# Life in Estonia without oil shale

## Use of renewable energy sources for electricity production in Estonia

Prepared by: Jaak Alekand, Kaupo Mets, Siim Oks

**Objective:**

- Participants will learn about and obtain more knowledge on the following topics:

  1) Electric current. Generator. Current, amperage, power, work;
  2) Environmental problems that accompany electricity production in oil shale power plants;
  3) Prevention and elimination of environmental pollution caused by oil shale energy;
  4) Exhaustion of oil shale deposits over the next fifty years;
  5) The possibility of life without electricity in the future;
  6) Purchasing electricity from neighbours. The electricity market;
  7) Nuclear energy;
  8) Use of biomass, cogeneration plants;
  9) Use of hydropower for electricity production;
  10) Use of wind power for electricity production;
  11) Use of solar radiation for electricity production.

- During the program, participants will think of opportunities for replacing oil shale energy with renewable energy.

**Target group:** high school students

**Duration:** 1.5 hours

**Location:** The second floor and the seminar hall on the first floor of the Ice Age Centre

Supported by the Environmental Investment Centre

**Tools:**

- group work worksheets;
- writing pads and a writing instrument;
- a smart device;
- operating models of wind turbine generators, pumped-storage hydro stations, hand generators, and solar stations;
- additional information on the characteristics on the distribution of wind and solar power.

**Activities**

**Introduction –** about 10 minutes

Students are divided into groups. The plan, area of activity, and schedule of the program will be introduced. Writing pads, writing materials, worksheets, and auxiliary materials will be distributed.

Setting the purpose of the program.

1. **Electricity production using wind, the Sun, running water, and muscular power –** 40 minutes in the oil shale hall of the Ice Age Centre.

   Group work. Solving worksheet tasks with the help of models.

   The opportunities and disadvantages of different methods of electricity production. Combining different methods. Cogeneration plants. Electricity transmission. Losses in electricity generation and transmission. Reconstructing a transmission network.

   Discussion.

2. **Renewable energy vs fossil energy** – 40 minutes in the seminar hall of the Ice Age Centre.

   Group work. Solving worksheet tasks.

   Advantages and disadvantages of the introduction of renewable energy sources. Disadvantages and advantages of fossil energy. Environmental impact. Energy security and ensuring the supply of electricity. The advantages of different regions of Estonia for introducing various renewable energy sources. Opportunities for saving electricity.

   Discussion. Making summaries.

## Relationship with the curriculum

The program supports the direction of exploratory study of the national curriculum.