

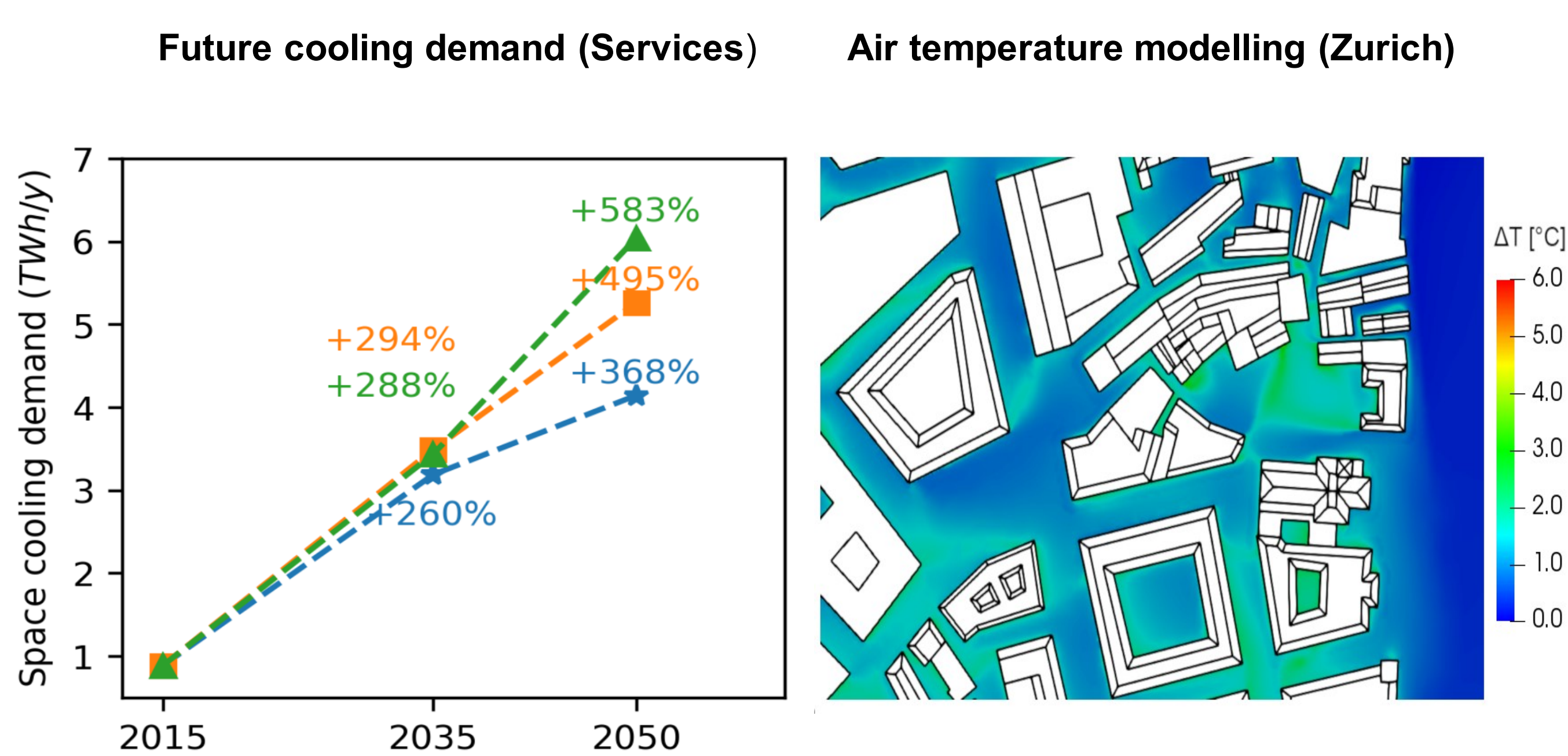
SCCER FEED&D Urban Renewables and Cooling

CITIES: FRIENDS OR FOES ?

- **Swiss buildings** are responsible for **37% of final energy demand** and **27% of domestic CO₂ emissions**.
- **Local renewable energies** (solar, geothermal, wind) will lead the urban energy system to **carbon neutrality**.

COOLING CHALLENGE

- **Rising temperatures** due to climate change will increase the **future cooling demand in urban areas**.
- **Future cooling demand and renewables potential in urban areas** were assessed at **national level**.
- **Urban Heat Island** effect on cooling demand is scrutinised by combining **mesoscale and district models**.



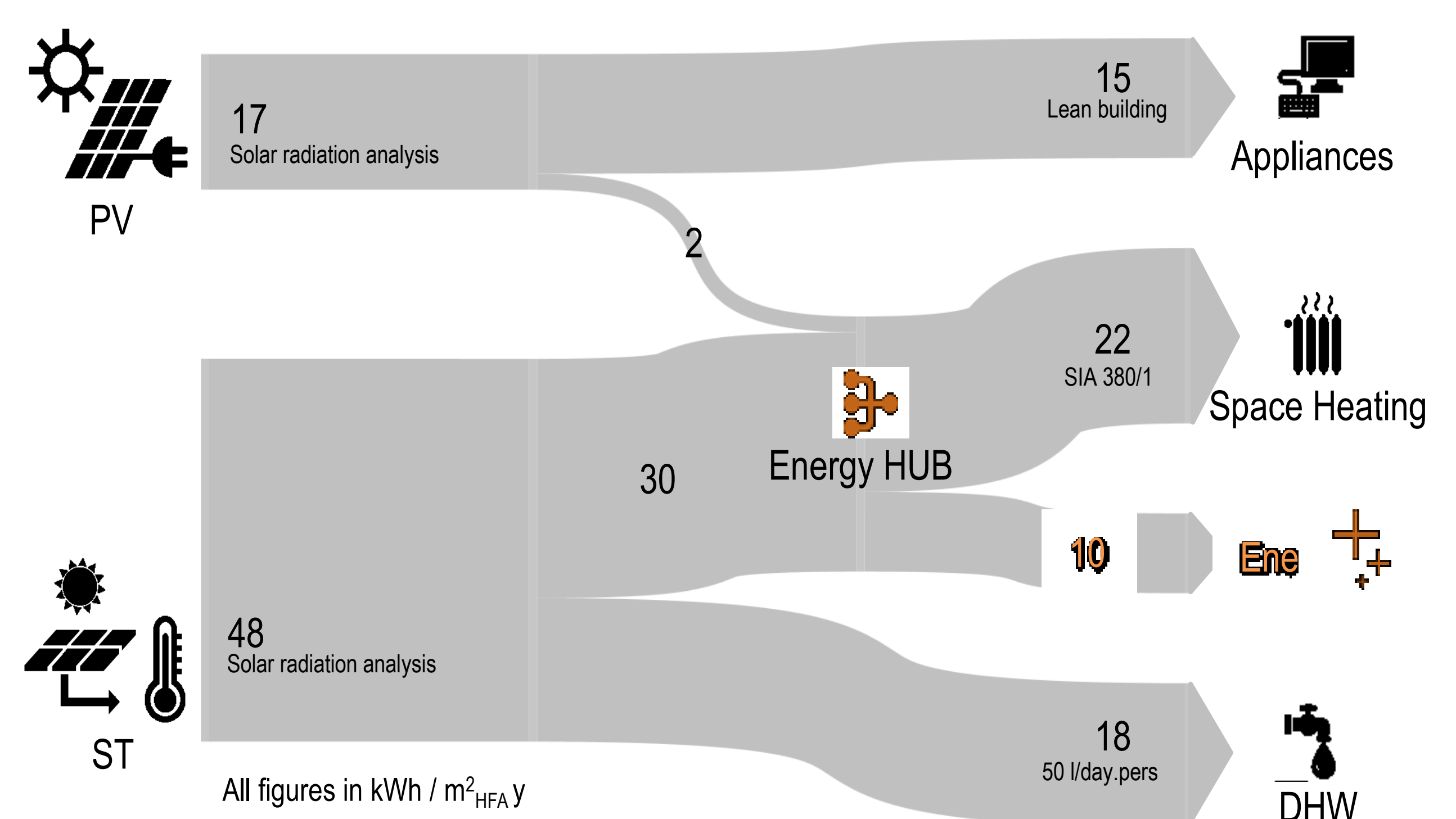
HARVESTING RENEWABLES

- **NEST SolAce** was set-up as a **future urban apartment** offering **optimal comfort** and **low environmental impact**.
- **Passive/active technologies** were implemented on the facades to generate **solar heat and electricity**.
- **Multi-functional facade elements** are comprising:
 - **Coloured nanocomposite glazing** for PV solar modules and solar thermal collectors
 - **Micro-structured glazing** for dynamic daylight and solar gain control
 - **Laser-treated glazing** fostering mobile communications
- **HDR vision sensors** for blind and electric lighting control favour **energy savings** and reduce **cooling loads**.
- **Evaporative cooling** using porous urban materials and **free cooling** in buildings can improve **outdoor/indoor comfort**.



KEY RESULTS

- **NEST SolAce** is **energy positive** for space heating, domestic hot water and appliances on an **annual basis**.
- **Embodied energy** fits to Minergie-ECO commended limit thanks to a **wooden-made modular prefabrication**.
- **Carbon neutrality** is achieved thanks to **CO₂ sequestration in wood products** over their life span.
- **Passive cooling measures** (window shades, night cooling) can be used in the future for **indoor climate control**.
- **Evaporative cooling solutions** and **urban greening** can be used to dampen peak air temperatures, reduce stress during heat waves and improve **outdoor comfort**.



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