

# **Finnish Research Programme on Nuclear Waste Management (KYT2014) in brief**

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## KYT2014 starting points 1

- The research programme is based on the Nuclear Energy Act (990/1987)
  - *"research aimed at ensuring that the authorities have such sufficient and comprehensive nuclear engineering expertise and other facilities at their disposal that are needed for comparisons of the various ways and methods of carrying out nuclear waste management"*
- International evaluation<sup>1</sup> in 2007 of the previous research programme KYT2010 paid attention to e.g.
  - Training
  - Large integrated projects
  - Safety assessment projects
  - Activity of the Steering Group
- International evaluation in 2012 of KYT2014
  - Being reported

<sup>1</sup> Apted, M., Papp, T. & Salomaa, R., 2008. KYT 2010 Review Report, Publications of the Ministry of Employment and the Economy, Energy and Climate 2/2008, 26 p.

## KYT2014 starting points 2

- Coordinated public research programmes in Finland were started in 1989
- Funding from State Nuclear Waste Management Fund (VYR) into which nuclear waste producers pay annually 0,08 % of their assessed liability, respectively
  - Annual funding from VYR is around 1,7 M€
  - Research organisations can also direct own funding in their projects

## KYT2014 aims

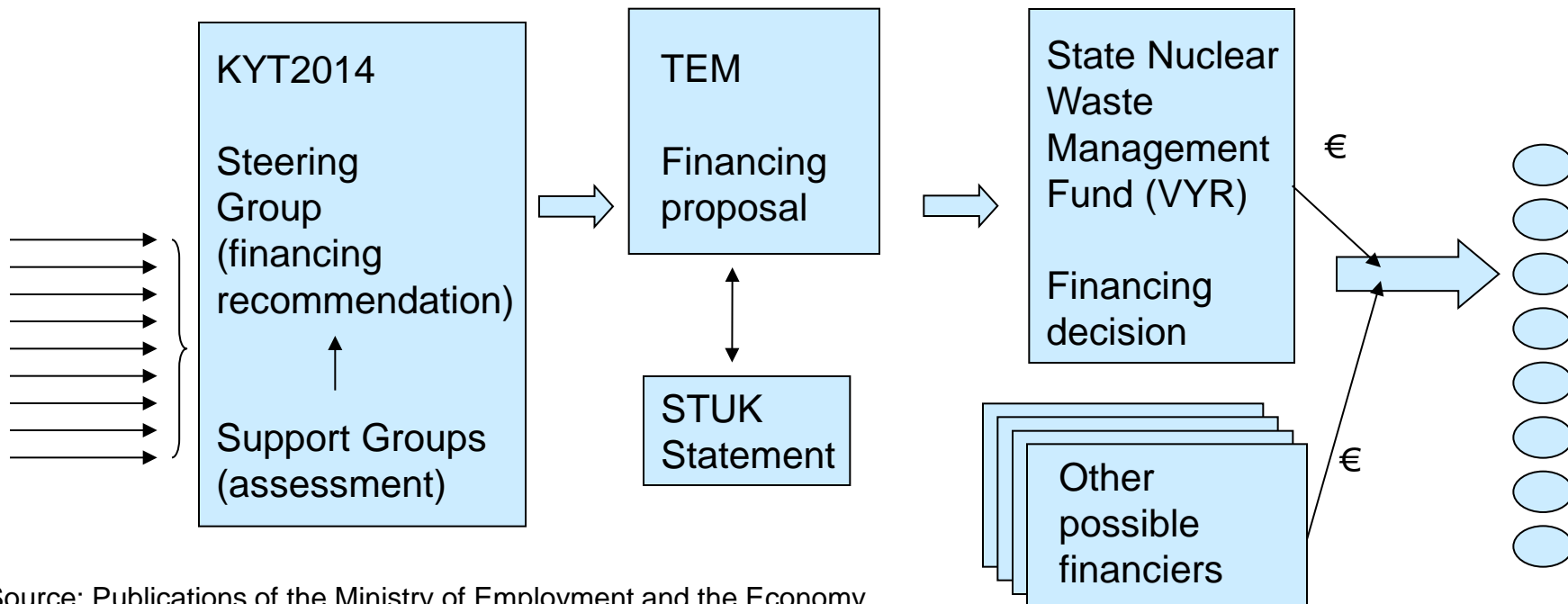
- Basic aim is to produce high quality research results to be used by Finnish nuclear authorities
  - STUK: Radiation and Nuclear Safety Authority, Finland
  - TEM: Ministry of Employment and the Economy
- Nationally central research topics
- Topics directly related to the respective nuclear waste management duties of waste producers or authorities do not belong to KYT2014
- The results of the research programme are public and thus available for all participants
- The long-term aim of KYT2014 is, for its part, to
  - Maintain national knowhow in nuclear waste management
  - Promote collaboration between authorities, nuclear industry and scientists

## KYT2014 management

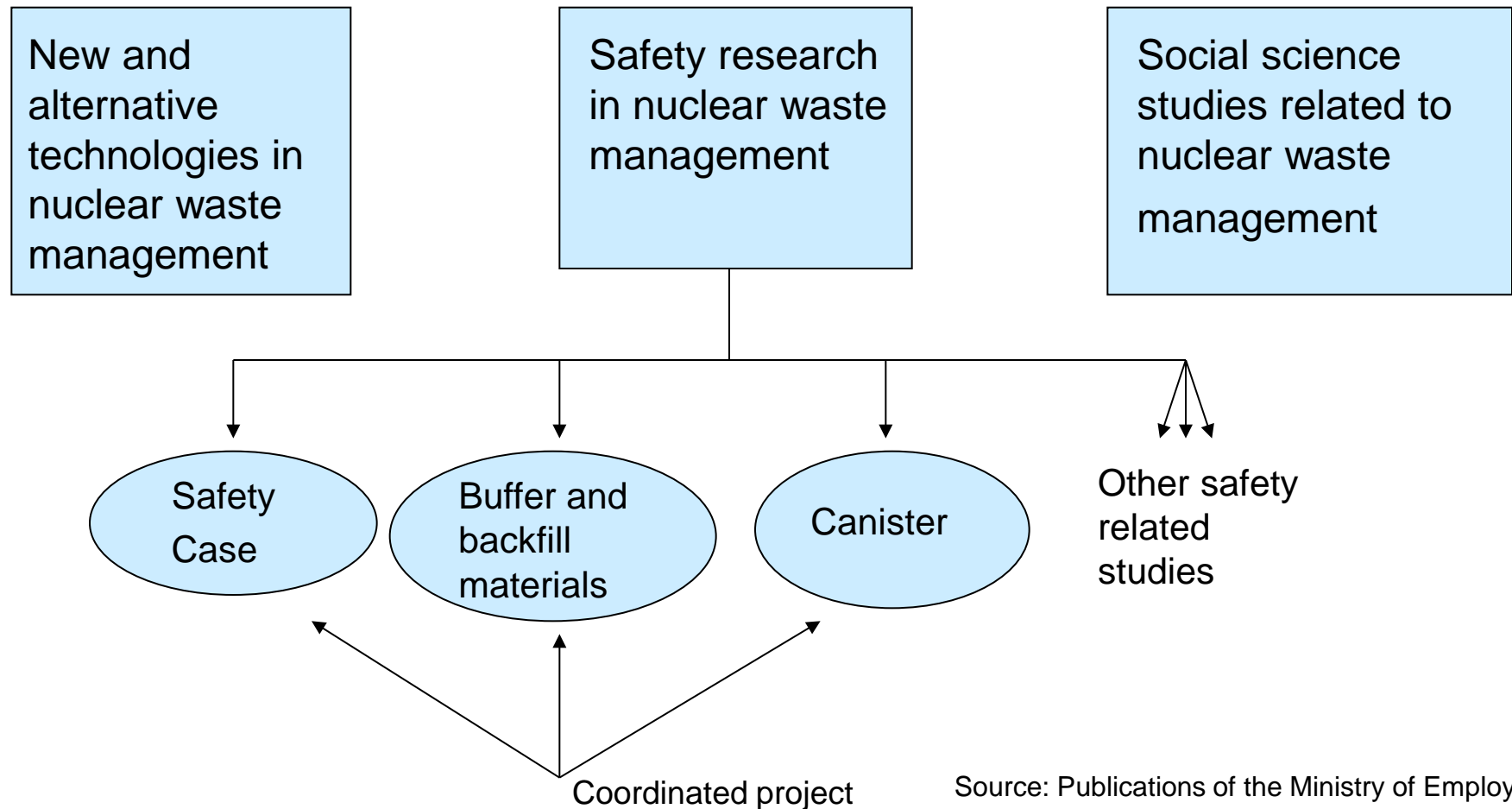
- Steering Group
  - TEM appoints
  - Strategic lines of the research programme
    - Can propose topical focus areas for TEM in the annual call for project proposals
    - Makes a recommendation for TEM of projects to be funded
- Support Groups
  - Appointed by the Steering Group
  - Assess the contents of project proposals
  - Follow up and guidance of the projects receiving funding
- Coordinator
  - Management of the research programme
- Website
  - <http://kyt2014.vtt.fi/>

## Decision making in KYT2014 about project proposals

Project proposals	Assessment	Financing proposal	Financing decision	Projects to be financed
(October)	(Nov.- Dec.)	(January)	(March)	



## KYT2014 research topics



Source: Publications of the Ministry of Employment and the Economy. Energy and the Climate 72/2010

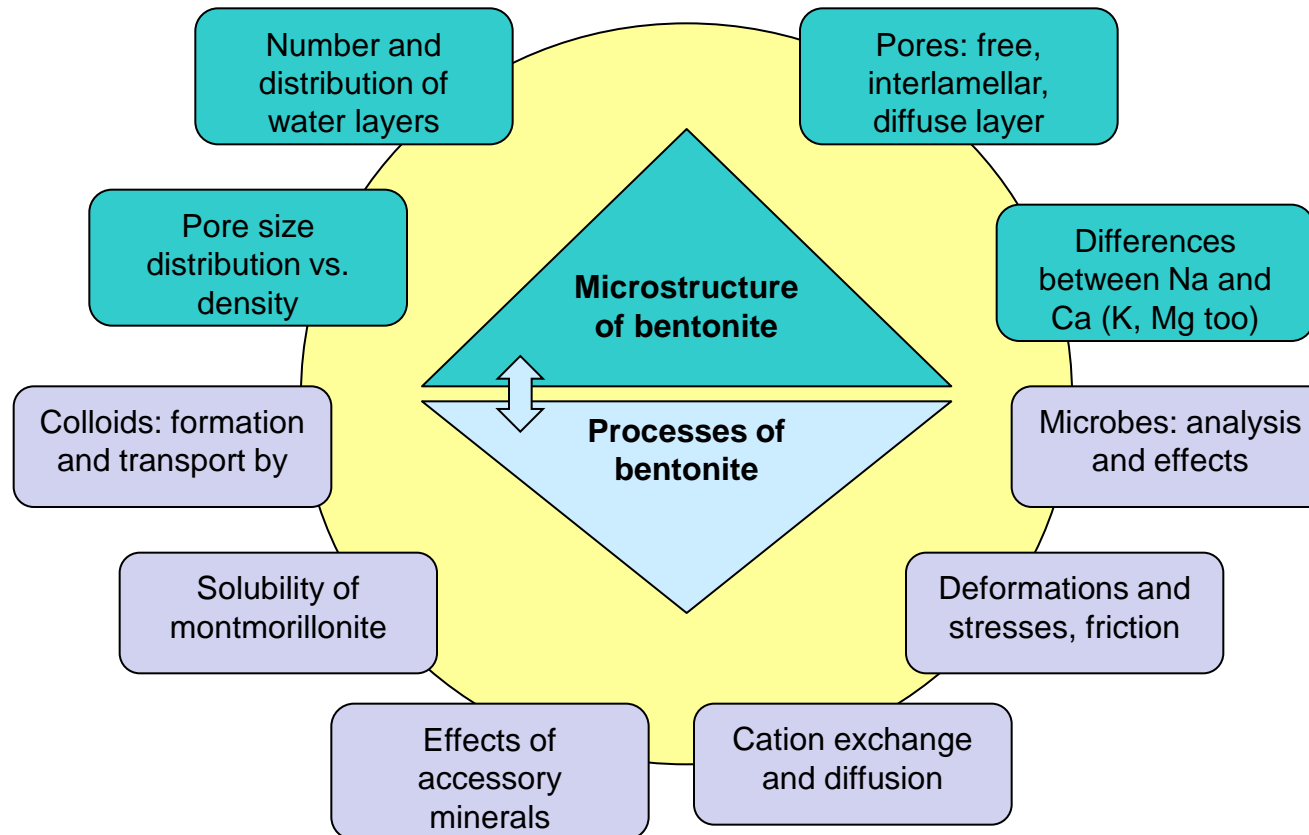
## **Safety research in nuclear waste management : Buffer and backfill materials**

- Coordinated project BOA (Markus Olin)
- Development of methodological toolbox
  - Coupled processes (THCMBR<sup>1</sup>)
  - Microstructure of bentonite
- Safety relevant issues
  - Erosion phenomena (piping and chemical erosion)
  - Long-term stability (mineralogical alterations)
  - Effects of high pH (cementitious materials)
  - Iron-bentonite -interaction
  - Effects of high salinity
  - Effects of freezing

<sup>1</sup> THCMBR process = thermo-hydro-chemical-mechanical-biological-radiation process



## BOA: Structure and processes



# BOA: Sub-tasks, methods and partners: 2013 proposal

## 2 THM and structure

### Microtomography

- JyU

### XRD, SAXS

- HYFL, VTT

### SEM-EPMA

- GTK

### Block-shear

- Aalto

### NMR

- VTT

### THM

- JyU

## 3 THC, colloids and biology

### THC, solubility

-VTT

### Colloid formation

- HYRL

### HR-ICP-MS

-VTT

### Microbes

- VTT

## 4 THMCB

### THM

- JyU, Numerola

### THC and

### THMC(B)

- VTT, Numerola,  
JyU

### Molecular dynamics

- UEF

## 1 Coordination

### Overall

- VTT

### Sub-projects

- GTK

- Aalto

- JyU

- HYFL

- HYRL

- UEF

- Numerola

- VTT – VTT Technical Research Centre of Finland
- GTK – Geological Survey of Finland
- Aalto – Aalto university
- HYFL – University of Helsinki, Physics
- HYRL - University of Helsinki, Radio chemistry
- JyU – University of Jyväskylä, Physics
- UEF – University of Eastern Finland
- Numerola - Numerola Oy

## KYT2014 collaboration

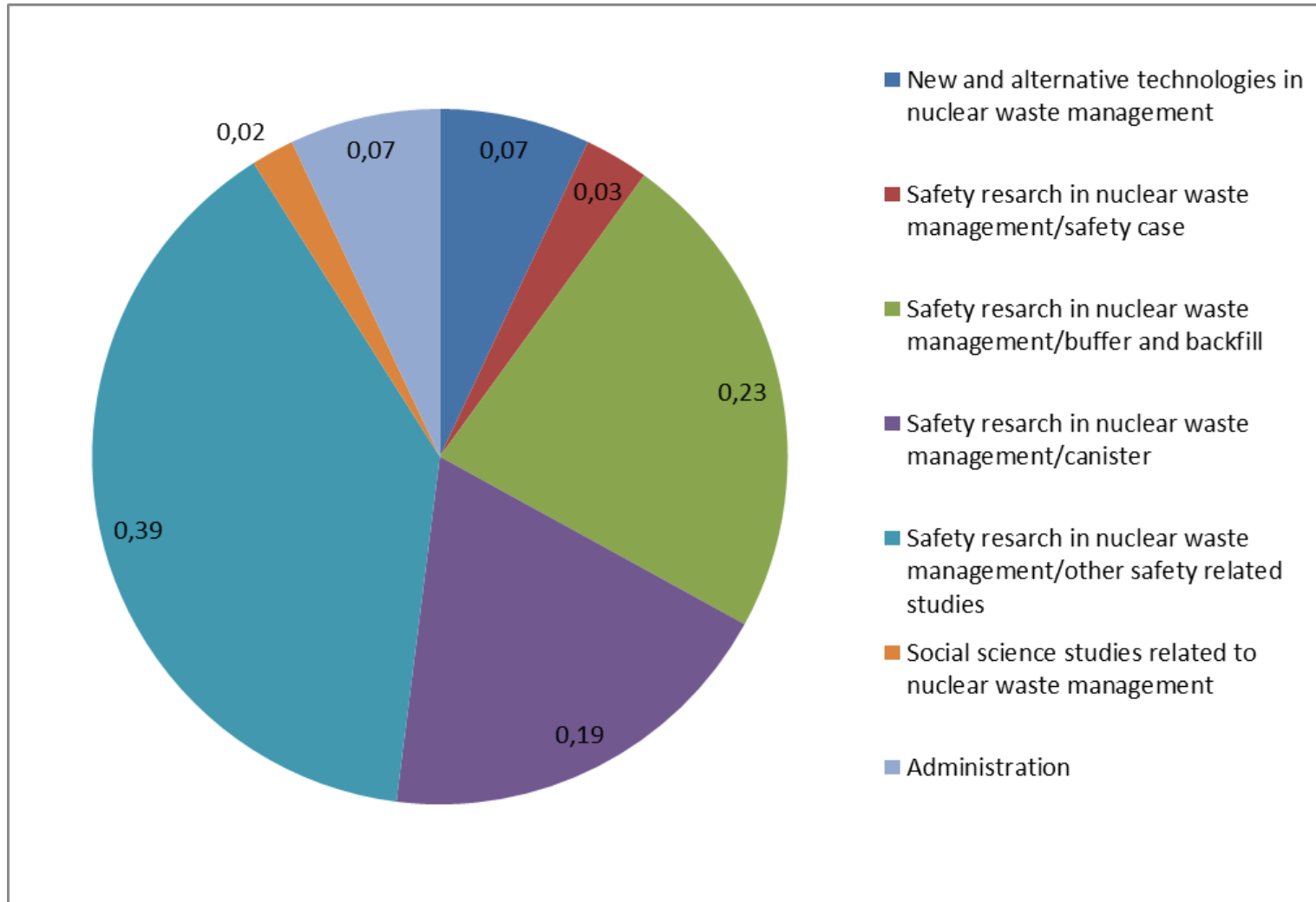
- Thematic seminars
- Other research programmes
  - Scientific collaboration
- YTERA project of the Academy of Finland
  - Graduate School for nuclear technology and radiochemistry
- EU
- International expert organisations, e.g. OECD NEA

## KYT2014 call for project proposals 2013

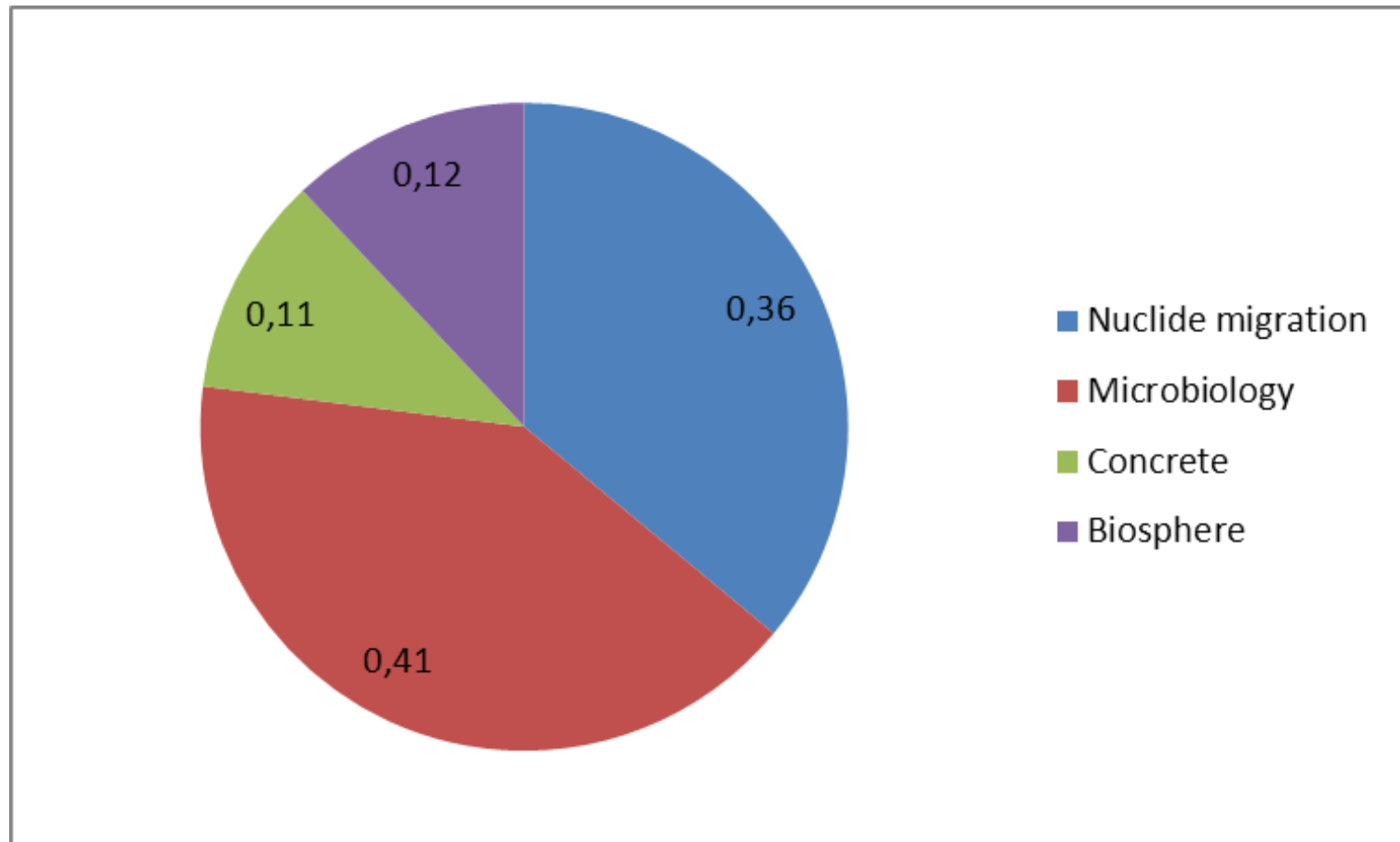
- In total 37 research project proposals, total funding requested 2,7 M€
- Funding recommended for 29 research projects
  - Aalto (6), GTK (2), HY (5), JY (3), UEF (1), Numerola Oy (1), VTT (11)
- 3 coordinated projects
  - Safety Case (LS-TUPER\*, VTT)
  - Buffer and backfill materials (BOA, VTT)
  - Canister (L-TICO, VTT)

\* Subprojects (GTK, HY, Tmi Pawel Simbierowicz) act as subcontractors to VTT

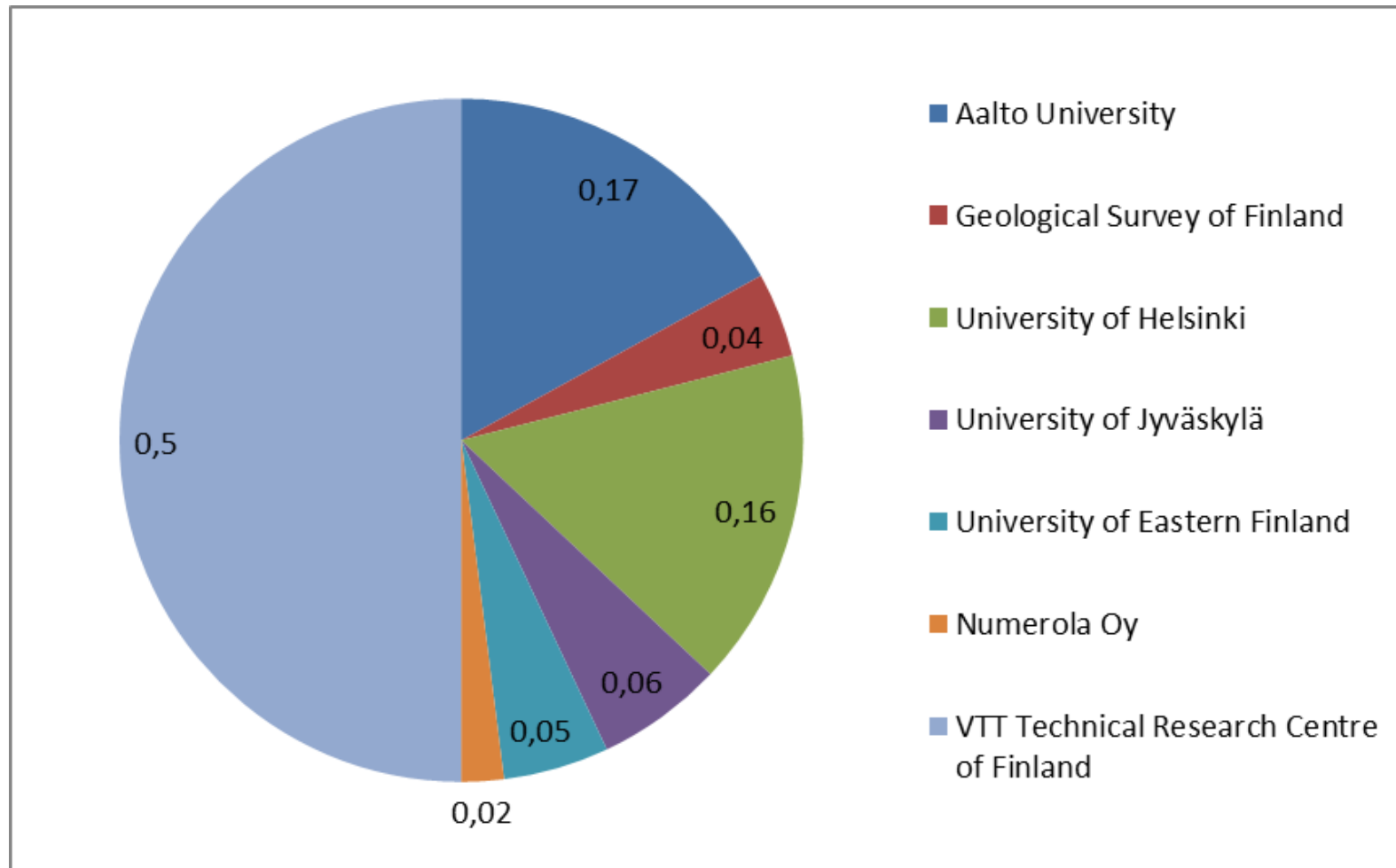
## KYT2014 call for project proposals 2013: Planned distribution of VYR funding 1795 k€ between research topics in 2013



## KYT2014 call for project proposals 2013: Planned distribution of other safety related studies (707 k€)



## KYT2014 call for project proposals 2013: Planned distribution of VYR funding 1795 k€ between research institutes in 2013



## KYT2014 summary

- Based on Nuclear Energy Act
- Research period 2011-2014
- Budget 1,7 M€/a
- Call of project proposals annually
- New things
  - Coordinated projects in safety research
- Framework programme (in English):  
[http://www.tem.fi/files/28692/TEM\\_72\\_2010\\_netti.pdf](http://www.tem.fi/files/28692/TEM_72_2010_netti.pdf)
- More information at KYT2014 website (<http://kyt2014.vtt.fi/>)



## And finally

- Thank you for your attention!