

NEW PROVIDER-CONSUMER RELATIONS IN ELECTRICITY PROVISION. GREEN ELECTRICITY SCHEMES IN THE UK, THE NETHERLANDS, SWITZERLAND AND GERMANY

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1 - Introduction

Until recently the provision of electricity, investment planning and guaranteeing of supply was the responsibility of state-owned companies serving captive consumers within natural monopolist markets. With the gradual liberalisation of European energy markets, this form of electricity provision has undergone substantial transformation. In a few years time most European households will no longer be captive consumers of their regional energy suppliers, but may choose between a range of different providers. As a result, energy companies will increasingly try to bind customers into supply contracts by means of product differentiation or reduced energy prices. Other providers are also entering the energy market, thereby widening the range of modes of provision (i.e. through supermarkets, consumer associations and trade unions) and products and services.

This paper questions how the liberalisation of the European electricity market and increasing environmental demands will take effect in the relations between household consumers and providers of electricity by discussing a range of green electricity schemes that are currently available in a number of European countries. Green electricity is particularly useful as a means of understanding the new relations between consumers and providers, in the sense that it is one of the main ways in which (old and new) providers are competing today. Green electricity schemes essentially take advantage of the extended opportunities in electricity markets in order to differentiate the consumer market. In addition the development of such schemes reflect how environmental issues might become institutionalised in the new market situation.

For the purposes of this paper, we borrow the definition of 'green electricity' from the German Grüner Strom Label: "power that is generated environmentally friendly from renewable energy sources or in co-generation". The 'greenness' or environmental soundness of different forms of green electricity is the subject of much debate. However, the lens through which we wish to explore green electricity schemes will focus on variation in the relationships emerging between electricity providers and domestic consumers. This will add some insights from a consumer perspective into what has so far been a provider-dominated debate on green electricity developments.

In the next section we will explore what differentiation in electricity provision might mean for relations between providers and consumers. We will develop a new classification, one that is not based on differentiation in sources of green generation (as in Markard & Truffer, 1999; www.greenprices.com), but instead outlines the type of relationships implicated between providers and consumers of green electricity. Section 3 presents a sketch of liberalisation and sustainable energy policy and a sample of green electricity schemes in the countries involved. The evaluation and conclusion will relate our findings on new environment-induced relationships between electricity providers and consumers to the ongoing debate on consumer involvement in processes of ecological modernisation in Europe (Chappells et al, 2000).

2 - Differentiation in electricity provision and consumption

The provision of green electricity alongside conventional electricity is something new. Not only because it concerns a *green* product, rather because it is a form of product differentiation not seen before in this kind of business. A number of studies (Eikeland, 1998; Midttun, 1999; Markard & Truffer, 1999) of the development of green electricity and liberalisation suggest that market conditions and consumer roles might change but few have picked apart the layers of differentiation through energy supply chains to investigate changing elements in the relations between providers and consumers. It is not just the fact that electrons are generated from particular renewable sources but also that the variety of these new arrangements might colour different pipes, products and relations in many diverse ways.

Green electricity provision involves an extension and differentiation of the **sources** from

which electricity can be generated, including wind, solar, hydro, co-generation, biomass or domestic wastes. In the near future a further differentiation in the “greenness” of different forms of electricity can be expected.

One requirement of liberalisation is the opening-up of the electricity grid to third parties who can deliver electricity under the same conditions as any other provider. This has resulted in the differentiation of **providers**, i.e. the provision of green electricity by wind energy associations, NGOs, or communities. This also involves new coalitions such as those between NGOs and utilities to endorse certain sources of generation or particular products and services.

Differentiation in electricity provision may involve different providers, but will not necessarily lead to a different end product, with electrons received in the same way as usual. Instead, it is more relevant to say that green electricity schemes will involve differentiation of the **modes of provision** to consumers. The public mode of electricity provision that has dominated in the past is now being joined by private, public-private and self provided modes.

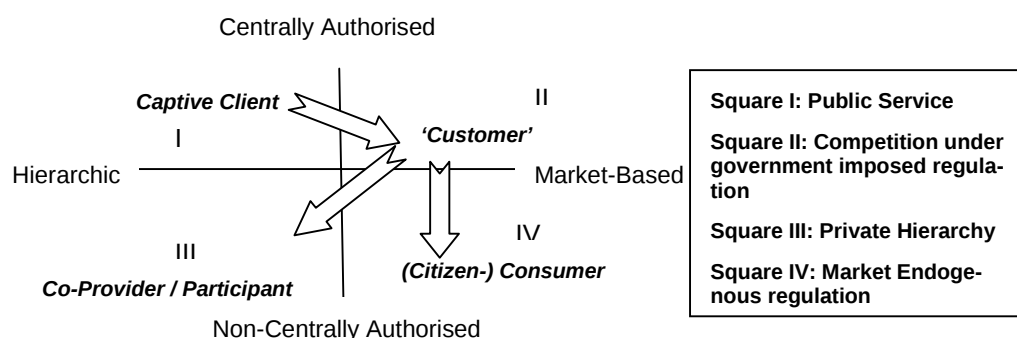
Electricity consumption has largely been a highly inconspicuous form of consumption and electricity itself a typically “low-involvement” product. The fragmentation of the electricity market and the possibility for greater differentiation of services within this market provides the opportunity to have potentially more conspicuous forms of consumption. In addition, the configuration of different green electricity schemes implies a number of new **consumer roles**. Theoretically, the following basic relations can be distinguished:

- **Captive Client – Public Utility:** The traditional relationship between electricity providers and clients is that of a natural monopolist serving captive consumers, leaving no choice for the latter to choose between providers or services. Captive consumers are protected by governmental law from providers’ possible abuse of monopolist power.
- **Customer – Privatised Business:** Since electricity sectors have been liberalised, providers have renamed and reconfigured this public service/client relation into a business/customer one. As consumers will no longer be captive, providers think it is time to listen to their preferences and complaints, to invent new products and services and to bind customers to their businesses.
- **Citizen-Consumers – (any) provider:** As new (green) electricity providers enter the electricity market a range of new relationships are emerging. These new providers appeal to their customers not only as being consumers of electricity, but also as conscious and responsible citizens who may take individual action to paint the network a little bit greener.
- **Participants or co-providers – (any) provider:** In addition to business–customer relationships, where electricity flows from providers to consumers, new market opportunities also enables electricity to flow the other way. Consumers or groups of consumers can also generate electricity from local resources and are increasingly being given the opportunity to deliver excess electricity back to the central grid.

As this paper places green electricity in a context of changing modes of electricity sector generation, the question arises whether the different relationships in any way relate to a specific mode of energy sector regulation. To investigate this, we borrow a model presented by Midttun (1999) who added a new dimension to the classical dichotomy between hierarchic versus market-based regulation in economic regulation and applied this to electricity provision. By stating that such dichotomy underscores the “governance dimension”, he developed a diagram setting out the classical dichotomy on the horizontal axis, and a governance dichotomy (centrally authorised versus non-centrally authorised) on the vertical axis. According to Midttun, a characteristic of green electricity is that it is originated outside the state apparatus and serves as a case of “decentralised endogenous regulation” (square IV in the figure below). However, our sketch of green electricity developments will show that it can also originate in government-regulated competition of energy companies (square II). Midttun’s diagram distinguishes the 4 relevant dimensions of governance in case of electricity sector regulation, which can be utilised to picture the above mentioned roles of consumers in the different governance environments (figure 1). The arrows indicate the possible consequences for consumer-roles vis-à-vis energy companies as electricity regulation develops.

This is only a preliminary classification, to be used as hypothesis. The cases of green electricity schemes will be used to test the hypothetical development as sketched in the diagram and bring some necessary refinement.

Fig. 1: Dimensions of Regulation and Changing Consumers Roles in case of Electricity Market Liberalisation (revised version of figure from Midttun, 1999)



3 - Green electricity provision in Europe

To introduce the contexts within which green electricity schemes have emerged in the UK, the Netherlands, Switzerland and Germany, a sketch of liberalisation and green energy policy data in these countries is presented in a table below. Although time-scales differ significantly, the paths of liberalisation of electricity markets and policy targets are quite similar. Switzerland is an exception in a number of aspects, due to the fact it is not an EU member-state and therefore not obliged to follow EU targets on CO₂ emissions and the implementation of renewable energy sources.

	Full competition domestic electricity market	Free consumer choice green electricity provider	Current and future government targets renewable generation	Number and % of green electricity customers	Main Policy Instruments 1990 – 2020
United Kingdom	1998	1998	2% (2000) 10 % (2010)	13,500 (<1%)	Non Fossil Fuel Obligation and 10% consumer levy Tradable green energy certificates
Netherlands	2007, but likely to be moved forward to 2004	2001	±3 % (2000) 5 % (2010) 10 % (2020)	140,000 (±6%)	Covenants with electricity sector Regulating Energy Tax (renewables excluded) Tradable green energy certificates
Germany	1998	1998	5% (2000) 10% (2010) (CO ₂ reduction 1990-2010: 21%)	240,000 (including hydro)	Feed-in-Law (StrEG) and Renewable Energies Law subsidising renewable generators Increasing energy taxation
Switzerland	2007	2007 (proposal for 2001 is rejected)	1.2% (incl. Hydro-power: 60%) 1.4% CO ₂ reduction: 10%	30,000	"Energy 2000" (until 2000, covenants) "Energie Schweiz" (number of energy tax proposals, yet to be agreed upon)

Sources: www.greenprices.com. UK: Elliot, 1999; Hough, 1999; Stanford, 1998; Adler, 1999, Utilities Bill, 2000. Netherlands: de Volkskrant; ECN, 2000; EnergieNed, 1994; Breukels, 1998; Ministerie van Economische Zaken, 1999; Germany and Switzerland: Wüstenhagen, 2000, www.e2000.ch, Nitch & Fischedeck (1999)

Utility-based Green Electricity schemes

Green electricity schemes provided by conventional electricity suppliers can be split into two types: 'green source' and 'green fund'. (www.greenprices.com). The former are more popular and refer to schemes where the supplier buys a unit of electricity from a renewable source for every unit purchased by the consumer. In contrast, green fund schemes do not involve the purchase of green energy as such, instead consumers pay a premium above the normal unit price of electricity, which is treated as a charitable contribution and is invested in small-scale renewable schemes.

In **the Netherlands** green electricity was first introduced in 1995. From 1999 on, all electricity distributing companies offer Green Electricity under various banners. Sources for green electricity generation are wind power, biomass and waste incineration, solar power and some hydropower sources. Independent organisations such as WWF supervise green electricity schemes and monitor the claim that no more green electricity is sold than generated. After the abolishment of regulating energy tax for green electricity, consumer prices vary between an added price of 2 and 5 cent per kWh. A successful mass-media campaign by WWF in 1999 has sped up the number of green electricity consumers from 100,000 (September 1999) to 140,000 (January 2000) (www.greenprices.nl). Because of a rise of the regulating energy tax for normal electricity on 1 January 2000, which made green electricity in some cases even cheaper than normal electricity, energy companies have stopped advertising and have put new green electricity customers onto a waiting list. Other companies have just raised the price for green electricity (de Volkskrant 30-11-99).

Since liberalisation, 14 electricity suppliers **the UK** have introduced green tariffs. Eastern Electricity has been one of the pioneers of UK 'green fund' development. As well as pledging to generate at least 10% of its electricity from renewable sources by 2010, the company has set up the Ecopower Scheme to generate funds for further investments in renewable energy. Subscribing to Ecopower involves a 5-10% premium. The funds generated are administered by an independent advisory committee – the Ecopower Trust – including representatives from consumer and environmental organisations. Although precise figures signing up for Ecopower are difficult to come by, the company reports that the number of customers signing up for the scheme is steadily increasing (Eastern Interview, 1999).

In **Switzerland**, the prototype of green electricity schemes are the "Solarstrom vom EW" (solar power from your local utility) which have emerged in the late 1990s (cf. Wüstenhagen 1998). These are somewhat similar to 'green fund' schemes. The marketing intensity for such schemes is usually low, with the exception of a few pioneering utilities. For many other utilities, the initial motivation to set up these schemes was a more defensive one: a reaction to public pressure to offer environmentally friendly products, which in their mind were technologically immature and commercially uninteresting. The high, cost-based prices (6-8 times conventional prices) of these schemes indicated that they were not designed to meet the needs of mainstream customers. With the advent of liberalisation, a new wave of product launches can be foreseen in the near future. These rely mainly on hydropower, but will provide added environmental value by meeting the criteria of the Swiss green electricity labelling scheme 'naturemade' (www.naturemade.org). At the moment, these services are only available for the captive consumers of the corresponding utilities. Consumer-supplier relationships do not change, except in the sense that the utility increases its efforts to learn about consumer's preferences to design its (renewable) energy products in a more appealing manner.

A similar shift in the type of green electricity schemes on offer can be seen in **Germany**, where utilities started with 'green pricing' schemes that involved voluntary payments by the consumer in addition to their usual electricity bill. Examples are Umweltplus, a green tariff launched by RWE Energie AG in 1997 (www.umweltplus.de), or EnBW's Umwelttarif (www.enbw.com). Although the customers of these tariffs are told that "it is now up to you to choose how electricity is generated" (EnBW), these schemes have been criticised, as in the UK and the Netherlands, by environmental NGOs for being too defensive and shifting the responsibility for environmental protection from the polluting company towards a few 'green' consumers. Partly as a reaction to this criticism, but also as a response to the new competitive environment, utilities are now adopting a different approach. Examples are Bewag (Berlin), which now offers a variety of products ranging from 'brown electricity' to a light green "BerlinKlassik" and a dark green "ÖkoPur" (cf. Wüstenhagen 2000). These products try to make the link between the pre-liberalisation green pricing schemes, who had more of a fund character and led to small, but visible new renewable energy projects, to the new competitive environment with stronger price pressures but also a need to remain credible. A different approach has been taken by Bayernwerk, who have launched a product named "Aquapower" that simply markets existing hydropower under a new brand. This may lead to the perverse situation that as more and more environmentally aware customers choose to buy Aquapower, the company will have to import more 'dirty' electricity from abroad to cover the demand of the residual customers, who pay a lower price. A clear commitment to renewable energy or a minimum quota of new renewables might overcome this, but there are no signs that the company would take one of these approaches. On the contrary, new Aquapower customers are

offered free air miles within Lufthansa's frequent flyer programme.

The extent to which these green electricity schemes will challenge the relations between monopoly consumers and public providers remains unclear. Although the introduction of green electricity schemes appears to offer previously captive consumers a wider choice of products, what is actually delivered to the home will be the same green/brown mix that is received by non-participating consumers. Taking green electricity out of the national pool is considered undesirable as the rest of the pool would get browner (Eastern Interview, 1999).

The possibility of green electricity schemes merely creating eco-niche markets is regarded by many as undesirable especially if it restricts green electricity innovation to only a small and marginalised market which is developed at the expense of other initiatives, such as government levies which gain greater consumer coverage. As Jegen and Wüstenhagen (2000) show in the Swiss case, most marketeers and energy policy makers agree with the statement that green electricity marketing can be a supplement to, but not a substitute for other energy policy measures to support renewables.

Changing the local electricity mix: New Independent Green Providers

Although many of the private companies which have developed green electricity schemes are affiliated to main energy utilities, independent suppliers also exist in all countries, many of which operate at a more local level. Examples include private companies which seek to compete in the competitive market and initiatives run at the community-level by household collectives, local authorities, housing associations or renewable energy associations.

The British Renewable Energy Company (RECo) currently supplies its own brand of green electricity - 'Ecotricity' – to commercial and industrial customers and is intending to offer this to domestic consumers at conventional market prices rather than charging a premium (Renewable Energy Company, 1999). It hopes to provide at least half its customer's demand from renewable sources (largely landfill gas and wind energy generation). Power produced by green generators is metered by the company and then passes into the local electrical distribution network, operated by the distribution subsidiary of the regional electricity company, before being passed on to the consumer via their existing meter (Adler, 1999).

A similar initiative in the Netherlands is SGEP (Co-operating Green Electricity Producers), a merger between several windmill associations that benefit from new legislation on direct delivery of green electricity to consumers (www.sgep.nl). After an initial payment of 45 Euros, members will be co-owners of the assets of the association, mainly wind turbines. In addition, a small proportion of electricity directly consumed by these members will be covered by the generated green electricity and will be delivered at the same price as normal electricity. Members will still pay their local Energy Company's bill, but the Energy Company must settle this with SGEP. SGEP opposes the green electricity schemes of energy companies, as being not green enough, as they include power generation from biomass and waste incineration.

In the Netherlands there are about 20 windmill co-operatives representing some 6000 household consumers who are share-holders of one or more windmills that have been installed by the co-operative itself (www.ecn.nl). Electricity is transported to the electricity grid and sold to the energy distributor in the area. Profits derived from the exploitation of a windmill are re-invested in installation of new turbines, as most members of wind mill co-operatives state that they do not see this as a financial but rather as an environmental activity.

In the UK other more locally oriented wind-mill co-operatives have been developed, for instance the Delabole Windfarm in Cornwall which provides electricity to the local households who are shareholders in wind power generation and export to the national grid. These green electricity arrangements result in situations where it is local generators that contribute to national power mixes thus reversing some relationships between providers and consumers.

With the exception of the first new entrant, NaturEnergie AG, the origin of most of the German independent energy companies were in the environmental community. For instance, representatives of a number of environmental NGOs founded Naturstrom AG in 1998, while Greenpeace Germany set up Greenpeace Energy in late 1999. The former 'Black Forest electricity rebels' from Schönau (see below) also decided to enter the nationwide market with a service called "Watt-Ihr-Volt aus Schönau" which claimed to be unique in supporting renewable generation projects in close vicinity to their customers' homes. The market success of these new entrants has been limited until now. The prime reason for the lack of success is the unclear regulatory environment, which puts new entrants into a weak position compared to

the incumbent utilities along with a lack of professional management skills and ongoing disputes among different green suppliers.

These arrangements differ from those seen in many of the schemes run by large electricity companies. First, they utilise local energy grids and generators, bringing green electricity closer to consumers' homes and are able to offer it at a competitive market price. Such arrangements are made possible by eliminating costs associated with transmitting electricity over long distances and new legislation on grid access of green suppliers. However, this does not mean that the relations between consumers and conventional grids and suppliers are totally severed. The new companies still have to deal with the electricity distribution companies. As such many independent green energy providers exist only as trading companies and customers will not find a green energy supplier 'on the doorstep'. Furthermore, the consumer may still get a brown/green mix of electricity even if these proportions have changed. We now go on to consider what happens when green electricity provision moves even closer to home.

Greening the Household: Consumer-providers

In a small town in the south west of Germany, members of the "Parents of a Nuclear-Free Future" group founded a firm in 1990 to finance and install small decentralised co-generation plants (heat-power systems) at strategic locations in town. As the tariff paid by the local energy utility for delivered electricity was much too low to cover the costs, a next step was the foundation of the "Netzkauf Schonau" (Buy the Network). After several referenda among Schönau residents and campaigning all over Germany, the foundation was able to buy the firm from its owners in 1997. The new company Elektrizitätswerke Schönau (with shareholders all over Germany) promotes energy saving via linear tariffs and higher feed-in tariffs for co-generated and solar electricity. They aim to supply at least 40% locally produced (green) electricity, which represent the equivalent of the nuclear energy portion supplied by the former supplier. The case of Schönau has since been copied, but it is unique in its rhetoric: citizens felt trapped in a monopolist electricity network and bought themselves out to be freed from the forced consumption of nuclear generated electricity. In "opposing the financial power of one with the petty cash of many, the citizens are no longer powerless" this is seen as an important experience for the citizens (www.ews-schoenau.de). EWS presents itself as a grass-root citizens' organisation working for and through citizens, but it has gradually developed into a 'normal' utility: it is owner of a local grid, generates and distributes electricity with additional demand-side and peak load management tasks and has now even entered the national electricity market with the 'Watt Ihr Volt' product.

There are other examples in Germany and Switzerland where companies or groups of consumers try to address the issue of sustainable energy systems beyond a mere purchasing decision for one electricity product compared to another. For example, Greenpeace Switzerland together with the Association of Swiss Youth Parliaments have launched the "Jugend-SolarProjekt", within which groups of young people are educated and motivated to set up solar panels on the roofs of their schools. Sebasol is a Swiss grassroot movement intended to disseminate the knowledge of building solar thermal installations in do-it-yourself groups. All these approaches share a higher level of consumer involvement. They are however, all in an early niche market stage.

In the UK there have been only few examples of individual solar panels which are grid-connected, while wind turbine developments at the household level have been beset by planning difficulties. Where a few pioneering householders have managed to generate their own green electricity provision they have run into difficulties when they come to trading arrangements which are not quite as flexible as liberalisation might imply. For example, small generators who have a surplus have been thwarted by their local electricity companies who have insisted on the installation of metering equipment costing over £2000 (Tickell, 1997). Such arrangements are in line with liberalisation policy in the UK, where it is stated that all electricity generators have to be served by half-hourly meters. This has also been a disincentive for community scale organisations to install PhotoVoltaic solar panels because it would be too expensive to sell any excess to the grid. Such examples illustrate the extent to which green electricity flows from centralised providers may develop at the expense of small-scale initiatives, where green electrons can freely move around households but not further up the grid into local or national distribution networks.

Greenpeace Netherlands' campaign *Solaris* was aimed to achieve a breakthrough in the apparently vicious circle of highly priced PV panels due to low demand and vice versa. In April

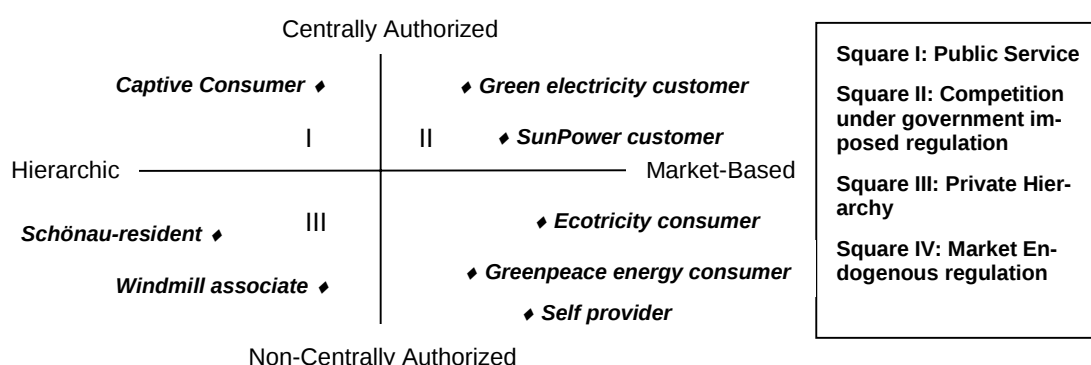
1998, Greenpeace opened an information and reference desk that listed consumers' subscriptions for solar panels. After a year, there were enrolments for 15,000 panels which convinced Energy Companies and the Ministry of Economic Affairs to come up with a subsidy program that lowered the consumer price of a panel below NLG 1000 (450 Euro) (www.greenpeace.nl). A number of large energy companies have since issued the Sunpower system: 4 solar panels for a price of almost 2300 Euro. The expected electricity production amounts about 10% to 15% of average electricity consumption of one household. The set will be installed on the roof and connected to the domestic electricity system using a normal socket, making the electricity meter run backwards if more electricity is produced at a given time by the solar array than is being used in the house. Any kWhours of electricity produced are thereby credited against consumption ('Net-metering'). In this way SunPower customers become co-providers of (green) electricity.

Evaluation of green electricity schemes

Although our selection of green electricity schemes is not exhaustive, it provides a comprehensive picture of the variety of green electricity resources and modes of provision emerging across Europe. In addition, it gives us a clearer idea of the diverse relations being worked out between green electricity providers and consumers. We have seen that many, if not all energy companies have issued green electricity schemes of some sort, at best these have coloured electricity production green, at worst they have re-allocated the green portion to a small group of consumers while painting the rest a little more brown. Electricity market liberalisation has also opened a window of opportunity to experiment with the entrance of several independent green electricity providers and traders, but it is still unclear whether this is a long-term development in all the countries involved in our review.

In all green electricity schemes there is a more or less implicit story about the role of the consumer, ranging from captive-silent to active and participative. We can now refine our hypothetical scheme of electricity sector governance and consumer roles by plotting the consumer roles attached to our cases into the scheme as presented in figure 1.

Fig. 2: Dimensions of Regulation and Consumer roles in green electricity provision



Liberalisation of electricity markets not only means a transition of public service to government imposed competition, but also to private hierarchies and market endogenous regulation. In each of these modes of governance there are possibilities for green electricity schemes, with quite different expectations concerning consumer's roles.

4 - Conclusion

We can conclude that green electricity schemes do reflect changing relations between consumers and providers but not in easily definable ways. The characteristics of this change require a much closer reading of the sub-layers of differentiation – seen through the different technical, institutional, organisational and social arrangements along national, local and household grids. Depending on the precise configuration of these arrangements, consumers' roles may range from consumers, clients, citizens or participants in electricity service provision. This exposes the contradiction that consumers might become more authoritative in certain areas of activity (e.g. self-generators, green purchasers) and in some areas (e.g. where regional/independent companies serve, or where local planners allow wind farms to be built) but can also be captive at the same time (e.g. not allowed to operate as green suppliers by selling back to the grid or remaining locked into arrangements with the conventional util-

ity). The same thing applies for new providers attempting to green the grids: they may provide an unfamiliar face at the consumer-provider interface but behind the meter can be allied with conventional suppliers or constrained by generation contracts and consumer demand.

Are green electricity schemes just old wine in new bottles? In this paper we have not just considered the end-product (the wine itself) or the greenness of generation (the colour of the grapes) but have focussed on further relations between provision and consumption (labels, bottling, distribution etc.). Indeed, in some cases green electricity offers utilities an easy opportunity for upgrading their image towards consumers. In light of our suggestion that different arrangements imply diverse roles for electricity consumers, we could say that instead of being the same wine in new bottles, many configurations of green electricity resemble quite another liquid offered in something quite different than bottles.

These diverse models of green electricity differentiation reveal that sometimes consumers and providers are connected more closely to energy as an environmental issue (e.g. transparent greenness, closeness to generation activity etc.), while in cases they become dissociated. In terms of environmental policy implications, this suggests that there might be many entry points to monitor and regulate green electricity – as a differentiated product, service or pricing scheme. Looking across different phases, modes and scales of green electricity provision allows warning signals from other countries at different stages of development to be taken into account. For instance, regulation and certification should prevent the allocation of green electricity to small groups of consumers resulting in a browner mix for everyone else.

Green electricity schemes generally imply a little more involvement among many consumers and much more involvement among a few co-providers and self-generators. This is, however, subject to the level of transparency about the character of 'greenness', the arrangements concerning grid access for new providers, and the willingness of consumers to consider electricity consumption as a tool to 'green up' their lifestyles.

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