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# Blackouts in the spotlight

COSTS AND CONSEQUENCES OF AN INTERRUPTION IN ELECTRICITY  
SUPPLY FOR INDUSTRIAL CONSUMERS IN CANTON TICINO

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## Executive summary

In the second half of 2018 some districts in Canton Ticino were hit by four unforeseen electricity blackouts, each lasting between 30 and 90 minutes. The failures were solved quickly and had no severe consequences. Still, these events were quite unexpected in a region used to very high security and quality standards for electricity supply.

*How much does a blackout cost? What is the optimal investment in security of supply?*

The four blackouts turned again the spotlight on the impact of an interruption on the economy of Ticino, and kindled discussions on the optimal level of electricity security needed by consumers and the resources available to reach it.

Indeed, these topics have been on the fore in recent times in Switzerland and in the European Union, within the wider debate concerning both the challenges posed by the new technologies for distributed generation and smart consumption, and the energy transition and the changes it will imply for wholesale markets, generation, and transmission systems.

*Aim of the Report: assessing costs and consequences of a blackout for industrial consumers in Ticino*

This Report aims at contributing to the debate on the value of electricity security by means of a qualitative and quantitative analysis of the consequences of a blackout for industrial consumers, as well as by assessing consumers' attitudes toward the characteristics of a blackout.

The analysis develops along three main topics:

1. The tools industrial consumers may use to avoid blackouts or at least limit their economic impact,
2. The economic value of the damage caused by a blackout, and the kinds of damage that cause most harm to industrial consumers,
3. The attitudes of industrial consumers toward the duration, advance notice, and possible compensation of a blackout.

*Method and data*

The analysis was conducted by means of a survey, that was developed based on the suggestions provided by the economic literature, drafted in Italian, and distributed between December 2018 and January 2019. 543 industrial consumers validly completed the whole survey, with a response rate around 12%. The final sample is representative of the economy of Ticino in terms of firms' size, location, and sector.

The survey included questions concerning each firm's characteristics and electricity consumption habits. The survey also asked about the firms' strategies to minimize blackout risks and harmful consequences, the perceived economic impact of blackouts (with and without advance notice), the kind of damage that the firm regarded as most dangerous, and finally the firms' preferences toward different blackout scenarios, that were investigated within a discrete choice experiment.

### *Results of the analysis: despite the recent blackout wave, industrial consumers still trust their suppliers*

According to the responses provided by the participants, industrial consumers are generally satisfied with the quality and security of their electricity supply. Electricity supply and electricity suppliers are still perceived as reliable, despite the fact that 70% of the respondents has been hit by at least one unforeseen blackout in the second half of 2018, and 30% has experienced at least one announced blackout in the last 12 months.

### *Preventing blackouts, mitigating their consequences*

Industrial consumers, on the other hand, show a strong interest in the tools available for preventing blackouts and mitigating their impact. Indeed, more than half of the sample owns at least one back-up device, such as an uninterruptible power source (UPS), a generator, or a back-up electricity line. Moreover, approximately one third of the sample is insured against blackout damage, especially against damages hitting machinery or information and communication systems.

### *A blackout's impact: economic value of the damage and most harmful consequences*

Industrial consumers state that, on average, the damage caused by a 60 minutes blackout is worth approximately 10% of their yearly electricity bill if there is no advance notice, and between 5% and 10% if the blackout is notified 24 hours in advance. Labour costs (forced inaction of workers, time used for checking possible damages), failures in the ICTs, lost turnover and, in the event of an unannounced blackout, damages to the end product are the most important drivers that may boost the economic value of blackout damage. Industrial consumers that are able to continue a higher share of their production activity during a blackout suffer instead less damage from the blackout: back-up devices may thus help, particularly if the production activity relies very much on electricity.

### *Consumers' attitudes toward advance notice, blackout duration, and blackout compensation*

Industrial consumers are, on average, very much averse to the bare risk of blackouts, irrespective of the blackout's length. The trouble caused by the occurrence of a blackout can however be partially relieved if the interruption is announced at least 24 hours in advance.

A longer blackout is always perceived more negatively than a shorter one, but the marginal damage caused by an additional minute of interruption tends to decrease with blackout length.

The possibility of receiving a compensation for blackouts does not elicit the expected positive reaction among industrial consumers. Only 30% of the sample shows a positive attitude towards a compensation ranging from 0% to 25% of the monthly electricity bill, whereas 70% shows a neutral or even negative attitude. A compensation for blackouts would probably be more useful as an incentive to distribution network operators or retail suppliers within a quality regulation scheme, rather than as a tool to wipe out the damages suffered by industrial electricity consumers.

### *A tool for evaluating investments and proposed changes in the electricity sector regulation*

The results collected in the Report shed light on the economic consequences of a blackout, and provide useful information on the impact on consumers of advance notice

or a different blackout duration. The Report also provides interesting hints as regards the willingness of consumers to trade a worsening (or improvement) of service quality for a reduction (or increase) in their electricity bill. The analyses also account for the heterogeneity among industrial consumers, who may differ in consumption habits, prevention strategies, and possible reactions to blackouts.

The Report may thus serve as a basis for deciding the optimal level of security, evaluating investment, and comparing prospective changes in the electricity market regulation that may be needed to safeguard or improve service quality to the benefit of end consumers.