Service Life Estimation for Photovoltaic Modules

- Relevance and Impact
  - Crucial for Economic Success
  - Crucial for Ecological Impact
- Major Influencing Factors
  - Module Design / Materials
  - Stressors and Stress Levels
  - → Microclimatic Loads have to be defined
- Glossary with relevant Terms and Definitions has been developed
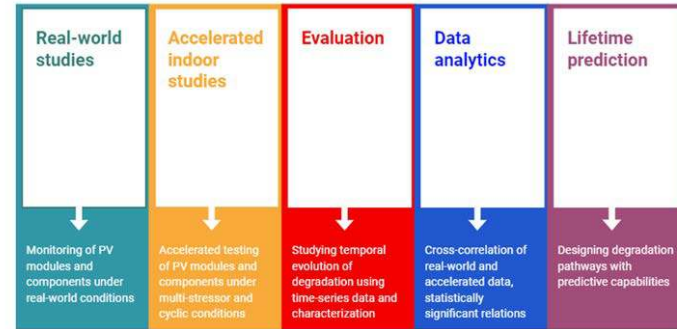- Overview on Modelling Techniques

Figure 6: Different steps involved in PV lifetime and degradation science.
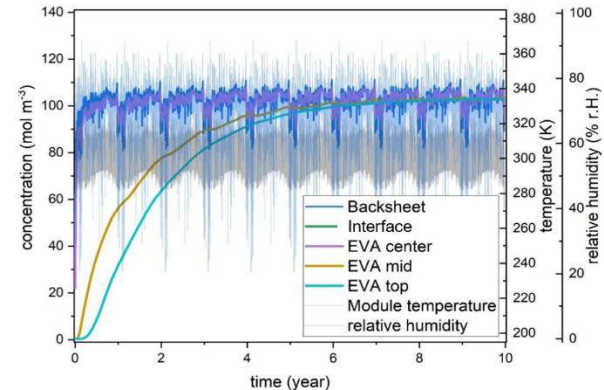

Figure 3: Development of humidity at different positions in a PV module over time

PVPS

1

Service Life Estimation for Photovoltaic Modules

- Approaches

  - Multi-step Degradation

  - Use of big data / data driven modelling

  - Combination of Degradation Process Models and Phenomenological Models

- Adapted Models for PV Modules

  - Reproduce degradation behavior well

  - Can include type specific behavior

  - Can include location specific impacts

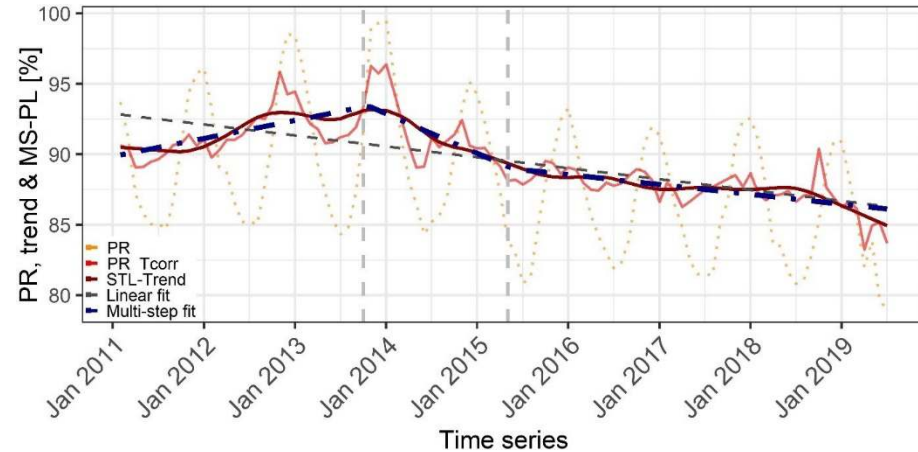 - Are transferable between climates

Figure 20: Multi-step performance fit for multi-crystalline PV system.

Adapted modelling approaches can deliver meaningful Remaining Useful Lifetime RUL and yield data

PVPS

Report IEA-PVPS T13-16:2021, June 2021