Acceptance of Supply Security and Blackouts in the Context of Climate Protection and Nuclear Energies in Germany

Aaron Praktiknjo[1]

Overview

An increasing number of concerns regarding the supply security are raised in reaction to the transition of the German energy system towards a renewable and nuclear-free system known as “Energiewende”.

This work has two primary goals:
1) to contribute to a measurability of supply security for residents by quantifying the consequences of blackouts monetarily and
2) to analyze the public opinion and preferences regarding supply security in the context of climate protection and the usage of nuclear energies.

Methods

The analyses are based on two online surveys carried out in the first half of the year 2011 with a total of over 840 participating households. The second survey was carried out just a week after the nuclear catastrophe in Fukushima. Furthermore, official statistics on expenditures and incomes of over 55,000 households are used to carry out simulations with results that are representative for the German population.

Based on the two surveys a simulation model was built to estimate outage costs in relation to specified durations. Two different kinds of outage costs are estimated: costs based on the willingness to accept compensation payments for blackouts (WTA) and costs based on the willingness to pay to avoid power interruptions (WTP). The estimated models were then applied to the official statistics.

For the estimation of the public acceptance of supply security in the context of climate protection and nuclear energies, ordered discrete choice models (Probit) were constructed and again applied to the official statistics.

Results

The estimated WTA and WTP based outage costs for a household in relation to the outage’s duration are shown in Figure 1 as boxplots. Figure 2 shows the shares of inconveniences on the outage costs of private households.

The estimated results regarding the public acceptance of supply security in the contexts of climate protection and nuclear energies are shown in Figure 3.

[1] Technical University of Berlin (TU Berlin), Department of Energy Systems, Einsteinufer 25, 10587 Berlin, Tel.: +49-30-31479329, E-Mail: aaron.j.praktiknjo@tu-berlin.de

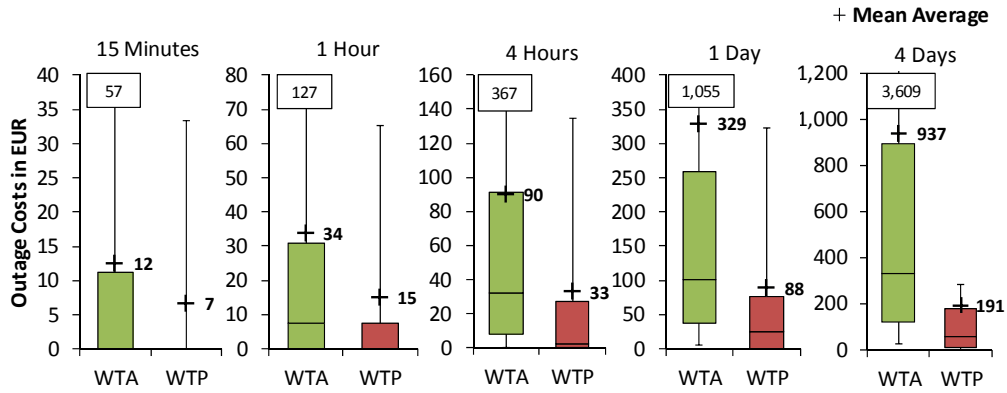

Figure 1: WTA and WTP based Outage Costs in Relation to the Interruption's Duration

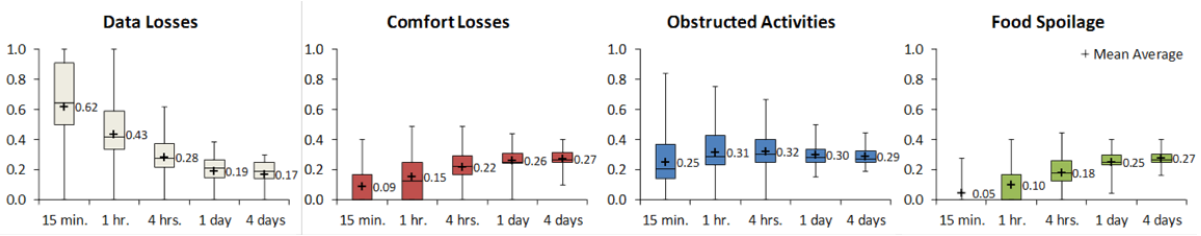

Figure 2: Shares of Inconveniences on Outage Costs in Private Households

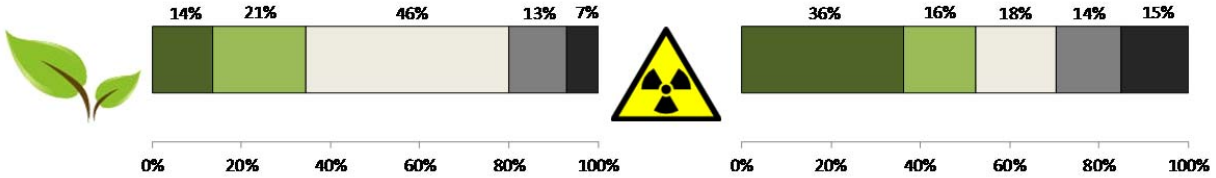

Figure 3: Public Opinion on Supply Security in the Context of Climate Protection and Supply Security

Discussion and Conclusion

The results indicate that outages generally lead to significant costs even for private households. WTA based outage costs are generally higher than WTP based outage costs. The distribution of the outage costs is strongly skewed to the right. Data losses have the highest impact on outage costs for short interruptions. A continuous power supply is likely to become more important in the future with further digitalization in private households.

The majority of the German population with a share of about two-third does not tolerate a decline of supply security in favor of climate protection. Moreover, climate protection is considered equally important as supply security. However, half of the population considers a nuclear phase-out being more important than supply security and a sixth considers both being equally important.

References

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