

INNOVATING SOLAR

Using PV's for renewable
heat and electricity

300% boost to PVs

9th October 2019
DTU CITIES



Sunovate
innovating solar





Sunovate – Denmark Observations

- Wind is dominate electricity spot price setter
- Negative pricing in higher wind events
- Wind ~40% Solar ~3%
- Large district heating network & storage
- Heat pumps increasing role in DH
- Droughts are impacting biomass supply (straw)
- Solar thermal plants running in reverse to cool at night
- Air pollution and heat island effects from burning fuel

“Sunovate’s Hybrid PVT panel provides the ultimate flexibility in boosting PV **electrical** performance and producing **renewable heat**”

“True renewable cross-sector **coupling** between heat and electricity”



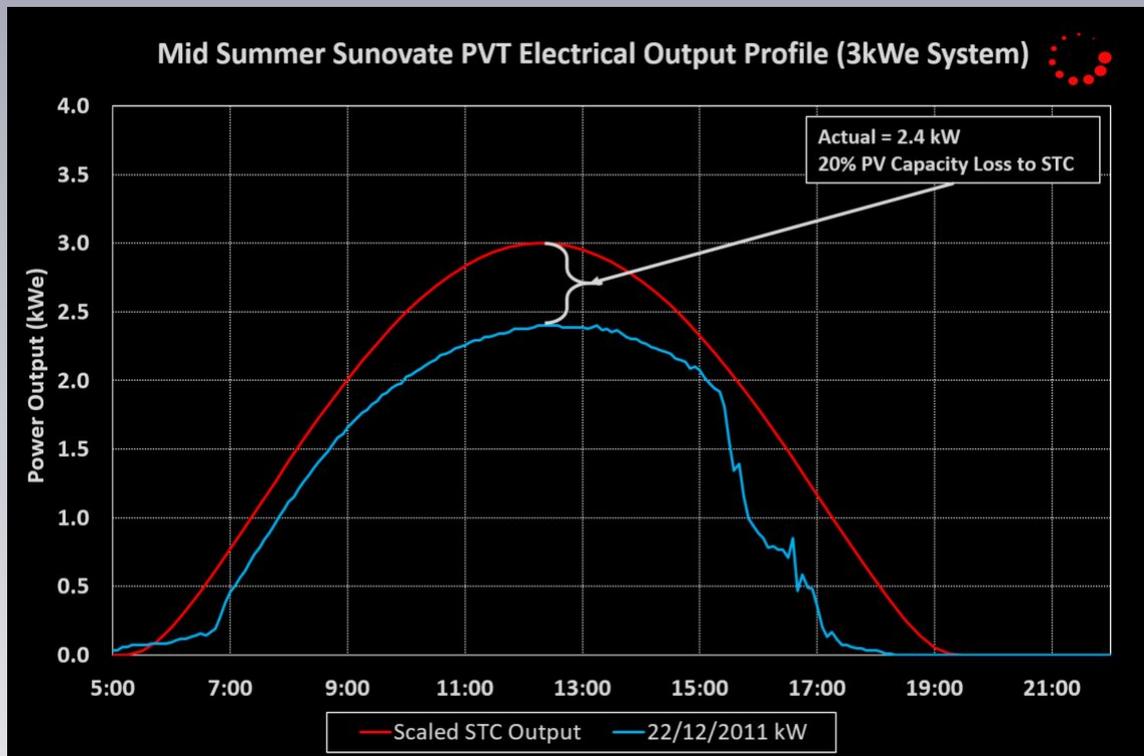
Sunovate – 1st Residential Install ($\eta+50\%$)



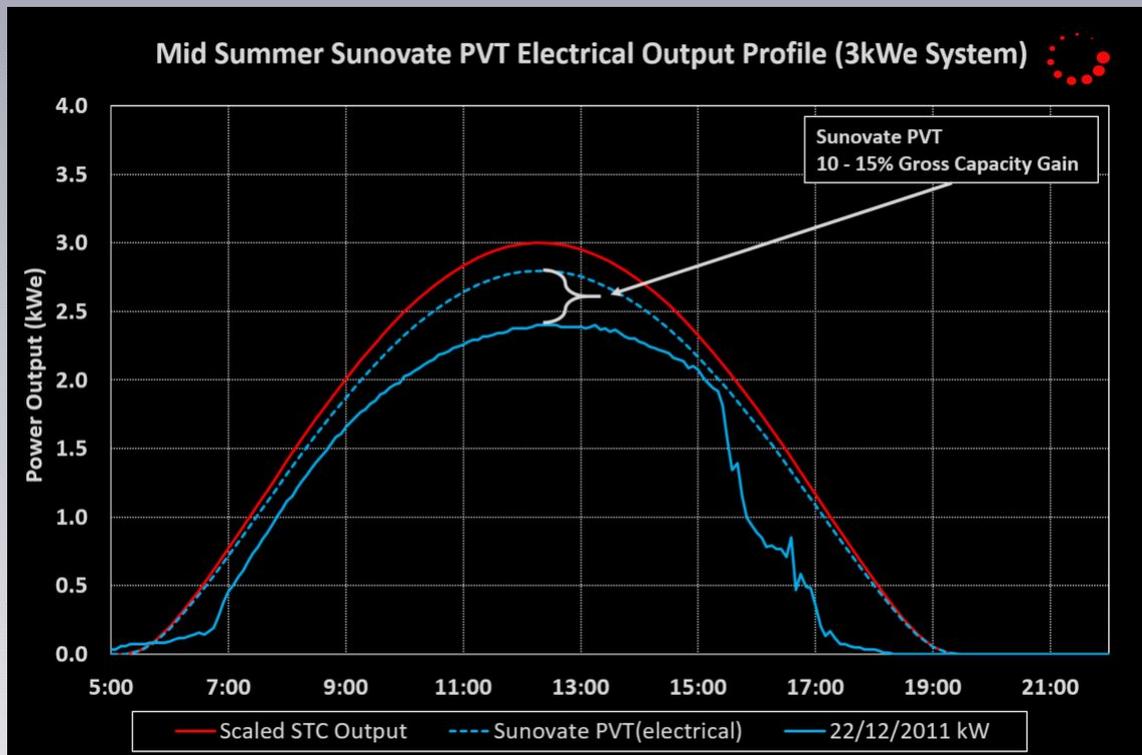
Rating - 1.375kW(electrical)
- 2.75kW(thermal)



Heat Effect In Real Life For PV



Introduce Sunovate PV Boost





“Renewable heating and cooling **lags** behind renewable electricity despite significant demand”

(Renewable Thermal Collaborative - July 2018)





Inadequate Options for Heating

Non Renewable

- High carbon emissions
- Health risks
- Price variability
- Security of supply

Renewable

- Large footprint
- Often complex
- Lack of flexibility
- High capital costs

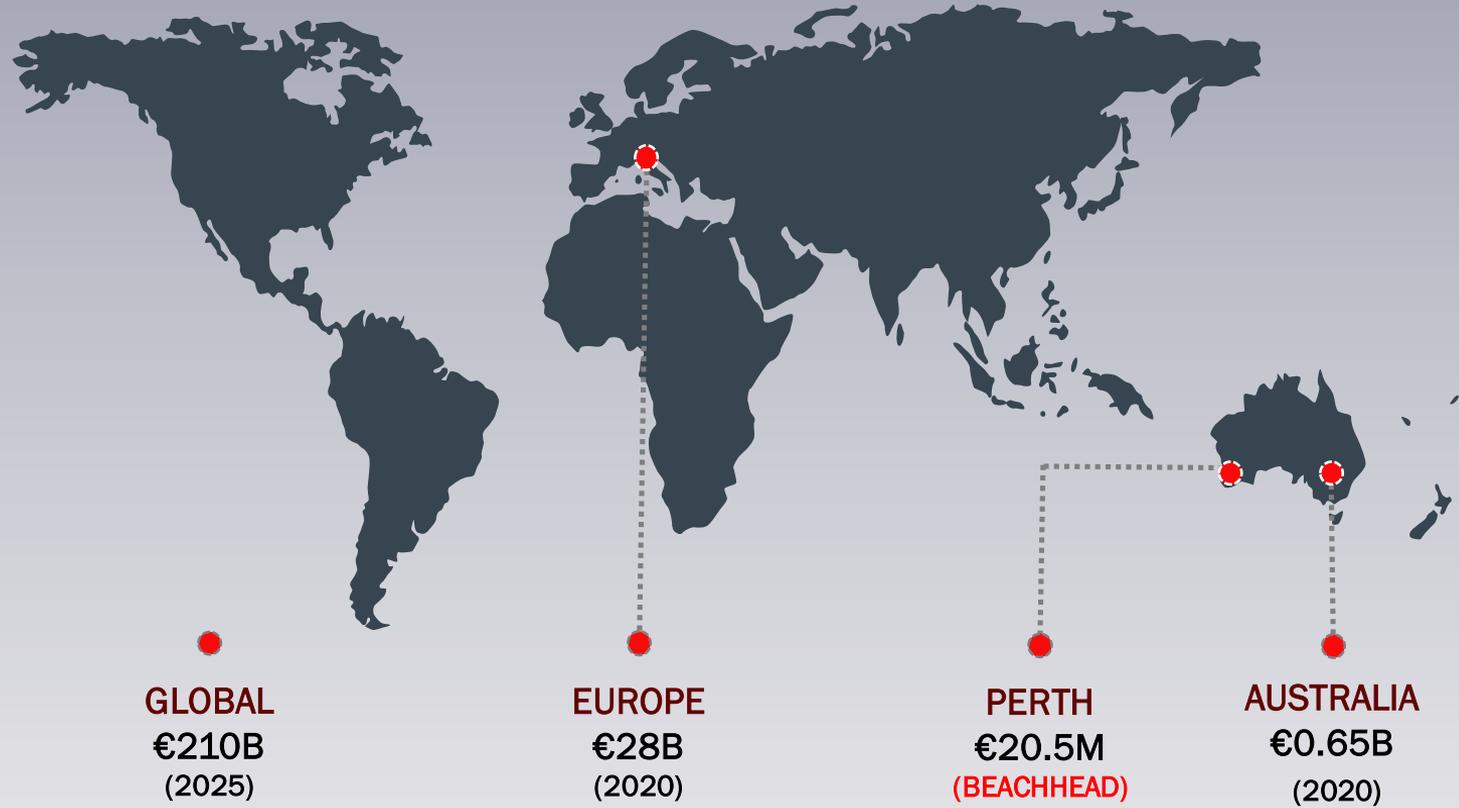




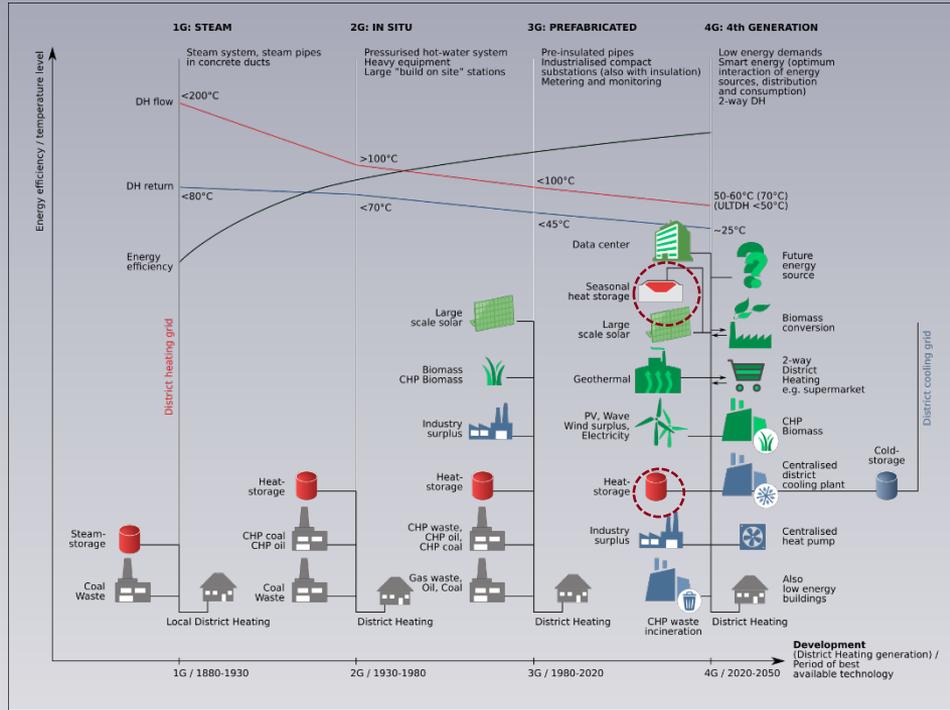
Space & Water Heating Market

- Commercial
- Industrial
- Residential
- District heating

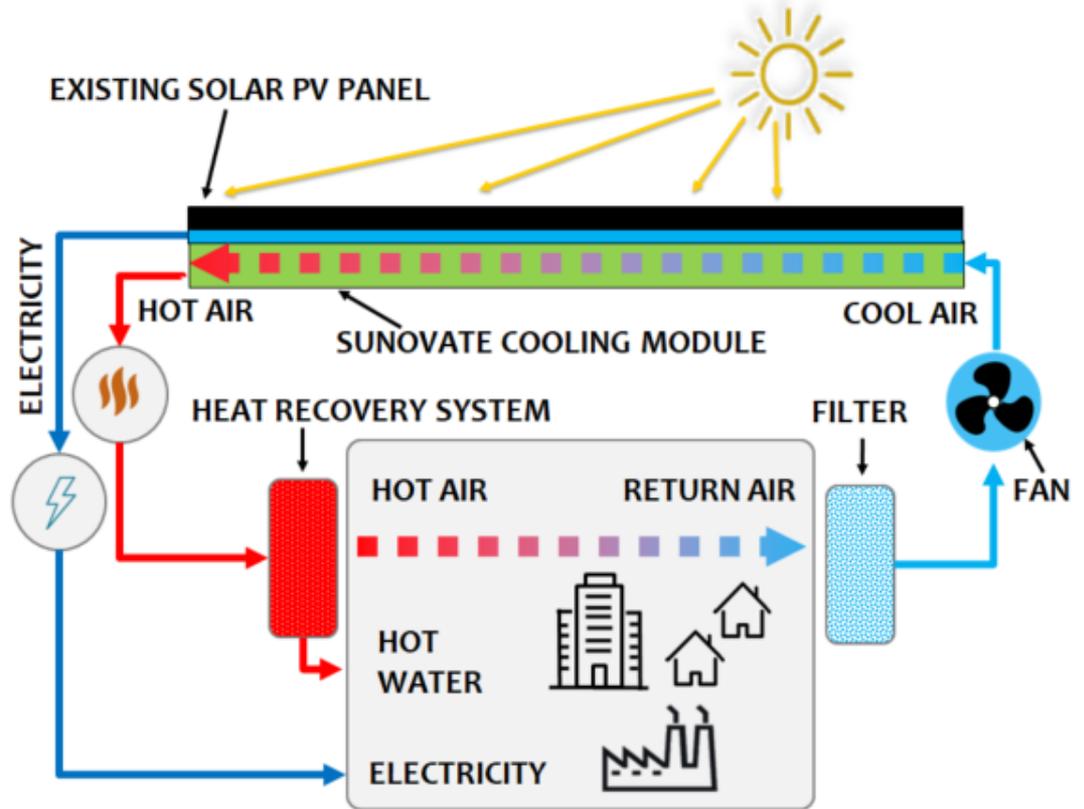
TAM ~10%



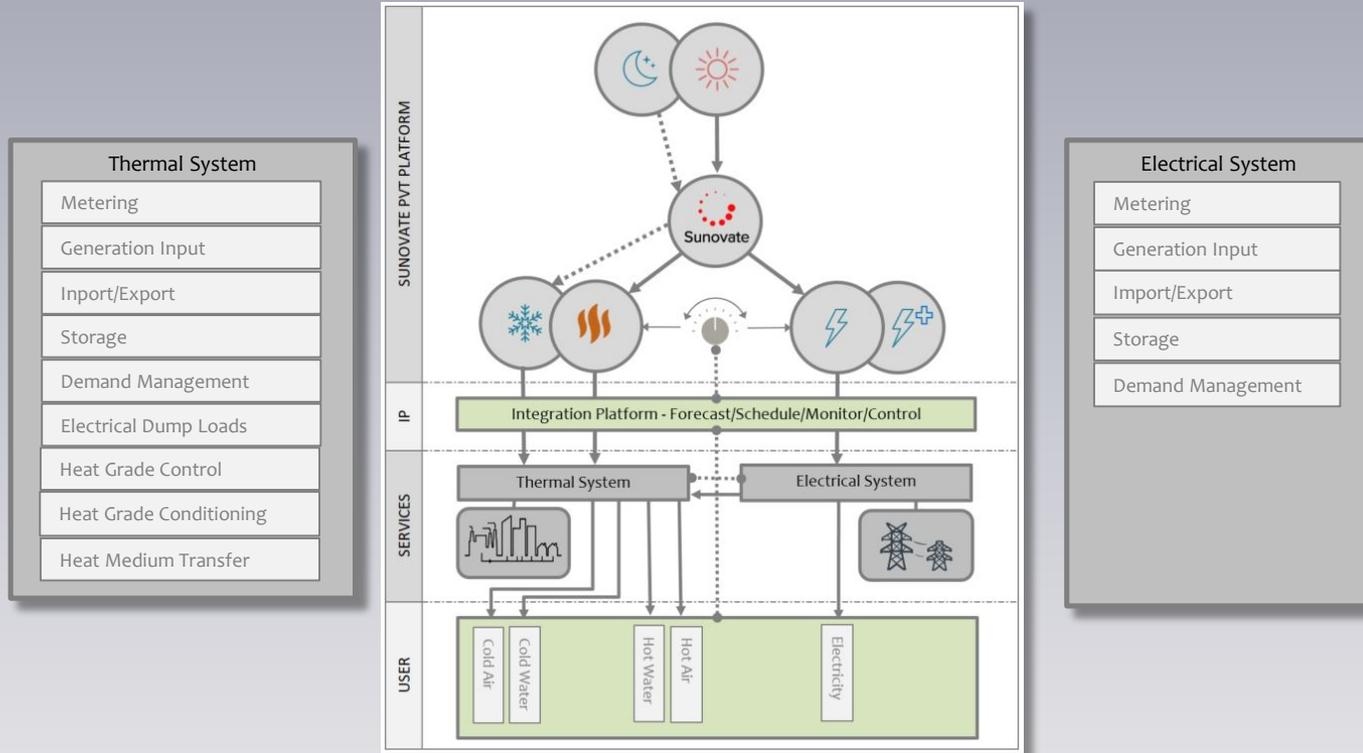
Heat Networks - Evolution 4.0



How Sunovate Works



Sunovate – Process Map



Sunovate Advantage – Multi Applications

- Direct air space heating
- Direct process heating/drying
- Hot water heating (via heat exchanger)
- Pool heating (via heat exchanger)
- Space heating (via heat pump heat exchanger)
- Hot water heating (via heat pump heat exchanger)
- Panel snow melt feature

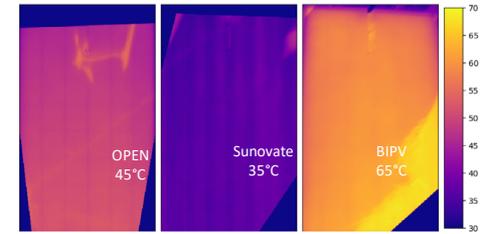


Sunovate Advantage - Even Heat Transfer

- Even cell temperature means;
 - Higher electrical yield
 - No hot cells
- Controlled air placement means;
 - Higher heat transfer rates
 - Minimised heated air re-entrainment
- Performance validated Curtin University, Western Australia

Client: Rytech Pty. Ltd.
Curtin Project: RES-SE-DME-AK-58073-1 **CONFIDENTIAL**
Prepared By: A. King

Curtin University
Rev: DRAFT Date: December 13, 2018



(a) left - uninsulated (b) centre - test panel - XXXX fan (c) right - insulated under panel

Figure 7: IR images at 1:05 pm on 15 Nov 2017



Sunovate Advantage - In Practice

Sunovate can be;

- Retrofitted to existing installations or fitted at point of manufacture
- Built into roofing panels or installed onto existing PV hardware
- Ground or roof mounted



Sunovate Advantage - Scalable Solution



Evaluation Projects - Australia

- Mobile panel test bench
- Residential install
- Project Pipeline:
 - Curtin University facilities
 - L3 Living Lab
 - Poultry farm
 - Mining/industrial
- Evaluation array test bed
- ARENA, E2EP (CRC RACE2030)

MOBILE TEST BENCH



L3 LIVING LABORATORY



CURTIN FACILITIES



RESIDENTIAL INSTALL





Seeking partners for;

- pilot projects
- future funding
- research partners

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