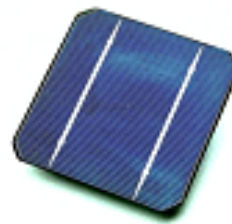
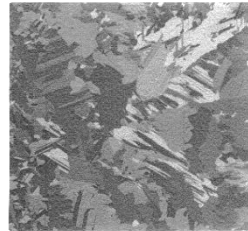
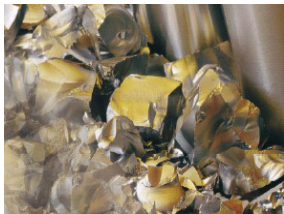


# Manufacturing of PV Modules

Magnus Nilsson  
Senior Project Manager

# Value chain PV industry



**Polysilicon**

**Wafer**

**Solar Cell**

**Solar Module**

**Systems**

# PV systems

## Grid connected

- Solar energy is rapidly becoming a valuable supplement in the electricity grids
- 86 percent of market

## Off grid

- Solar energy is the perfect solution in remote areas
- 14 percent of market



Residential buildings



Commercial buildings



PV power plants



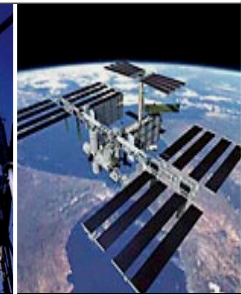
Home systems



Water pumping



Telecom



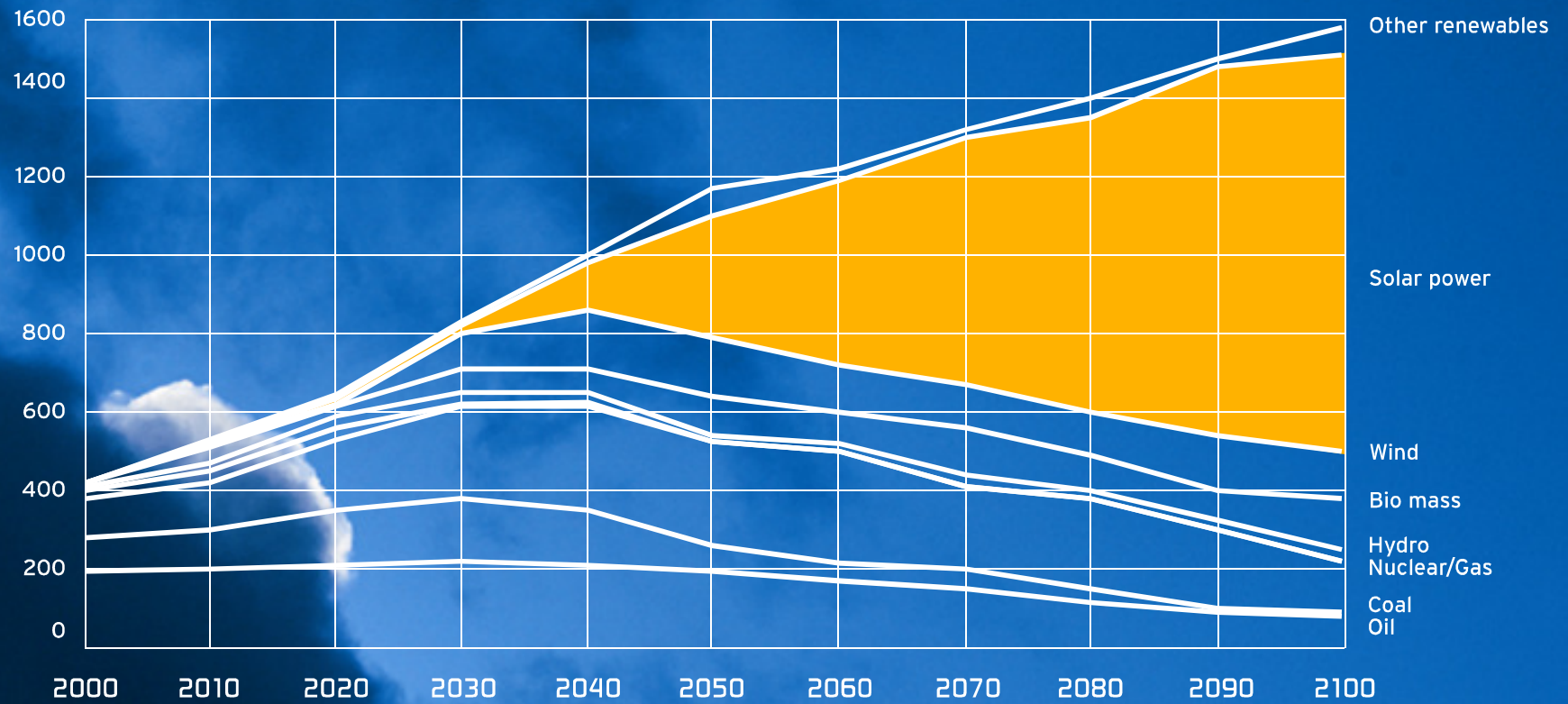
Space

# PV grid connected in Germany

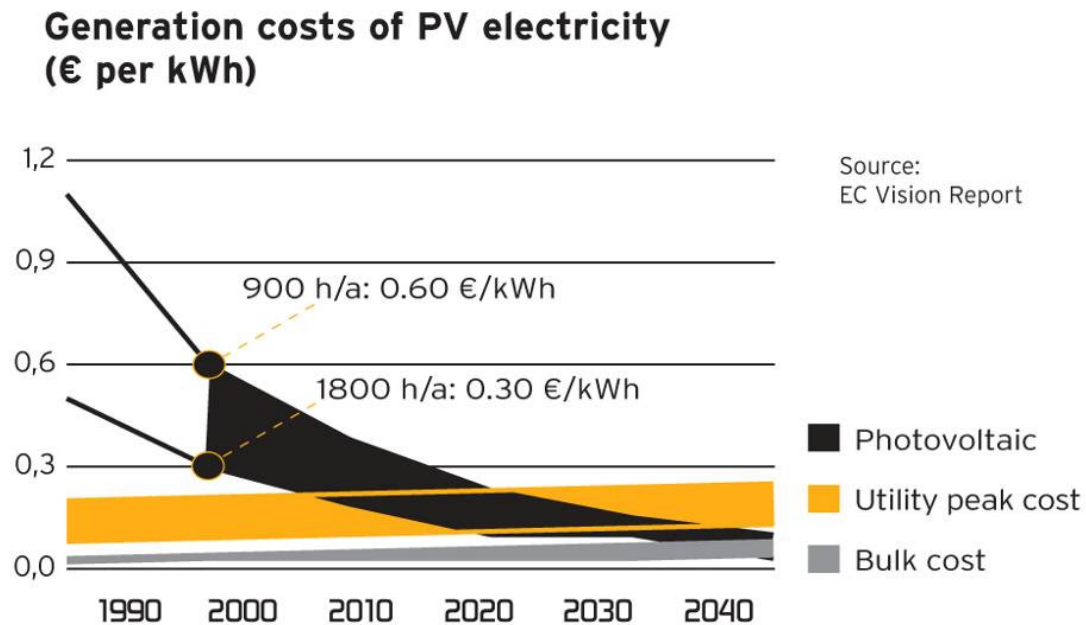


Magnus Nilsson 2011

# Future of solar energy

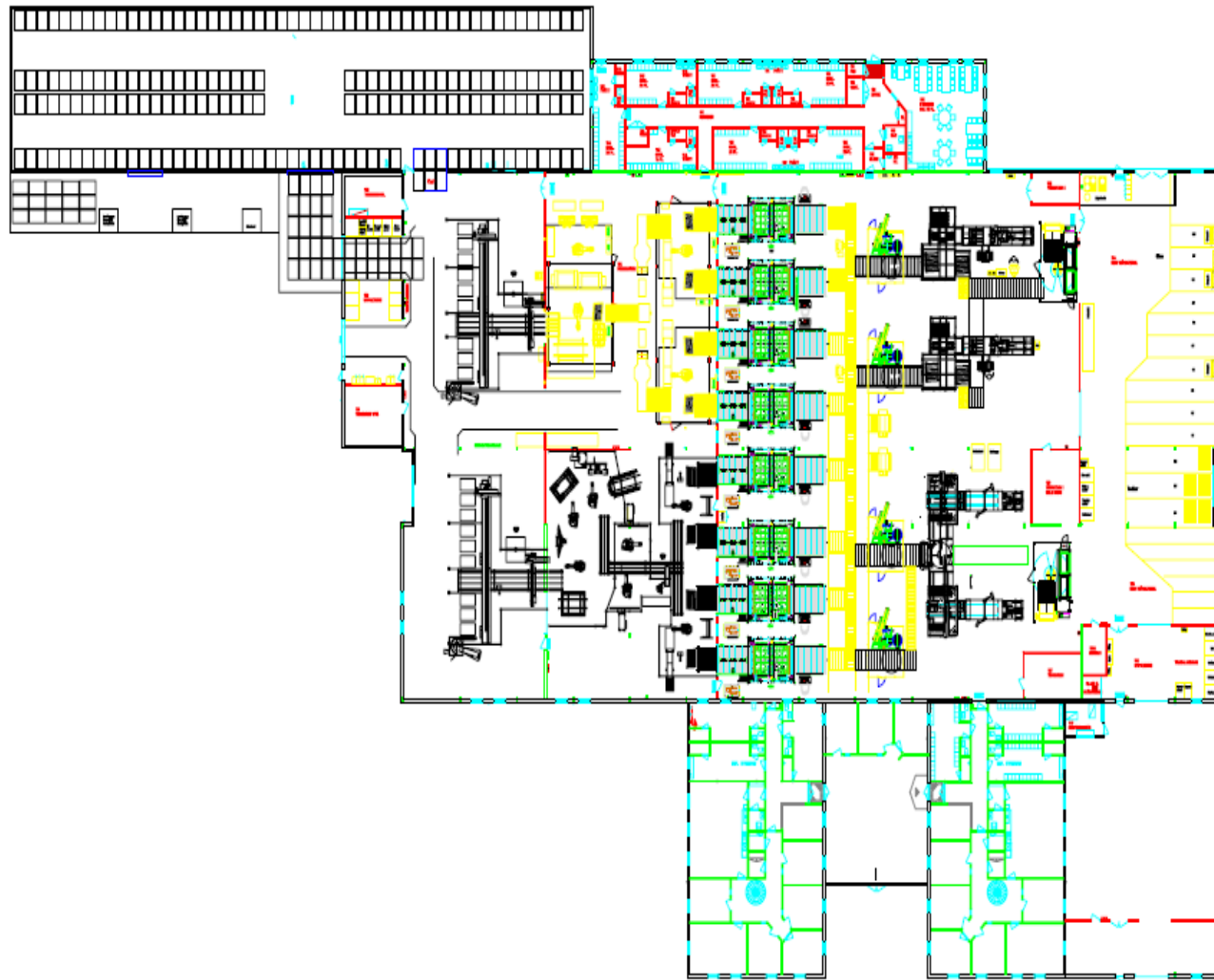


# Solar energy getting competitive



Generation costs of PV electricity have shown a steady downward trend and are projected to continue to decline in the coming years.

# SweModule Production Plant



Magnus Nilsson 2011

# Module components #1

## → Aluminium frame

- Mounting
- Mecanical stability

## → Glas

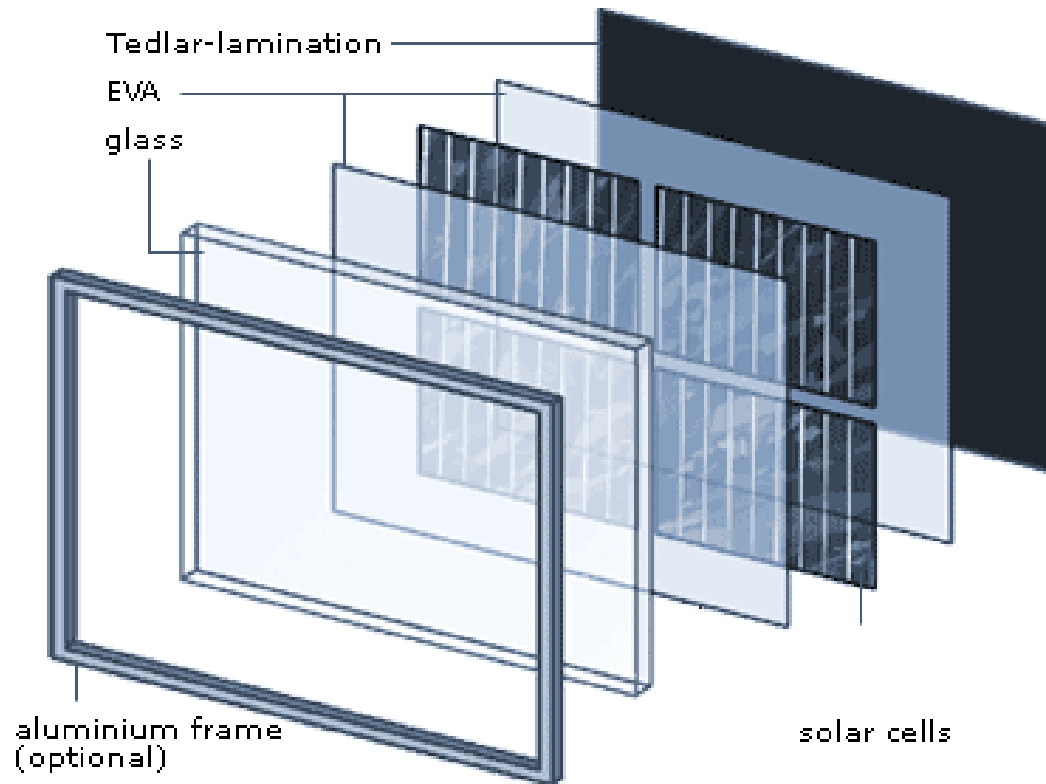
- Protection towards environment
- Low reflection

## → EVA

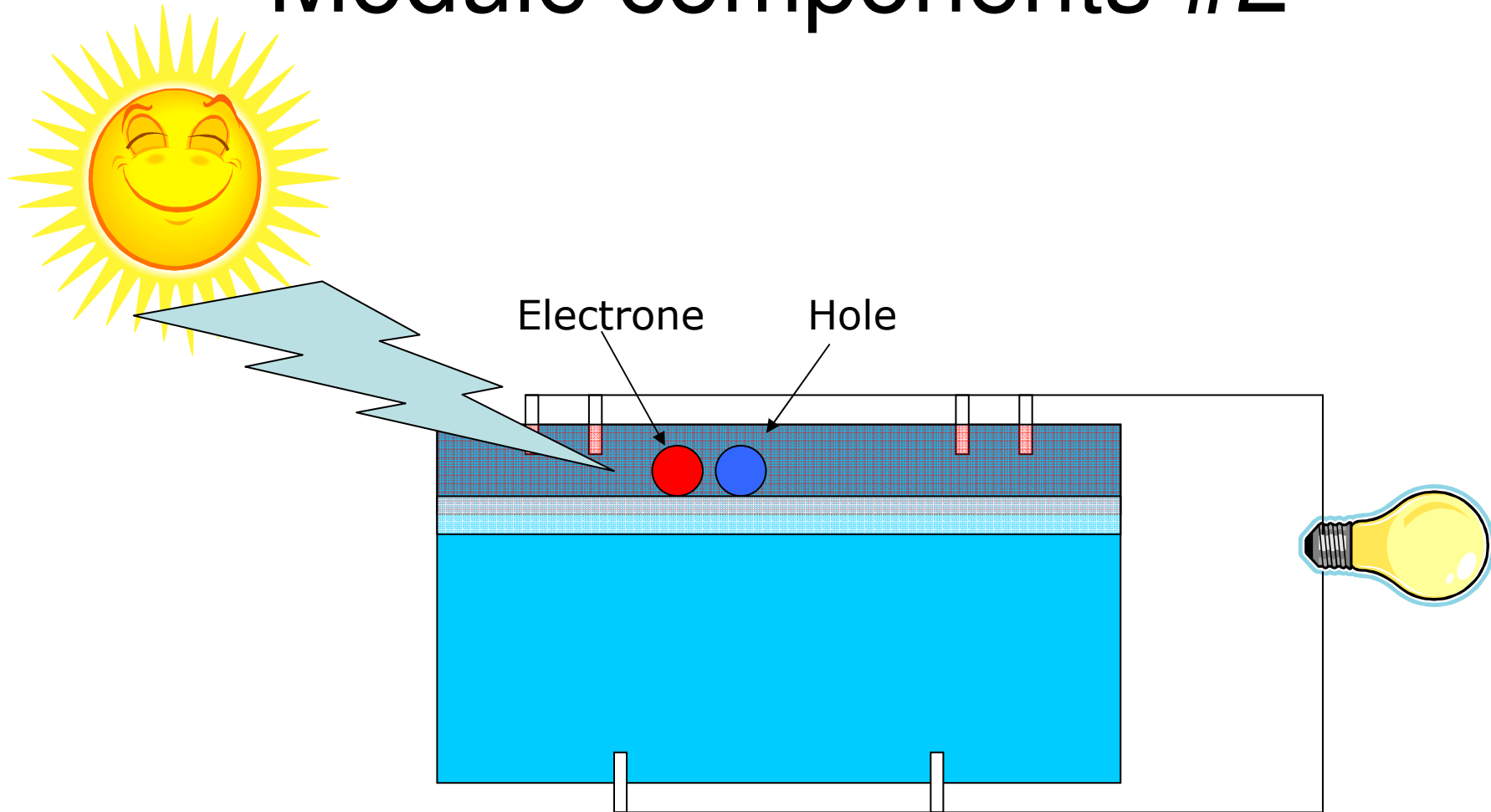
- Incapsulation
- Isolation
- UV-protection
- Transparent

## → Back sheet

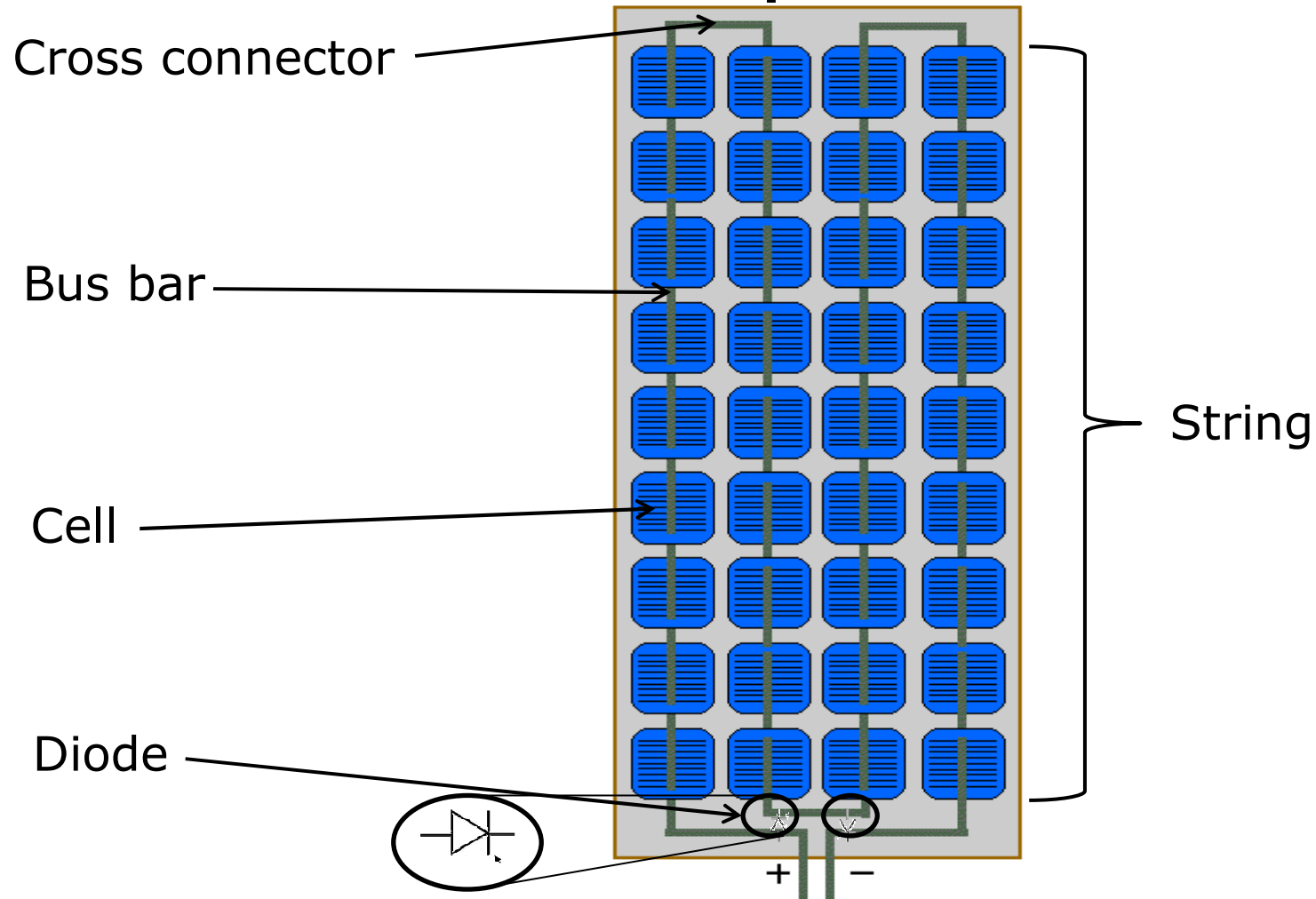
- Moisture protection
- Isolation
- UV-durability



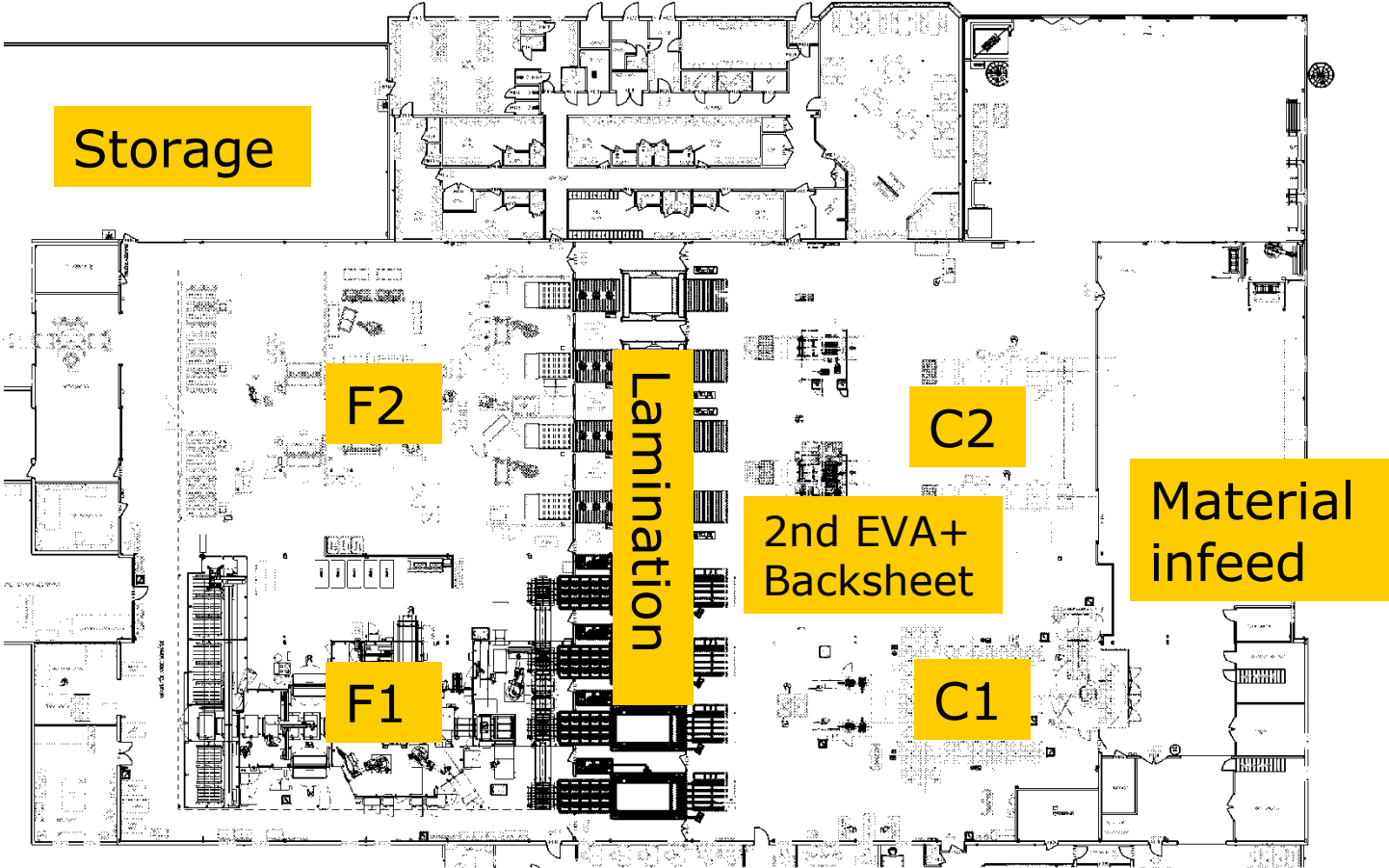
# Module components #2



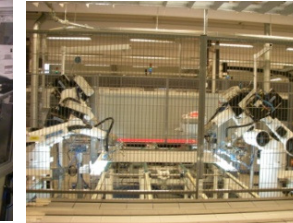
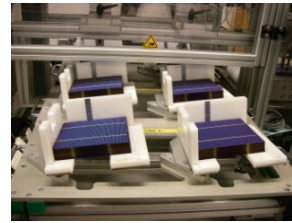
# Module components #3



# Factory layout



# Production process



Glass pallet

Glass + EVA1

Cell feed in

Solder string

Connect strings

EVA2+backsheet

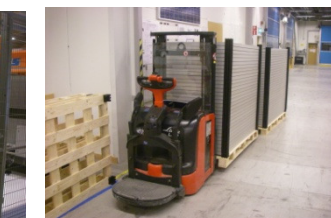
Material infeed



Clean room



2nd EVA+backsheet



Lamination

Edge trimming

Boxing+Taping  
Framing+flashing

Inspection  
classification

Packing

Storage

Lamination



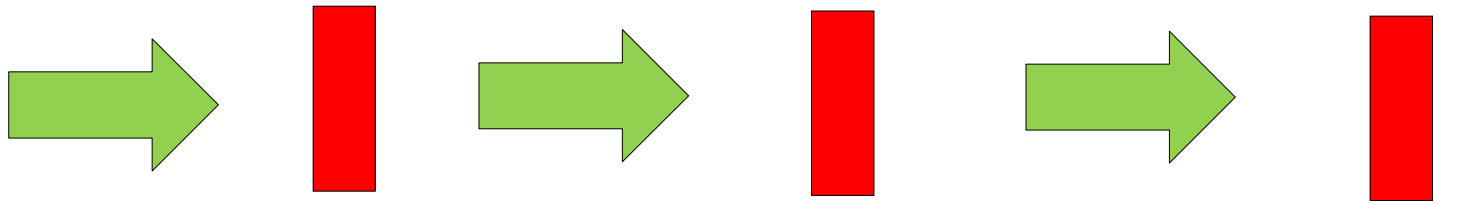
Finishing line



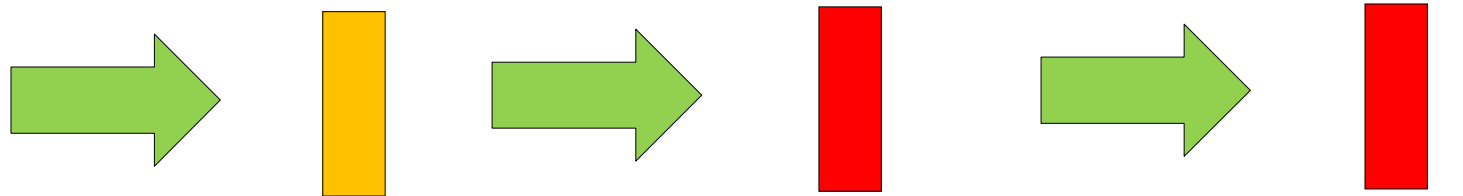
Storage

# Quality control – vision systems

Cell loading - Check cell - Soldering - Check string - String layup - Check layup



CC soldering - Check soldering - Lamination - Check laminate - Boxing - Check boxing



Flashing - Final inspection - Labelling - Check label - Packing on pallet

