



UCD Energy Institute response to the [Consultation Paper](#) on **Dynamic Electricity Price Tariffs** by **Commission for Regulation of Utilities (CRU)**

Acknowledgements

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UCD Energy Institute response to the [Consultation Paper](#) on Dynamic Electricity Price Tariffs by Commission for Regulation of Utilities (CRU), Ireland

The UCD Energy Institute (UCD EI) welcomes the opportunity to respond to the consultation paper on Dynamic Electricity Price Tariffs uploaded by CRU. UCD EI is Ireland’s leading research institute focused on decarbonisation of Ireland’s energy systems. It brings together researchers from a wide range of academic disciplines to tackle the challenges associated with decarbonisation of energy systems. In the past, UCD EI has offered its [views](#) on a wide range of Ireland’s sustainable energy systems transition policies and schemes. These comments are based on UCD EI’s research and expertise in the area of sustainable energy policies that should not only be economically efficient but also promote the fair, just and equitable transition of Ireland’s energy ecosystems to meet carbon emission targets and advance welfare of society. As we have [stated](#) in a previous Consultation on Network Tariff structures, active demand response needs to be carefully managed with a degree of flexibility to account for heterogeneous levels of EVs, heat pumps and renewable generation on different parts of the network. Further, any initiative, such as time of use tariffs, to promote a particular type of customer response will need to consider the variety in residential energy conservation behaviours situated in different background contexts with evolving demand and generation mix (Meles et al., 2022; Mukherjee & Ryan, 2020; Kumar et al., 2023).

We appreciate that CRU is seeking comments on the consultation paper from a wide range of stakeholders and the online discussion portal reflects this with diverse responses ranging from constructive suggestions through cautious approach to critical comments. As the scheme progresses, it will be essential to carry out rigorous empirical analysis of the actual results to make sure they realize the intended outcomes and inform future policy decisions. UCD EI would be interested in participating in such consultations and analysis.

Our responses to the specific questions are based on UCD EI and external research relevant to the consultation topic and is limited in scope to private residential consumers of electricity.

Question: 3.2.1 Do you agree with the CRU’s proposal for the introduction of a “Standard Dynamic Price Contract”?

Response: 3.2.1 We believe that dynamic pricing of electricity for retail electricity consumers is a step forward in the direction of improving economic efficiency, promoting variable renewable generation sources and providing choice to consumers. However, the actual outcomes will emerge over time depending on multiple factors internal and external to the individual households. These include design features, such as the ratio of peak to off peak price signals, and existing system characteristics such as load profiles, level of utilisation of energy efficient appliances, electric vehicles (EV), distributed generation (DG) sources and the generation mix. Most importantly, the scale and speed of standard dynamic price contract adoption will be significantly influenced by the heterogeneity in residential households’ behaviour and will impact the overarching intended outcomes.



In this context, it is relevant to note that despite the generally favourable opinion of electricity customers of the potential benefits of dynamic pricing, it is quite difficult to get people actively involved and to convince them to actually switch to dynamic tariffs. This difference between what people say and what they actually do (stated willingness to adopt and actual adoption) has been variously described in the literature as the intention-behaviour gap, value-action gap, knowledge-action gap, and attitude-behaviour gap (Kumar, et al., 2022; Kowalska-Pyzalska, et al., 2014). As such, bridging these gaps by overcoming households' adoption barriers will be crucial in realising the intended benefits associated with dynamic tariffs. Given that Ireland is aiming for a high wind and PV system, which are obviously both weather dependent, it follows that the consumer would need to modify their energy usage patterns on a daily basis (particularly due to variations from high wind to low wind on consecutive days) and this gap would grow in importance. Barring a few exceptions, however, there is little empirical evidence on the factors underlying the reluctance of households to switch over to dynamic electricity pricing despite their professed opinions (Schlereth, Skiera, & Schulz, 2018). We believe that the CRU's current proposal will have to be complemented by empirical studies that investigate heterogeneity in individual residential decision-making in the Irish households' context. It will also be important to see how current and future owners of electric vehicles and solar PV with and without batteries will react to the dynamic tariffs and vice versa.

Question: 3.2.2 Do you agree with CRU's proposed three-component tariff structure to be applied to Standard Dynamic Price Contracts?

Response: 3.2.2 We recognise the rationale for the proposed three-tiered pricing structure as part of the "Standard Dynamic Price Contract" for retail consumers. One UCD EI [study](#) analysed how three main retail tariff components differ in their potential to support environmental objectives. A proportionately high fixed charge component in the retail tariff reduces the incentive for consumers to invest in energy efficiency or self-generating technologies in line with renewable energy targets but does ensure that network costs are covered irrespective of energy efficiency or DG deployment. Variable, per unit energy pricing, combined with good feedback information, gives price signals to consumers to reduce their energy consumption overall and at peak times (Ryan, et al., 2018). However, it is not just the tariff structure but also the operational values of those three components that will be important in realizing net savings for the retail consumers. In particular, the peak to off peak ratio of short-term electricity prices will be a considerable factor in realizing overall efficiency gains and overcoming household's adoption barriers. If the time invariant part of the retail tariff remains high, the resulting price spread would likely be too small to realize necessary savings (Freier & Loessl, 2022). Furthermore, long run price elasticities are significantly larger than short run price elasticities, indicating that consumers take time to adjust their consumption in response to a change in electricity price (Ryan, et al., 2018). A comprehensive empirical study that analyses the net impact of the dynamic pricing using real time data will help guide customers on potential gains, as well as inform decision-making going forward.



Question: 3.3.1 Do you agree with the CRU’s proposal that hourly DAM prices, as published daily by SEMOpx, should be used as the reference price for Standard Dynamic Price Contracts?

Response: 3.3.1 We understand the rationale behind CRU choosing DAM prices as the benchmark to give sufficient response time to consumers and avoid undue complexity, but we would also like to suggest that the principles behind the risks and rewards should be clarified and brought out further for better customer understanding. As an example, if the supplier chooses to risk purchase from the intraday market (IDM) in deviation from the day ahead market (DAM) prices announced earlier, will the benefits or burden from those price differentials be passed on directly to consumers or shared between the suppliers and consumers or borne entirely by the suppliers? Similarly, we support proposals to provide visibility of prices more than one day ahead to allow customers to plan their load more efficiently. For example, anti-cyclones appear every 3-5 days leading to changes in wind generation, weekends imply reduced demand and reduced prices, and some loads (such as EVs) could be scheduled for charging on cycles of 3+ days in order to reduce the charging cost if price forecasts were provided. However, more clarity on apportionment of risks between customers, suppliers and third parties will be needed if the proposed provisions mentioned in section 1.2.3 regarding more than three-day wind energy generation forecast data is made available in the future.

Question: 3.4.1 Do you agree with the CRU’s proposal that Price Cap aligned with the Weekly Strike Price, as published by SEMO, should be applied to Standard Dynamic Price Contracts?

Question: 3.4.2 Do you agree with the CRU’s proposal that a Price Floor should not be applied to Standard Dynamic Price Contracts?

Response: 3.4.1 & 3.4.2 We agree.

Question: 3.5.1 Do you agree with the CRU’s proposal regarding the determination of reaching the 200,000 threshold?

Response: 3.5.1 No specific comments to offer here. However, the rationale for the figure 200,000 and future plans for its revision, if any, should be shared with all stakeholders.

Question: 3.5.2 Do you agree with the CRU’s proposals regarding the implementation period?

Response: 3.5.2 We have no specific comments to offer.

Question: 3.6.1 Do you agree with the CRU’s proposal that only customers with high quality data communications capability (i.e. CTF value of four) should be eligible to have a dynamic price contract?

Response: 3.6.1 In line with the principles of just and equitable design of sustainable energy policies, we would like to reiterate our position furnished [earlier \(item 6\)](#) that customers who are unable to access or invest in particular technologies should not be unfairly disadvantaged. We foresee no harm in making available the DEPT contract to customers who do not have access to



high-quality data communications coverage (i.e. CTF value of four) but would still like to opt in and participate after accepting the risks and rewards of a dynamic pricing scheme based on estimated import data.

Question: 3.8.1 Do you agree with the CRU proposals that, at a minimum, suppliers must provide the price daily on a page on their website?

Response 3.8.1 We agree.

Question: 3.8.2 Should there be a mandatory requirement on suppliers to provide pricing information in some additional format or by other means?

Question: 3.11.1 Do you agree with the CRU's position that pricing alerts should be a mandatory requirement for suppliers who offer dynamic price contracts?

Response 3.8.2 & 3.11.1 We agree that all relevant information including the daily prices and alerts should be made available in easily understandable form without any qualifications by the suppliers. Further, in the interest of transparency and to facilitate research into energy tariffs, it would be very helpful for suppliers to provide pricing information in a standardised format to the CRU, which in turn could make the full dataset of tariff information available for download (e.g. in .CSV format) from the CRU website.

Availability of pricing information would be needed for the development of any future digital tools to facilitate comparison of dynamic tariffs across suppliers, and we would suggest that the CRU Price Comparison Website Accreditation Framework be updated to recognise this. Price comparison tools are an important element of consumer empowerment in the domestic energy market, and efforts should therefore be made to ensure that the data needed to perform these comparisons is readily available.

Question 4.1.1 Do you agree with the CRU's proposed amendments to the Supplier's Handbook?

Response: 4.1.1 No specific comments to offer here.

Question 4.1.2 Are there any other customer protection measures that the CRU should introduce to ensure that suppliers fully inform customers of the opportunities, costs and risks associated with dynamic price contracts?

Response: 4.1.2 Please see response to 3.3.1

Question 4.1.3 Are there any other specific customer protection measures that the CRU should introduce to protect vulnerable customers?

Response: 4.1.3 More empirical studies across jurisdictions, residential profiles with different appliances and weather zones based on actual income data will be required to affirm the general statement quoted from the ASSET study in section 1.2.5. This study for the European Commission states that dynamic pricing leads to fairer allocation of costs among electricity consumers as they



are relatively time invariant, benefitting low-income households. However, in some cases, there may be pronounced higher rate peak time consumption over winter months, negating any daily price savings due to more off peak time electricity consumption by low-income households during the year (Reguant & Fabra, 2022). Moreover, even a relatively smaller price hike is amplified for low-income consumers due to their higher relative energy burden (Barrett, Farrell, & Roantree, 2022).

Question 4.2.1 Do you agree with the CRU’s proposed amendments to the Supplier’s Handbook in relation to billing for customers who are on dynamic tariffs?

Response 4.2.1 No specific comments to offer here.

Question: 4.2.2 Do you agree that customers should have access to historic data and calculations for a period of 36 months?

Response: 4.2.2 We agree. Individual customers should have access to their data over a period of 36 months to track their usage and understand how changes in use can change their electricity use profile. In the interests of transparency and to facilitate research on energy tariffs, this data should also be provided to the CRU by all suppliers and then collated as a single publicly accessible dataset available from the CSO.

Question 4.4:1 Do you agree with the CRU’s proposal that an early termination fee should not apply to customers on Standard Dynamic Price Contracts?

Response: 4.4.1 We agree in principle that an early termination fee should not apply to customers on Standard Dynamic Price Contracts to facilitate dynamic price tariff adoption among customers as a learning experience. Bridging the intention-behaviour gap discussed in Response 3.2.1 will involve minimising barriers to adopting dynamic pricing, including early termination penalties, as much as possible. In Southern California USA, a similar strategy with cost insurance has been tried that mitigates risk and stimulates consumers to switch from flat to dynamic pricing plans, while helping them become familiar with the new tariff (Schlereth et al., 2018).

Question 5.1 Do you agree with the proposal that monitoring of dynamic price contracts will be incorporated into the CRU’s wider market monitoring activities?

Response: 5.1 We agree.



Conclusion

UCD EI welcomes the opportunity to respond to the CRU consultation paper on Dynamic Electricity Price Tariffs (DEPT). We believe that dynamic pricing of retail electricity tariff is a step forward in the direction of improving economic efficiency, promoting variable renewable generation sources and providing choice to consumers. However, the actual outcomes will emerge over time depending on multiple factors internal and external to the individual households. Most importantly, the scale and speed of DEPT contract adoption will be significantly influenced by heterogeneity in residential households' behaviour, impacting their overarching intended outcomes. In particular, the peak to off peak ratio of the short-term electricity prices will be a considerable factor in realizing overall efficiency gains and overcoming household's adoption barriers. We believe that the current CRU's proposal will have to be complemented by empirical studies that investigate decision-making in individual residential behaviour in the Irish households' context. It will also be important to see how current and future owners of electric vehicles and solar PV with and without batteries will react to the dynamic tariffs and vice versa in view of the changed financial calculations. We also suggest that the principles behind risks and rewards under different price scenarios should be brought out and clarified further for better understanding and simpler decision-making by residential customers.

Ireland is targetting 80% RES by 2030, so day to day variations in dynamic prices could be high, with the consumer being required to adopt significantly different usage patterns from day to day to minimise their electricity cost. It is difficult to know in advance how many consumers will be "active" in the long run.

The consultation document shows daily prices variations based on historical prices, but with 80% renewable energy sources (RES) target for 2030 and increased interconnection (to France and GB), analysis based on future price variations should be studied, including how flexible loads will alter their behaviour based on day ahead (DA) prices. In time, the DA price will correctly factor in expected flexible load behaviour, and artificial intelligence (AI) and machine learning approaches will enable improved forecasting of DA behaviour.

Low prices can occur due to low demand, but they can also occur due to high RES production (which may be associated with low or high demand). So, it is possible that under high RES and high demand conditions that prices would be low, which could lead to increased network loading issues on some regions of the low voltage (LV) network due to EV charging, heat pump loads, and other (partially) flexible load types – study is needed to assess the likelihood and frequency of such events.

The effects of automated responses based on dynamic prices require investigation, which could reduce load diversity and increase coincident load behaviour towards the lowest price hour(s), and with step changes in load consumption at the top of relevant hours.



If you would like to discuss any aspect of our response in more detail, please do not hesitate to contact us.



References

- Barrett, M., Farrell, N., & Roantree, B. (2022, June 16). *Energy Poverty and Deprivation in Ireland*. Retrieved from The Economic and Social Research Institute: <https://www.esri.ie/publications/energy-poverty-and-deprivation-in-ireland>
- Freier, J., & Loessl, V. v. (2022). Dynamic electricity tariffs: Designing reasonable pricing schemes for private households. *Energy Economics*, *112*, 106146.
- Kowalska-Pyzalska, A., Maciejowska, K., Suszczyński, K., Sznajd-Weron, K., & Weron, R. (2014). Turning green: Agent-based modeling of the adoption of dynamic electricity tariffs. *Energy Policy*, *72*, 164-174.
- Kumar, P., Caggiano, H., Cuite, C., Andrews, C. J., Felder, F. A., Shwom, R., . . . Schelly, C. (2022). Behaving or not? Explaining energy conservation via identity, values, and awareness in U.S. suburban homes. *Energy Research & Social Science*, *92*, 102805.
- Kumar, P., Caggiano, H., Shwom, R., Felder, F. A., & Andrews, C. J. (2023). Saving from home! How income, efficiency, and curtailment behaviors shape energy consumption dynamics in US households? *Energy*, *271*, 126988.
- Meles, T. H., Ryan, L., & Mukherjee, S. C. (2022). Heterogeneity in preferences for renewable home heating systems among Irish households. *Applied Energy*, *307*, 118219.
- Mukherjee, S. C., & Ryan, L. (2020). Factors influencing early battery electric vehicle adoption in Ireland. *Renewable and Sustainable Energy Reviews*, *118*, 109504.
- Reguant, M., & Fabra, N. (2022, October 15). *Assessing the distributional effects of real-time pricing for electricity*. Retrieved from VOX EU CEPR Column : <https://cepr.org/voxeu/columns/assessing-distributional-effects-real-time-pricing-electricity>
- Ryan, L., Monaca, S. L., Mastrandrea, L., & Spodniak, P. (2018, December). *Harnessing Electricity Retail Tariffs to Support Climate Change Policy*. Retrieved from UCD Centre for Economic Research Working Paper Series: https://www.ucd.ie/economics/t4media/WP18_22.pdf
- Schlereth, C., Skiera, B., & Schulz, F. (2018). Why do consumers prefer static instead of dynamic pricing plans? An empirical study for a better understanding of the low preferences for time-variant pricing plans. *European Journal of Operational Research*, *269*, 1165-1179.

