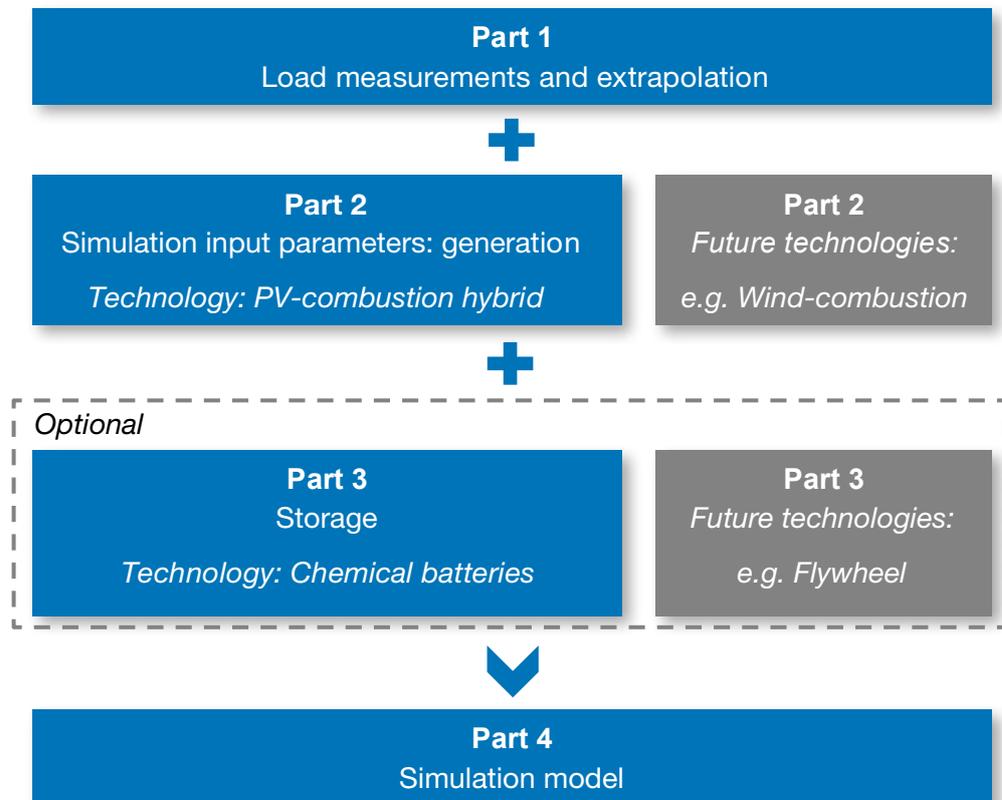


## Reliable fuel savings calculations for bankable PV-Hybrid power systems

- High quality load measurements and generator parameters are key inputs for calculating potential fuel savings resulting from integrating solar PV into a combustion-based power generation system
- Reliable and transparent fuel saving calculations provide a strong basis for project investability and bankability to clients, investors and financiers
- VDE Institute has developed a test specification together with leading industry players which certifies that all key requirements for fuel savings calculations for PV-hybrid power systems are properly accounted for

The VDE test specification VDE-PB-014:2015 ‘**Procedure for load-measurements and extrapolation, and minimum technical requirements to determine the simulation input parameters for hybrid-power generation systems**’ is composed of 4 parts:





## Structure of the test specification

**Part 1** covers the required **procedures for load measurements** to ensure that measurements are correct, and a **methodology for data extrapolation** to ensure that all relevant factors are considered (e.g. seasonality of demand). The assessed output is a realistic annual load curve.

**Part 2** covers the required quality and integrity of the **generator input parameters** (both renewable and combustion-based). This ensures that resulting generator simulations are thorough and comparable. For now, the technical specification is tailored to a PV-combustion-hybrid case (i.e. PV-diesel), but may be expanded to other technologies in the future (e.g. wind-combustion).

**Part 3** is optional and covers the required **energy storage-related input parameters** which can be factored into the generator simulations as well. For now, the technical specification is tailored to chemical battery storage (e.g. lithium-ion, lead acid), but may be expanded to other technologies in the future (e.g. flywheel).

**Part 4** is a specification for **simulation software** to ensure that it accounts for the key simulation parameters in calculating fuel savings. Part 4 makes use of the aforementioned standardized load measurements/extrapolation and the standardized generation and storage parameters as simulation inputs.

## Certification process

For Parts 1 to 3, two different assessment procedures are defined:

- Certification according to Procedure B means that the basic requirements have been fulfilled.
- Certification according to Procedure A means that more stringent requirements have been fulfilled.

A PV-hybrid system that passes the requirements for each Part (1-4) of the test specification shall be awarded a Statement of Conformity for the corresponding Part, which furthermore specifies if Procedure B or Procedure A was fulfilled.

## Benefits for the industry

The VDE test specification serves as guidance for prospective users and system integrators, and its main objective is to increase transparency for key project stakeholders such as investors and lenders. It supports investability and bankability by assuring that the fuel savings calculations for the PV-hybrid system factor in all the necessary key parameters. Better data also reduces the risk of improperly designed and oversized systems that could lead to reduced revenues. Through the widespread adoption of this test specification throughout the industry, comparability of different PV-hybrid systems will improve as well.



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