VGB POWERTECH

Technical-Scientific Report

Analysis of Unavailability of Power Plants 2012 – 2021

VGB-TW 103Ae (2022)

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Amendments can be sent to the e-mail address vgb.standard@vgb.org. The subject line should contain the exact specification of the relevant document in order to clearly assign the e-mail content to the appropriate VGB-Standard.

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The following report could not be published because there are not sufficient data available for this period to form a collective according to the anonymization criteria of the VGB KISSY database.

B.3.2 All units (without CCGT and gas turbine) < 10 MW

I. Introductory Remarks

Since 1970 VGB has collected data based on standardized definitions, calculation methods, and recording procedures. With the liberalization of the energy markets the technical and economic assessment of power plants has gained more and more in importance. Intensifying the co-operation between Eurelectric and VGB it was decided to merge both associations' data collection for the availability and unavailability of power plants. Since 2008 the data of Eurelectric´s TherPerf-Report and VGB´s KISSY-Report has been presented in one common report. This report provides information about the availability and utilization. It analyses the unavailability of components of thermal power plants all over Europe in order to compare the quality of power plants and to assess plants´ behavior in daily operation. Reasons for unavailability have been collected since 1988 in order to identify and to assess the root cause (systems and main components) and to give hints to countersteer.

But power generation in Europe changed substantially over the last decade. The development of renewables, the generation reduction of conventional power plants, the different energy policies, and the general development of the electricity market enhance the need for more knowledge in details, responsiveness, and effective tools to help taking the right decisions.

Due to these needs the VGB Technical Group "Performance Indicators" (TGPI) modernized and upgraded the VGB power plant information system (KISSY) in order to be able to provide up-to-date technical benchmark reports in real time. The European utilities are able to analyze the data online within their companies. Currently the German, English, French, Italian, Dutch, and Portuguese languages are supported. The online analysis tool enables both the use of already implemented parameters and the evaluation with newly defined parameters, which are added by the TGPI. Commercial background information (e.g. price data of the electricity exchange) will also be included in the KISSY system.

Analogues to the multilingual KISSY database the associated guidelines are already published in different national languages. The former VGB Guidelines "Availability of Thermal Power Plants", "Unavailability of Thermal Power Plants" and "EMS Event Criterion Key Systems" were updated with the newly defined parameters and merged into one, completely revised VGB-Standard. The English, French and German versions are placed on the VGB homepage and can be downloaded.

Data collection

In addition to the power plant availability parameters, the performance of key systems and equipment affecting the unavailability of power plants are also important. An unavailability analysis is also done annually in order to identify such systems and equipment and to monitor or retrofit these parts in order to improve power plant performance. The systems and equipment are specified according to the power plant identification system (KKS – Kraftwerk-Kennzeichensystem).

Data for unavailability analysis is collected annually from the VGB member companies similar to the data for the availability analysis. Since not all companies are participating in the availability statistics, these companies supply their unavailability data into the UA statistic at least. The analysis is based on different plant categories and the data set is not the same.

The unavailability incidents are coded in accordance to the VGB event characteristics key (EMS). Approximately 8,400 unavailability incidents were recorded in the year 2021, i.e. during the period under review, 2012 to 2021, a total of about 101,000 unavailability incidents was evaluated.

The EMS – introduced in the year 2003 – replaced all former event-coding key systems. This guarantees unambiguous coding.

The evaluation of unavailability of thermal power plants at hand is covered the operating period 2012 to 2021 with operating parameters of a total of 272 power plant units. The evaluation takes into account all data that were entered online by VGB member companies into the KISSY data base by 31th July 2022 for the period under review, i.e. until the end of 2021.

KISSY: Current applications and further developments

Combination of different designation systems in KISSY implemented for the first time with EDF

In 2021, for the first time, the operator EDF participated in the inter-company unavailability statistics with its CCGT plants. The special feature here is that a completely different plant identification and coding system is used towards to the VGB reference designation and the event characteristic key system. In a joint project, various experts have worked out a method of transferring the corresponding unavailability incidents into the VGB power plant information system (KISSY) without violating the typical quality features.

In the future, this step will make it possible for other types of EDF power plants to participate in this technical benchmark. It is conceivable that the new power plant designation database will be used to develop a translation list that will carry out the translation process automatically and import the data to KISSY using the existing interface. Other operators who have the same requirements will be encouraged by this step to also participate in this technical benchmark.

We would like to emphasise that additional evaluations can be carried out through this provided data in order to examine current issues more closely. The article cited on the next page presents an example of this.

General remarks concerning the structure of the report

This report was restructured and adapted to the 'Availability of Power Plants' technical-scientific reports and considers only units which entered unavailability incidents into the corresponding module of the power plant information system.

Reserve power plants that do not actively participate in the market but are hold for grid support do not participate in this inter-company benchmark. In the online evaluation module of KISSY, it is possible to carry out separate evaluations for these special power plants independently.

The category 'Results' is separated in four types of units: fossil fired units, CCGT's, gas turbines, and nuclear power plants. The fossil fired units were divided additionally in the categories fuels, technology, and capacity. This section evaluates the incidents of the following causers: all, fuel relevant and non fuel relevant with the correspondent KKS function key. The 'Gas Turbine' sub chapter focuses on the simple gas turbines (without CCGT) divided into the parts open cycle and jet engine units. The nuclear power plants take into account the light water reactors (BWR and PWR) in total. All other types of reactors are not taken into account due to the small statistical statement.

Remark: all weighted average values are written in normal style and the quartile values are written in Italic style.

Other definitions can be found in the VGB-Standards:

– VGB-S-002-01 Basic Terms of the Electric Utility Industry
– VGB-S-002-03 Fundamentals and systematics of availability determination for Thermal Power Plants
– VGB-S-002-33 Annex to VGB-S-002 Series