



**Let's venture  
beyond the obvious**

# Opportunities in the world of huge challenges



# VTT's business areas

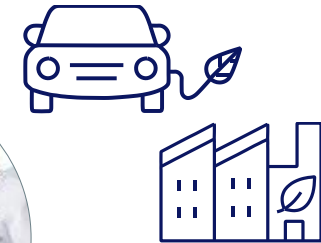


- Sensing and integration
- Connectivity
- Data-driven solutions
- National Metrology Institute VTT MIKES
- Micronova manufacturing services

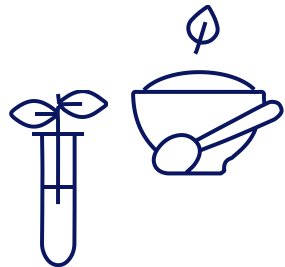
## KNOWLEDGE INTENSIVE PRODUCTS AND SERVICES



## SMART INDUSTRY AND ENERGY SYSTEMS



- Lifecycle solutions
- Nuclear safety
- Smart energy and transport solutions
- Digital engineering
- Business innovation foresight



- Industrial biotechnology and food solutions
- Biomass processing and products
- Sustainable energy and chemical technologies

## SOLUTIONS FOR NATURAL RESOURCES AND ENVIRONMENT



Personnel 2,054  
Operating income  
241M€

# VTT's R&D infrastructure – an essential part of the national research infrastructure

VTT's research environments are world-class. They enable product development from basic research to piloting and even small-scale production.



## **Bioruukki**

The largest bioeconomy pilot and research facility in the Nordic countries.



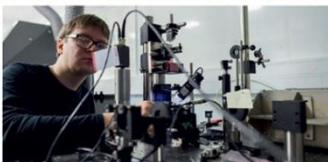
## **Biotechnology and food research piloting environment**

offers unique facilities for the development and customisation of bio and food industry technologies.



## **Micronova**

World-class cleanroom facility, fully equipped for the fabrication of silicon, glass and thin film-based microsystems.



## **VTT MIKES Metrology**

is the National Metrology Institute of Finland and performs high-level metrological research and develops measuring applications in partnership with industry.



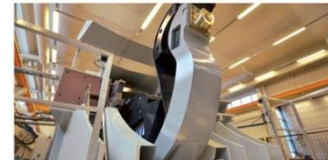
## **Engine and vehicle laboratory**

enables research on passenger cars as well as heavy-duty vehicles up to 60 metric tons to develop energy efficiency, emissions reduction and use of 2nd generation biofuels.



## **PrintoCent**

World's first pilot factory for printed intelligence industrialisation.



## **ROViR**

Remote Operations and Virtual Reality Centre for the development of remote operations and virtual reality technology in industry.



## **A pilot-scale research environment for fibre processes**

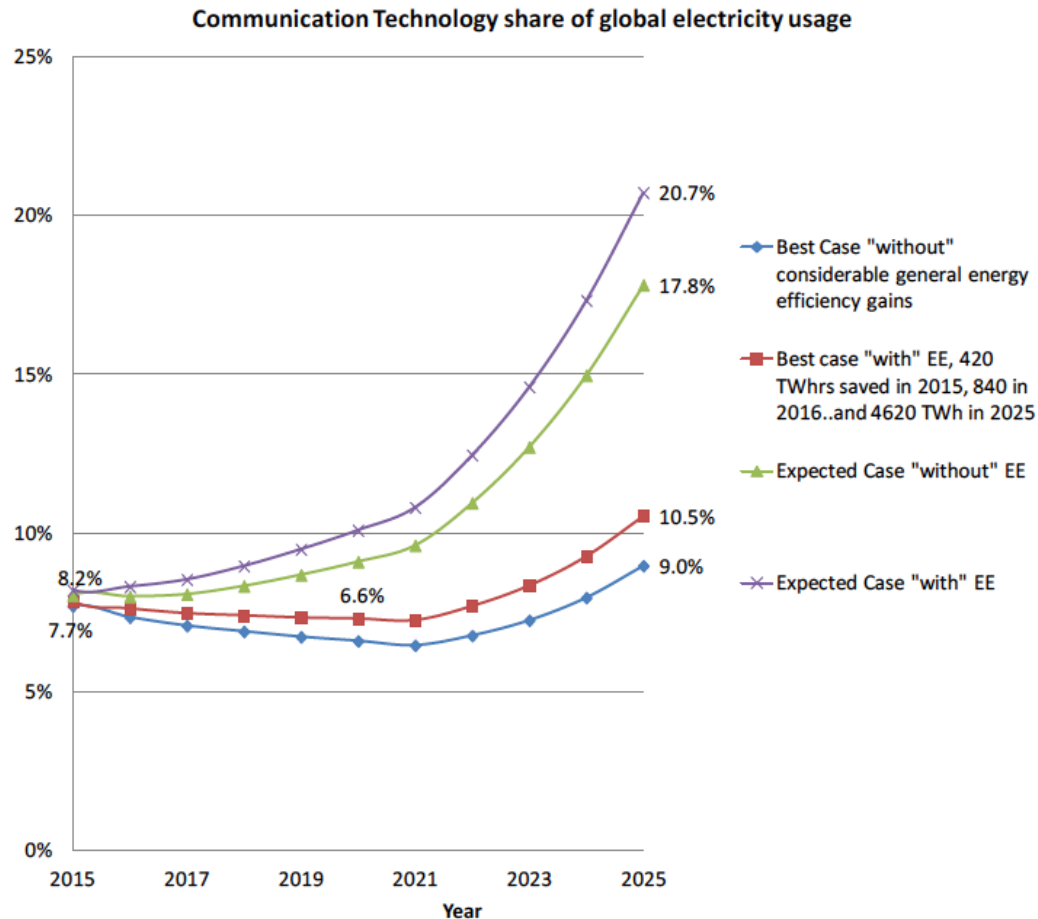
enables the development of novel products and supports the renewal of the pulp and paper industry.



## **Centre for Nuclear Safety**

for nuclear technology safety research.

# Energy use by communication technology

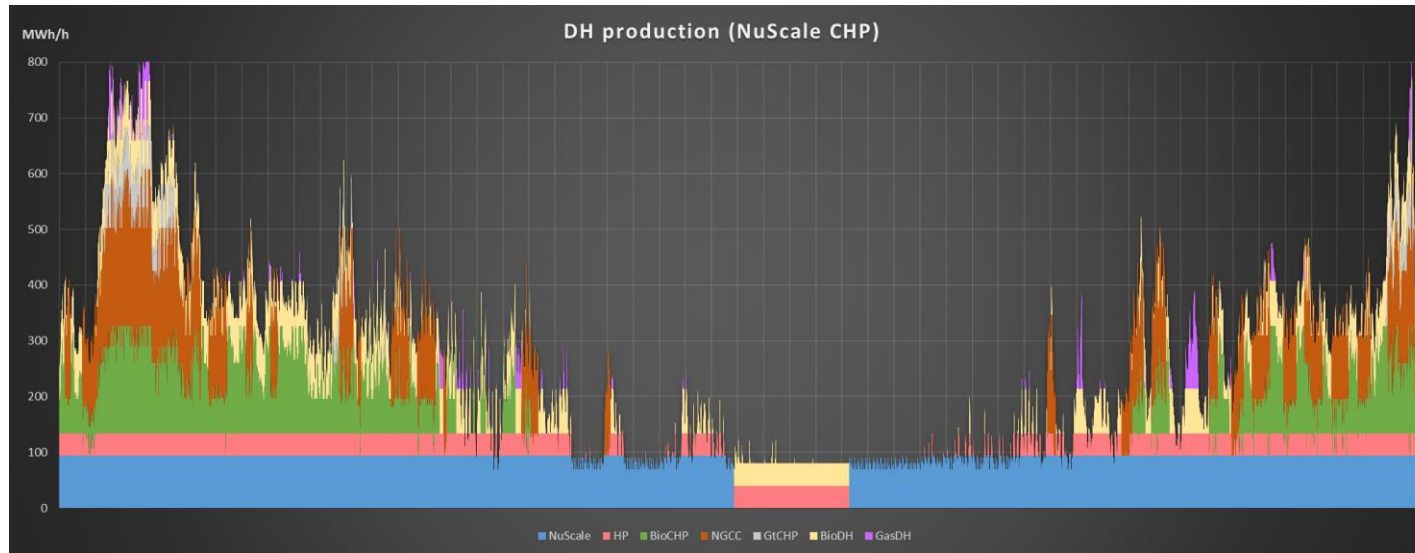


## VTT's capabilities, services and activities:

- Heat recovery from data centers
- Data centers as flexible resources
- Data transfer optimization
- Solar energy and energy storage in base stations e.g. in VTT's 5G pilot
- 5G and beyond

Source: Andrae, Anders S.G.; Edler, Tomas. 2015. "On Global Electricity Usage of Communication Technology: Trends to 2030." Challenges 6, no. 1: 117-157. Creative Commons open access article.

# Small Modular Reactors in City Energy



Source: VTT's study about introducing an SMR in the energy system of a mid-sized Finnish town in Finland.

VTT's capabilities, services and activities:

- SMR programme support
- Analysis of SMR's as a part of the city energy system
- Coordination of ecosystem for business opportunities
- Euratom project ELSMOR to confirm European capabilities of ensuring safety



# VTT's participation in Finnish and European research alliances

VTT in the Academy of Finland's Centres of Excellence	VTT's national development platforms	VTT's key European research alliances	VTT in PPP initiatives (H2020 programme)
<ul style="list-style-type: none"> <li>• CoE in Atomic Layer Deposition (ALD) (2012 - 2017)</li> <li>• CoE in Low Temperature Quantum Phenomena and Devices (2012 - 2017)</li> <li>• CoE in Molecular Engineering of Biosynthetic Hybrid Materials (2014 - 2019)</li> <li>• CoE in Quantum Technology (2018 - 2025)</li> </ul>	<ul style="list-style-type: none"> <li>• Bioruukki – Research and pilot environment for the bioeconomy</li> <li>• SMACC – Smart Machines and Manufacturing Competence Centre</li> <li>• PrintoCent – Innovation centre for printed electronics</li> <li>• 5G test network</li> <li>• Micronova – Cleanroom for silicon-based micro systems</li> <li>• MIKES – National metrological institute</li> <li>• VTT Centre for Nuclear Safety</li> </ul>	<ul style="list-style-type: none"> <li>• EARTO – an umbrella organisation that promotes and defends the interests of European research and technology organisations</li> <li>• EERA – European Energy Research Alliance</li> <li>• EIT Digital – European Institute of Innovation &amp; Technology</li> <li>• EIT Raw Materials – European Institute of Innovation &amp; Technology</li> <li>• EIT4Food – European Institute of Innovation &amp; Technology</li> <li>• NUGENIA – Research cooperation between the European nuclear industry and research institutes</li> </ul>	<p><b>Contractual PPPs</b></p> <ul style="list-style-type: none"> <li>• Photonics</li> <li>• 5G</li> <li>• Big Data</li> <li>• Cyber Security</li> <li>• Robotics</li> <li>• FoF (Factory of the Future)</li> <li>• SPIRE (Sustainable Process Industry and Resource Efficiency)</li> <li>• EeB (Energy Efficient Building)</li> </ul> <p><b>Joint Technology Initiatives / Joint Undertakings</b></p> <ul style="list-style-type: none"> <li>• Electronic Components and Systems ECSEL</li> <li>• Biobased Industries BBI</li> <li>• Fuel Cells and Hydrogen FCH</li> </ul>