DC Cable Quality Matters!

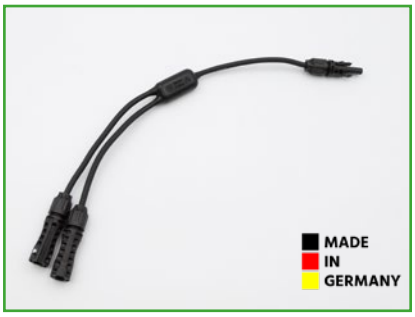

Fig. 1: Jurchen JuCon High Quality DC cable

Fig. 2: Low Quality DC cable with burnt connectors

~2% of the CAPEX costs for a solar plant are related to DC cables (Fig. 3). However, according to an EU-funded Solar Bankability Project (https://cordis.europa.eu/project/id/649997/results), **malfunctioning cables can account for up to ~20% of the project cost** over the project life .

The return of investment of high quality cables is within one year as shown in Table 1, due to much lower failures of high quality cables leading to significantly less loss of revenue.
Jurchen Technology has a reputation for high-quality DC cables with over 4.6 GW of cables delivered globally over the last 10 years without any warranty claims. Jurchen follow's a vigorous quality check and is the only TUV certified 1,500 volt DC cable that meets all required quality & testing standards (https://www.jurchen-technology.com/products/dc-cabling/jucon/).

The cost of a 10MWp fixed-tilt system is about 10 million EUR, out of which the cable costs are ~200K EUR, around ~2% of the project cost. However, DC cables are the most common cause of technical faults (Fig 7) that lead to PV plant downtime. Cables-related downtime results in a loss of 8.34EUR /kWp/year*. This is translated to 83,400 €/year. Including the acquisition costs, a 10MWp plant results in ~2.7M € after 30 years.

Cable costs during the project life

Year	Low quality cables*	Jurchen JuCon cables**
Acquisition costs	200,000 €	220,000 €
1st Year downtime costs	83,400 €	56,700 €
Total after 1st year	283,400 €	276,700 €
2nd Year downtime costs	83,400 €	56,700 €
3rd Year downtime costs	83,400 €	56,700 €
Total after 3 years	450,200 €	390,100 €
⋮	⋮	⋮
Total after 30 years	2,702,000 €	1,921,000 €
Savings through high quality cables after 30 years: 781,000 €		

Table 1: Cost of cable failures over 30 years at 10MWp solar power plant. The return of investment of high quality cable can be achieved within the first year with significant saving after 30 years.

DC Cable cost

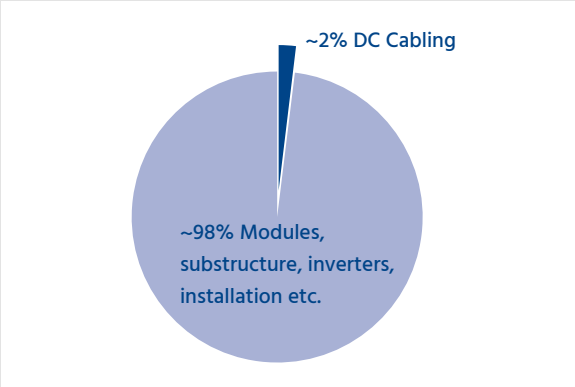

Fig. 3: DC cable costs vs the total CAPEX costs

Cost of cable failures vs. construction cost

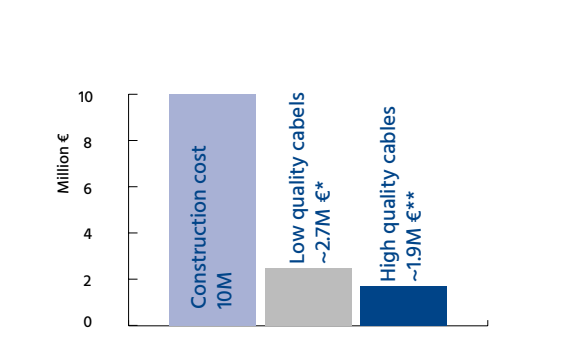

Fig. 4: Cost of cable failures over 30 years at a 10MWp solar power plant. Low cables quality: ~2.7M €*, High quality cables: ~1.9 €**. Further details in Table 1

* All costs related to cable failures during the project life shown in Fig. 7.
** All costs related to cable failures shown in Fig. 7 excluding costs related to broken/burnt connectors which are avoided by the use of high quality cables.

DC Cable prices

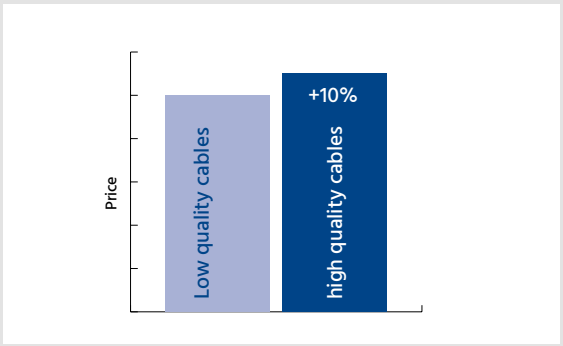

Fig. 5: JuCon supply price is 10% more expensive, however it offers significantly high quality which reduces the operational costs

Loss due cable failures

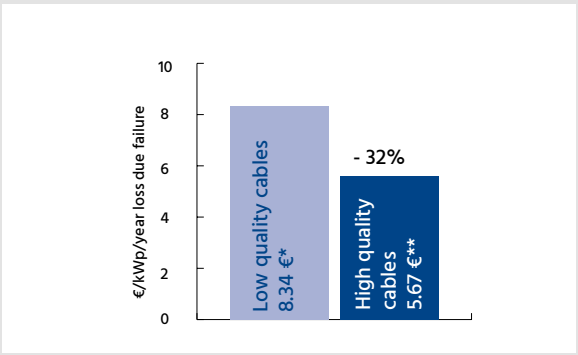

Fig. 6: Loss due cable failures - Low quality cables: 8.34 €/kWp/year*, high quality cables: 5.67 €/kWp/year**

* All costs related to cable failures during the project life shown in Fig. 7.

** All costs related to cable failures shown in Fig. 7 excluding costs related to broken/burnt connectors which are avoided by the use of high quality cables.

The use of low low-quality cables might seem an obvious way to reduce the upfront project CAPEX costs, however it will likely cause significant costs during the project life far beyond the initial saving which can be avoided by using high quality Jurchen cables.

Quote from EU-funded Solar Bankability Project:
"A cost-based Failure Modes and Effects Analysis has been developed in the Solar Bankability project with an aim to provide a tool to assess the technical risks during the PV project operational years not only from a technical viewpoint but also from the economic impact perspective. In the cost-based FMEA methodology, a cost priority number (CPN) is assigned to each technical risk linked to PV plant failures; the CPNs give an indication of economic losses from planning failures, system downtime, and substitution/repair of components. The CPN method was applied to a database of over one million documented failure cases during installation and operational phase of utility scale PV plants and insurance claims. The top 20 technical failures causing PV plant downtime obtained from this analysis are plotted in Figure 7."

Top 20 technical failures

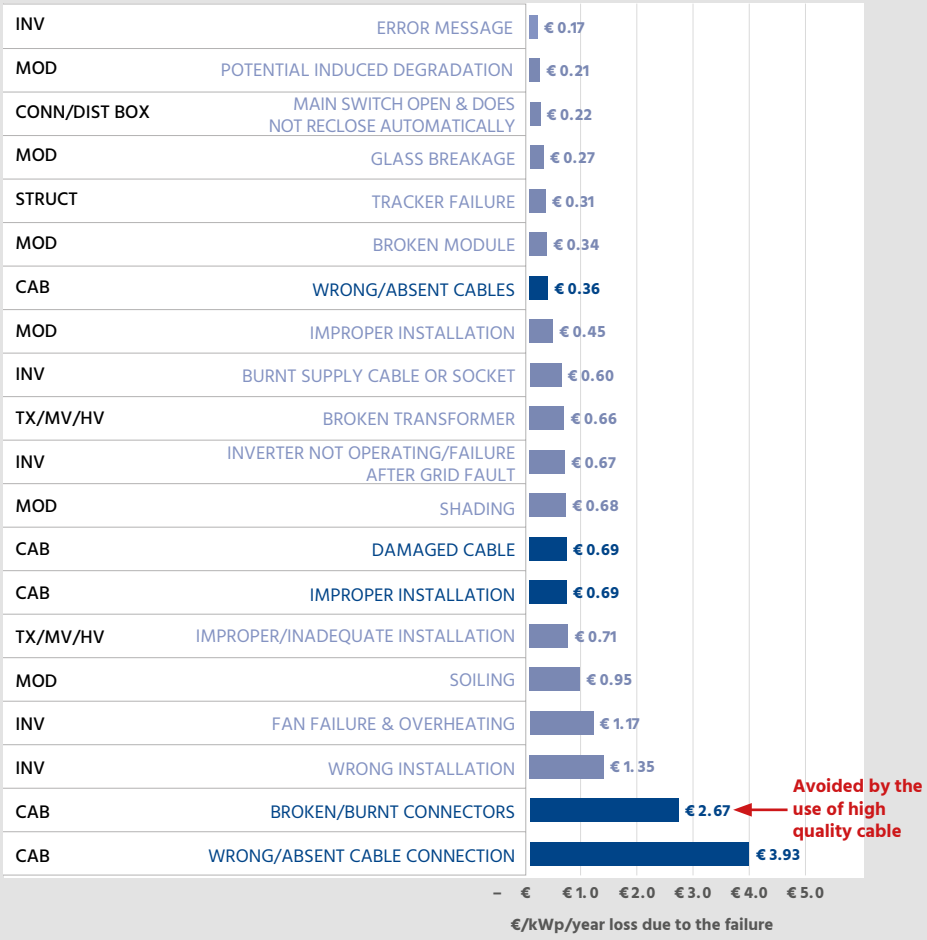

Fig. 7: The 20 highest failures of a PV plant, ordered by the associated cost. (CAB=cabling, INV=inverter, MOD=module, TX=transformer, STRUCT=structure) Source: EU-funded Solar Bankability Project

Source: EU-funded Solar Bankability Project, Grant agreement ID: 649997, End date: 28 February 2017
Stäubli International AG, White Paper: Part 1 - The anatomy of the PV connector