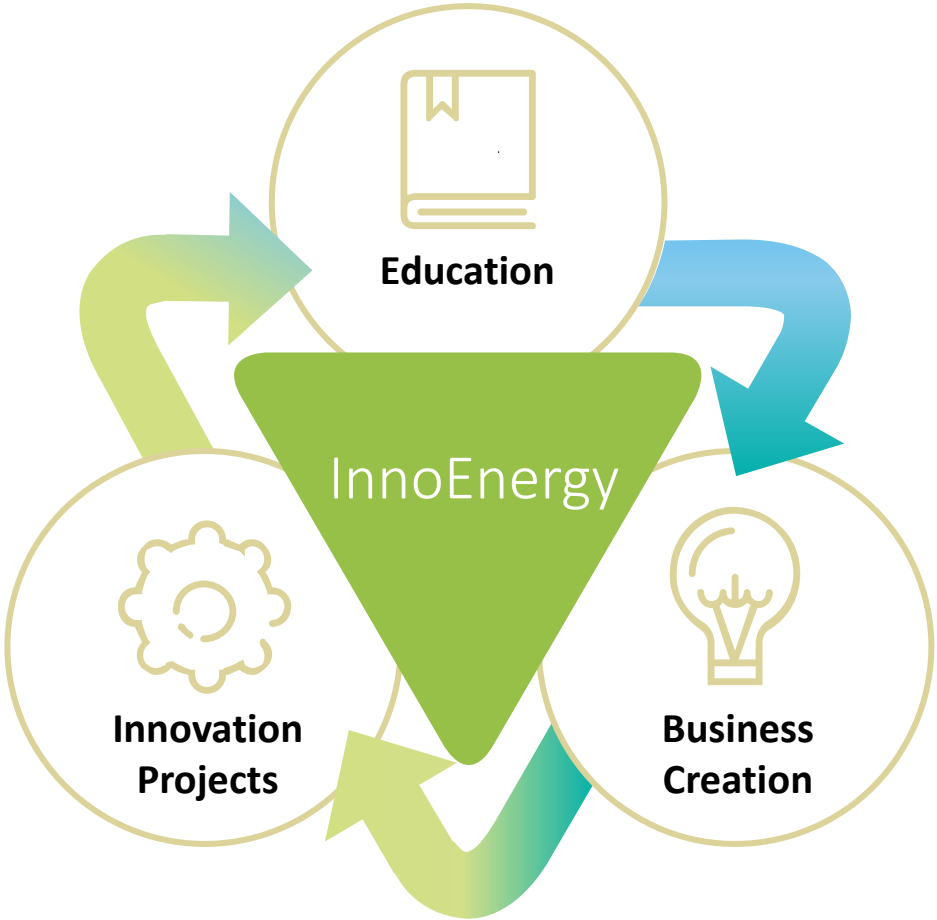
InnoEnergy
Knowledge Innovation Community

Technology Game Changers PV Manufacturing in Europe

PV MANUFACTURING IN EUROPE CONFERENCE (ETIP-PV)
Brussels, May 19th 2017

Javier Sanz, CTO Renewable Energies



250
Project partners across Europe

77
Patents filed

78
Products and services supported

3
Manufacturing facilities constructed

147
Million euros of InnoEnergy investment

1.2
Billion euros in project costs

3
Billion euros in forecasted sales

162
Early start-ups supported

80
Companies created

33
Million euros of external investment raised

1,884
Business ideas captured

500
Gamechangers from the InnoEnergy's Master's School

11,200
Applicants to InnoEnergy's Master's School

93%
Graduates who find a job within six months of graduating

15%
Average annual salary earnings over graduates of similar programmes

140
PhD students supported

35
PhD graduates

8
MOOCs

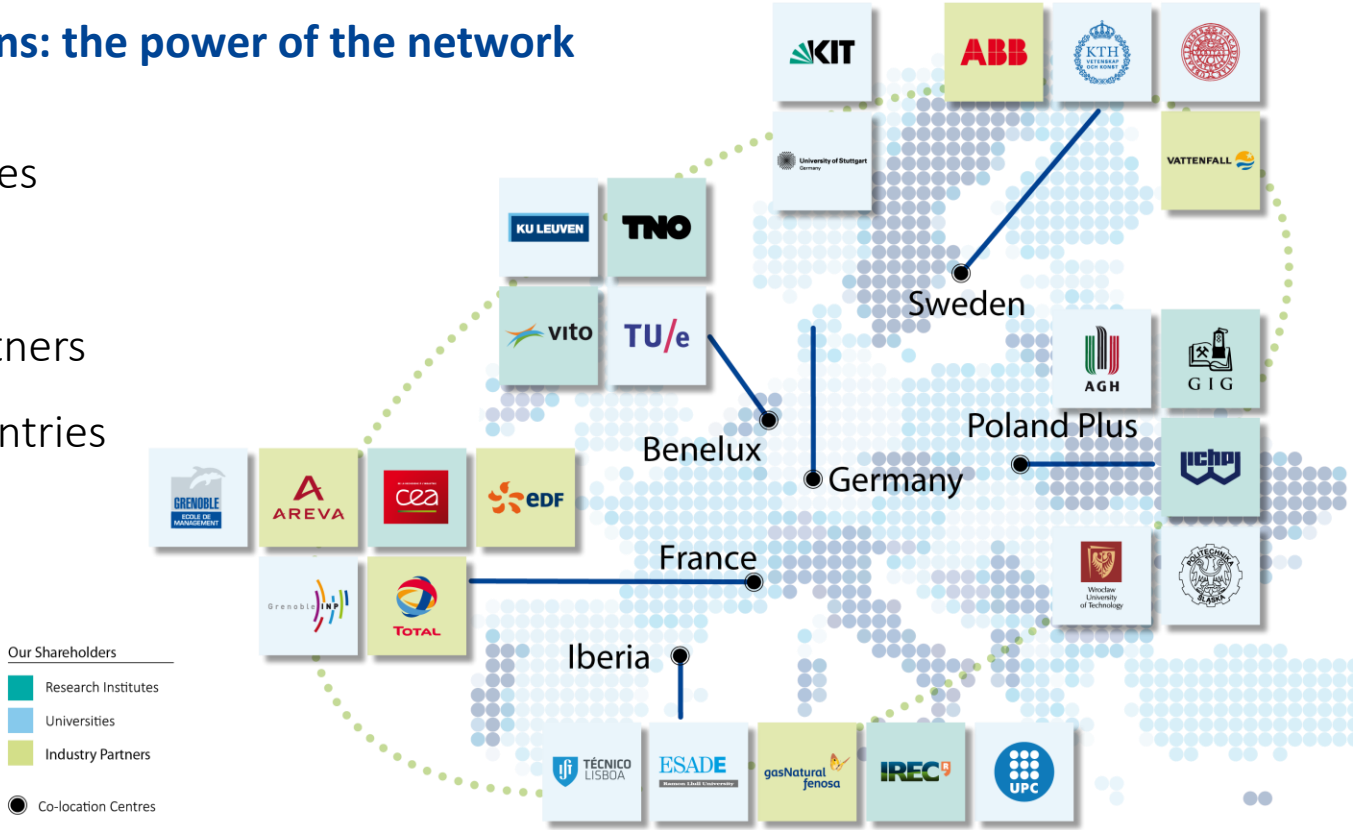
Making connections: the power of the network

6 co-location centres

26 shareholders

250 additional partners

Activities in 17 countries



Winter package

Re-industrialization of Europe as the Goal:

- Create 900.000 new jobs
- Mobilize 177 B€ of investments annually
- Increment the EU GDP by 1% up to 2030

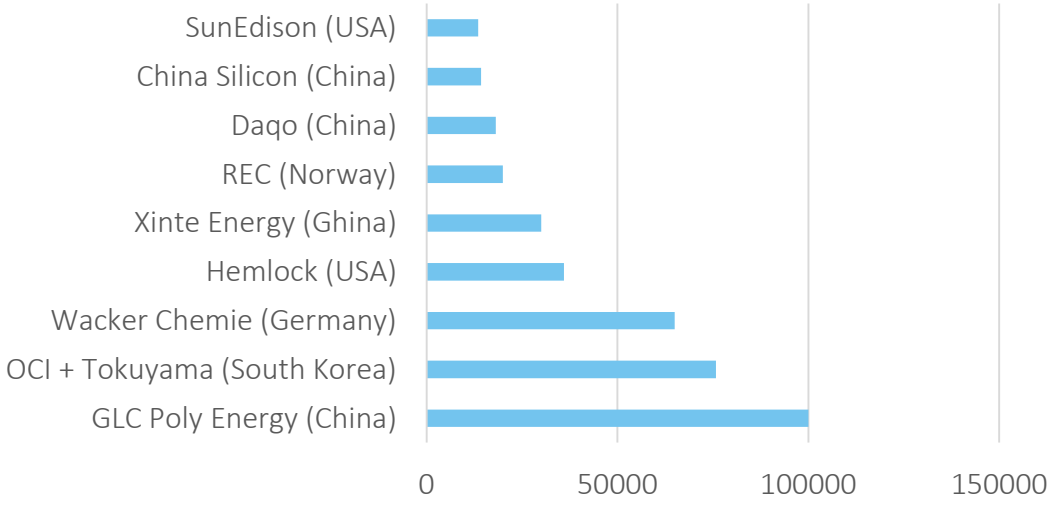
By 2030:

- Half the power produced must be renewable
- Emissions to be reduced by 40%

* Crystalline Silicon dominates bulk market applications
* Large players in the Chemical / Raw Material industry
* Thin Film the “game changer” to come

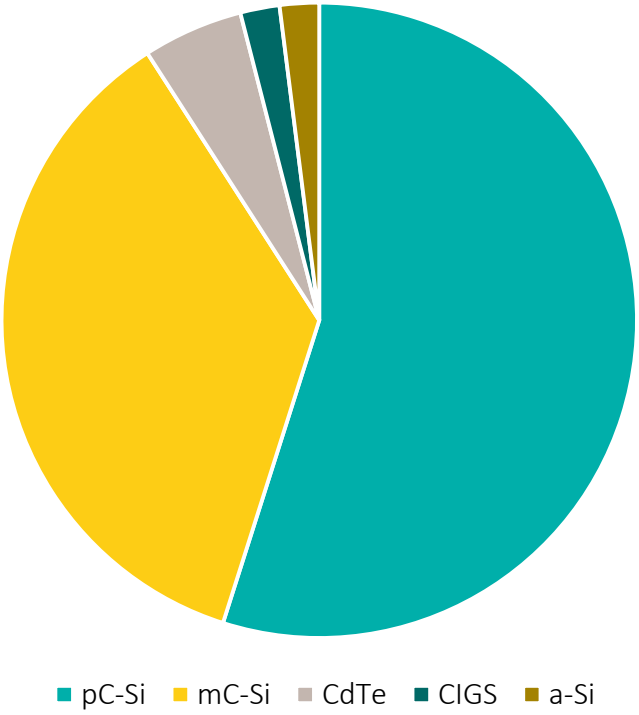
Largest Polysilicon Producers

Estimated data end 2016 – Source IHS



TECHNOLOGY MARKET SHARE

Source IHS



PV Value Chain Innovation Assessment

Framework:

- Focus in Crystalline Si and Thin Film
- Other emerging technologies to be assessed by other means
- Timeframe: 2014-2030

Innovations affecting:

- PV Plant modules
- PV Plant Inverters
- BoS Structures
- Bos Electrical
- Development, Installation and Construction
- Operation, Maintenance and Service

Impact analysis on:

- Cost
- Gross AEP

DELPHOS
by KIC InnoEnergy
Tracking the impact of innovation on the levelised cost of energy

Link: https://delphos.innoenergy.com/welcome

How the innovations impact the LCOE

How the revised parameters affect LCOE

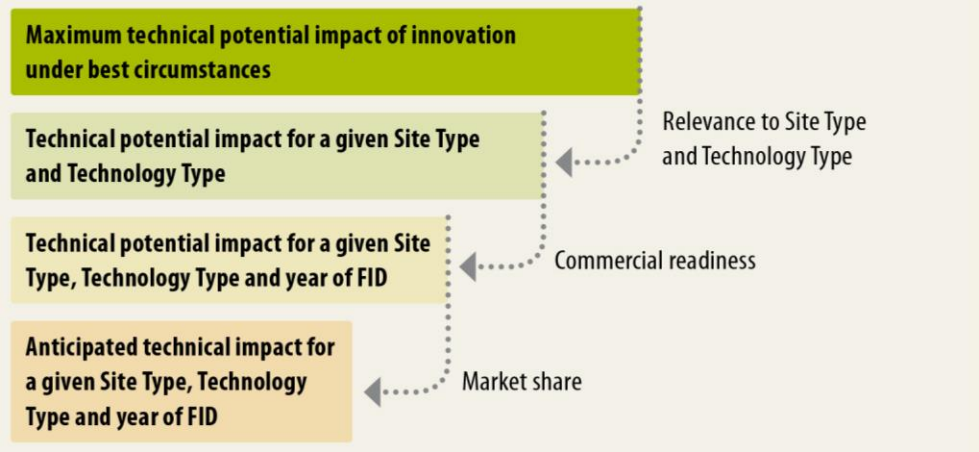


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Figure 4.2 **Anticipated and potential impact of PV cell manufacturing innovations for a ground mounted utility scale PV plant using conventional c-Si technology with FID in 2030, compared with an installation with the same nominal power on the same Site Type with FID in 2015.**

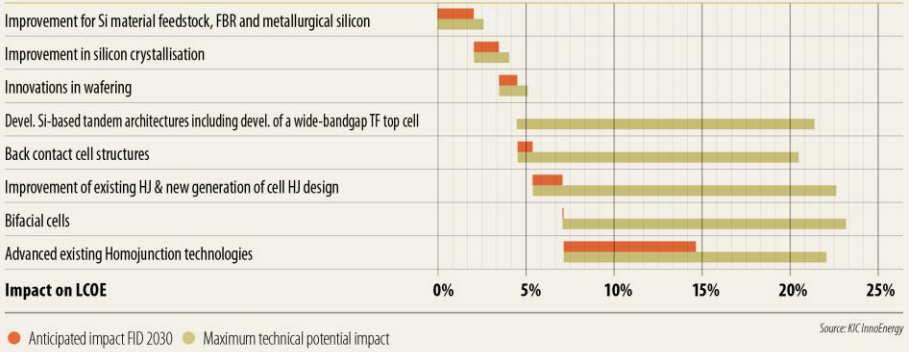


Figure 4.3 **Anticipated and potential impact of PV cell manufacturing innovations for a rooftop PV installation using High Efficiency c-Si technology with FID in 2030, compared with an installation with the same nominal power on the same Site Type with FID in 2015.**

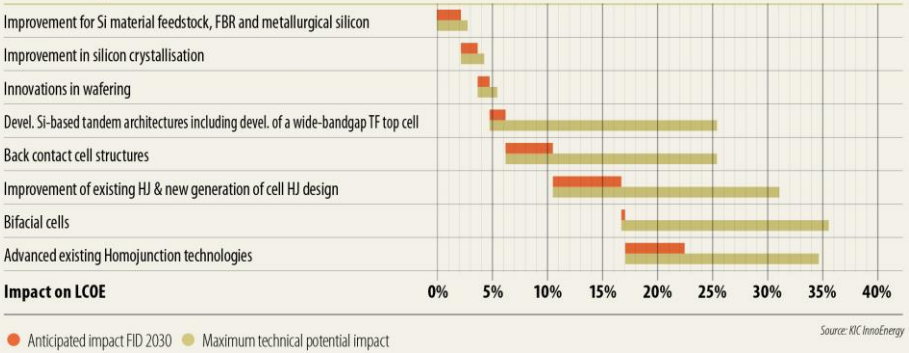
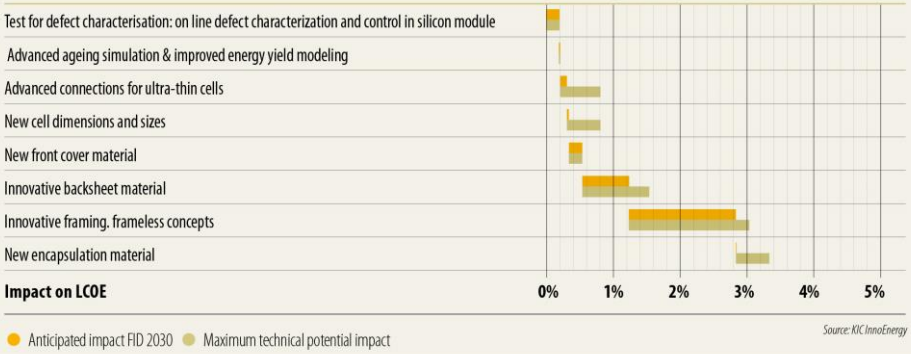
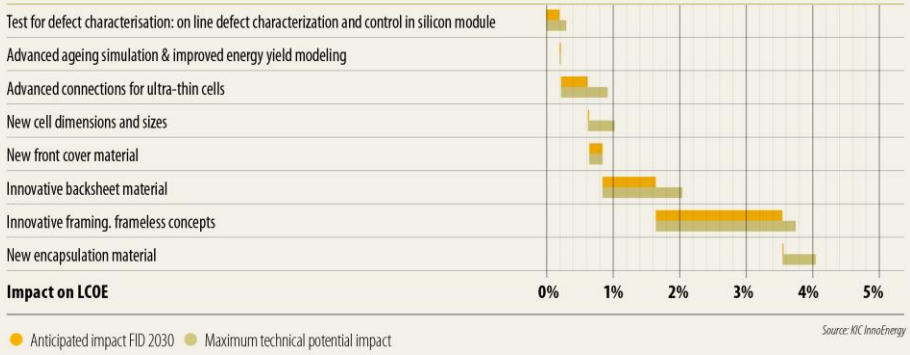


Figure 5.2 **Anticipated and potential impact of PV module manufacturing innovations for a ground mounted utility scale PV plant using Conventional c-Si technology with FID in 2030, compared with an installation with the same nominal power on the same Site Type with FID in 2015.**



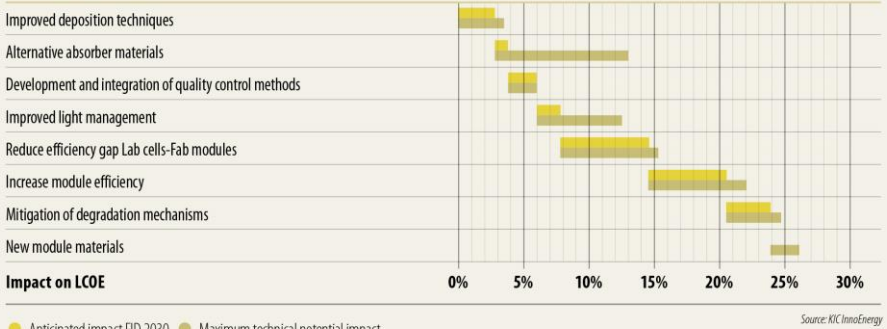
Source: KIC InnoEnergy

Figure 5.3 **Anticipated and potential impact of PV module manufacturing innovations for a rooftop PV installation using High Efficiency c-Si technology with FID in 2030, compared with an installation with the same nominal power on the same Site Type with FID in 2015.**



Source: KIC InnoEnergy

Figure 6.2 **Anticipated and potential impact of TF module innovations for a ground mounted PV installation using TF technology with FID in 2030, compared with an installation with the same nominal power on the same Site Type with FID in 2015.**



Source: KIC InnoEnergy

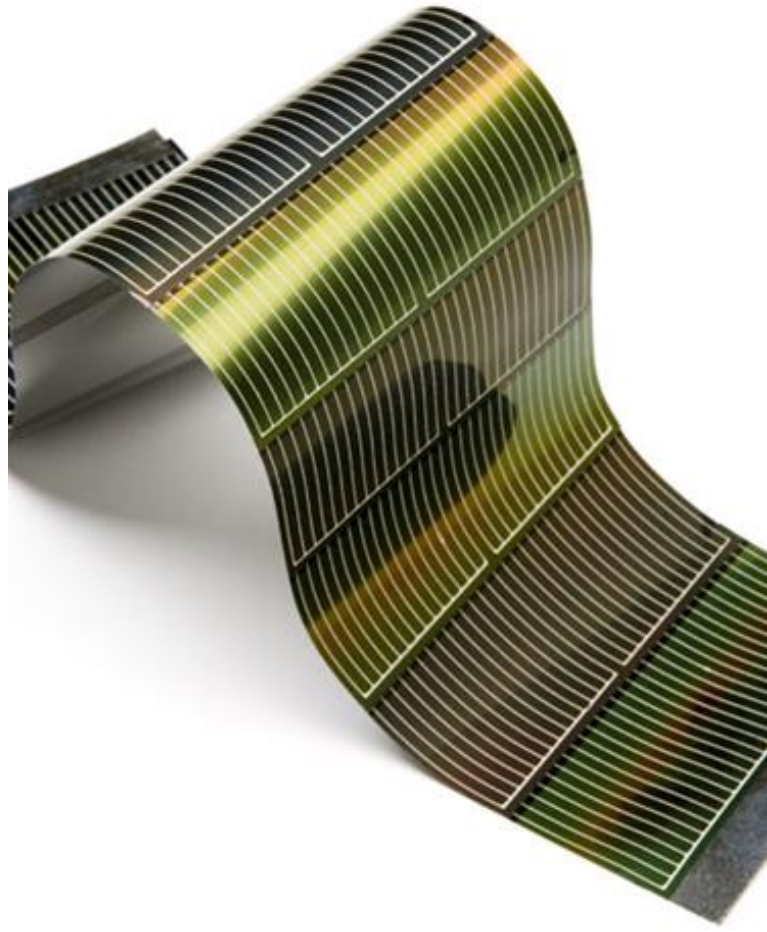
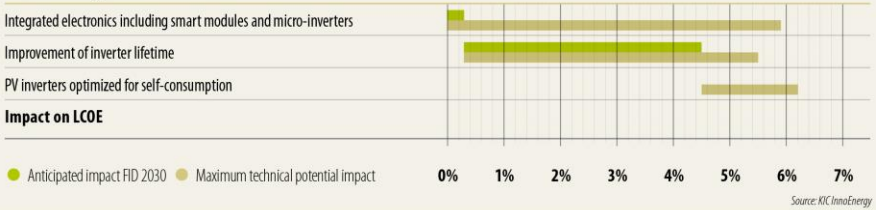
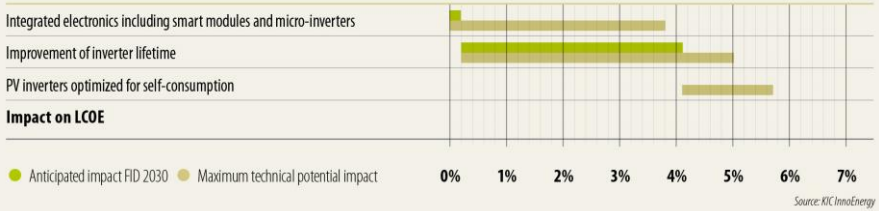


Figure 7.2 **Anticipated and potential impact of inverter innovations for a ground mounted utility scale PV plant using Conventional c-Si technology with FID in 2030, compared with an installation with the same nominal power on the same Site Type with FID in 2015.**



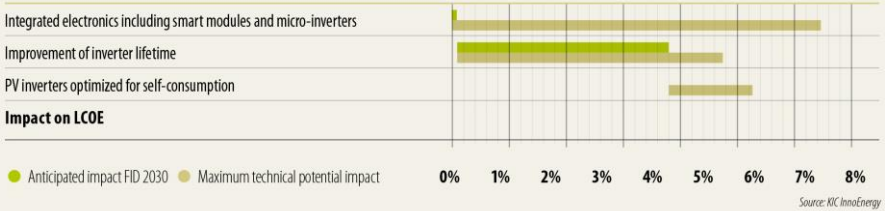
Source: KIC InnoEnergy

Figure 7.3 **Anticipated and potential impact of inverter innovations for a rooftop PV installation using High Efficiency c-Si technology with FID in 2030, compared with an installation with the same nominal power on the same Site Type with FID in 2015.**



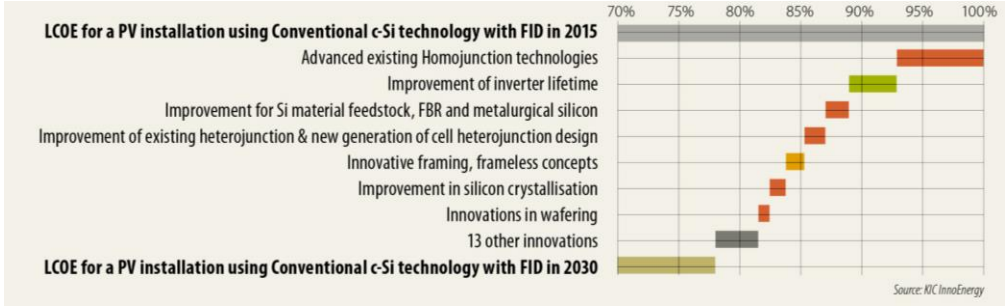
Source: KIC InnoEnergy

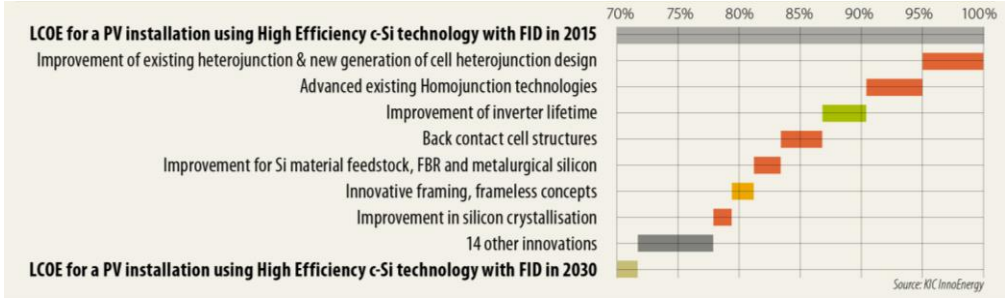
Figure 7.4 **Anticipated and potential impact of inverter innovations for a ground mounted PV installation using TF technology with FID in 2030, compared with an installation with the same nominal power on the same Site Type with FID in 2015.**

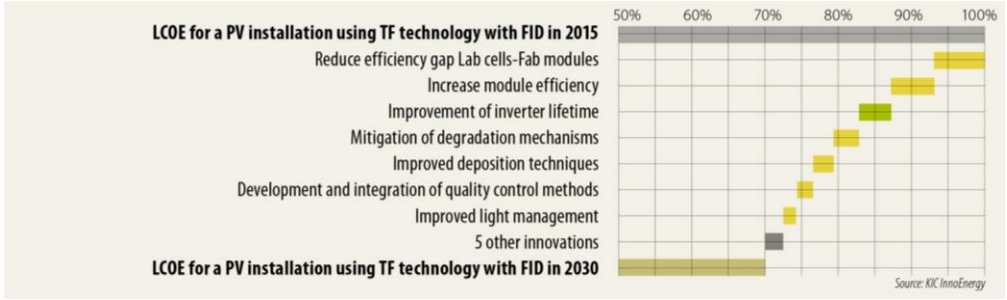


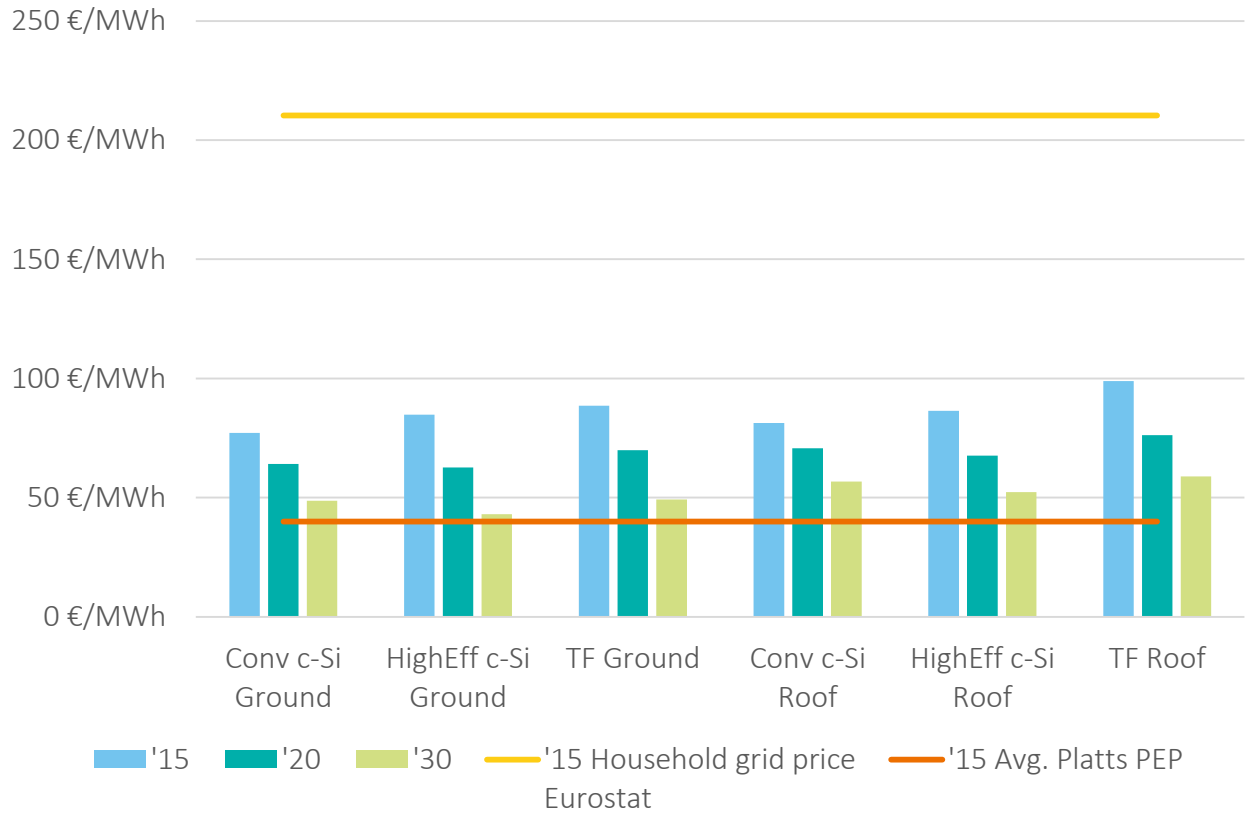
Source: KIC InnoEnergy

INNOVATIONS IN c-Si and TF LEADING MANUFACTURING OPPORTUNITIES








250 €/MWh
200 €/MWh
150 €/MWh
100 €/MWh
50 €/MWh
0 €/MWh
Conv c-Si Ground
HighEff c-Si Ground
TF Ground
Conv c-Si Roof
HighEff c-Si Roof
TF Roof
'15
'20
'30
'15 Household grid price Eurostat
'15 Avg. Platts PEP

Innovation Projects & Commercializing Entities

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EnThiPV

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BIPV-Insight

Ventures

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