gap is problematic when it leads to regulatory failure. In the conditions when Dutch energy policy proclaims support for prosumers' participation in local energy markets, whereas legal provisions in place do not allow it, a 'futility' outcome of regulatory failure, characterized by no change to the status quo despite regulatory efforts, is obvious.[80]

b. Access to Wholesale Energy Market

The current Dutch energy legislation does not define consumers: instead, the term 'customer' is used, referring to persons connected to the network.[81] Producers are defined as organizations that generate energy.[82] The current Dutch legislation does allow the possibility that customers might act as producers. The Dutch Electricity Act states, for example, that the network operator should connect customers who are producers to the grid in the manner and for the tariffs that are objective, transparent and non-discriminatory, and which takes into account the costs and benefits of the various techniques related to renewable energy, distributed generation and cogeneration.[83]

At the same time, suppliers and traders are defined as organizations that, respectively, supply electricity or gas,[84] or participate in agreements regarding sale and resale of electricity or gas.[85] Whereas the legislation does not explicitly state so, the fact that prosumers are exempted from the supplier's license requirement as discussed earlier suggests the possibility of them acting as such. In such conditions there is no reason why individual prosumers could not qualify as traders under the current definition. Moreover, the current Dutch energy legislation contains the definition of 'market participant' as defined in Regulation on wholesale energy market integrity and transparency, referring to 'any [natural or legal] person, including transmission system operators, who enters into transactions, including the placing of orders to trade, in one or more wholesale energy markets'.[86] Thus, individual prosumers could also qualify as market participants and have the right to access the (wholesale) energy market on fair and equal conditions (level playing field).

However, comparably to the possibility to act as suppliers, wholesale market access for prosumers remains theoretical. This is mainly due to the requirements imposed on the market participants which are again 'geared' towards traditional and large (compared to individual prosumers' size) market players. Illustrative of such requirements is the obligation towards parties trading on the wholesale market to act as 'program-responsible parties', or 'programmaverantwoordelijke marktpartijen'- PV- in Dutch).[87] These parties are responsible for optimizing the supply and demand portfolio, as to ensure electricity grid balancing. This obligation is imposed upon energy suppliers and customers connected to the electricity grid with the exception of prosumers and final consumers. It is the energy suppliers that usually perform this role on behalf of individual prosumers.[88]

80 Futility outcome is described as 'no change to the existing problem […] regardless of regulatory intervention'. See Baldwin, Cave and Lodge (n52) at 73; Hirschman (n51).

81 See Article 1.1.c of the Dutch Electricity Act 1998, and Article 1.1.o of the Dutch Gas Act 2000.

82 See Article 1.1.g of the Dutch Electricity Act 1998, and Article 1.1.ag of the Dutch Gas Act 2000.

83 See Article 31.1.h and Article 28.3 of the Dutch Electricity Act 1998. This echoes Recital 36 of the Directive 2009/72/EC, which states that 'transmission and distribution tariffs [should be] non-discriminatory and cost-reflective, and should take account of the long-term, marginal, avoided network costs from distributed generation and demand-side management measures'. See Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.

84 See Article 1.1.f of the Dutch Electricity Act 1998, and Article 1.1.ah of the Dutch Gas Act 2000.

85 See Article 1.1.h of the Dutch Electricity Act 1998, and Article 1.1.ai of the Dutch Gas Act 2000.

86 See Article 1.7 and Article 1.8 of Regulation 1227/2011/ EU of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency.

87 Article 1.1.o of the Dutch Electricity Act 1998.

88 Large market parties usually solve the imbalances created by the injection in the grid of locally produced sustainable electricity by the means of their (usually large) portfolio optimization. Individual prosumers do not have such a portfolio, and therefore could not effectively fulfil the role of a program-responsible party. See Pront-van Bommel and Buist (n31).

c. Some Observations

It is observed that the individual prosumers in the Netherlands in fact do not have direct market access, either to local sustainable energy market or to national one (wholesale and retail). The main identified reason for the absence of access are the legal requirements contained in the current Dutch energy legislation which are geared towards traditional and large(r) energy market players, and do not provide a 'discount' to the individual prosumers based on their size and potential impact.

When individual prosumers of local renewable energy are regarded as potential competitors to the existing market players, these requirements could be interpreted as significant entry barriers to the market. Moreover, these barriers are indicative of regulatory disconnection between innovation (as illustrated by the prosumers participating in peer-to-peer energy transactions on local and national energy markets) on the one hand and regulation on the other hand. This disconnection is problematic, as it leads to regulatory failure. The sub-section below illustrates the regulatory approaches adopted by the Dutch government to address this regulatory disconnection.

d. Addressing Regulatory Disconnection

As previously discussed, most prosumers are not able to consume energy at the moment of production. In other words, most prosumers do not reach the level of 100% in their self-consumption. A solution could be of technical nature, and namely storing the produced energy until the moment of consumption (e.g. home battery). In the absence of storage, solutions of administrative nature include feed-in tariffs and net metering schemes. Feed-in tariffs approach essentially means that prosumers receive a premium for self-generated electricity that is not self-consumed.[89]

The Netherlands has opted for the alternative net metering scheme ('salderen' in Dutch),[90] which presumes that unused electricity that is locally produced by prosumers can be fed into the grid, and later subtracted from the total electricity consumption bill of the consumer. In other words, under such scheme 'the excess electricity injected into the grid can be used [by the prosumers] at a later time to offset consumption during times when their onsite renewable generation is absent or not sufficient'.[91] In the Netherlands net metering is exclusively meant to be used by individual prosumers, who have installed local sustainable energy production facilities in their homes. In practice such facilities are mostly represented by the solar panels on the roofs. The benefit of net metering is that the prosumers do not have to pay either energy tax or VAT on the netted electricity (the electricity itself is obviously free, as it is self-produced).[92]

Since January 2014 in the Netherlands the maximum volume of electricity that can be netted for an individual prosumer is capped at the maximum consumption of that prosumer. In other words, net metering is capped at the level of self-sufficiency, and so the prosumers cannot net more than they actually consume.[93] In cases when prosumers' self-generation exceeds their self-sufficiency (they produce more than they consume e.g. because they have many solar panels, or because they were away from home a lot), they can still feed electricity in the grid, provided they have the so-called 'back-feeding meter' ('teruglevermeter' in Dutch). Prosumers then receive a fixed price for such electricity from their energy supplier. This price varies per energy supplier, and depends on the volume of electricity that is fed into the grid. Whereas some energy suppliers do offer the equivalent of the retail market price for such electricity, most pay a price that is significantly lower compared to the retail market price for electricity.[94]

It is clear that net metering scheme adopted in the Netherlands aims to stimulate self-generation of the prosumers at the level of self-sufficiency, and is not lenient towards generation above this level. The main reason for this are the costs which such approach imposes on the energy system. As noted earlier, net metering essentially allows the prosumers to use the electricity network as a type of virtual temporary storage where they can store the produced electricity up to the moment when they need it (e.g. during their peak consumption hours in the morning and in the evening). In contrast to gas pipelines which allow the

89 Best practices on Renewable Energy Self-consumption (n16) at 9-10.

90 See Article 31c of the Dutch Electricity Act 1998.

91 Best practices on Renewable Energy Self-consumption (n16) at 10.

92 See <http://www.hieropgewekt.nl/kennis/zelflevering-en-saldering/zelflevering-saldering>, accessed 2 November 2016.

93 See Article 31c of the Dutch Electricity Act 1998.

94 See <http://www.hieropgewekt.nl/kennis/zelflevering-en-saldering/zelflevering-saldering>, accessed 2 November 2016.

possibility of marginal storage of natural gas in the pipelines themselves, electricity networks do not offer such possibility, and the netted electricity is simply transported to different consumers who are in the position to consume at the required moment. Hence, the electricity the prosumers consume in their peak hours is only administratively qualifying as local sustainable energy. The actual electricity they consume could as well be produced in coal or gas power plants. Thus, net metering is an option available to individual energy prosumers to 'trade' the energy produced above self-sufficiency level, or in other words when prosumers act as 'net producers'. But the conditions surrounding this transaction are rather restricted: the prosumers can only have a contract with a single energy supplier, who acts as the single buyer of the produced energy at the fixed price and therefore possesses significant buyer power.

The main benefit of net metering is also the main drawback: by equating the financial value of local sustainable energy produced by the prosumers and consumed at the moment of production (self-consumed) with the electricity which is netted at the moment of overproduction and consumed at a later moment, net metering effectively eliminates an incentive for the consumers to consume electricity simultaneously with production (self-consume). Large scale deployment of net metering, especially in combination with self-generation above the level of self-sufficiency, would be problematic in terms of both energy system integrity and its costs. The latter under the current scheme would not be allocated to the problem-causing party (and namely prosumers), but rather would have to be borne by the other market participants.

The Dutch government seems to be aware of the problems with current net metering arrangement. It will be evaluated in 2017, and based on the results of this evaluation the decision will be taken whether or not to discontinue this scheme.[95] Nevertheless, it has been announced that the scheme will remain in place at least until 2020, for a number of reasons. First, this is due to the current expectations of the energy prosumers procuring solar panels regarding the relative stability of the financial benefits associated with net metering. It is noted that this arrangement is currently considered to be the most attractive scheme for individual prosumers engaging in local sustainable energy production.[96] The second reason is that the smart meters which would allow metering of own consumption and the electricity fed in the network are not rolled out in all locations yet.[97]

As such, net metering arrangement in the Netherlands effectively represents temporary legislation, or a sunset clause, which is an example of a regulatory approach falling into the horizontal dimension of measures aimed to bridge the problematic gap between innovation and regulation. Net metering is undoubtedly efficient as a mechanism for stimulating local sustainable energy production. However it has no positive, and arguably an adverse, effect on the simultaneous consumption of own electricity by the prosumers. This adverse effect could be described as 'jeopardy' outcome of regulatory failure, that refers to the situation when despite the positive aspects of a regulatory measure in question, its application could lead to undesirable side-effects.[98] Indeed, the earlier named Dutch energy policy document 'Vision on Local Energy' states that net metering arrangement does not support the formulated political goals, and namely the stimulation of local sustainable energy markets, presuming that electricity produced locally is also consumed locally, and at the same moment in time.[99] Thus, net metering is in fact incompatible with the Dutch policy goals regarding the local sustainable energy market, and as such does not represent an effective regulatory approach to address regulatory disconnection. In the following sub-section of the current paper the question of whether the level of local market access is equivalent for collective local energy prosumers is addressed.

3. Sharing Energy as Collective Prosumers

a. Access to Local and Wholesale Energy Markets

As was noted earlier, prosumers could also produce local sustainable energy and engage in sharing ener-

95 See <http://www.hieropgewekt.nl/kennis/verlaagd-tarief-financiering-zonneparken-zelflevering-en-saldering/money-money-money>, accessed 2 November 2016.

96 See <http://www.hieropgewekt.nl/kennis/verlaagd-tarief-financiering-zonneparken-zelflevering-en-saldering/money-money-money> (accessed 2 November 2016).

97 Visie op lokale energie (n16), at 18.

98 Baldwin, Cave and Lodge (n52), at 73.

99 Visie op lokale energie (n16).

gy efforts collectively. At the moment there are around 500 collectives in the Netherlands.[100] The formats of these collectives range from wind cooperatives owning and operating an onshore wind turbine to local energy initiatives where participants jointly invest in solar panels, and could also engage in energy efficiency and other energy-related activities. Dutch prosumers' collectives could resort to the following main business models:

- Shareholder model, where collectives are producing renewable energy >>> collectives are selling it to the energy supplier >>> ROI (Return On Investment) to the collectives' members (shareholders);
- Indirect supply model, where collectives are producing renewable energy >>> collectives are selling it to the energy supplier >>> energy supplier is selling energy to the collectives' members;
- Direct supply model, where collectives are producing renewable energy >>> collectives are selling energy directly to the collectives' members.

The shareholder model does not imply the possibility of the collective supplying energy to its own members. In order for the local energy collectives to supply the produced energy directly to the prosumers participating in the collective, the collectives in question would have to apply for an energy supplier's license discussed earlier in the current paper. Comparably to the individual prosumers, local energy collectives usually experience the requirements of such a license as too demanding and thus in practice it is nearly impossible (or very difficult) for these collectives to obtain it. As the result very few initiatives adopt this direct supply model.

Because of these limitations, local energy collectives usually supply their members via an intermediate energy supplier: collectives sell the produced energy to a supplier, who in turn sells this energy to the members of the collective, its customers.[101] The main issue with indirect supply model is that the members who want to buy such electricity lose their flexibility in choosing an energy supplier, as they need to become clients of the energy supplier with whom the collective in question has a contract.[102]

Besides local and national market entry barriers in their potential role as energy supplier, local energy collectives face obstacles in acting as energy traders, comparable to those experienced by the earlier discussed individual prosumers. Also in this case it can therefore be concluded that there is an evident regulatory disconnection, which leads to regulatory failure.

The evaluation of the level of market access available in practice to the collectives of energy prosumers reveals that also in this case the level of access is inadequate, if not outright inexistent. This is similar to the earlier described situation of the individual energy prosumers. In both cases the level of access and the conditions under which this access takes place are radically different for the 'traditional' market players, and for the new small entrants representing potential competition – energy prosumers.

The regulatory approaches adopted by the Dutch government to address the regulatory disconnection in case of collective energy prosumers are discussed in the following sub-section of the current paper.

b. Addressing Regulatory Disconnection

The location and the proximity of the energy production installation to the residence of prosumers play an important role in the choice of the appropriate support scheme, as does the fact whether the prosumer is acting on her own (individually) or in a group (collectively). As discussed in the previous subsection of the current article, net metering is available to individual prosumers who install a local sustainable energy production installation in their houses. The collectives of prosumers engaging in local sustainable energy production and wishing to supply own members could rely on the so-called 'postcode area arrangement'.

As of January 2014 the 'postcode area arrangement' ('postcoderoos regeling' in Dutch) became effective.[103] This arrangement allows for a discount from the amount of energy tax to be provided to the members of the collective procuring electricity produced by this collective. This discount is conditional

100 See <http://www.hieropgewekt.nl/faq-page#n2305>, accessed 2 November 2016.<http://www.hieropgewekt.nl/initiatieven>, accessed 2 November 2016.

101 Marieke Oteman, Mark Wiering and Jan-Kees Helderman, 'The institutional space of community initiatives for renewable energy: a comparative case study of the Netherlands, Germany and Denmark' (2014) 4(11) *Energy, Sustainability and Society* 7; De Proeftuin 'Decentrale Duurzame Collectieven' (n25) at 11.

102 See for example <http://www.windvogel.nl/?page_id=5042>, accessed 2 November 2016.

103 See Article 59 of the Dutch Environmental Taxes Act; see also <http://www.hieropgewekt.nl/kennis/verlaagd-tarief/de-regeling-het-kort>, accessed 2 November 2016.

upon the requirement that the production installation owned and operated by the collective in question is located within the same or directly adjacent postcode area where the consuming member of the collective lives. It should be added that the limitation of maximum own consumption (self-sufficiency level of max 10.000 kWh/ year) is also applicable to this scheme, similarly to the net metering arrangement available to individual prosumers.[104] Of course this arrangement is only of marginal value to the already established collectives, such as for example wind cooperatives, whose existing members often live in other areas. However it could be more important for the newly organized collectives.

From a technical perspective, postcode area arrangement essentially works identically to net metering. Also in this case the electricity networks are used as a buffering means by transporting the produced local sustainable electricity to the consumers able to consume electricity at the moment of production. This similarity to net metering is also evident in the fact that postcode area arrangement is often referred to as 'collective net metering'.[105] Whereas the arrangement does stimulate the combination of local energy production and consumption, it does nothing for the coincidence of both in time. As this characteristic is mentioned as essential in the document 'Vision on Local Energy',[106] it could be concluded that the postcode area arrangement is not addressing this aspect properly and hence it is incompatible with the Dutch policy goals in relation to sustainable local energy markets. In this respect the tentative plan of the Dutch government to potentially substitute net metering with postcode area arrangement as the main support instrument for local sustainable energy does not seem sound,[107] as neither scheme stimulates simultaneous production and consumption of local sustainable energy (increases the level of self-consumption). In consequence, it could be argued that the regulatory approach selected by the Dutch government to address disconnection between innovation on the one hand and regulation on the other hand is not adequate.

It is observed that the efforts of the Dutch government to address the identified regulatory disconnection are not limited to postcode area arrangement. As the means to bridge the gap between innovation and regulation, changes were introduced in the Dutch Electricity Act,[108] allowing the subsequent adoption of the Decision on Experiments in Decentralized Sustainable Energy Production in February 2015.[109] This decision is an administrative decree (algemene maatregel van bestuur, or AMvB, in Dutch), whose contours were sketched in the earlier discussed policy document 'Vision on Local Energy',[110] as well as in the SER Accord.[111] The idea behind the decree is to provide experimental freedom in format of exemption from compliance with certain provisions of the Dutch Electricity Act to projects that could support the energy transition, but where the social benefits and effects are not sufficiently evident yet.[112] The experiments will be evaluated and the successful ones will form the basis for structural legal updates.[113]

The decree is limited to local sustainable energy collectives, and namely a cooperation or an association of homeowners (vereniging van eigenaars, or VvE, in Dutch).[114] The exemption concerns two categories of projects, varying in size and ownership of the networks in question.[115] The projects in both categories could apply for exemptions from compliance with the Dutch Electricity Act on a number of provisions, and namely:[116] The experimental projects could combine energy production, supply and network operation within one organization – the structure which is not possible at the moment under the Dutch law. The experimental projects could also supply produced energy to its members directly, without resorting to

104 See Article 59 of the Dutch Environmental Taxes Act; see also <http://www.hieropgewekt.nl/kennis/verlaagd-tarief/de-regeling-het-kort>, accessed 2 November 2016.

105 See <http://040energie.nl/zon/zon-collectief/flinke-terugslag-collectief-salderen/>, accessed 2 November 2016.

106 Visie op lokale energie (n25).

107 Visie op lokale energie (n25) at 18.

108 See Article 7a of the Dutch Electricity Act 1998.

109 Besluit experimenten decentrale duurzame elektriciteitsopwekking, 28 February 2015, available online (in Dutch) at <http://wetten.overheid.nl/BWBR0036385>, accessed 2 November 2016.

110 Visie op lokale energie (n25).

111 Energieakkoord voor duurzame groei (n16).

112 Energieakkoord voor duurzame groei (n16), at 84- 85.

113 Energieakkoord voor duurzame groei (n16), at 84- 85.

114 See Article 7.i., Besluit experimenten decentrale duurzame elektriciteitsopwekking (n110).

115 The first category concerns the projects where the distribution network in question remains in the hands of the regional system operators (DSOs). The second category concerns the so called 'project networks', owned and operated by the cooperation or association in question. See Article 1, Article 2.1., Article 7.g. Besluit experimenten decentrale duurzame elektriciteitsopwekking (n109).

116 See Articles 10- 14, Besluit experimenten decentrale duurzame elektriciteitsopwekking (n109).

the intermediary energy suppliers, by the means of an exemption from the supplier's license requirement of the Dutch Electricity Act. Moreover, the projects could experiment with the variable prices and supply tariffs, etc. It is also possible to experiment with constructing and operating a network by a party other than a system operator. It is worth noting that the local sustainable electricity production by the cooperation or the association should not exceed the maximum electricity consumption of its members (± 5% as margin). This provision is comparable to the caps associated with the previously discussed net metering and postcode area arrangements. [117] By allowing for the exemption possibilities for local energy collectives qualifying under experimental in this decree, the document essentially takes a step in ensuring the level playing field for collective local energy prosumers.

This decree nevertheless has a number of important drawbacks, such as narrow definition of the eligible projects and their limited number. The success of this administrative decree is still to become obvious. For now it is still too early to tell, as the period for applications for exemptions only opened in May 2015, and so far only four projects received an exemption.[118] Moreover, the decree does not in fact introduce measures to increase the level of self-consumption. Rather, it allows to test where there is disconnection between the market developments in the Netherlands and the existing legal framework. Nevertheless, it could be confidently stated that this administrative decree is in line with the Dutch political goals in relation to local sustainable energy markets, and namely the stimulation of both local electricity production and consumption, and, more importantly, the synchronization of them in time. This decree is a typical example of experimental legislation. As such, it falls under the horizontal dimension of regulatory approaches to addressing problematic regulatory disconnection. Despite the several drawbacks identified above, the decree is an undoubtedly positive development, as projects evaluated as successful will be the basis for legislative revisions.

In the following section the discussion is finalized, conclusions are outlined.

VI. Analysis and Conclusions

The sharing economy has become a reality in many sectors, including energy. Energy consumers are increasingly able and willing not only to produce own energy and thus become prosumers, but also to sell this energy on the local or national energy market on par with 'traditional' energy market players. Thus, the role of prosumers is de facto extended as to include the parallel roles of consumers, producers, suppliers and traders. Against this background the main question of the current paper has been formulated as the extent to which it is possible for the prosumers to share energy under the current Dutch regulatory framework. This question has been evaluated from the theoretic perspective of regulatory disconnection, referring to the gap between innovation on the one hand and respective regulation on the other hand.

It has been observed that the phenomenon of regulatory disconnection is not intrinsically problematic. It only becomes such when it leads to regulatory failure. The wide range of regulatory approaches to address regulatory disconnection that is deemed problematic and leading to regulatory failure could be divided into three broad groups, or dimensions, and namely: horizontal dimension referring to the timing of regulatory intervention, vertical dimension referring to the level of regulatory specificity, and institutional dimension, referring to the role of institutions and to the format of regulation.

In order to answer the main research question, the presence of regulatory disconnection between innovation, as exemplified by the expanded role of the prosumers, and the respective Dutch energy regulation has been assessed. Furthermore, it has been evaluated whether this disconnection is problematic. As prosumers could generate energy and act on the energy market both individually and collectively, the legal provisions pertaining to both individuals and collectives have been analysed. Moreover, local energy markets where prosumer-generated energy is produced and consumed at the same time are endorsed as a positive and desirable outcome in both EU and Dutch energy policy documents. Therefore the level of individual and collective prosumers' access to local energy market is used as a kind of benchmark for assessing the regulatory disconnection.

117 See Article 6, Besluit experimenten decentrale duurzame elektriciteitsopwekking (n109).

118 See <http://www.rvo.nl/subsidies-regelingen/experimenten-elektriciteitswet/besluiten-ontheffingen>, accessed 2 November 2016.

It is concluded that under the current legal provisions of the respective Dutch energy regulatory framework individual and collective prosumers effectively have no adequate direct access to local and/or national wholesale energy market. This absence of direct market access is due mainly to the provisions contained in the Dutch Electricity Act that were designed with the traditional market structure in mind, such as large energy producers and suppliers selling energy to their customers. The disconnection between innovation and regulation is therefore clearly established.

The obstacles represented by the respective legal provisions are primarily exemplified by the requirements associated with obtaining a supplier's license, necessary to supply e.g. one's neighbor or family in another region. While such requirements are business-as-usual for larger, traditional, energy suppliers, complying with them is next-to-impossible for individual and collective prosumers. As the ability of individual and collective prosumers to supply and to trade generated energy is essential for the functioning of local market where energy is produced and consumed at the same time, the barriers to prosumers' market access represent a regulatory failure. In such conditions the identified regulatory disconnection is undoubtedly problematic.

It is noted that in the Netherlands there are regulatory measures in place aiming to address the identified regulatory disconnection between the expanded role of the prosumers on the one hand and the regulatory framework on the other hand. The chosen regulatory approach aimed at addressing the discrepancy between the market access ambitions of the individual prosumers and the regulatory provisions in place is the so-called net metering. The Dutch government plans to evaluate the net metering scheme in 2017, and to potentially discontinue it after 2020. Thus, net metering is a typical example of temporary legislation, or a sunset clause, which falls under the horizontal dimension of regulatory approaches to disconnection.

Net metering allows prosumers to administratively store in the electricity grid the energy which they produce but do not consume instantly. By doing so, net metering undoubtedly stimulates the generation of local energy. Yet, it creates no incentive for prosumers to consume energy at the moment of production – the situation which is efficient from the perspective of total energy system costs, and which is also endorsed as the preferred scenario on both EU and Dutch national level. Moreover, the access to the market enabled by the net metering is rather limited, and has restrictive conditions: for example, prosumers are bound to one energy supplier in both roles of consumers and producers. As the situation when generated local energy is consumed at the moment of production, and within the same geographic region (on the local energy market), is portrayed as the desirable regulatory outcome in the Dutch energy policy, it could be concluded that net metering does not correspond to these goals. Moreover, as it effectively diminishes the incentive for prosumers to consume generated energy at the moment of production, it could be stated that such scheme leads to regulatory failure, and as such is not an effective mechanism for addressing regulatory disconnection.

Similar conclusions could be drawn in relation to the postcode area arrangement – a scheme aiming at allowing energy collectives to supply their own members. Whereas the scheme stimulates the local production as well as local consumption, it does not support their coincidence in time. In other words, the consumed local energy does not necessarily have to be consumed at the moment of production. In technical terms, postcode area arrangement works identically to net metering, and is in fact also often referred to as 'collective net metering'. In such circumstances, it could be stated that also this regulatory measure is ineffective in terms of addressing the identified regulatory disconnection.

Another regulatory measure aimed primarily at local energy collectives is the Decision on Experiments in Decentralized Sustainable Energy Production, an administrative decree that allows experimental projects to apply for derogations from certain provisions of the Dutch Electricity Act. An example is an exemption from the requirement to obtain a supplier's license in order to supply own collective members. The experimental projects applying for such derogations will be evaluated and if the results are positive, respective changes might be introduced in the Dutch energy legislation. This decree is a prime example of experimental legislation, and hence falls under horizontal dimension of approaches to regulatory disconnection. Whereas this decree has a number of significant drawbacks, the most important one being its rather restrictive format, it can be confidently stated that it is aligned with the Dutch energy pol-

icy goals, and namely the access of prosumers to the local market where local energy can be generated and consumed simultaneously.

It is observed that in addressing the regulatory disconnection between the expanded role of the energy prosumers on the one hand and the respective energy regulation on the other hand, the Dutch government favors temporary and experimental legislation. Both of these regulatory approaches fall under the horizontal dimension of dealing with disconnection. The temporary legislation adopted in the Netherlands is deemed ineffective in addressing regulatory disconnection, and the success of the experimental decree is still to become obvious, as it was introduced fairly recently.

In such conditions it is worth investigating whether a different dimension of regulatory approaches to regulatory disconnection, such as vertical or institutional one, would be more effective. In the same vein, it could be argued that the expanded role of prosumers presumes not only technological change, but also a significant shift in norms and values. The energy consumers who were previously at the receiving, passive, end of the energy value chain, now become energy producers, able and willing to participate in energy markets on par with traditional players. By doing so, prosumers have a potential to revolutionize the energy market set up and disrupt the business models of incumbent market players. Such shift in values and norms could indicate that a regulatory reform is a more appropriate approach to addressing the regulatory disconnection in question. However, prior to making such recommendations more research is clearly necessary.