

# 31. Symposium Photovoltaische Solarenergie

10/03/2016 Bad Staffelstein



## Expertentsich Nr. 3 Impulsreferat - SolarBankability



Matthias v. Armanspeg (ACCELIOS Solar)



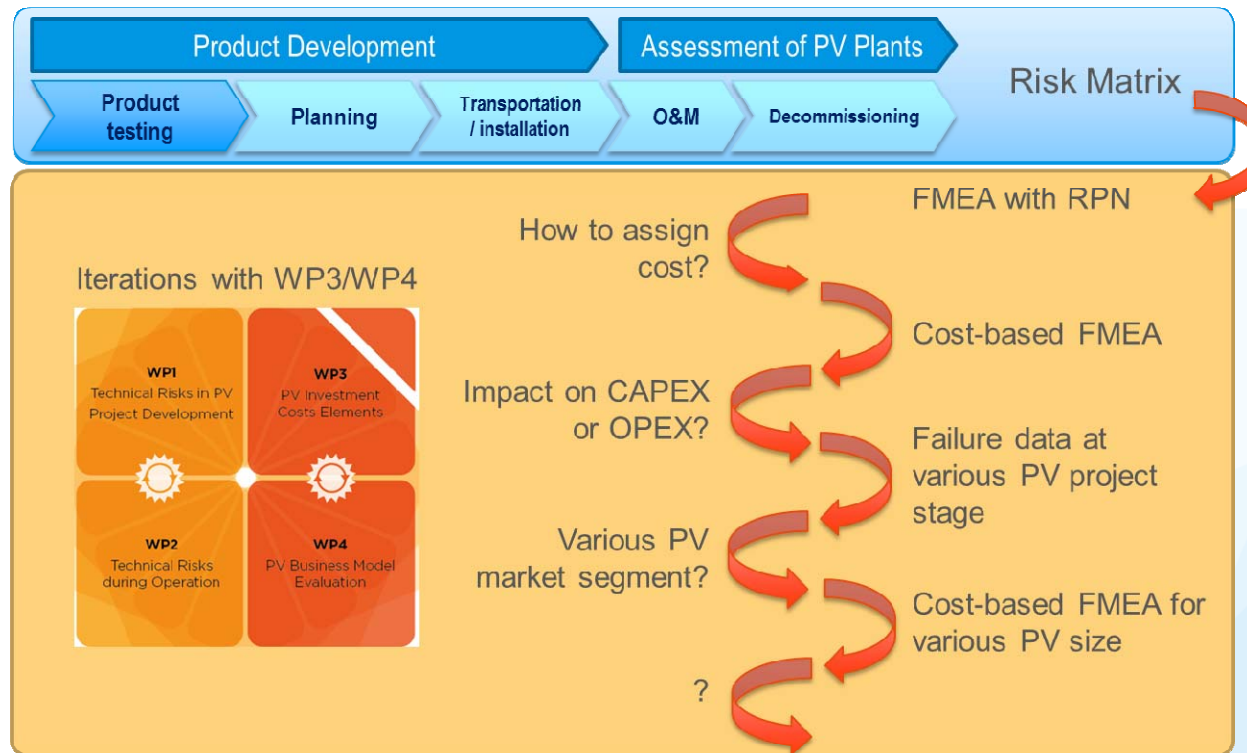
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# How to Assess Technical Risks?

- Standardized technical risk rating system
- Impact assessment and mitigation measures
- Increase of PV investor confidence



# Technical Risks Data Base\* (>420 MWp)



Segment	Total number of plants	Total Power [kWp]	Average number of years
<b>TOTAL</b>	<b>746</b>	<b>421853</b>	<b>2.3</b>
Components	No. tickets	No. Cases	No. Components
Modules	430	667402	1961147
Inverters	395	2080	11191
Mounting structures	420	15534	43057
Connection & Distribution boxes	221	12338	20372
Cabling	614	367523	238546
Transformer station & MV/HV	53	220	558
Total	2133	1065097	2274871

- When do failures occur?
- Do all failures have a relevant economic impact?
- Are data biased, i.e. location / technology?

*\* Project deliverables D1.1 & D2.1 to be published March 2016*

# Technical Risks Matrix\* (>140 Risks)



		I	II	III	IV	V
	Components / Project Phase	Product testing / development	PV plant planning / development	Installation / Transportation	Operation / Maintenance	Decommissioning
A	Modules	9	9	4	14	1
B	Inverter	2	10	4	9	1
C	Mounting structure	3	7	2	3	1
D	Connection & Distribution boxes	4	2	3	-	-
E	Cabling	2	3	6	4	-
F	Potential equalization & Grounding, LPS	-	2	3	-	-
G	Weather station & Communication & Monitoring	-	6	4	7	-
H	Transformer station & MV/HV	-	2	-	1	-
I	Infrastructure & Environmental influence	1	2	2	-	-
J	Storage System	1	1	1	1	1
K	Miscellaneous	-	1	-	4	-

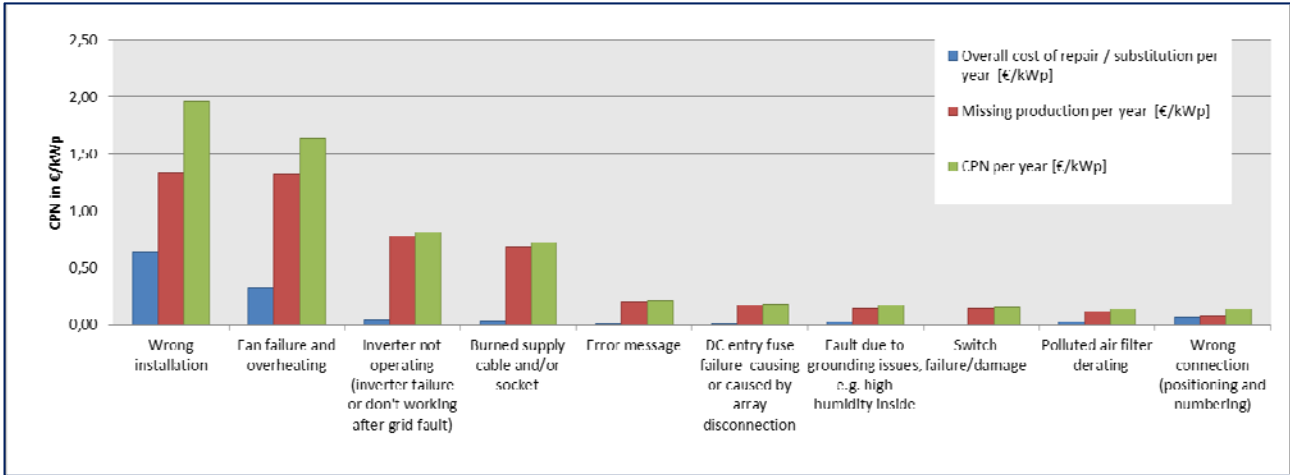
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# Cost Priority Number (CPN)



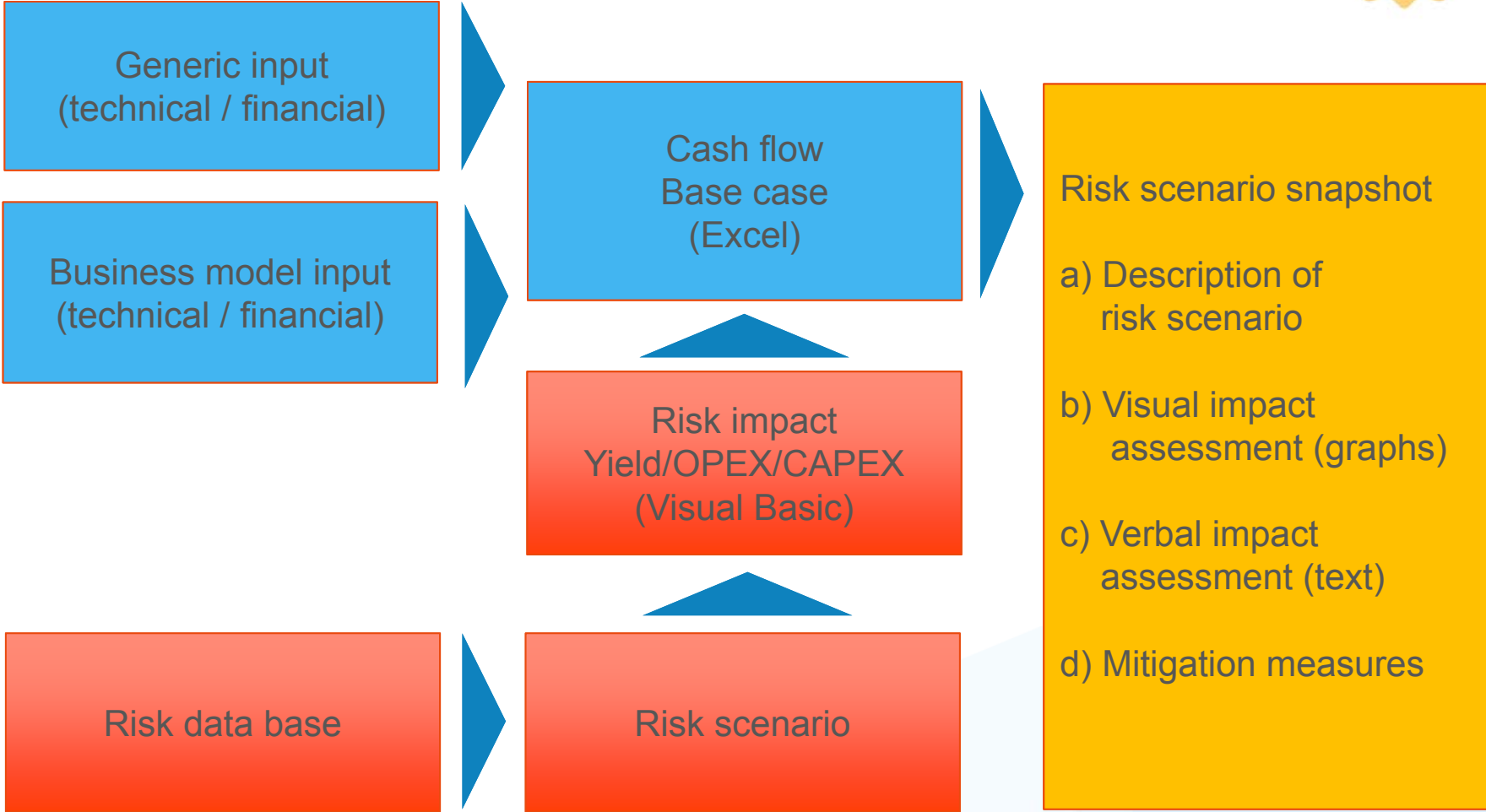
Cost Priority Number = Downtime Cost + Repair Cost

Example: Top 10 inverter risks for all types of PV systems\*



\* Project deliverables D1.1 & D2.1 to be published March 2016

# Risk Modelling Tool



# Impact Assessment and Risk Mitigation



Total project IRR analysis for four selected business models

	Description
Business model 1	Residential rooftop PV system with crystalline modules located in central Europe (>3 kW, c-Si, Germany)
Business model 2	Residential rooftop PV system with crystalline modules and battery storage located in central Europe (>3kW c-Si + storage, Germany)
Business model 3	Model 3: Utility scale ground mounted PV system with crystalline modules located in central Europe (>1 MW, c-Si, UK)
Business model 4	Utility scale ground mounted PV system with CdTe modules located in southern Europe (1MW, CdTe, southern Italy)

# THANK YOU!



Mail: [armansperg@accelios-solar.com](mailto:armansperg@accelios-solar.com)

Mobil: +49 (170) 7902525



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