RAP®

POLICY BRIEF

Benefiting Customers While Compensating Suppliers: Getting Supplier Compensation Right

Author
Phil Baker

October 2016

Summary

The commercial viability of consumers benefitting from the opportunity to provide flexibility services – crucial to cost-effective decarbonisation of the power sector – is in danger of being unjustifiably quashed under the currently contemplated approach to compensating suppliers.

Developing convenient and beneficial ways to make demand more responsive to market conditions is a key to the cost-effective decarbonisation of the power sector. By flexing their electricity demand, customers, assisted by third-party aggregators where appropriate, will in the future be able to participate in the electricity market or offer services to the grid. In becoming more responsive, customers will reduce overall system costs and assist both the integration of intermittent renewable generation and electrification of the heat and transport sectors.

However, in many jurisdictions, customers, or aggregators operating on their behalf, are required to compensate suppliers, either via negotiation or some administered arrangement, for energy "sold on" in the form of demand response in providing services to the electricity market. This requirement to compensate suppliers has the potential to severely restrict customer participation and reduce the very considerable associated societal benefits involved. Furthermore, analysis reported in this paper shows that supplier compensation is unnecessary and unjustified, and points to a simple resolution that would allow suppliers to remain financially whole, while at the same time facilitating the provision of market services and allowing the associated societal benefits to be realised.

Introduction

If the challenges of energy decarbonisation are to be met in a cost-effective, affordable, and reliable fashion, customers will need to increasingly engage with the electricity market. As the deployment of intermittent renewable resources to meet Europe's decarbonisation targets continues, the need for flexibility in both market and balancing timescales will grow, while the amount of dispatchable generation capacity able to provide that flexibility will decline. Customers, both large and small, will therefore increasingly need to manage their consumption in response to market signals in order to help fill that gap. Furthermore, as decarbonisation progresses through the electrification of the heat and transport sectors, distribution networks will come under increasing pressure. This will further increase the value of demand flexibility, which will take on a local dimension over time. In the future, customers will therefore need to become increasingly active market participants, having a role in both balancing demand and supply, and in responding to local network needs in order to avoid or delay traditional but expensive network investment.

Barriers to the Deployment of Demand Response and the Issue of Retailer Compensation

Despite the importance of demand flexibility to the delivery of Europe's decarbonisation goals, there remain a number of barriers to its deployment. These barriers often relate to regulatory failures that deny the demand

side an opportunity to participate in the electricity market or to compete with traditional generation resources in providing services to the grid. They range from market or service requirements that are designed around the characteristics of conventional generation and so discriminate against demand participation, to the outright prohibition of demand-side offerings in market or balancing timescales.

Many of these barriers are well documented and in some instances are being successfully addressed. However, a less well-appreciated but equally damaging barrier lies within the relationship between a customer offering demand or flexibility services to the market, possibly via a third party or "aggregator" who will "bundle up" the flexibility of many smaller customers to provide volumes of interest to the market, and the customer's supplier. When a customer, or aggregator operating on his behalf, modifies consumption in order to offer energy to the market, the customer or aggregator is effectively "selling-on" energy in the form of demand response, energy that has been purchased in advance by the supplier in anticipation of the customer's consumption. As the retailer cannot generally bill his customer for energy that is not directly consumed, the supplier appears to face a loss of revenue in these circumstances. This has resulted in demands for retailers to be compensated for the loss of revenue, with compensation being agreed either via negotiation between the supplier and the customer or his aggregator, determined via an administered arrangement.[2]

Although it is reasonable for a supplier to expect not to suffer financially in situations in which customers are selling-on energy that has not been paid for, evidence suggests that calls for direct compensation should be rejected on two counts. First, it is a significant threat to the development of "incentivised" demand response and the associated benefits to be gained in terms of reduced retail energy tariffs and lower-cost integration of intermittent resources. Second, an obvious and simple alternative exists that ensures suppliers are not disadvantaged financially, without endangering the deployment of demand response or the associated benefits.

The Societal Benefits and Costs of Demand Response and the Impact of Compensation

In order to understand more fully the societal benefits of demand response and who may benefit and lose from its increased deployment, The Regulatory Assistance Project (RAP) has commissioned an analysis of its impact on the French, German-Austrian, and Nordic spot markets over the years 2013/14, 2014/15, and 2015/16. These markets were chosen to give a good spread of characteristics, that is, the French market being "peaky" in nature with high demand/temperature sensitivity, Germany having high levels of renewable capacity giving rise to increased price volatility, and the Nordic markets having a reduced level of price volatility owing to the large amount of hydro storage capacity.

Using actual day-ahead price data for the three markets, the analysis identified

- the potential overall reduction in whole market energy costs to be achieved through demand response;
- the cost of achieving these reductions;
- the "demand response benefit–cost ratio"; and
- the perceived loss of supplier revenue owing to energy purchased but not billed and the impact of compensation on the economic viability of demand flexibility.

The analysis also investigated the sensitivity of the above to different levels of demand response penetration and utilisation, by considering the impact of 1 gigawatt (GW) and 4 GW of demand response applied over 50 and 400 hours to each of the three markets.

Outcome of the Analysis

The Societal Benefit of Demand Response

The analysis, the outcome of which is summarised in Table 1, highlights the significant reduction in whole market energy costs to be delivered by demand response. Column D of Table 1 shows that, assuming a modest 1 GW of demand response applied for 50 hours in the three

1 A customer or aggregator selling-on energy in the form of demand respone to the market or System Operator in return for a payment is referred to as "incentive-based demand response." This differs from the situation in which a customer simply modifies consumption in response to price signals (e.g., a time-of-use or dynamic energy tariff), which is referred to as "price-based demand response."

2 An administered approach to compensation has been adopted in France and is proposed as a model that could be adopted throughout Europe.

Table 1

Financial Impact of Demand Response on the French, German-Austrian, and Nordic Markets for 2013/14 to 2015/16 (1- and 4-GW Penetration; 50 and 400 Hours' Duration)

	A	B	C	D	E	F	G
	Market	Year	Average decrease in spot price on application of DR (€/MWh)	Whole market retailer benefit [M€]	Compensation payment to retailers (based on French compensation model) [M€]	DR sales [M€]	Retailer market benefit/ (Cost = DR sales)
50h/1GW	FRA	2013/14	30.72	119.33	3.64	3.5	34.09
		2014/15	23.04	90.35	3.52	2.74	32.97
		2015/16	32.92	124.34	2.74	2.37	52.46
	GER-AUT	2013/14	42.54	169.92	3.18	2.46	69.07
		2014/15	23.92	101.85	2.96	2.36	43.16
		2015/16	26.71	109.97	2.38	2.12	51.87
	NORDIC	2013/14	14.19	47.68	2.38	2.03	23.49
		2014/15	10.99	35.79	2.2	2.08	17.21
		2015/16	38.09	136.65	1.9	2.69	50.80
50h/4GW	FRA	2013/14	39.07	152.7	14.57	12.31	12.40
		2014/15	25.12	98.43	14.07	10.56	9.32
		2015/16	38.27	145.59	10.95	8.41	17.31
	GER-AUT	2013/14	45.61	182.01	12.71	9.23	19.72
		2014/15	27.11	115.64	11.82	8.81	13.13
		2015/16	32.73	134.72	9.5	7.26	18.56
	NORDIC	2013/14	17.41	58.76	9.54	7.48	7.86
		2014/15	19.85	64.96	8.79	6.65	9.77
		2015/16	59.4	214.34	7.61	8.11	26.43
400h/1GW	FRA	2013/14	13.01	379.27	28.06	24.68	15.37
		2014/15	11.81	344.57	27.93	20.77	16.59
		2015/16	18.99	515.54	21.42	15.72	32.80
	GER-AUT	2013/14	20	635.83	24.44	19.13	33.24
		2014/15	13.83	458.89	22.66	17.9	25.64
		2015/16	11.29	355.13	18.4	15.58	22.79
	NORDIC	2013/14	7.71	186.32	19.69	14.26	13.07
		2014/15	5.49	135.12	18.08	13.47	10.03
		2015/16	10.21	272.75	14.75	13.98	19.51
400h/4GW	FRA	2013/14	19.48	576.88	112.23	88.37	6.53
		2014/15	14.23	415.89	111.7	79.22	5.25
		2015/16	27.47	617	85.68	57.33	10.76
	GER-AUT	2013/14	23.74	753.96	97.74	70.46	10.70
		2014/15	16.58	550.98	90.63	67.21	8.20
		2015/16	15.78	501.45	73.6	55.15	9.09
	NORDIC	2013/14	9.74	237.85	78.75	53.8	4.42
		2014/15	8.59	214.09	72.32	48.93	4.38
		2015/16	18.6	508.68	58.98	53.12	9.58

markets considered, the annual reduction in total whole market cost lies in the range of €228 to €370 million, rising to €229 to €494 million if utilisation is increased to 400 hours. The corresponding range of annual whole market savings for 4 GW of demand response is €950 to €1,144 million and €1,181 to €1,628 million, respectively.

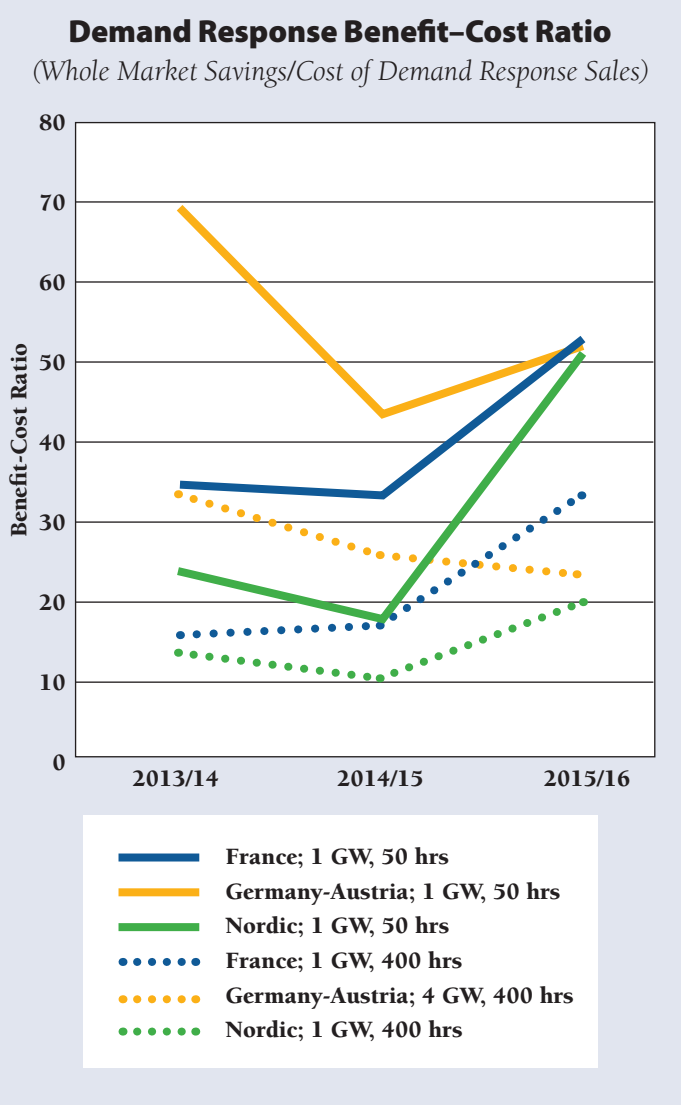
These savings result from reduced wholesale market clearing prices during the hours when demand response is applied. The costs incurred by retailers in purchasing energy in anticipation of their customers' needs are therefore reduced and, assuming sufficient retail market competition or regulatory oversight, these reduced costs should pass through to customers in the form of lower retail energy tariffs. As all customers benefit from lower tariffs and not just the providers of demand response, the benefits of demand response can be considered to be truly societal in nature.

The Demand Response Benefit–Cost Ratio

The benefits to consumers of reduced retail energy prices brought about by the application of demand response does come with a cost, that is, the revenues extracted from the spot market by the providers of that demand response. However, although these revenues can be significant in absolute terms, they are tiny compared with the whole market cost savings. This is illustrated by column G of Table 1, which shows the "demand response benefit–cost ratio" for the various combinations of demand response capacity and utilisation considered. It can be seen from column G that the benefit-to-cost ratio for 1 GW of demand response applied for 50 hours ranges from 17 to 70. The corresponding figures for 4 GW of demand response applied for 400 hours are lower owing to reduced impact of demand response as penetration increases; however, the benefit–cost ratio never falls below 10. The information contained in Table 1 column H for 1 GW of demand response penetration is shown graphically in Figure 1.

It is interesting to note that analysis carried out by RTE also suggests that the societal benefits of demand response consistently outweigh the potential costs. In a report published in October 2013, RTE estimated that, assuming 1 GW of demand response applied for 600 hours during the winter period, the benefit seen by suppliers would range from 60 to 300 M€. As the compensation for lost sales would amount to some 30 M€, RTE's estimate of the ratio of consumer benefit to lost income of between 2 and 10.[3]

Figure 1



Loss of Supplier Income Associated With Incentivised Demand Response and the Impact of "Supplier Compensation"

It is difficult to assess the income lost by suppliers from customers offering demand response to the market, as individual suppliers will adopt different hedging strategies and purchase energy in different timescales. As the actual energy purchase costs will be known only by the supplier, negotiating compensation between supplier and customer or his aggregator will be difficult. This "information gap," when coupled with the fact that in many Member States customers or their aggregator

3 See RTE report "Expérimentation sur la valorisation des effacements de consommation sur les marchés de l'énergie (dispositif "NEBEF 1")." Retrieved from http://www.rte-france.com/uploads/media/pdf_zip/alaune/2013_10_16_NEBEF_Rapport_de_consultation_Vdiff.pdf

must have permission from the customer's retailer before providing demand services, places the retailer in a very dominant negotiating position.

The administered approach to compensation adopted by France, and assumed to apply to the German-Austrian and Nordic markets in this analysis, is an attempt to overcome these difficulties. However, the analysis shows that compensation, even via an administered arrangement, is likely to hinder the deployment of demand response. It can be seen by comparing columns E and F in Table 1 that, assuming the French compensation arrangements apply to all three markets, suppliers would nearly always receive more in compensation than the service provider could realise from selling the service. Little, if any, revenue would remain to cover the costs of establishing demand response capability in the first place or making any reasonable return, therefore destroying the case for further deployment.

This conclusion is confirmed by data published by RTE showing that, during 2014, compensation payments exceeded 87 percent of the value of demand response sales based on spot price.[4] It is therefore clear based on both analysis undertaken by RAP and evidence from the French electricity market that introducing a general requirement for third-party aggregators to compensate suppliers directly for lost income has the potential to stop aggregation – so important for providing a pathway for smaller commercial and domestic customers to participate in delivering Europe's decarbonisation goals – in its tracks.

An Alternative to Direct Compensation

An alternative method of ensuring that suppliers are able to recover lost revenues, without risking the viability of incentivised demand response and aggregation services, would be for suppliers to simply retain a small proportion of the wholesale market savings, because in all practical circumstances those savings will always exceed and often dwarf any income lost by suppliers from customers selling-on energy. In fact, as retail market competition is rarely perfect, it may well be that suppliers are able to retain significantly more of the savings associated with demand response than is necessary to cover any losses associated with sold-on energy.

Relying on the retention of some of the wholesale market savings to ensure that suppliers remain financially whole rather than negotiated or administered compensation would be both a pragmatic and just solution. The alternative of direct compensation would most likely result in there being very few benefits to be enjoyed in the first place, while, as the reduction in wholesale energy prices brought about by demand response is enjoyed by all customers via lower retail tariffs, it seems appropriate that all customers should share in the associated costs.

Demand Response as a Competitor to Generation and the Need for Independent Supply

The savings in whole market costs flow from the reduction in average spot market clearing prices (shown in column D of Table 1) during periods of high demand, when demand response is most likely to be applied. These savings therefore reflect a reduced demand and a consequent loss of income for generation. At the margin, generation will be displaced from the market and therefore suffer a loss of profit, while all operational generation will experience a reduction in infra-marginal rent to be extracted from the energy market. Over time, as demand response becomes embedded in the system, it is to be expected that some displaced generation will close and that the savings associated with reduced infra-marginal rent will be partially replaced by avoided generation capacity capital and other fixed costs. These avoided costs will also be significant and probably on par with the savings in infra-marginal rent.

The inevitable conclusion is therefore that, although demand response brings potentially significant savings to consumers, those savings are made at the expense of incumbent generators. Demand response is fundamentally negative for generation businesses owning assets that, at the margin, will no longer be viable. It is therefore unrealistic to expect those businesses, or indeed vertically integrated entities that combine both generation and retail under one corporate roof, to be sympathetic to the concept of demand flexibility or to champion its deployment. It should therefore be no surprise if the incumbent industry is supportive of the current direct approach to compensation.

The businesses that will promote demand flexibility are those that will benefit most. Demand response is central to the business case of independent aggregators and they are therefore most likely to champion its deployment. Independent retail businesses are also likely to support the development of demand response as a means of reducing the cost of sourcing energy during high-demand periods and as a balancing option, even though it is not central to their core business of selling energy.

4 NEBEF. (2015, July 8). Commission d'Acces au Marche reunion plenier. Presentation by RTE.

Conclusions

The analysis reported here demonstrates the real societal benefits that incentivised demand response can deliver. Although potential savings vary from year to year and with penetration and utilisation, the analysis suggests that the total annual savings assuming the application of 4 GW of demand response for 400 hours in each of the three markets could be in excess of €1.6 billion – clearly, the savings to be achieved across the whole of Europe would be even more dramatic. It is also likely that potential savings will increase steadily over time with the continued deployment of intermittent generation and increasing energy price volatility. However, these potential savings could be placed in jeopardy if customers, or aggregators operating on their behalf, are required to directly compensate suppliers for energy bought upfront but sold-on and not billed. The analysis, confirmed by data published by RTE, indicates that most if not all the demand response revenues available would be eaten up by direct compensation, leaving little or no margin to support the costs of provision or of incentivising customer participation.

Happily, the analysis points to an obvious and simple alternative that would allow suppliers to remain financially whole while at the same time facilitating the development of customer demand flexibility and allowing customers to retain nearly all of the associated societal benefits. As the cost of delivering these societal benefits are generally dwarfed by the magnitude of the benefits themselves, suppliers could retain a small proportion of these benefits in order to recover any loss of revenue associated with energy sold-on but not billed.

In fact, absent perfect retail market competition, it can be argued that suppliers are likely to retain more than sufficient revenues to cover any losses and that any calls for direct compensation should be dismissed on those grounds alone. In practice, the issue may become more about how to ensure the majority of cost savings brought about by demand response are passed through to customers, rather than about ensuring that suppliers remain financially whole.

Finally, the analysis highlights the rather obvious point that the societal benefits of demand response reflect a corresponding reduction in the revenue available to generation. For this reason, it is unreasonable to expect conventional generation businesses, or retail businesses tied to conventional generation assets via vertical integration, to be supportive of initiatives that promote the deployment of demand response. Independent supply businesses on the other hand can be expected to be supportive, given that customer demand flexibility provides an alternative to purchasing energy during high-price periods. Third-party aggregators will also be supportive of measures designed to encourage growth in customer demand flexibility, indeed the development of aggregation services will be a necessary facilitator of that growth.

Additional Resources

Hitting the Mark on Missing Money

http://www.raponline.org/knowledge-center/hitting-mark-missing-money-ensure-reliability-least-cost-consumers/

Getting the formation of prices in wholesale electricity markets right is key to ensuring reliability, delivering value for money, and empowering and protecting consumers. Yet many of the measures proposed to address what is known as the "missing money problem" instead create a new problem:misallocated money, overcompensating some resources and undercompensating others. The consequences of this misallocation put the business case for low-carbon power system innovation at risk, a particular concern at this time of transformation in the sector. This paper offers a brief refresher on how we should expect energy prices to form in a modern system, the ways in which they should be expected to shape critical investment decisions, and some of the ways energy price formation can go wrong. With this as a foundation, author Michael Hogan lays out a robust and sustainable approach to ensuring a reliable, low-carbon electric supply at the lowest reasonable cost.

The causes of "missing money" include failing to properly value the demand for balancing requirements, administrative measures (such as price caps) intended to rein in market power, and beneficial public policy measures whose design does not account for any price distortion effects. To tackle the problem effectively, regulators have three options. Top priority should be given to redressing the root causes of the missing money directly. Because this will take time, however, policymakers can reinforce their efforts by adopting administrative mechanisms that add missing money back into energy and balancing services markets. These two strategies, deployed in tandem, offer the best chance to ensure reliability at least cost. A capacity remuneration mechanism, which compensates investors in capacity resources outside the energy and balancing markets, is a third-best option. If resorted to, it should be designed as much as possible to recognize the higher relative value of more flexible resources; it should be accompanied by a thorough reform of the process for assessing the amount of capacity really needed to 'keep the lights on' in accordance with the established standard; and it should be a supplement to, rather than a substitute for, measures to improve the quality of energy price formation, with the ultimate objective that at some point in the future it will no longer be needed.

Can We Trust Electricity Prices?

http://www.raponline.org/knowledge-center/can-we-trust-in-electricity-prices-the-case-for-improving-the-quality-of-europes-market-monitoring/

One of the essential components of competitive wholesale electricity markets is *market monitoring*—the process by which producers and consumers can be assured that power markets are functioning effectively and that power market prices have been set due to costs, values, and system conditions, as opposed to through the exercise of market power, strategic withholding, or manipulation. Market monitoring encompasses both *market surveillance* to root out any wrongdoing and *market performance assessment* to continuously evaluate the performance of the markets, in particular, the effectiveness of market design and market structure and the impact of policies or interventions on market functioning.

This policy brief explains how effective market monitoring is crucial to stakeholder confidence in wholesale electricity markets. Effective market monitoring is a sure way to help ensure consumers actually receive the benefits that well-functioning competitive markets are supposed to deliver. The briefing also sets out why Europe's current wholesale power market monitoring arrangements need review and reform that ideally would be part of the EU's current market design initiative, and suggests key questions that should be part of this review process.

The brief also includes recommendations drawn from the experience of several U.S. regions, Australia,

and Canada. The first being to significantly increase resources for monitoring the EU's power markets as economising on surveillance and enforcement is a false economy. Best practice in other markets around the world illustrate that the quality of data, data analysis, and communications for market performance assessment could be improved. Market surveillance could also be improved to ensure anomalies are quickly followed up with effective and timely investigations and enforcement. The EU's monitoring system would also benefit from a greater degree of independence, integration of the market surveillance and market performance assessment functions, and a regional approach.

A Regional Approach to Resource Adequacy: The Participation of External Resources in Capacity Remuneration Mechanisms

http://www.raponline.org/knowledge-center/a-regional-approach-to-resource-adequacy-the-participation-of-external-resources-in-capacity-remuneration-mechanisms/

The development of integrated, regional electricity markets is progressing rapidly in Europe and market integration is producing tangible results, evidenced by a reduction of around one-third in average wholesale prices over the period 2008 to 2012. However, while Member States appear to accept that non-domestic generation will contribute to meeting domestic demand in real time through these regional markets, they are reluctant to rely on non-domestic generation capacity when assessing resource adequacy in investment timescales. Many view supply reliability as a national responsibility, and rules are not yet in place that would give Member States the confidence to rely on neighbouring systems during periods of resource scarcity. This paper outlines the benefits of a regional approach to resource adequacy and assessment, and considers implementation issues that such an approach raises. The paper also identifies actions the European Commission must consider in order to make progress towards a fully integrated electricity market.

The Regulatory Assistance Project (RAP)®
Beijing, China • Berlin, Germany • **Brussels, Belgium** • Montpelier, Vermont USA • New Delhi, India
rue de la Science 23 • B - 1040 Brussels • *phone:* +32 2 894 9300
www.raponline.org