

**LIPPU
LAIVA**











EMISSION FREE TOOLBOX

CARBON NEUTRALITY
CITYCON REACHES CARBON
NEUTRALITY BY 2030

Citycon's carbon neutrality target and measures

- Citycon's emissions were **10 114 tCO₂e** in 2021
- **85 %** of the current emissions are caused by district heating
- Citycon's target is to become **carbon neutral by 2030**. This is achieved by
 - reducing **energy consumption** and
 - increasing **own renewable energy production**
 - remaining emissions can be eliminated by purchasing green district heating (preferred) or compensated by offsetting
- Reaching the target requires energy efficiency measures conducted in the centres – each centre can contribute towards meeting the target!

Measures to reduce CO₂ emissions

 Solar energy	 Green products
 Local heat/cooling production	 Replacing gas heating
 Energy efficiency improvements	 Energy storage
 LED lighting	 Compensation

ENERGY STRATEGY

Carbon neutral

Maximize on-site renewable energy production

Waste & Energy recycling

Participating regional energy markets



Smart Energy Control

Possibility to cut peak outputs

Energy storage solutions

Smartgrid to control energy flows

Interactive user management system

Consumption optimization

- Passive and structural energy management methods
- High-end solutions on hvac systems
- Demand based control of maintenance and technology
- Management is based on data collected by the building

...and SMART SUSTAINABLE ELECTRICITY SYSTEM

**PV PANELS TO ROOF AND FAÇADE
AND ELECTRIC BATTERY**

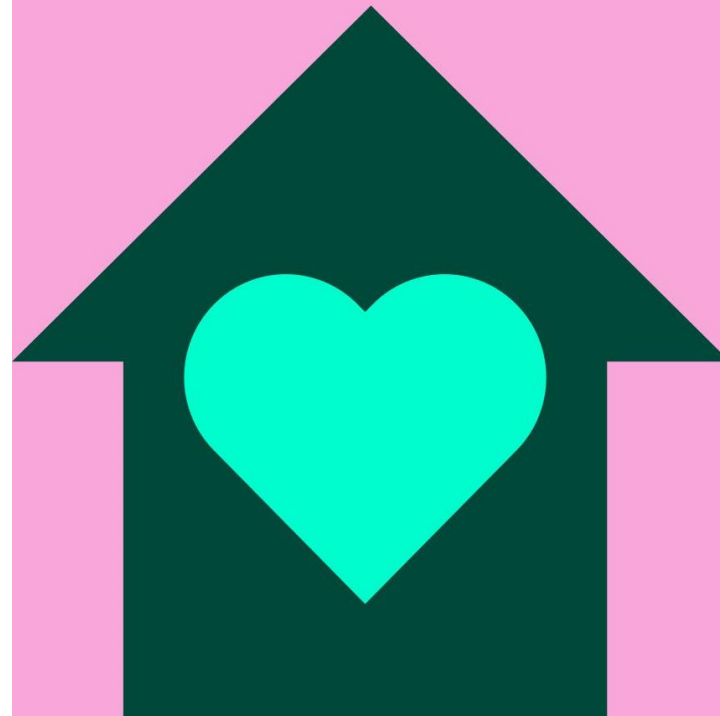
**MICROGRID SYSTEM WITH SMART
CONTROL OF ELECTRICITY AND
ACTIVE PARTICIPATION TO
RESERVE MARKETS**

**TARGET TO MINIMIZE ENERGY
COSTS BY FOLLOWING ELECTRICITY
PRICE AND GAIN PROFITS FROM
RESERVE MARKETS**

**Electricity
consumption**

Lightning, HVAC,
charging of eVehicles,
elevators and escalators,
heat pump system, etc..

**Onsite electricity
production and storage**



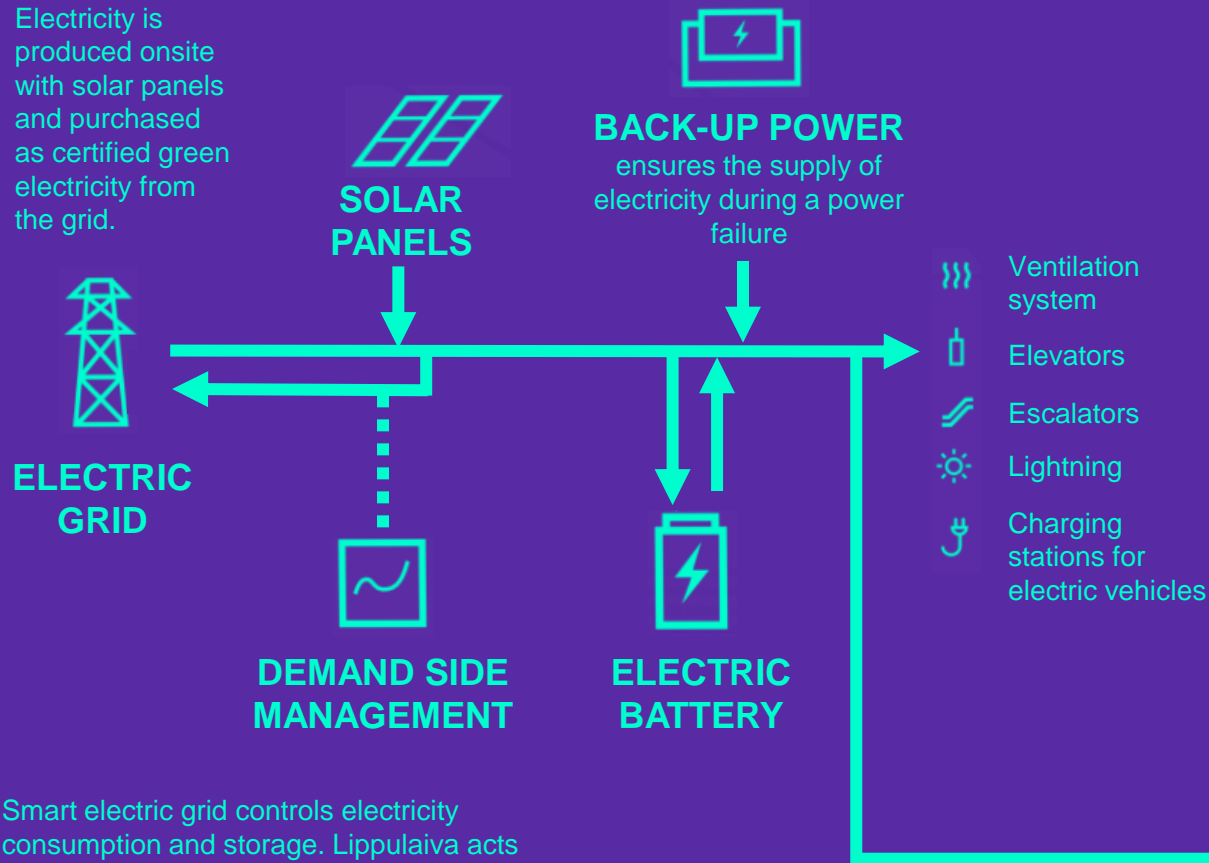
ONSITE THERMAL ENERGY SYSTEM BY ADVEN

- EUROPE'S LARGEST HEAT PUMP SYSTEM IN COMMERCIAL BUILDING

Thermal energy consumption	Thermal energy system	Carbon neutral heating and cooling
<ul style="list-style-type: none"> ▶ Heating for <ul style="list-style-type: none"> ▶ Space heating ▶ Domestic hot water ▶ Cooling for <ul style="list-style-type: none"> ▶ Space cooling, all year round ▶ Cooling of ventilation air, when outdoor temperature exceeds 15°C 	<ul style="list-style-type: none"> ▶ Onsite geogeneity field <ul style="list-style-type: none"> ▶ Geowells 170 x 300m, over 51 km ▶ Energy center <ul style="list-style-type: none"> ▶ Heating capacity of heat pumps 4000 kW (four heat pumps) <ul style="list-style-type: none"> ▶ Also heat recovery from excess heat (condensed heat from space heating and cooling of ventilation air) ▶ Electric boiler 500 kW ▶ District heating connection 	<ul style="list-style-type: none"> ▶ Geowells act as thermal energy storage ▶ Approximately 95% of heating consumption and 100% of cooling consumption is covered onsite <ul style="list-style-type: none"> ▶ Electric boiler and district heating used for back-up ▶ District heating connection gives possibility to sell heating from Lippulaiva to local district heating system in future ▶ Energy as a service by Adven <ul style="list-style-type: none"> ▶ Designing and implementation of thermal energy system, operating and maintaining the facility

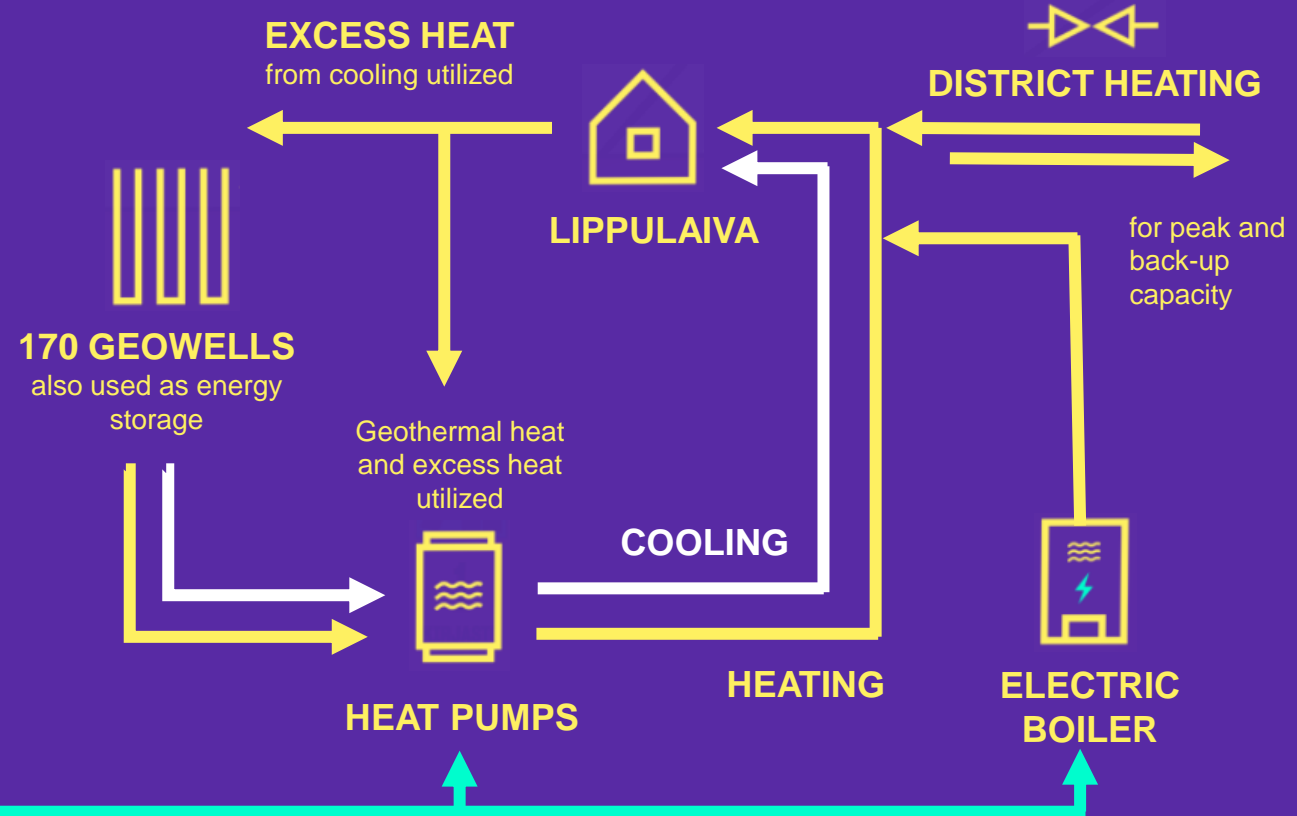
ELECTRICITY SYSTEM

Electricity is produced onsite with solar panels and purchased as certified green electricity from the grid.



Smart electric grid controls electricity consumption and storage. Lippulaiva acts as an active partner in reserve markets.

THERMAL ENERGY SYSTEM



PARTICIPATING THE ELECTRICITY RESERVE MARKETS



- Lippulaiva is participating Finnish demand response markets. In practice it means we are constantly monitoring our energy usage.
- When National energy network is affected by energy loss or peak, Lippulaiva is offering it's resources to balance the market demand.
- There are few optional markets real estates can participate; FCR-N, FCR-D and FFR. All the markets have on limiting values;
 - **Minimum resources offered**
 - **Response times**
- Allocation strategy defines which resources, market places and times are being used.

EXPERIENCE FROM SPARCS AND SMART BUILDINGS

- Think outside of the box building
- You can simulate as much as possible in beforehand, but actual will be different.
- Is current electricity planning agency/person capable of providing smart building planning?
- Role of modern technology is growing > *partnership vs vendor lock*
 - You need to commit for partners earlier, than in normal model
- Contract model (hardware vs service) > *negotiation & maintenance*
- Expertise needed from buyer side
- Analyze realistically emission factors > on what you can affect and make biggest impact?
- Perfect timing was yesterday > act sooner than later

CONCLUSION



Contact:
Kimmo Hyttinen
040-5704953
Kimmo.hyttinen@citycon.com

- Real estate sector need to be prepared for the volatility in energy markets
- In old buildings we are used to have many technical stand-alone systems with some smartness, which are not talking with each other
- Reporting needs for different parties varies significantly; owner, manager, technical staff, tenants etc. Correct data should be available anytime to all of the parties.
- New expertise needed from managers and technical personnel as systems are getting more complex and technical.
- Internal networks are getting closer to traditional IT systems. Cyberrisks have to be taken seriously in all of the processes.
- Reliable metering, analytics, adjustability and optimizing whole property energy usage has key role.