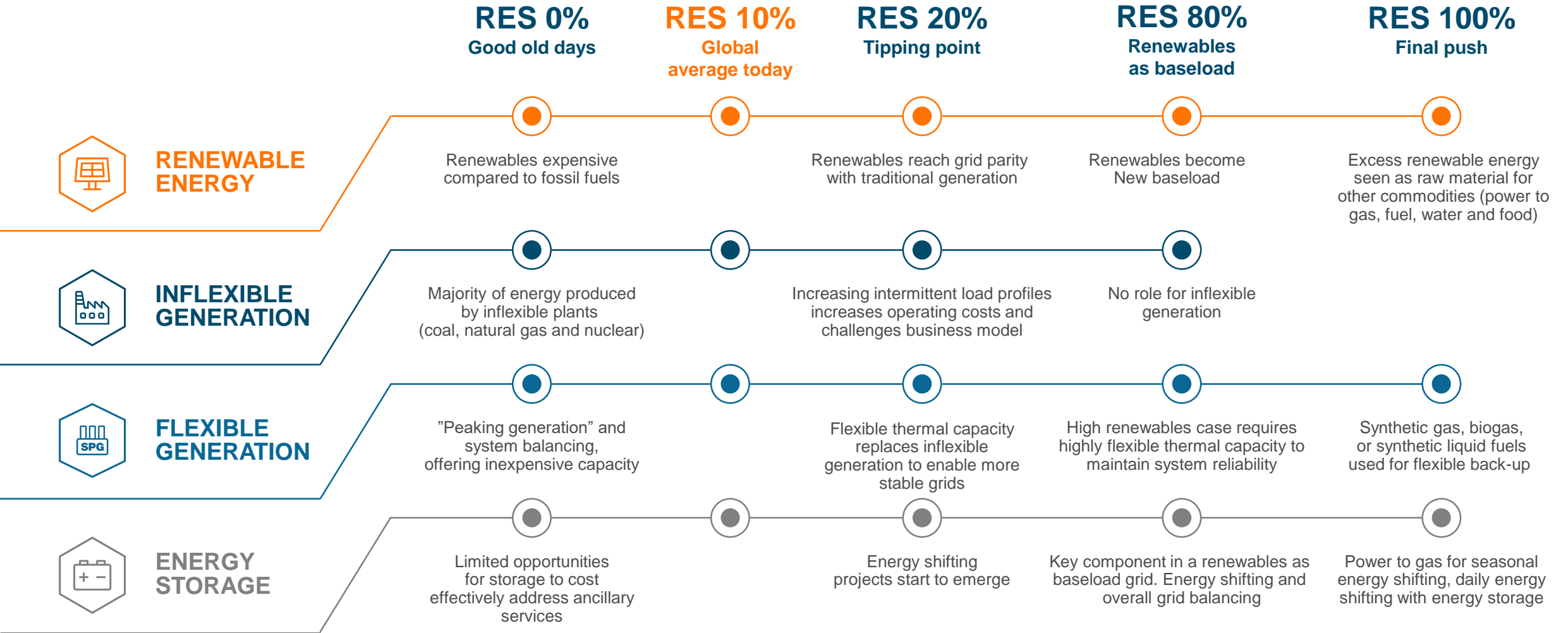
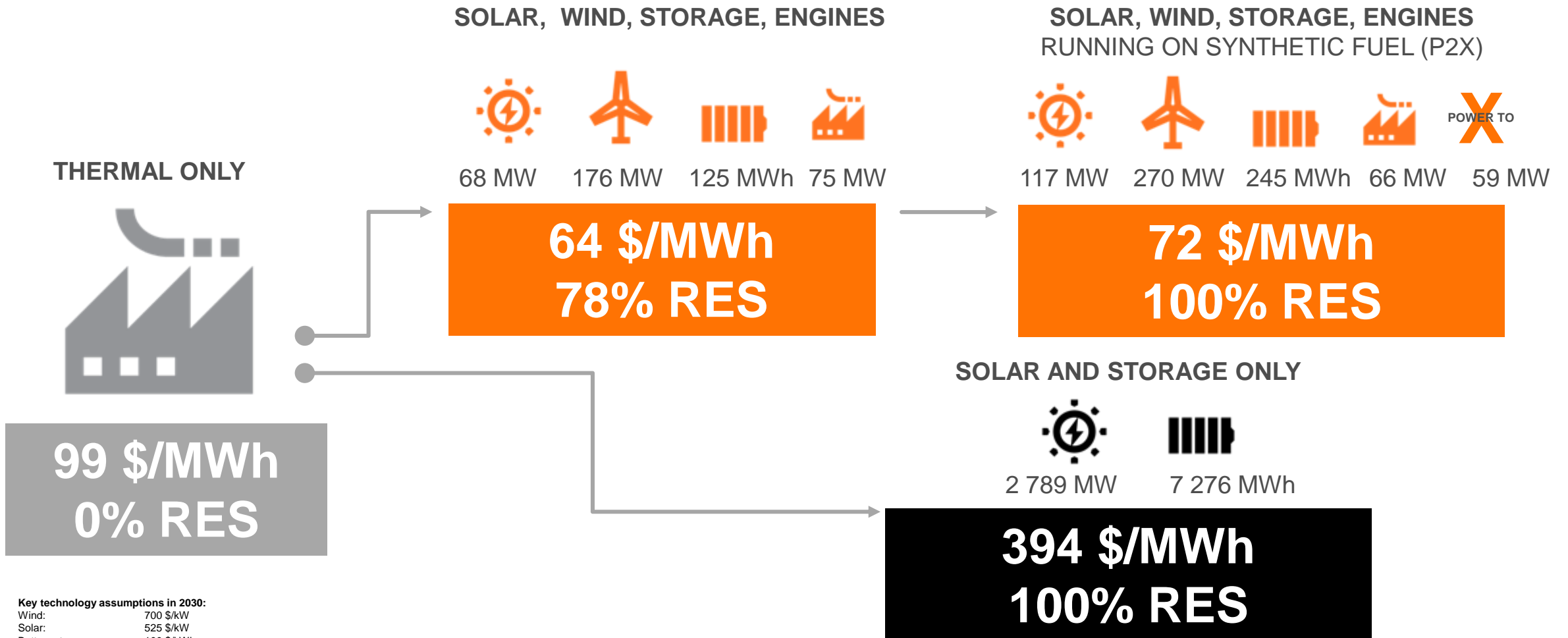


# POWER TO X:STA LIIKETOIMINTAA JO TÄNÄÄN

MATTI RAUTKIVI  
DIRECTOR, BUSINESS DEVELOPMENT, WÄRTSILÄ ENERGY



# THE RIGHT FLEXIBILITY MIX ENABLES AN OPTIMISED TRANSITION



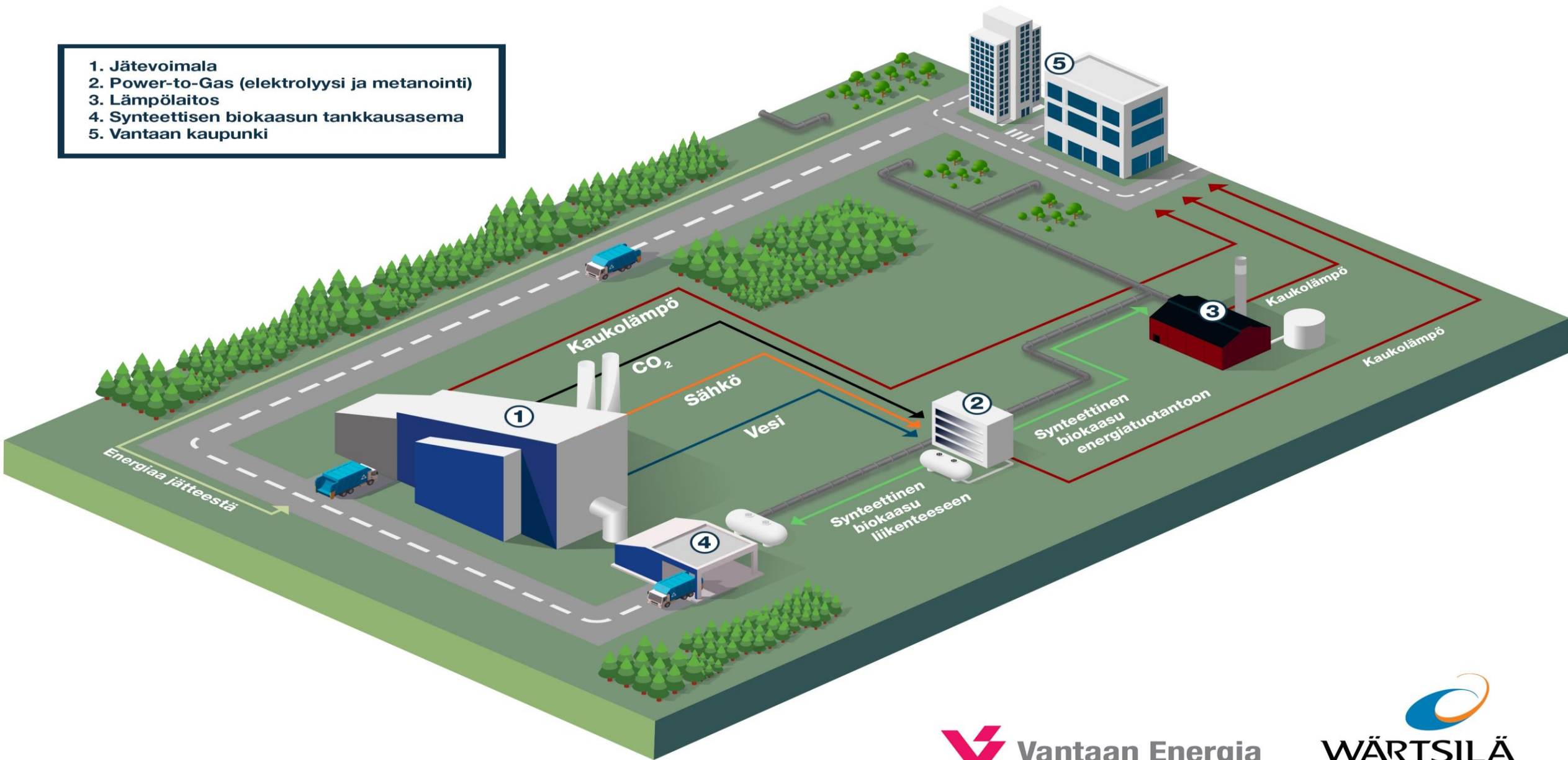
**Key technology assumptions in 2030:**  
 Wind: 700 \$/kW  
 Solar: 525 \$/kW  
 Battery storage: 100 \$/kWh  
 Power-to-X: 700 \$/kW  
 Thermal options: same as today

# Wärtsilä: Autamme asiakkaitamme murroksessa kohti 100% uusiutuvaa energiaa

- Teknologiyhtiön on tärkeää ymmärtää tulevaisuutta oikeiden teknologioiden kehittämiseksi
- Tulevaisuuden sähköjärjestelmien mallinnusosaaminen avainasemassa päätöksenteossa
- Uusiutuvasta energiasta valmistettu synteettinen biokaasu tärkeä osa uusiutuvalla energialla toimivia sähköjärjestelmiä
- [Atlas of 100% Renewable Energy](#) esittelee kustannustehokkaimman, täysin uusiutuvaan energiaan perustuvan sähköjärjestelmän 145 alueella



1. Jätevoimala
2. Power-to-Gas (elektrolyysi ja metanointi)
3. Lämpölaite
4. Synteettisen biokaasun tankkausasema
5. Vantaan kaupunki



# NEBRASKA PUBLIC POWER DISTRICT & LAPPEENRANTA UNIVERSITY OF TECHNOLOGY

Wärtsilä, Lappeenranta University of Technology (LUT) and Nebraska Public Power District (NPPD), signed a Memorandum of Understanding for the study of the development of a business case for the use of alternative fuels with Wärtsilä generating sets.

The aim is to achieve a technically and commercially viable solution that will allow NPPD to proceed with an industrial scale pilot project. This initiative will help accelerate the move towards a future based on 100% renewable carbon free sources. The specified alternative fuels include methanol, dimethyl ether (DME) and ammonia, synthesised from hydrogen, CO<sub>2</sub> and nitrogen.

# WÄRTSILÄ X CARBON RECYCLING INTERNATIONAL

The Icelandic company Carbon Recycling International (CRI) won the Wärtsilä arranged SparkUp challenge, in which Wärtsilä was looking for start-ups and scale-ups to share solutions within the Power-to-X field.

Wärtsilä and CRI continued by working together on a feasibility study for scaling up the Power-to-X technology to a commercial scale and finding synergies between both Wärtsilä and CRI.

# WÄRTSILÄ X Q POWER

Wärtsilä and Q Power, a Finnish pioneer in biomethanisation, will cooperate to accelerate the development and commercialisation of renewable synthetic fuels.

Both companies will work closely together to further develop the market and to find business opportunities for biomethanisation and synthetic fuels globally. The first target of the cooperation is to showcase a mobile demonstration plant at the Finnish pavilion at Expo 2020 Dubai between October 2020 and April 2021.



# WÄRTSILÄ X JOUTSENO PILOT PLANT

Wärtsilä together with Lappeenranta University of Technology (LUT) and multiple other major companies including Neste, St1, Finnair have started a feasibility study for the first-of-its-kind synthetic fuels pilot production plant in Finland.

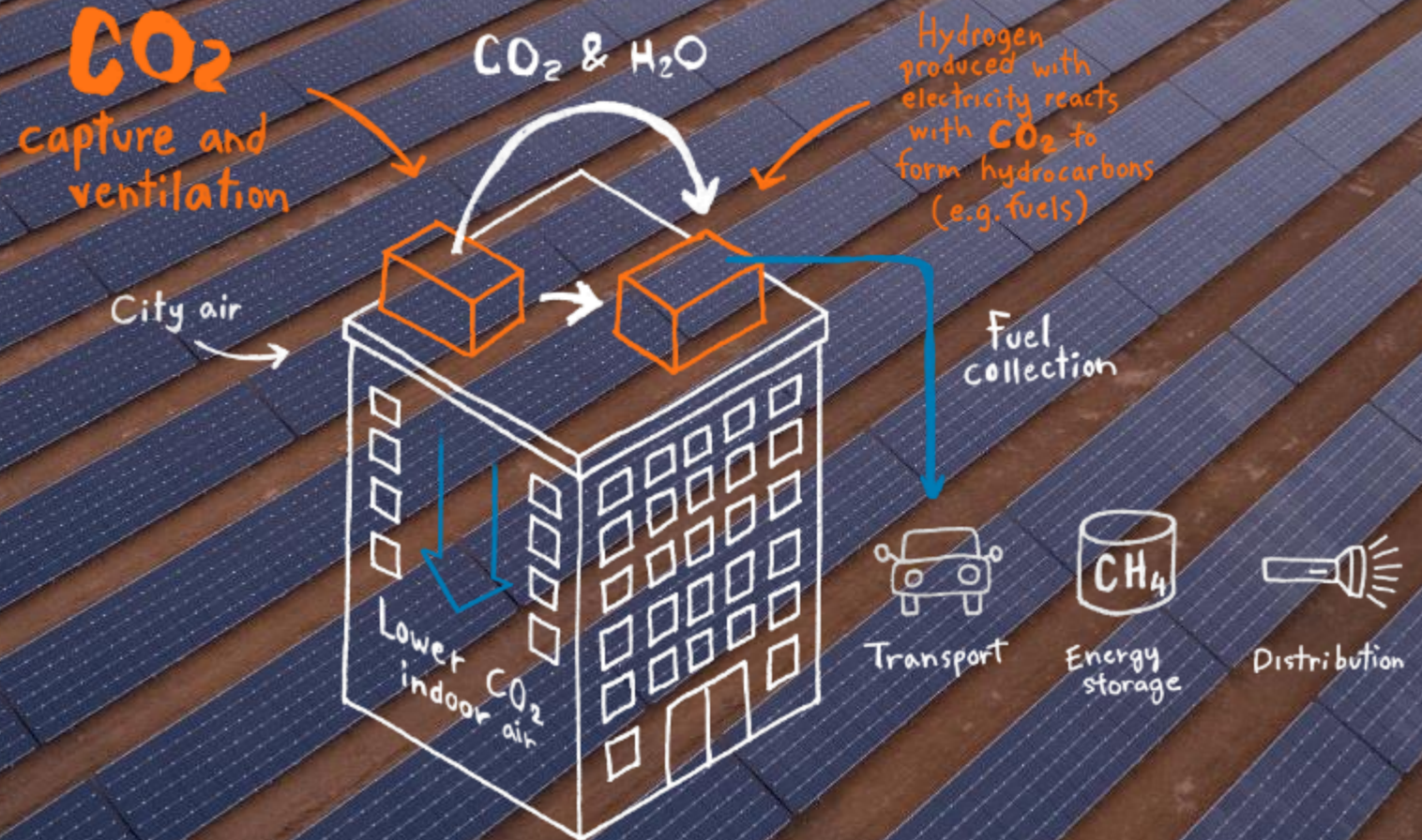
The pilot plant will utilise CO<sub>2</sub> emissions from the cement facility in Lappeenranta, Finnsementti, as well as by-product hydrogen from Kemira's production as raw materials. Through a synthesis combining the CO<sub>2</sub> and hydrogen, methanol is planned to be produced in industrial-scale with expected volume of 27 000 tonnes per year. Wärtsilä and St1 are working closely together to materialise this project.

# HIILINEUTRAALI SUOMI



# WÄRTSILÄ X SOLETAIR POWER

- › Wärtsilä is seed funding Soletair Power Oy
- › Soletair Power's solution represents an important step towards carbon neutral societies and supports Wärtsilä's strategy in leading the energy sector's transformation towards a 100% renewable energy future
- › Improved efficiency in people because of the improved air quality





**WÄRTSILÄ**