Grid-tied PV-systems: Quality Requirements

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Introduction

Environmental and Social Requirements

Technical Requirements

Resumé

››› Grid-connected PV-systems can have environmental and social impact

- Large land required (settlements, agricultural use)
- Water for cleaning of solar modules (availability, conflict of use)
- E&S impact during construction
- EHS during construction and operation, i.e. on roofs
- Other project specific impacts

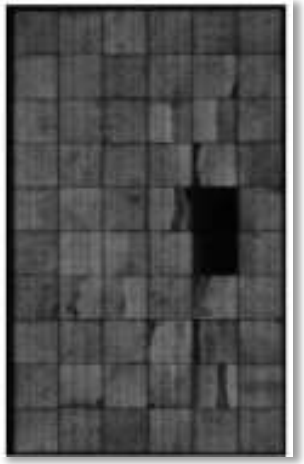
»» Experience shows that technical quality in PV-projects can be low resulting in risks for output over lifetime

Source: F. Determann

Source: D. Etschmann

Source: F. Neumann

Source: F. Determann



Source: PI Berlin

Source: D. Etschmann

Source: D. Etschmann

Source: F. Determann

Source: D. Etschmann

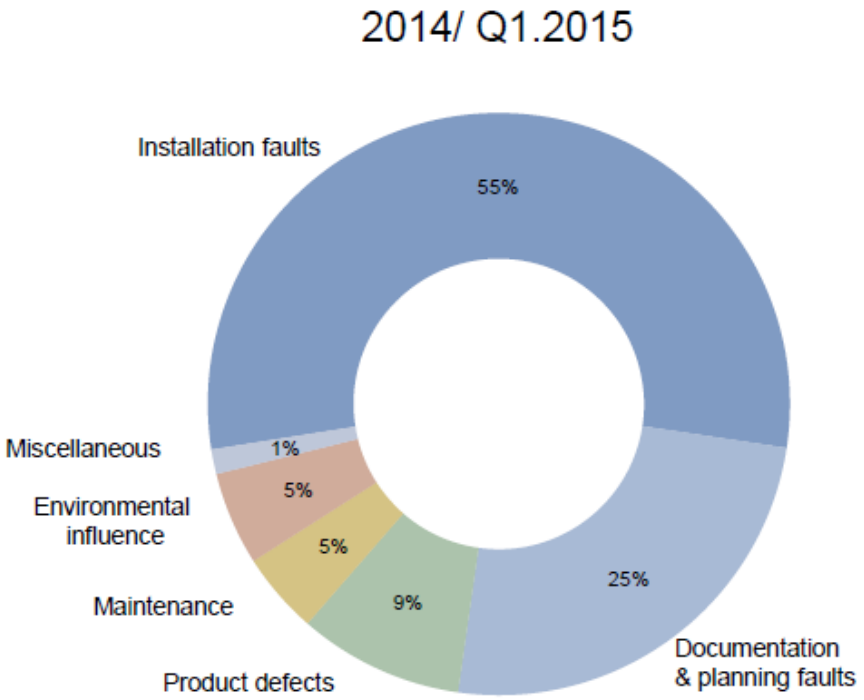
Source: F. Determann

››› Studies show 30% of systems have serious defects – PV-industry is still young and learning

Main findings:

- 30 % of power plants show particularly serious and serious defects (incl. safety issues) or large number of issues
- > 50 % of defects are caused by installation errors

! Systematic quality assurance is required
Pant inspections and maintenance are imperative



Source: TÜV Rheinland

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››› There are several E&S aspects to be considered (excerpt)

- Environmental and Social Impact Assessment (ESIA) with resulting Environmental and Social Management Plan (ESMP)
- See IFC Performance Standards PS1 to PS 8
- No use of land with settlements or agricultural use
- Equitable acquisition of land
- Water quantities required for cleaning modules and sourcing of water with no potential conflict of use
- EHS during construction and operation

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››› Technical requirements for utility-scale PV-systems according to best practice (excerpt)

- Independent engineer (planning and implementation)
- Performance-ratio testing, secured through penalties
- Availability testing, secured through penalties
- Module quality testing, secured through penalties
- Verified structural integrity
- Verified corrosion protection of mounting structure
- Monitoring system, string monitoring if applicable
- Use of all relevant norms

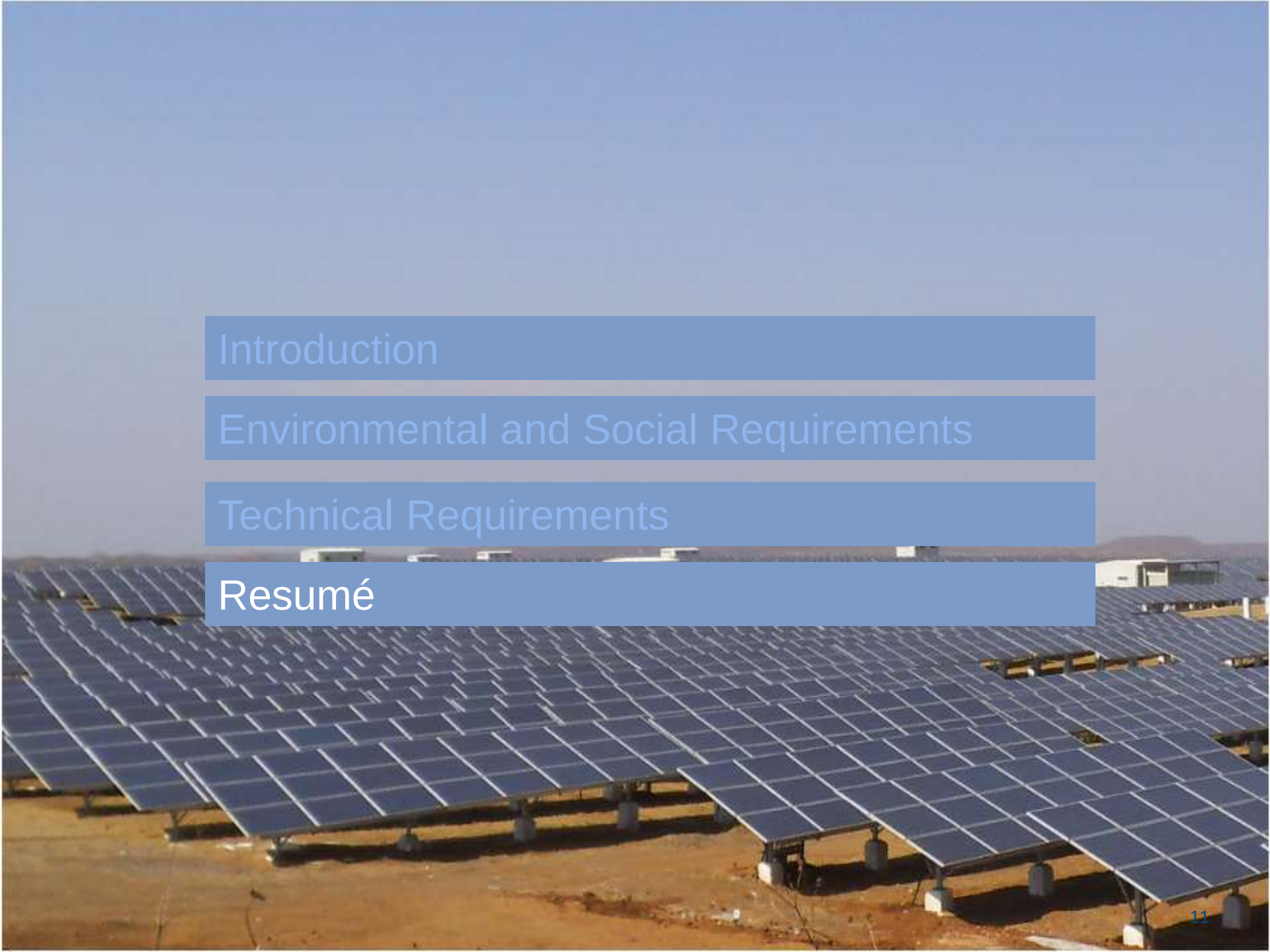
››› Best industry practice for utility-scale PV-systems for solar modules goes further than existing standards

IEC 61215:

- defines some tests to determine power and potential flaws
- defines some tests focused on durability
- it is known that this is insufficient for ensuring durability

Best industry practice:

- acceptance testing
- durability testing:
  - **either** done in sufficient manner by manufacturer
  - **or** must be done by project



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››› Governments and organisations can play in important role in setting the required standards

Possible areas of action:

- Creating awareness for E&S- as well as technical requirements
- Refer to international best practice (see literature from IFC and IRENA)
- Promote use of standards where sufficient
- Strive for further development of standards
- Foster market conditions focused on long-term LCOE
- Support development of quality infrastructure

››› Resumé

- Grid-connected PV-systems are a relatively simple
- Unexperienced players oversee important points
- Several points in E&S, planning, procurement, installation and O&M must be done well
- Independent engineer to be contracted
- Acceptance and durability testing of modules important
- Added value is lower real LCOE
- States and organisations can support in several ways

››› Thank you for your attention

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