# 2.1. National strategy on building and sustaining capacity in nuclear and radiation safety in Finland

Regional Workshop on the Management of Training Systems for Nuclear and Radiation Safety

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Mikko Merikari

mikko.merikari@stuk.fi

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- National report on nuclear capacity
- Roles and responsibilities
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- Update of the report
- Examples of activities

# Need for National Strategy for developing and sustaining nuclear capacity in Finland

mikko.merikari@stuk.fi

# Nuclear Map of Finland

FENNOVOIMA

New built project:
NPP to Pyhäjoki

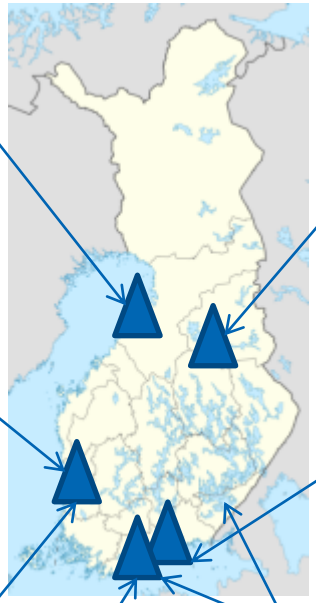
TVO

TVO: Olkiluoto NPP
(2 units in operation;
1 unit in commissioning)

POSIVA

Geological Repository
- depth 455 m

Posiva - Final repository for spent fuel
- owned by TVO & Fortum



**Helsinki region:**
- VTT; FiR-1
(Reseach Reactor)
- Helsinki University
- Fortum HQ
- STUK

Terrafame

Mining Company;
Nickel mine, application/license for uranium production

Fortum

Fortum:
Loviisa NPP
(2 units)

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Radiation and Nuclear Safety Authority

**Other:**
Lappeenranta University
Of Technology



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# Use of Radiation in Finland

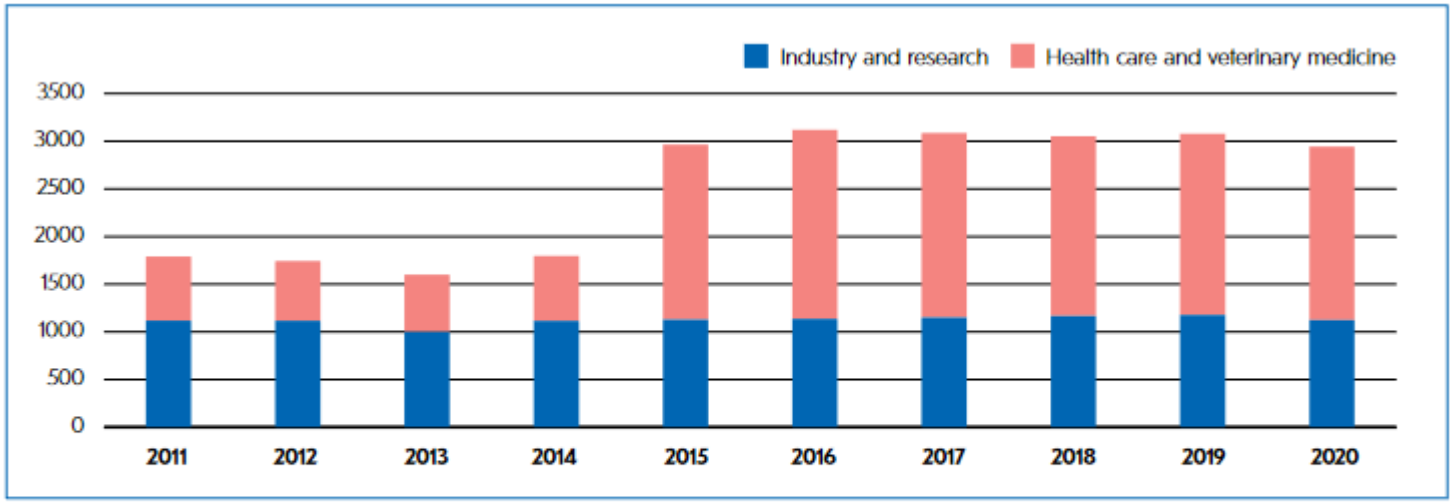


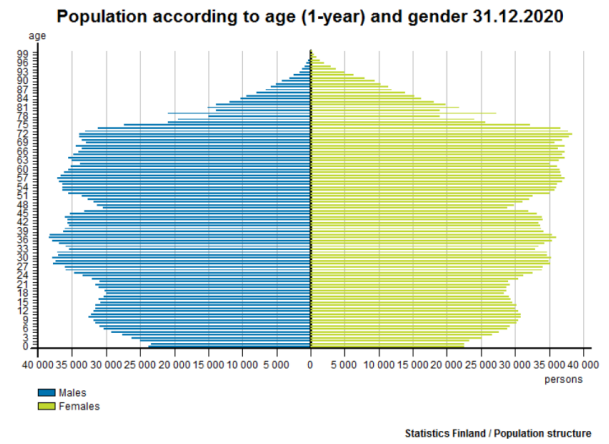

**FIGURE 2.** Number of safety licences in 2011–2020. In addition, three safety licences issued for aviation operations were current in 2019–2020. The increase in health care licences in 2015 is due to the dental X-ray practices being changed from registered activities to activities that are subject to a licence.

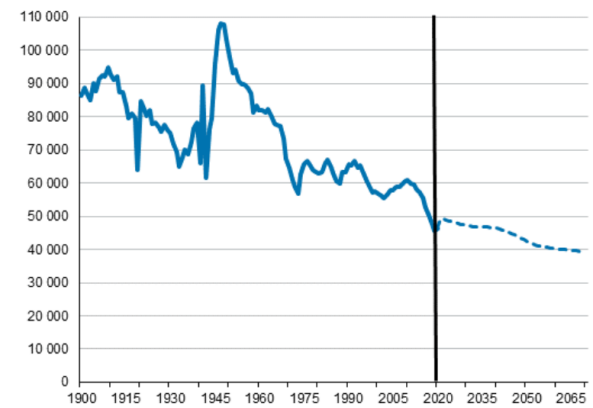


mikko.merikari@stuk.fi

# Finland in ~2010: Need for National approach (1/2)

- Limited labour market (in general)
  - Finland is a small country
    (~5,5M citizens; ~3,3M in working age)
- Finland has a strong education system for engineering and natural sciences
  - Tradition for engineering and technology
  - *However, Nuclear engineering is not and will not be a mainstream career path in Finland*
- *Official languages: Finnish and Swedish (+ Sámi)*
  - *Limitations for certain recruitment activities*



# Finland in ~2010: Need for National strategy for developing and sustaining nuclear capacity (2/2)

- National pool for nuclear professionals was (and still is) limited
  - New nuclear projects
    - Olkiluoto 3 & 4; Fennovoima 1
  - Other nationally significant projects were launched (mining, shipyards, IT, etc.)
  - Need for ensuring the adequate resources and the high level of knowledge - also in the future

- Continuous changes in the industry have highlighted the importance of the ability to adapt on national and organizational levels.

➢ National approach was needed

# National strategy for developing and sustaining nuclear capacity

- Ministry driven process to ensure the Nuclear capacity in Finland
  - Specific working group was nominated (2010-2012)
    - All of the main nuclear organizations of Finland were involved
      - Ministry (the owner), licensees and applicants, regulatory body, main TSOs, research institutes & education institutes (broadly)
      - Regulatory body in active role
  - Purpose of the working group was
    - to provide information
      - What are the estimated competence needs of the industry?
      - What is the estimated capability to produce new professionals on national level ?
      - Status and resources of the research and educational institutes
    - to give recommendations for development until the 2020's
  - Revision of national plans, policies and structures related to nuclear and radiation safety

➢ National strategy for securing and sustaining the nuclear capacity in Finland

# National strategy for developing and sustaining nuclear capacity

- The overall results of ’the initial study’ indicated
  - certain competence areas needed to be developed/sustained
  - the overall age structure needed balancing

- Furhermore, the final report resulted in various development activities such as
  - ’fine tuning’ of the education system;
  - a long-term strategy for further development of research activities.
    - In 2014 the report “Nuclear Energy Research strategy” emphasized the importance of the research in the competence building
  - valuable input for various development programs
    - development activities on national and organizational levels

# The Follow-up in 2018

- The follow-up report was published in 2018
  - National nuclear safety committee → Ministry activated the follow-up study
    - Recommendations to continue the efforts to sustain the knowledge and the expertise of certain competence areas (facing the effects of generation change)
    - Research activities supporting the nuclear and radiation safety have been ‘secured’
    - The general age structure of nuclear has improved but the age structure will remain as an item of special interest
    - Future changes in the national education system need to be evaluated from the perspective of nuclear and radiation safety
- The next follow-up is be scheduled for ~2025

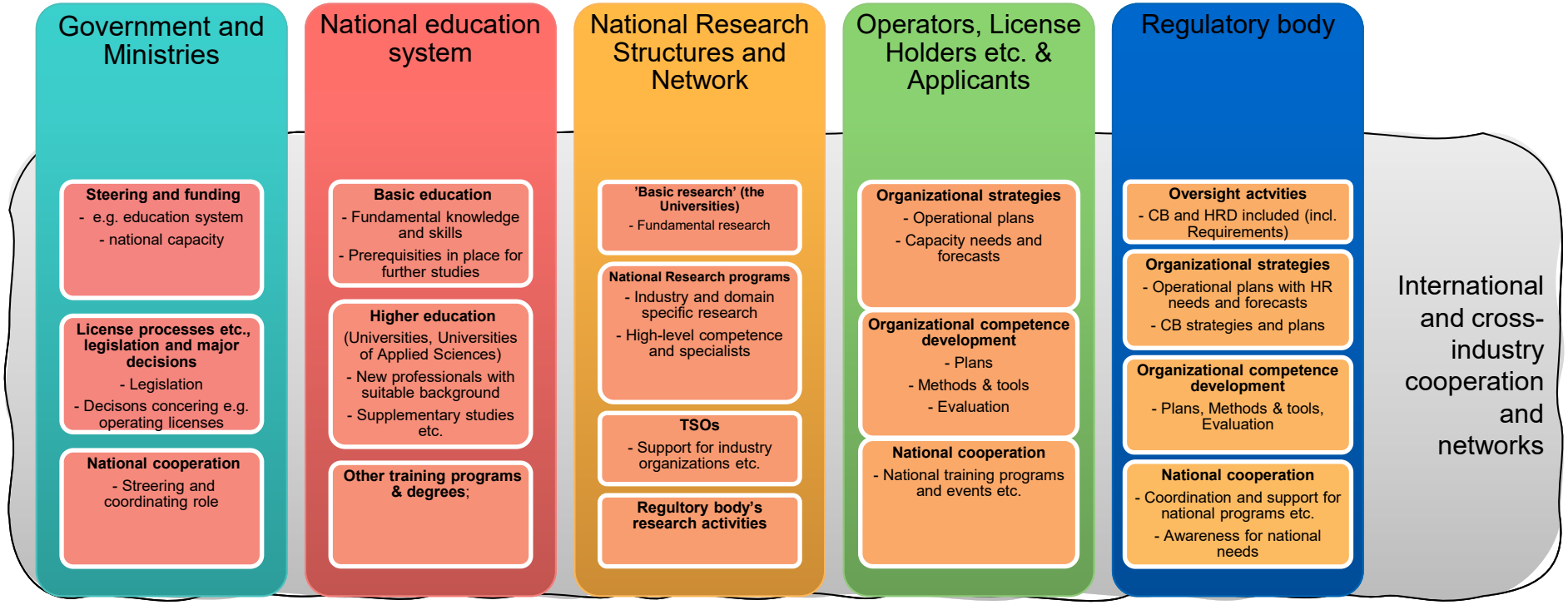
# National Approach: Different Roles and Responsibilities

mikko.merikari@stuk.fi

# Different roles: Capacity Building in Nuclear and Radiation Safety in Finland

- Finnish national approach (strategy) includes:
  - National steering (and funding) elements with e.g. Ministries
  - Ability to develop and produce basic competence
  - Research structures to produce high-level expertise and competence,
  - Organizational strategies, solutions and structures,
  - National cooperation, and
  - Regulatory activities

- International and cross-industry cooperation (networks) are relevant elements of capacity building in nuclear and radiation safety in Finland

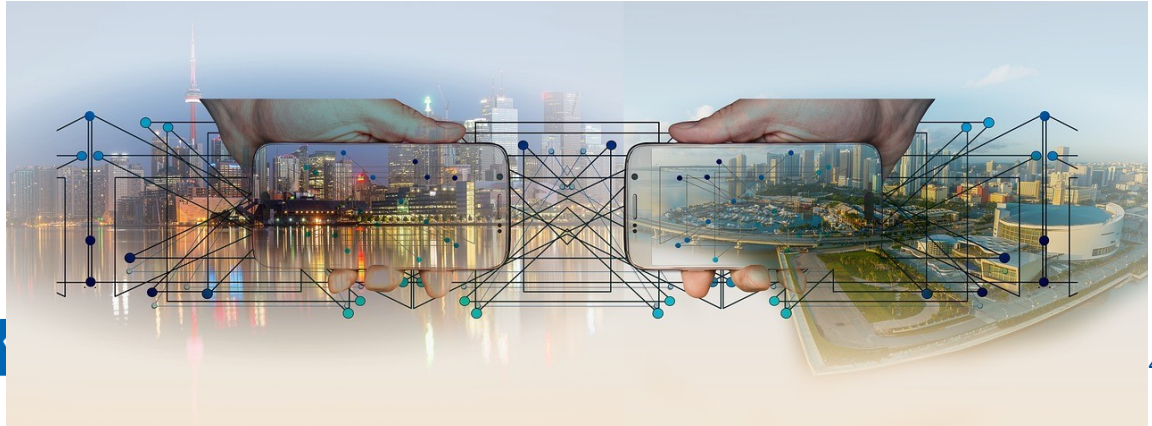


# National co-operation: examples

mikko.merikari@stuk.fi

# National co-operation: research (examples)

- National research programs e.g. on nuclear power plant safety and safety of nuclear waste management (SAFER2028)
  - a six-year scientific research programme; a continuation of SAFIR and KYT - programmes
  - to develop and continuously improve nuclear safety and nuclear waste management safety expertise
    - by solving safety issues relevant to the Finnish use of nuclear energy.
  - to capture and transfer knowledge between organizations and generations (the results are public)
  - to ensure high-level multidisciplinary safety research in national context
  - Funded by National Nuclear Waste Management Fund - together with the key organizations operating in the nuclear energy field.



# National co-operation: training (examples)

- National training course on nuclear safety
  - *The Basic professional training course on nuclear safety and nuclear waste management*
  - Organized in co-operation by the main Finnish nuclear energy organizations
  - Annual training course since 2003
    - Each of the 6-week course starts in November at the Lappeenranta University of Technology with about 100 participants.
  - Over 1200 (junior) experts have participated
  - Participants and lecturers from all nuclear organizations in Finland;
    - Recognized experts as lecturers;
  - *During covid the course was transformed into a hybrid training course (online and face-to-face elements)*

- Topical events (national) to share knowledge and to create common understanding among the industry etc.
  - Forums & workshops on various contemporary topics
    - e.g. counterfeit and fraudulent products in nuclear industry
  - Topical working groups

# Organizational activities

mikko.merikari@stuk.fi

# Sustaining Nuclear Capacity in Finnish nuclear organizations

- Typical organizational challenges in Finland are concerned with developing and sustaining nuclear knowledge
  - Retirement of senior experts;
  - Changes in expectations regarding working life

- Aim for systemic and systematic management of capacity
  - ”People, technology and processes/structures”
  - Example: Integrated management system as a platform for CB activities
    - Processes, procedures, guidance etc. with CB elements embedded

- Oversight activities on Capacity building
  - Regulation (with requirements) for CB, HRD, continuous improvement, operating experience...
  - Different inpection programs include activities specifically targeted in the area of knowledge and competence management

- Education and research institutes supported by specific funding
  - ’The presence of nuclear and radiation safety in the research agenda has been secured’


mikko.merikari@stuk.fi

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# Questions?

mikko.merikari@stuk.fi



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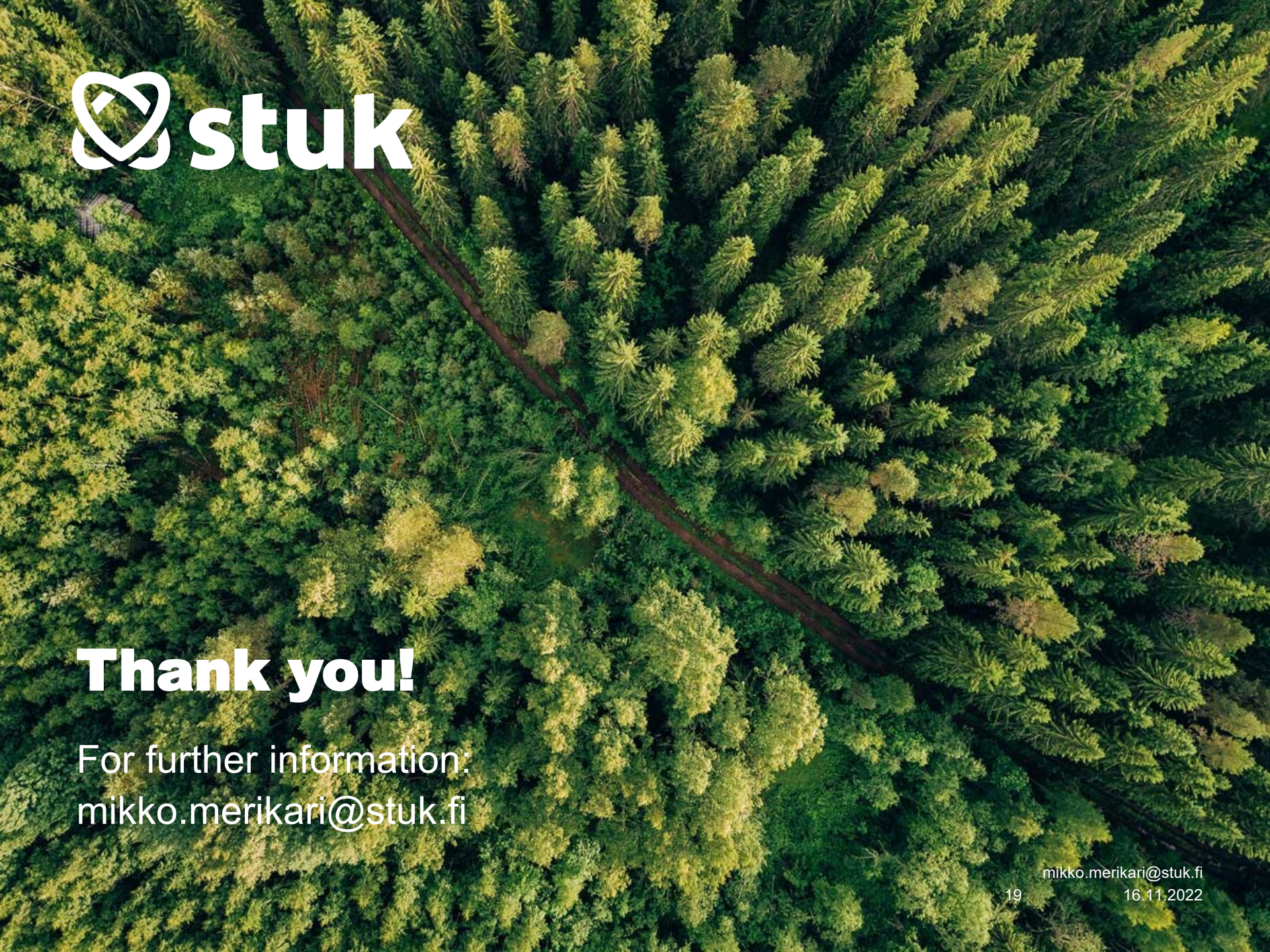

# Thank you!

For further information:
mikko.merikari@stuk.fi