Nuclear education for sustainable nuclear energy development - past and future perspective of Latvia

E. Pajuste\textsuperscript{1}, Agnese Līckrastiņa\textsuperscript{2}, Ainārs Bajinskis\textsuperscript{1}, Anete Stīne Teimane\textsuperscript{1}

1 University of Latvia, Jelgava str.1, LV1004, Riga, Latvia,
2 Riga Technical University, Kipsalas str. 6A, LV-1048, Riga, Latvia
**Latvia – facts and figures**

**Latvia**
- Area: 64,589 km²
- Population (2021): 1,893,223
- Longest river: Gauja (452 km)
- Highest hill: Gaizins (311 m)
- Capital: Riga
- Founded: 1918

**Riga**
- Area: 304 km²
- Population (2017): 701,977
- Founded: 1201

EU member since 2004
IAEA member state since 1997
Latvia hosted a unique experimental fission reactor - Salapils research reactor (SRR), founded in 1961, where research in various areas of science and technique was performed.

The pool-type reactor was intended for scientific research in nuclear physics, radiation physics, neutron activation analysis, radiation chemistry, radiobiology and nuclear energy.

Physicists from SRR cooperated with physicists from different research reactors, other nuclear facilities and institutes of physics in the Soviet Union (for example, in Leningrad, Moscow, Belarus, Georgia), had partners abroad (for instance, in Germany, France, the Czech Republic) and carried out contract jobs.

The reactor was shut down on June 19, 1998
In April 26, 1983 event took place ~900 km from Latvia that dramatically changed the public perception towards nuclear energy - Chernobyl disaster.

6000 people from Latvia were sent to participate in the Chernobyl nuclear power plant (NPP) emergency response (Chernobyl NPP participant or «liquidators»).

The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) estimates the total collective dose to the total of about 530,000 recovery operations workers as about 60,000 person-sieverts.

Map of Cesium 137 deposits across Europe. Source: Atlas européen EC/IGCE 1998 and IRSN.
Experience of neighbors - Lithuania

**Visaginas Nuclear Power Plant** was a planned nuclear power plant project in Lithuania. It was proposed to be built at the site of the closed Ignalina Nuclear Power Plant, which was shut down on 31 December 2009 in accordance with Lithuania's accession agreement to the European Union.

On 14 October 2012, an advisory referendum on constructing a new nuclear plant found 62.7% of the participating Lithuanian electorate **against** and 34.1% for.
2022 data on Latvia’s overall electricity production, consumption, and imports (MWh):

- production – 4 794 651 (67.5% of the overall consumption);
- consumption – 7 106 177;
- imports – 2 311 527

*Source: AST, https://www.ast.lv/lv/electricity-market-review*
RES and geographical location

Example: solar panel production in Latvia depending on the time of year.
Current Energy Policy

**Priority areas:**

- Increasing RES electricity generation capacities
- Improving the capacity of cross-border interconnections
- New targets in Latvia’s National Energy and Climate Plan 2030 – reviewed target est. 70%
- High share of RES => need for balancing capacities → NPP

Geopolitical situation has a huge influence on Latvia’s energy market and now the nuclear energy has been considered as one of the main technologies that could cover the base electricity load in the future
Nuclear energy is included in the updated National Energy and Climate plan and in July 2022 the amendment of the National Energy law has been proclaimed including the point on nuclear energy as part of the energy program strategy.
Currently, the importance of nuclear and radiation technologies has raised both to the development of nuclear medicine in Latvia and an intense involvement in activities related to nuclear fusion, fission and particle physics.

Involvement in scientific research

Students of all levels (bachelor, master and PhD) are being widely involved within Horizon2020, Horizon Europe, EURATOM and national research projects in collaboration with such organizations as ITER, CERN (CMS and MEDICIS collaborations), Joint European Torus, etc.

Moreover, students from the universities are involved in specialized PhD programs, such as Fusion Education, FUSENET, Joint UL-CERN and RTU – CERN doctoral studies.

New study courses, modules

By the support of the IAEA the teaching staff of the University of Latvia (UL) and Riga Technical University (RTU) have possibility to enhance their competence and infrastructure for providing training in radiation technologies and safety (TC Project LAT004).
Historical knowledge, today’s strong educational and research focus together with the State’s activities and the requirements of the energy sector and industry needs are providing excellent conditions for the nuclear energy technology development that are tailored for the specific needs of the small country.
Thank you!

Dr. Elīna Pajuste
Senior researcher, associate professor
University of Latvia
(+371) 67033937, (+371) 29560513,
elina.pajuste@lu.lv
Jelgavas 1 - 317, Riga, LV-1004, Latvia
www.lu.lv/en