

**MERICA GROUP OF COMPANIES
AND**



**SMART GRID SOLUTIONS
FOR MINI-GRIDS**

June 2015



Who is Lichtblick?



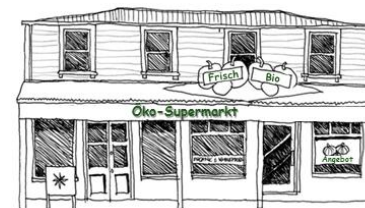
440 employees



575.000 households



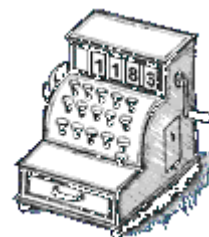
8 sales offices nationwide



47.500 commercial customers



1.600 grid operator working relations



724 Mio. € turnover

Who is Merica Group of Companies in Asia?

Malaysia

Central project development and support team:

- RE system design
- Software integration



Vietnam & Philippines


- Country level organization including legal and technical team members
- Developing local projects and managing stakeholders at all levels

Who we are – Merica Energy in this room



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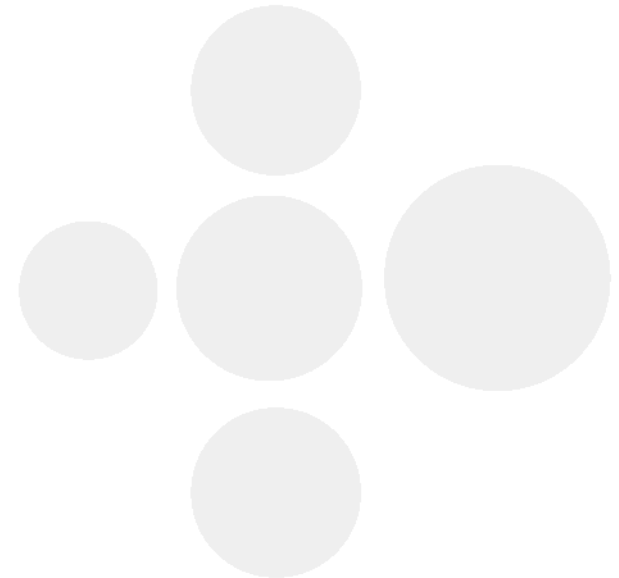
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Malaysia



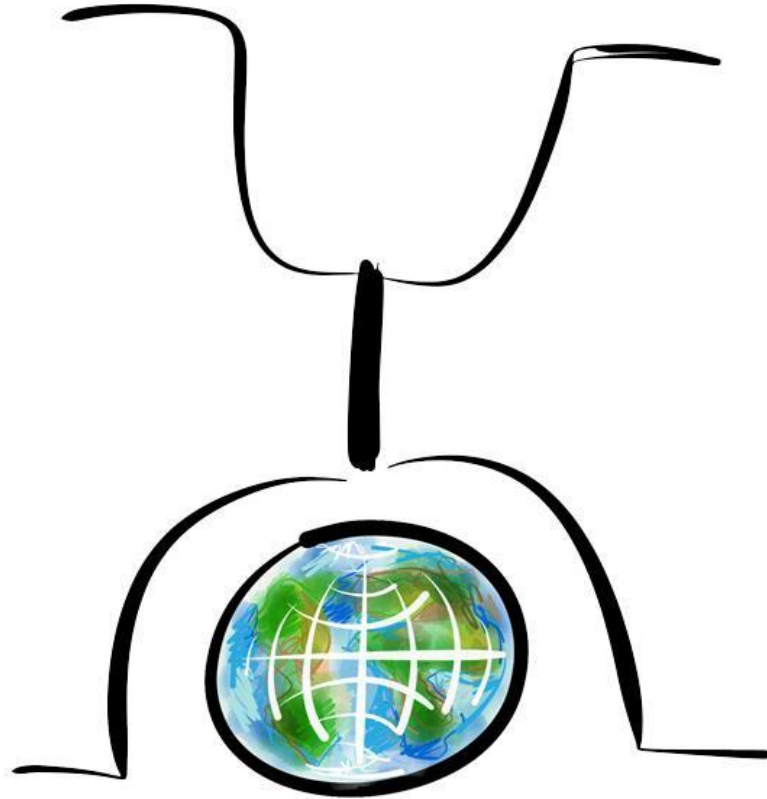
Agenda



- **The (new) Energy World**

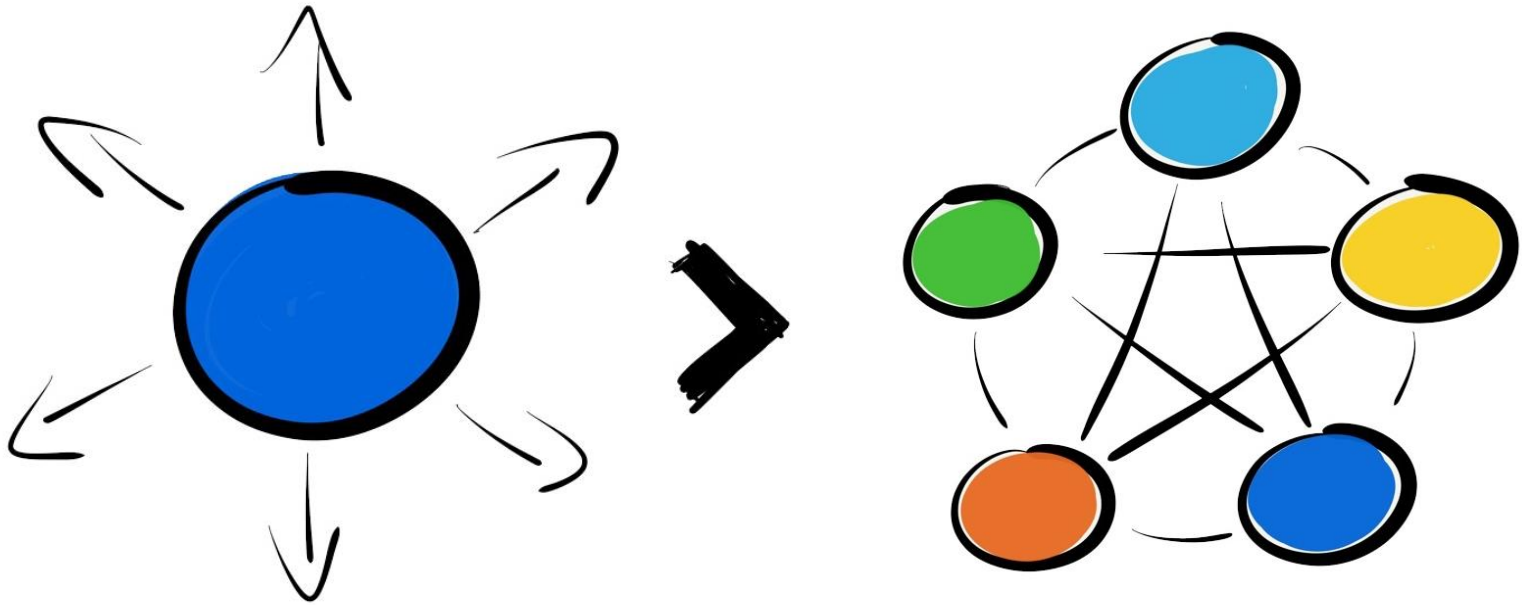
- LichtBlick and the 'Swarm'-Approach
- Opportunities for Implementation in Asia

The new energy world (in Europe) Upside down !



The new energy world

From large power plants to small distributed systems



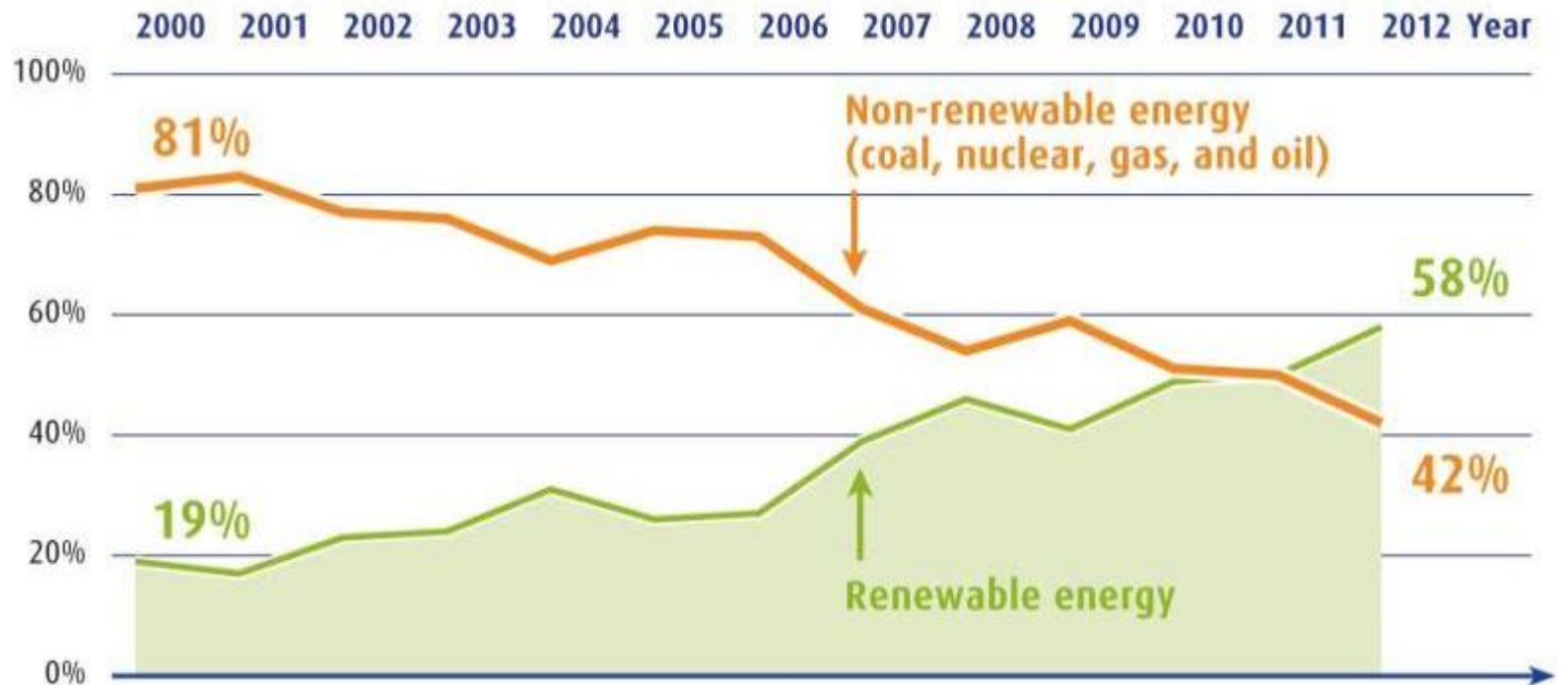
The old electricity producers



The new electricity producers - Prosumers

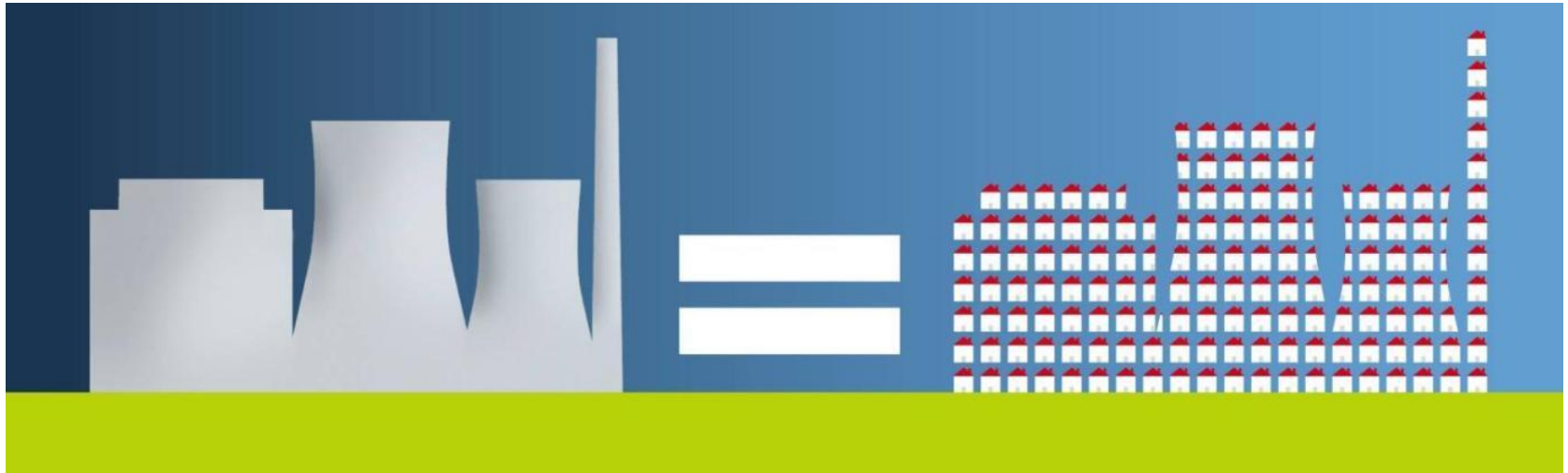


In Germany, installed RE capacity exceeds the capacity of conventional power plants

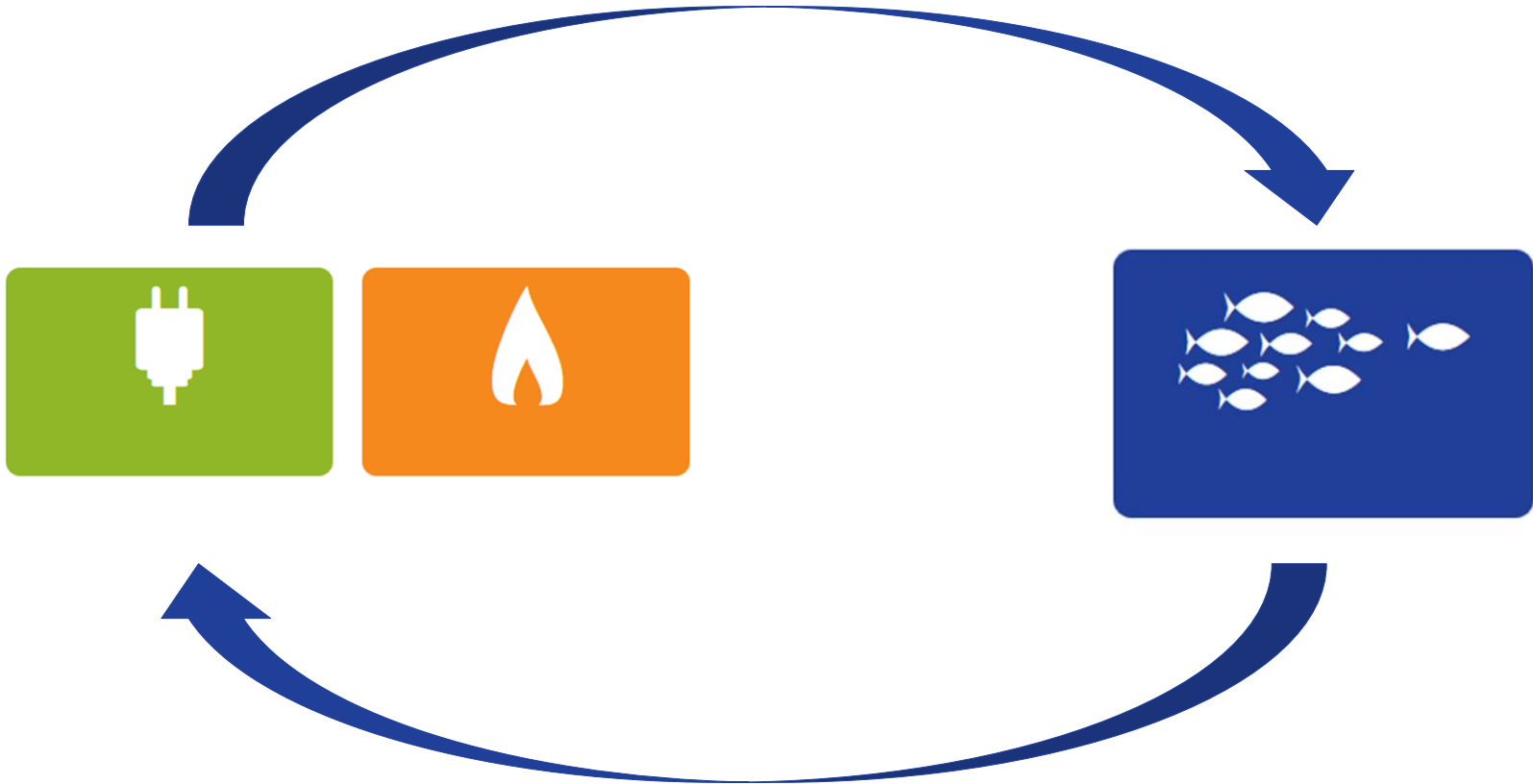


Source: LichtBlick SE / IRENA Database

Many 'ProSumers' suddenly replace entire conventional power plants



Only one problem: How to coordinate this 'swarm' of distributed plants, flexible demand and battery storage



Agenda

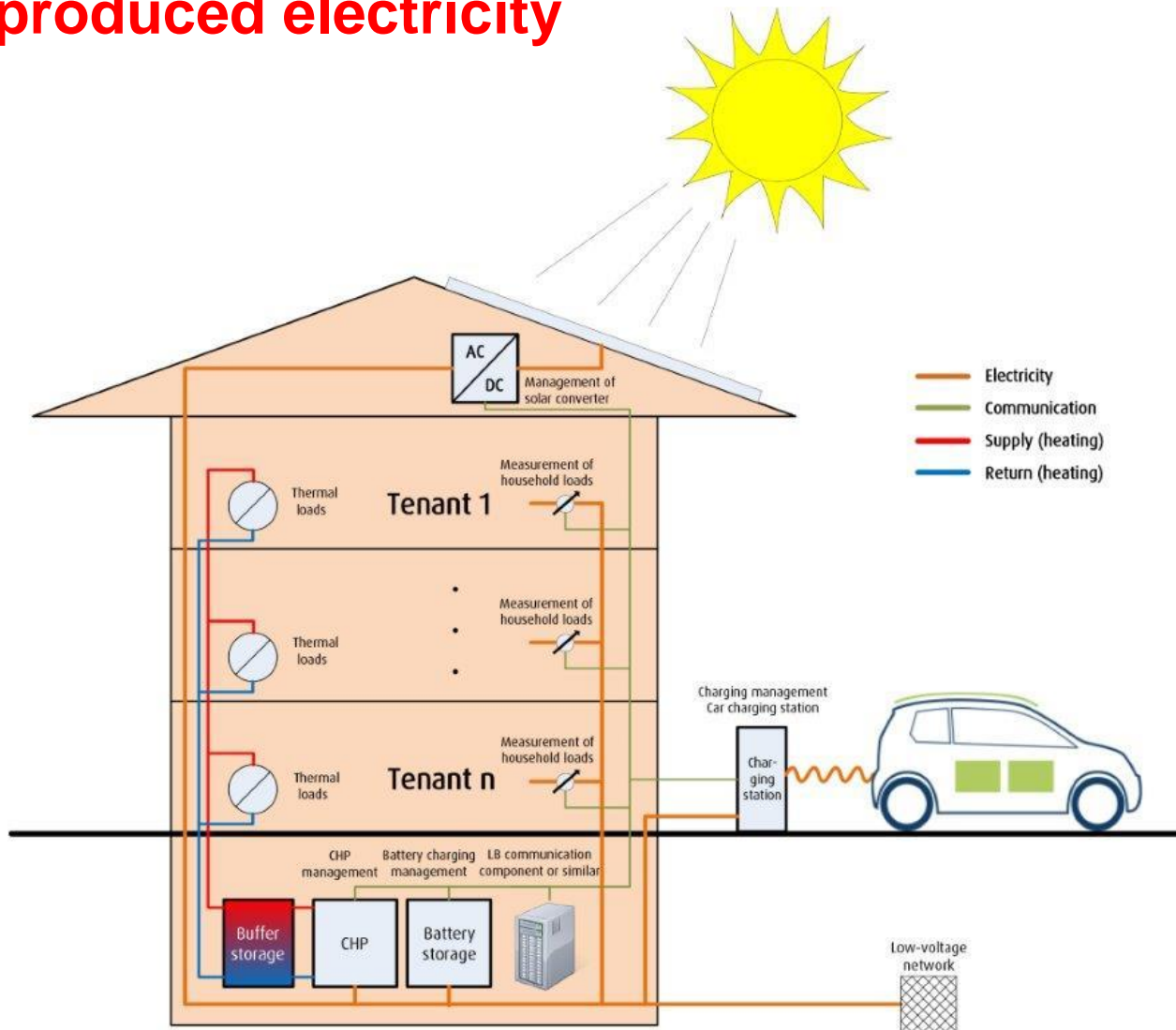


- The (new) Energy World
- **LichtBlick and the 'Swarm'-Approach**
- Opportunities for Implementation in Asia

SchwarmDirigent or 'Swarm Conductor'



'Swarm House' to maximize the own consumption of locally produced electricity



The Yellow Quarter in Berlin

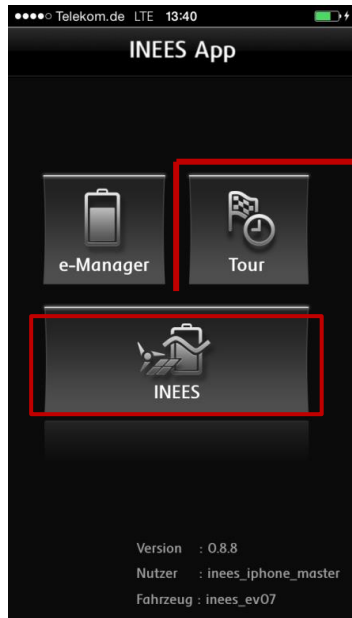


Integration of electric vehicles

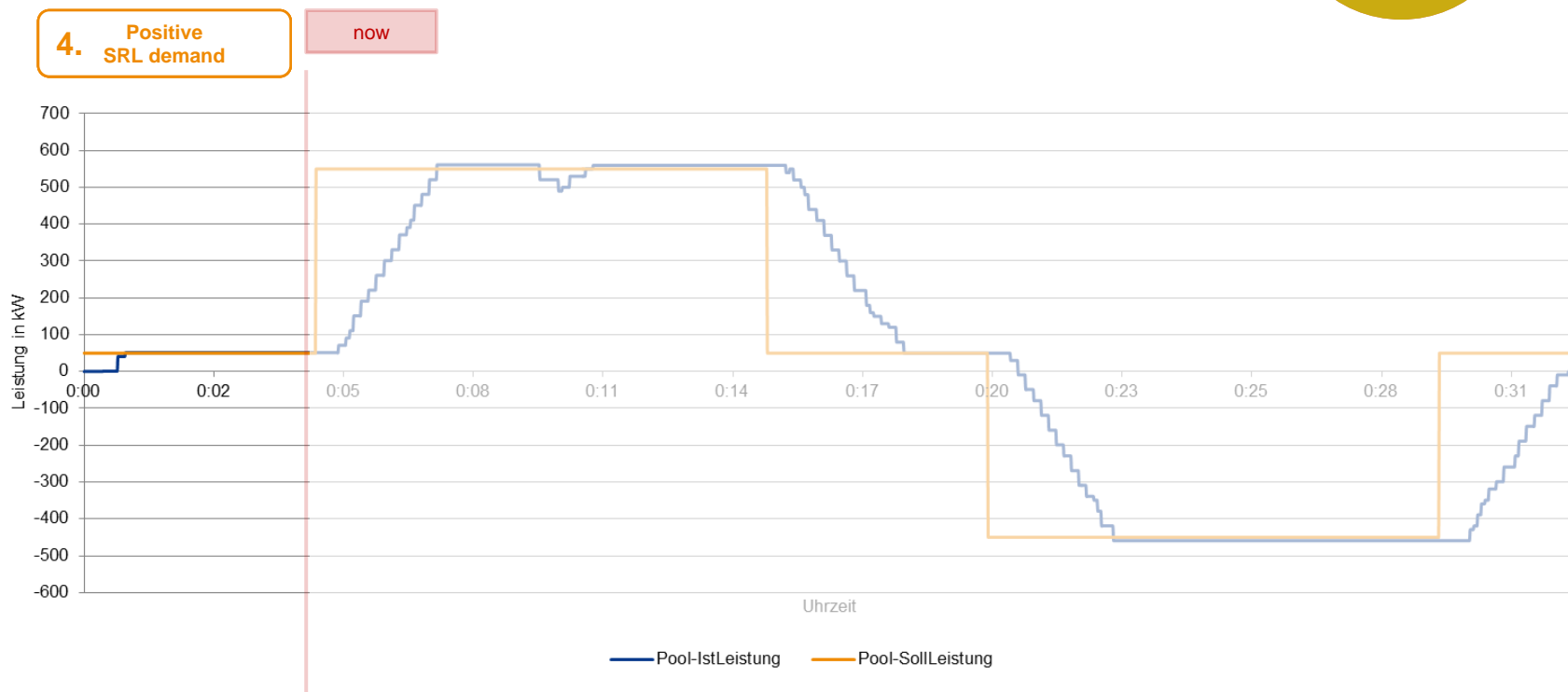
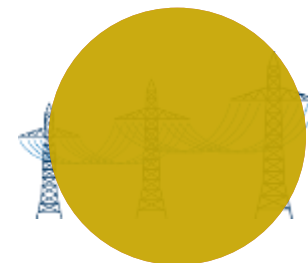
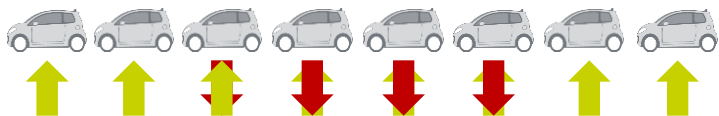


Research project
for e-mobility.

'SwarmMobility' App to manage vehicle battery storage



Supplying balancing power with 'SwarmMobility'

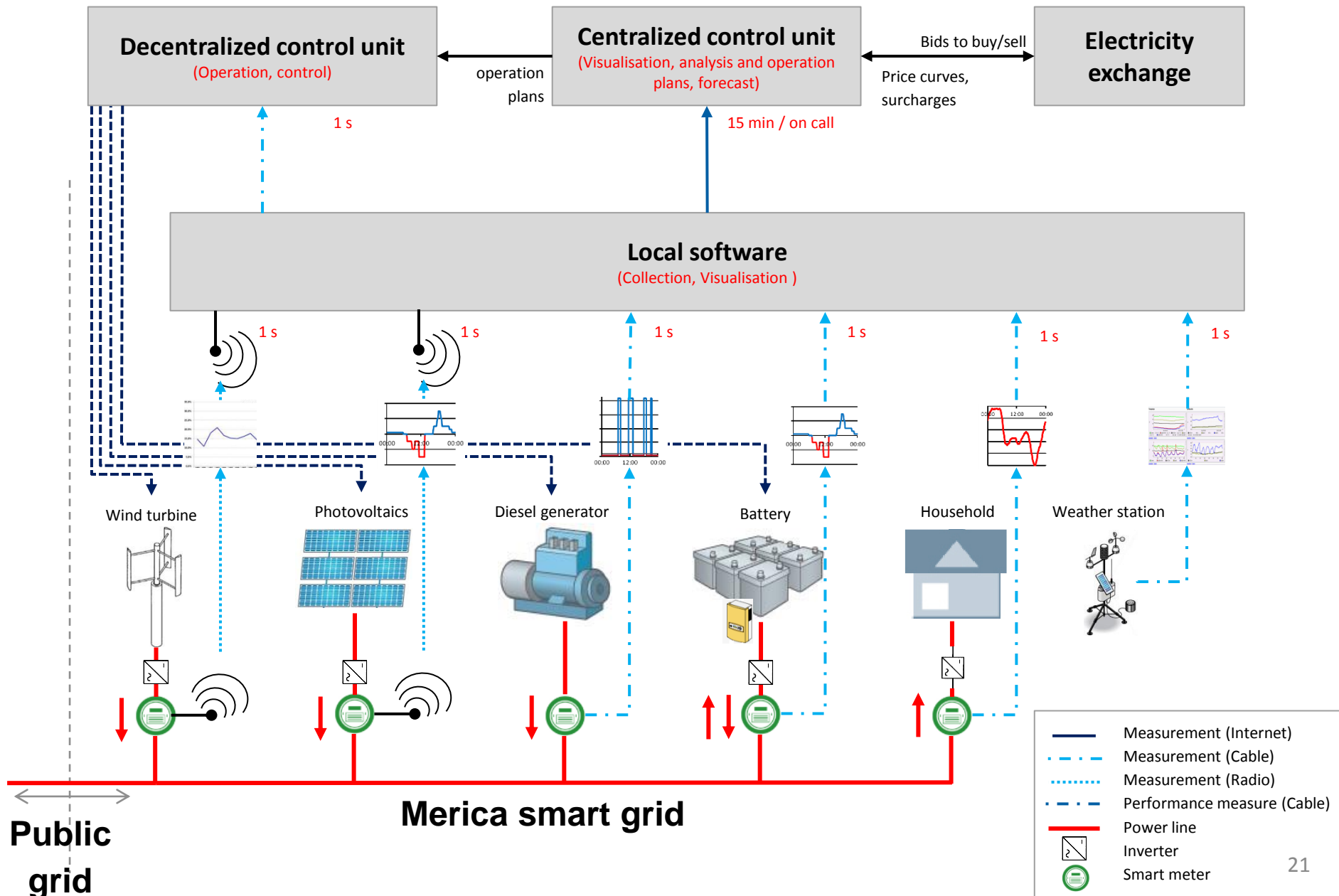


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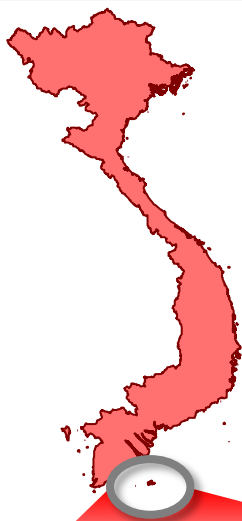
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- **Opportunities for Implementation in Asia**

SchwarmDirigent connected with grid and exchange



Pilot Project in Vietnam to replace 90% of diesel

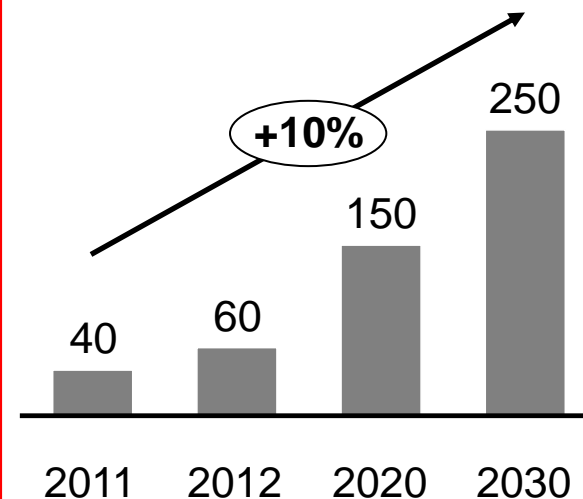
Key facts of the island Con Dao



- Located in the South of Vietnam
- No grid connection to the main land
- Total area: 76 km²
- Population: 7,000 people
- Annual income: 1,064 USD (2010)

Tourism growth & potential

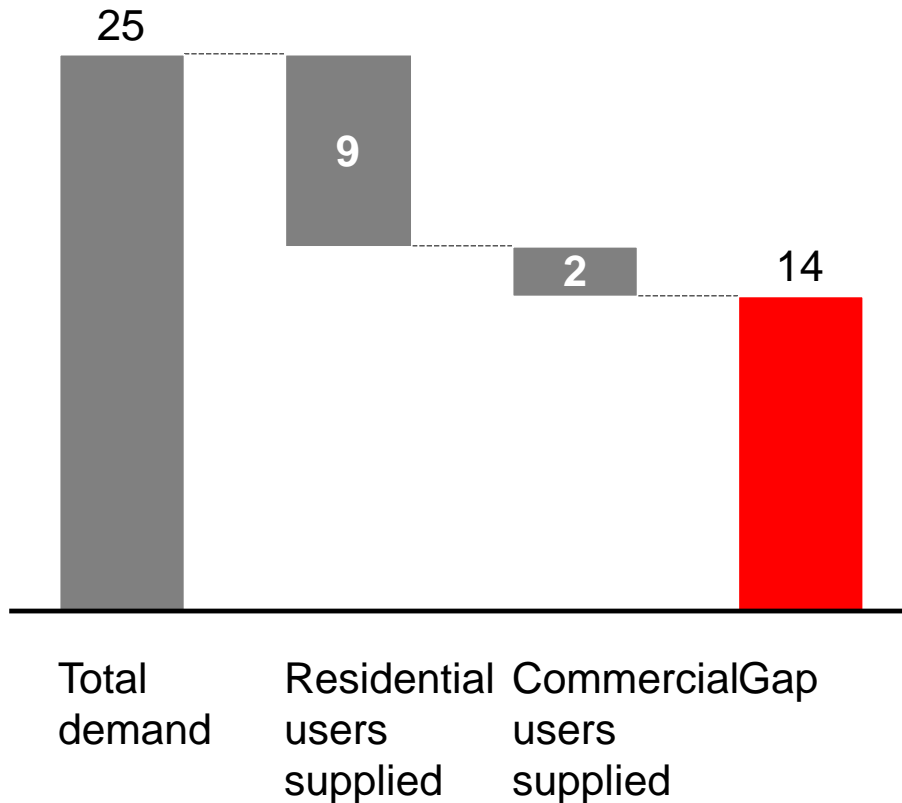
in thousand visitors per year



Current electricity supply is insufficient and inefficient

Electricity supply and demand balance for island in 2014

in million kWh



Implication

- Most of the hotels and other commercial users do not have a grid connection and run their own individual diesel generators.
- No renewable energy capacity installed. 5-year plan to expand existing diesel capacity.
- Overall very inefficient use of the available load.

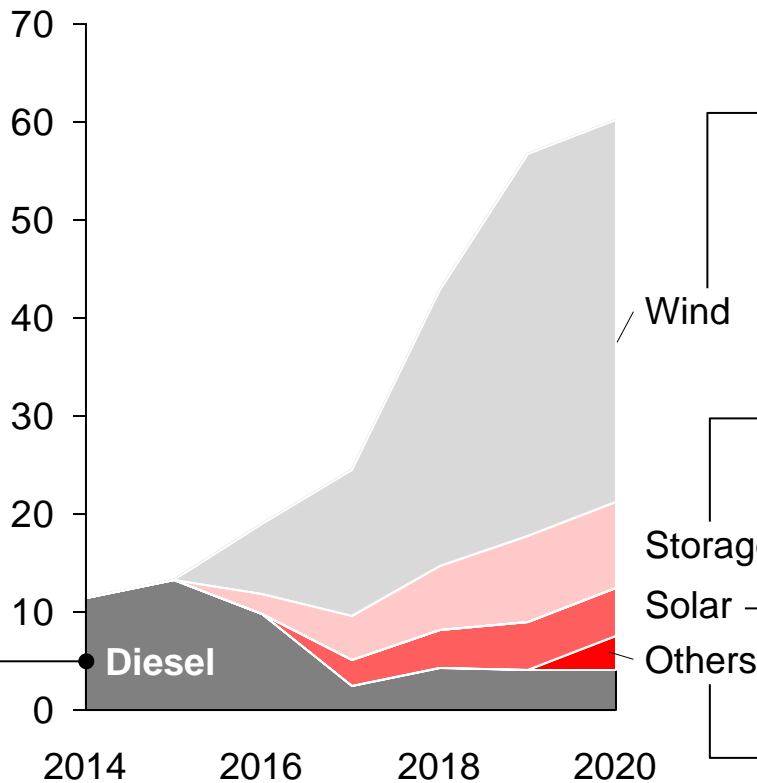


Gradually shift the energy generation towards a mix of renewables + battery + 'some' diesel

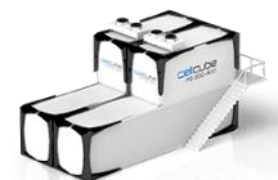
Today ...



Island's energy generation in million kWh

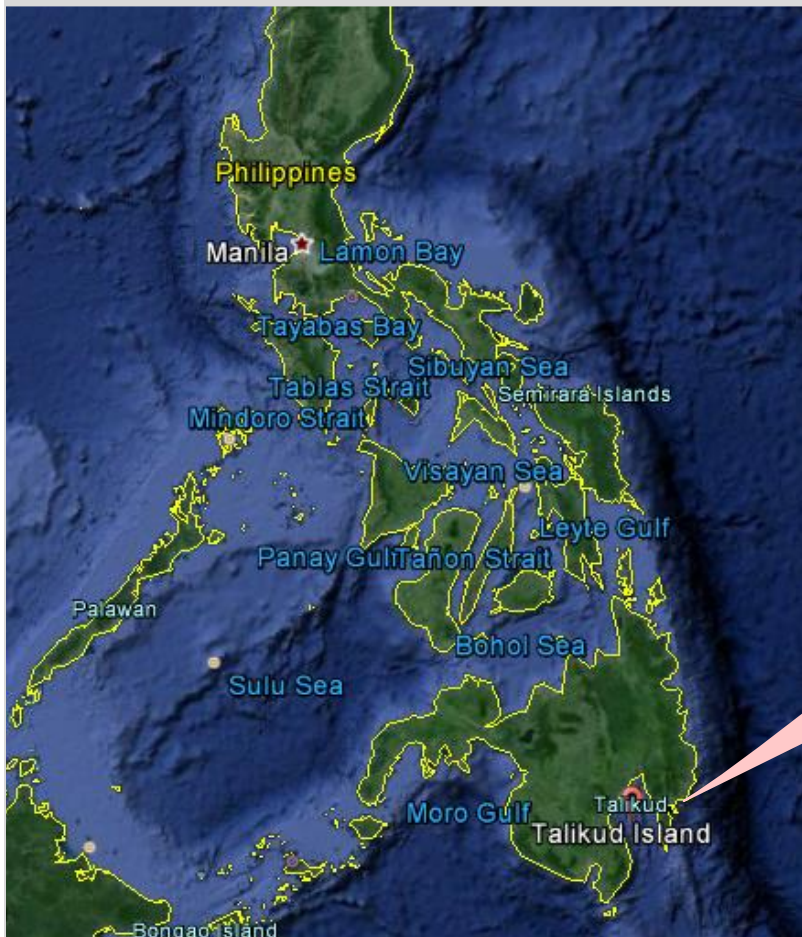


... in the Future



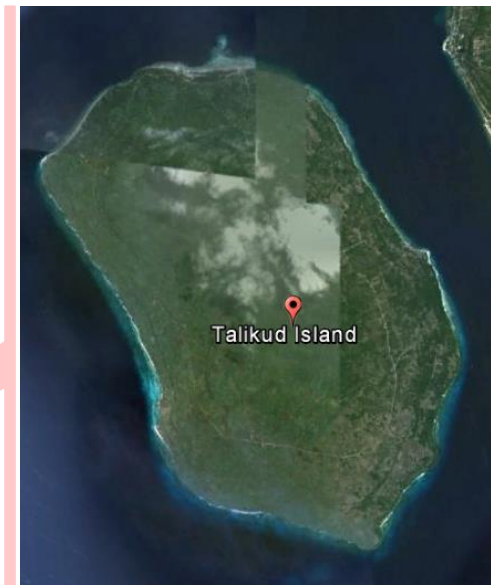
Pilot project on a Philippine Island to show how to establish 24/7 electrification at lower cost than diesel

Small island near Davao, Mindanao



Key facts of Talikud Island

- ⊕ Small island with ~9,000 inhabitants
- ⊕ Main sources of income is fisheries, copra production and nascent eco-tourism
- ⊕ Inhabitants want to maintain and leverage the pristine environment of the island



Today the electricity supply is limited to 10 hours a day

Vision: 24/7 power supply



Today: Irregular and expensive electricity

- ⊕ Electricity is supplied through 3 small and old diesel gensets
- ⊕ Resorts require backup, cooling ice (for fisheries) 'imported' from neighboring island
- ⊕ Power price is high: 31 US cents per kWh despite subsidies of 8 US cents per kWh



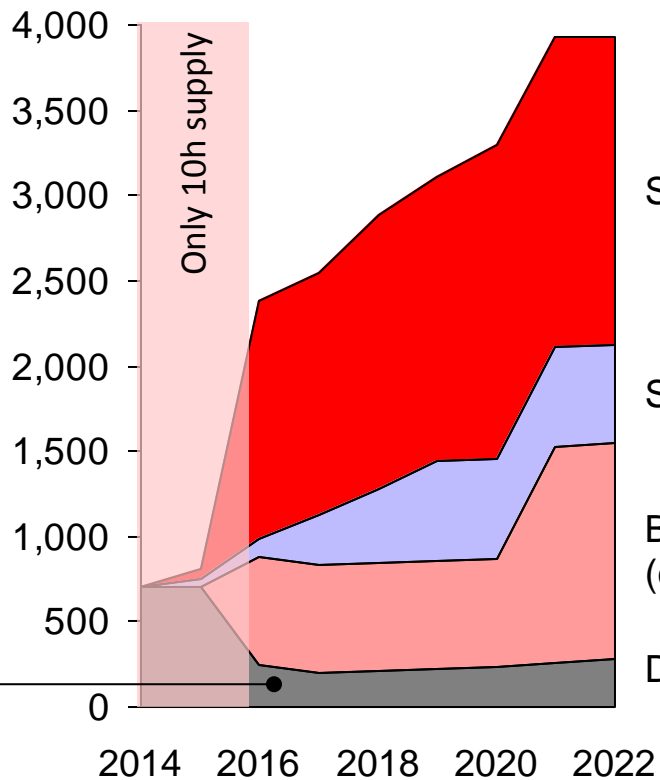
MERICA plans to implement a solution for 24/7 and reliable energy supply

Today ...



Diesel

Island's energy generation in million kWh



... in the Future



Solar



Storage



Biomass (coconut)



Diesel

Thank you...

