Next generation PV technologies

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Isn’t PV already high-performance and inexpensive? Yes! But there are still challenges...

Maybe we wouldn’t need the next generation of PV if:

- We had an unlimited supply of cheap panels (e.g. from China)
- AND we had an infinite supply of raw materials
- AND we had limitless space to install panels

Why Next Generation PV?

- Each efficiency improvement strengthens the economic case
- Reduced material consumption → lower ecological footprint & less dependence
- Lightweight, flexible, and adaptable important to tackle space constraints

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Integrated PV: Netherlands is already leading

Programmalijn 3 geïntegreerde Zon-PV-producten

PV-geïntegreerd in daken en gevels (BIPV), voertuigen (VIPV) en infrastructuur (IIPV)

R&D-pilotlijn 4T Si-Pk tandemcellen, >30% rendement

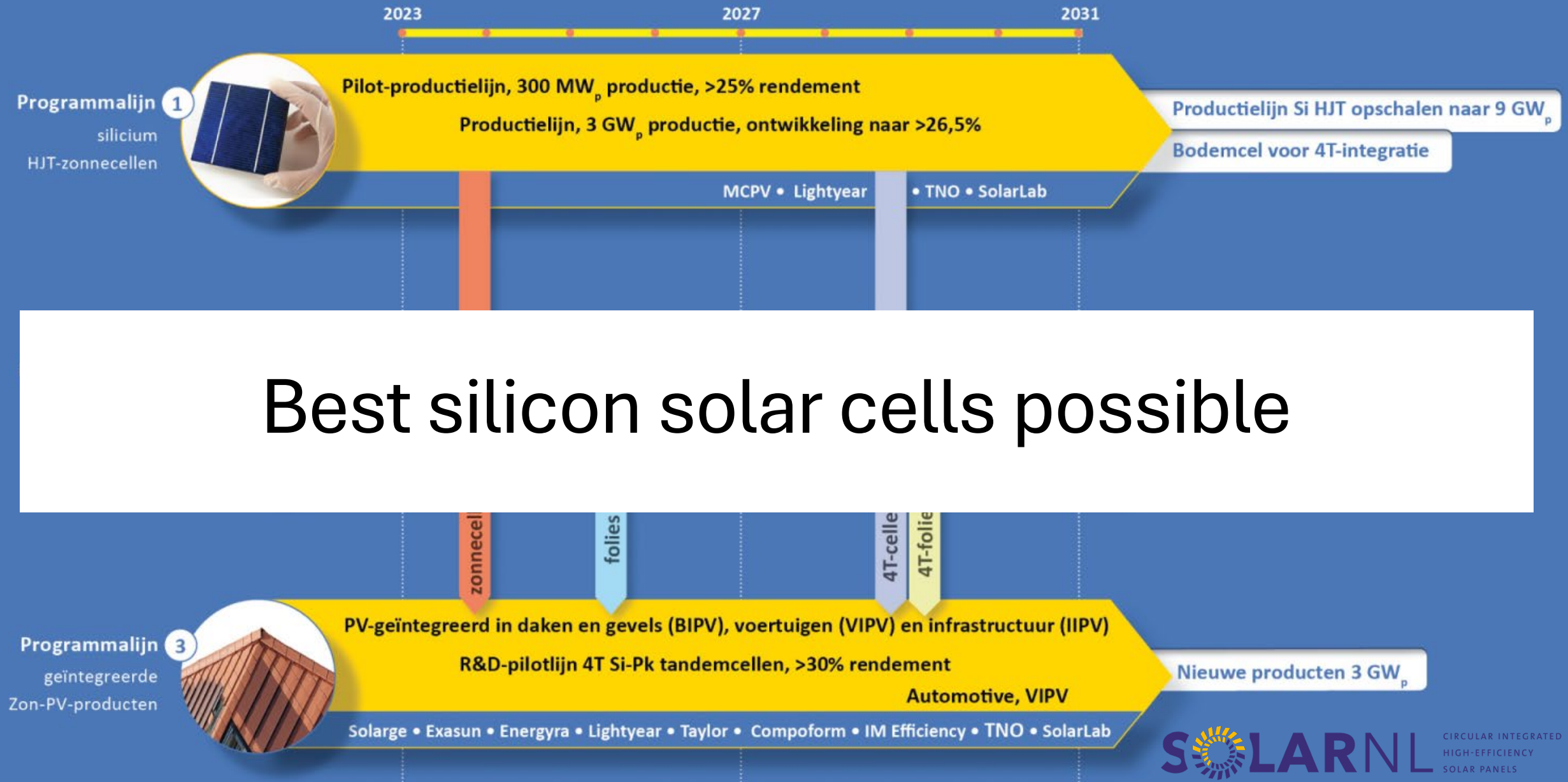
Automotive, VIPV

Solarge • Exasun • Energyra • Lightyear • Taylor • Compoform • IM Efficiency • TNO • SolarLab

Nieuwe producten 3 GW_p

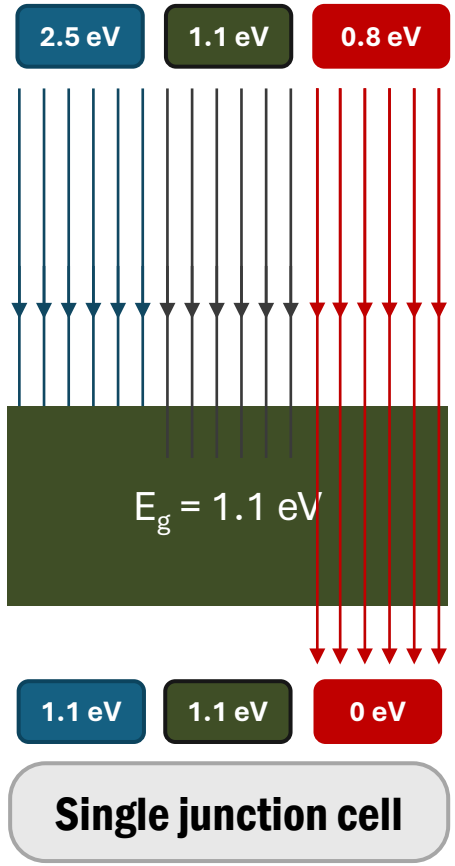
SOLARNL CIRCULAR INTEGRATED HIGH-EFFICIENCY SOLAR PANELS

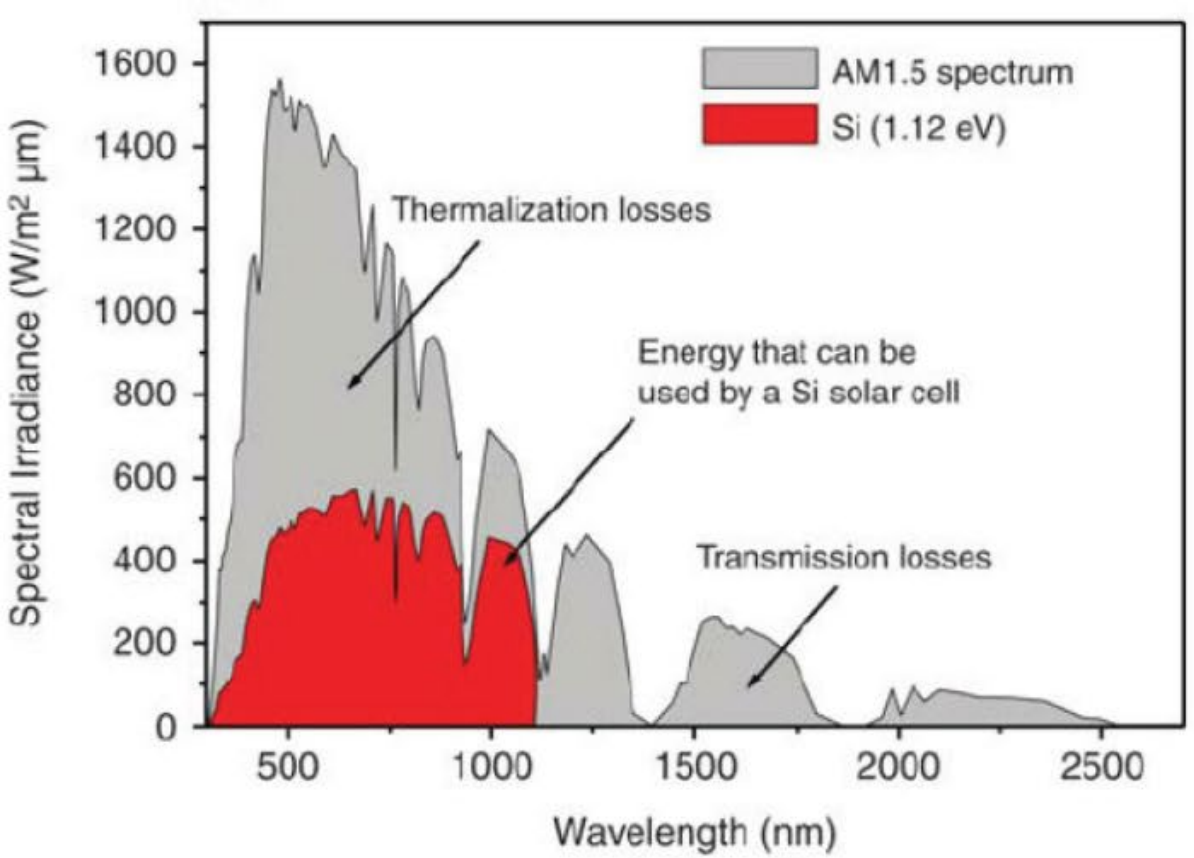
Made in Europe needs high efficiency



Isn’t silicon sufficient?

If there weren’t all the ifs, but also there is so much potential!!!

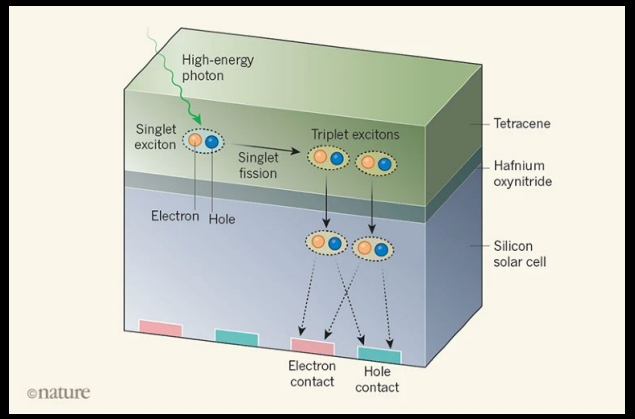




Natalya V Yastrebova. “High-eciency multi-junction solar cells: currentstatus and future potential". PhD thesis. U. of Ottawa, 2007

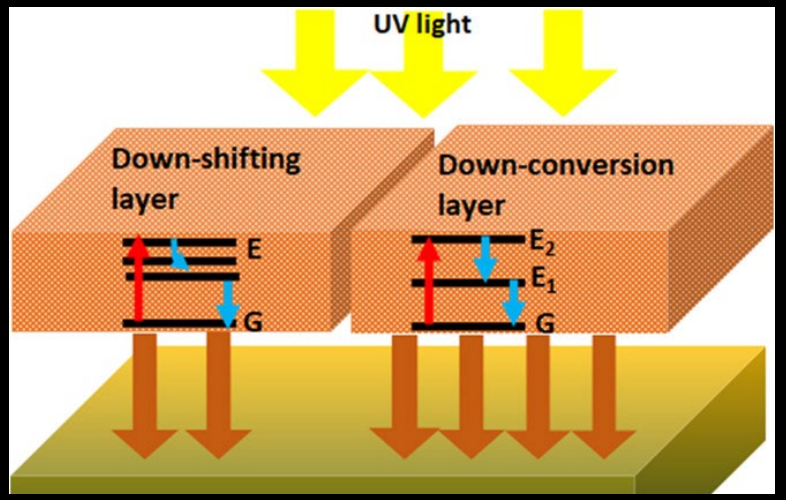
Silicon + partner: possible examples

Singlet fission



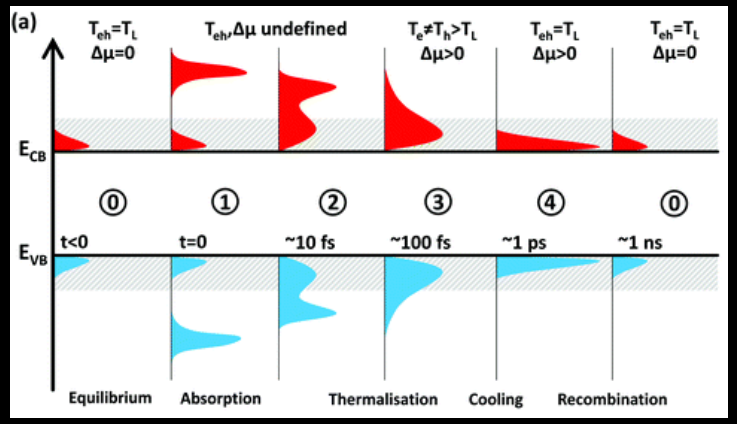
Luther, J. M., & Johnson, J. C. (2019). An exciting boost for solar cells.

Up/Down-conversion & shifting



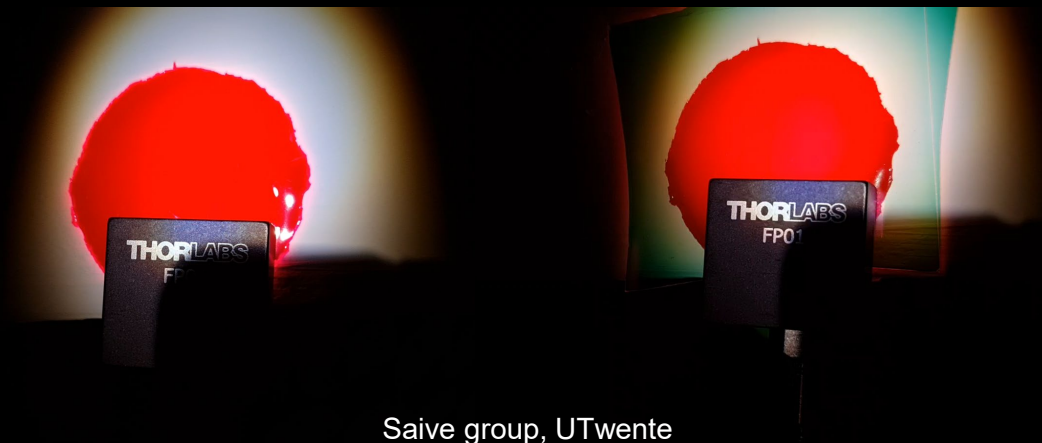
Swansea University, RRL Solar

Hot carriers



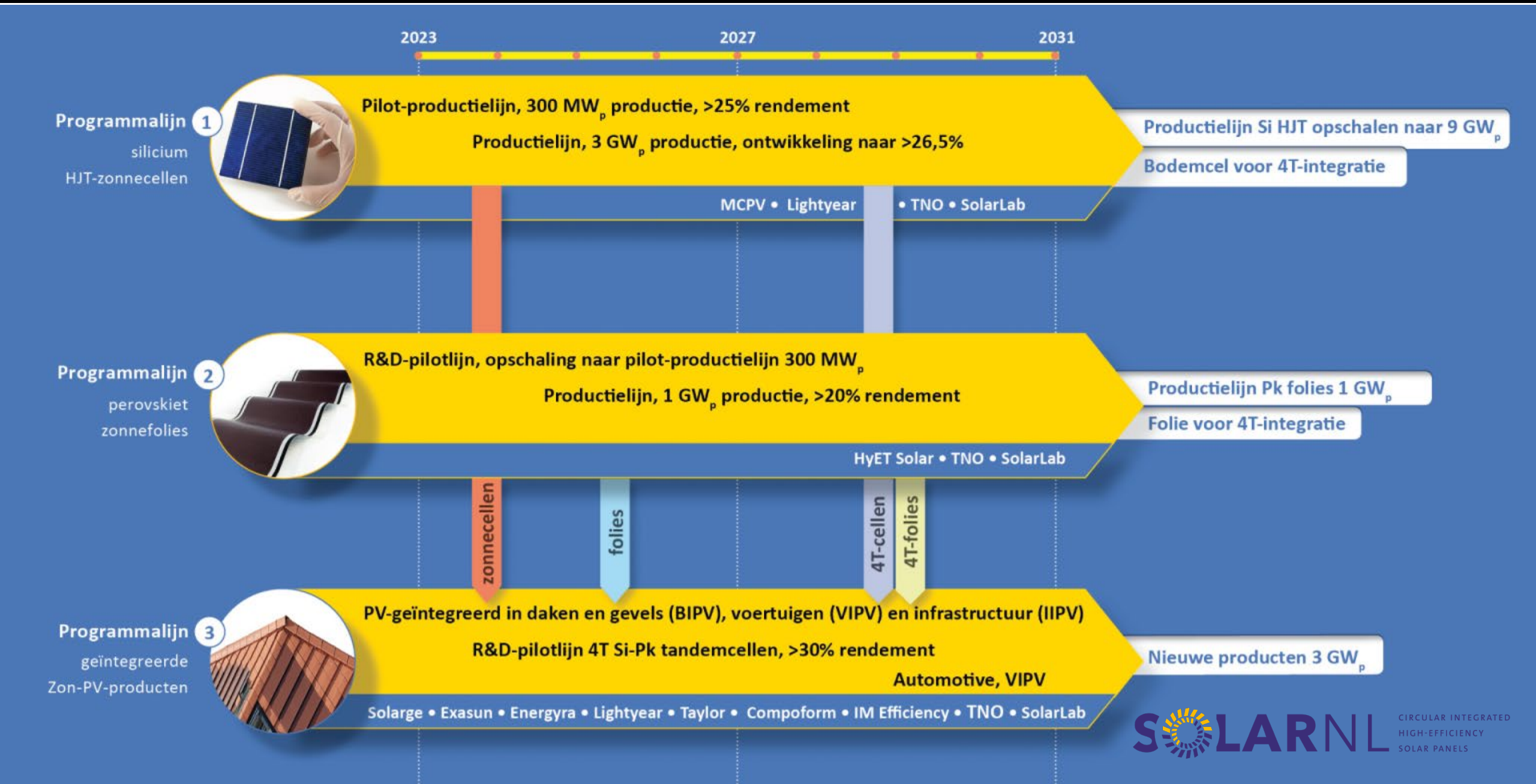
Kahmann, S., & Loi, M. A. (2019). Hot carrier solar cells and the potential of perovskites for breaking the Shockley–Queisser limit. *Journal of Materials Chemistry C*, *7*(9), 2471-2486.

Luminescent solar concentrators



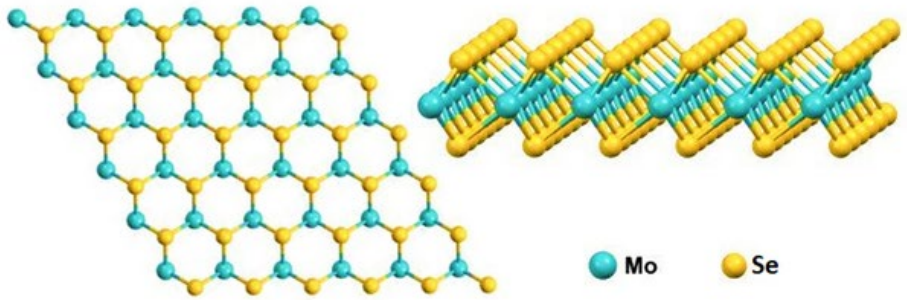
Saive group, UTwente

The prince on the horse: Perovskite

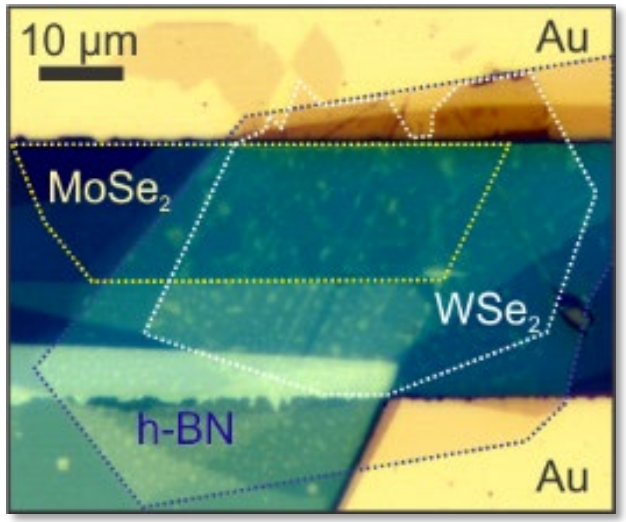


Materials consumption, how low can we go?

2D PV



Light-weight
Earth abundant



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2D Solar Cells Poised to Set Power-Per-Weight Record

Panel speakers:

Eline Hutter & Monica Morales Masis