

# Specification

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## A1

The difference between kW and kWh:

W is a measuring scale for energy applied per timeinstance. There are different possibilities to describe W in common terms. A pretty graphic one is the movement of mass. 1 W equals 1 kg of mass moved by 1 meter in one second:  $1(kg * m * m)/s * s * s$ . Or in electrical terms: 1 W equals 1 Ampere of electrical power with a voltage of 1 Volt. Both of those formulas are equal to a much simpler Term for Watt:  $1 W = 1 J/s$ . In simple terms, 1 Watt is the same as one Joule of energy applied over 1 second. For completeness,  $1 kW = 1000 W$ .

Wh are the common term for measuring energyconsumption/-production. 1 Wh is 1 W applied continuously over 1 hour.  $1 Wh = 1 W * 1h = 1 J/s * 3600s = 3600J$ . For a scientific context the Wh therefore is simply not used, instead the common SI standard J is used.

In comparison, Wh is the total amount of energy used. W is how much energy is used in a specified timeslot (mostly 1 second).

Sources:

Robert A. Nelson: The International System of Units. Applied Technology Institute

[https://www.atcourses.com/international\\_system\\_units.htm](https://www.atcourses.com/international_system_units.htm)

G rard Borvon: History of the electrical units. S-eau-S, 10. September 2012

<http://seaus.free.fr/spip.php?article964>

Das Internationale Einheitensystem (SI). Deutsche  bersetzung der BIPM-Brosch re „Le Syst me international d’unit s/The International System of Units (8e  dition, 2006)“. In: PTB-Mitteilungen. Band 117, Nr. 2, 2007

<https://www.ptb.de/cms/fileadmin/internet/Themenrundgaenge/ImWeltweitenNetzDerMetrologie>  
aufgrund der EU-Richtlinie 80/181/EWG in den Staaten der EU bzw. dem Bundesgesetz  ber das Messwesen in der Schweiz

<https://www.admin.ch/opc/de/classified-compilation/20101915/>

## **A2**

## **A3**

Userstories instead of requirements.

## **A4**

System architecture Diagram

## **A5**

add weather component

## **A6**

reliable and responsive system

## **A7**

three-tier system architecture