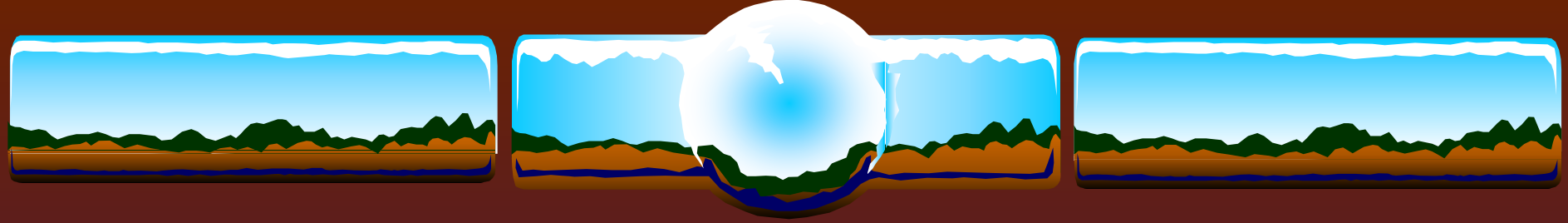

Implementation of Green Bookkeeping at Reykjavik Energy

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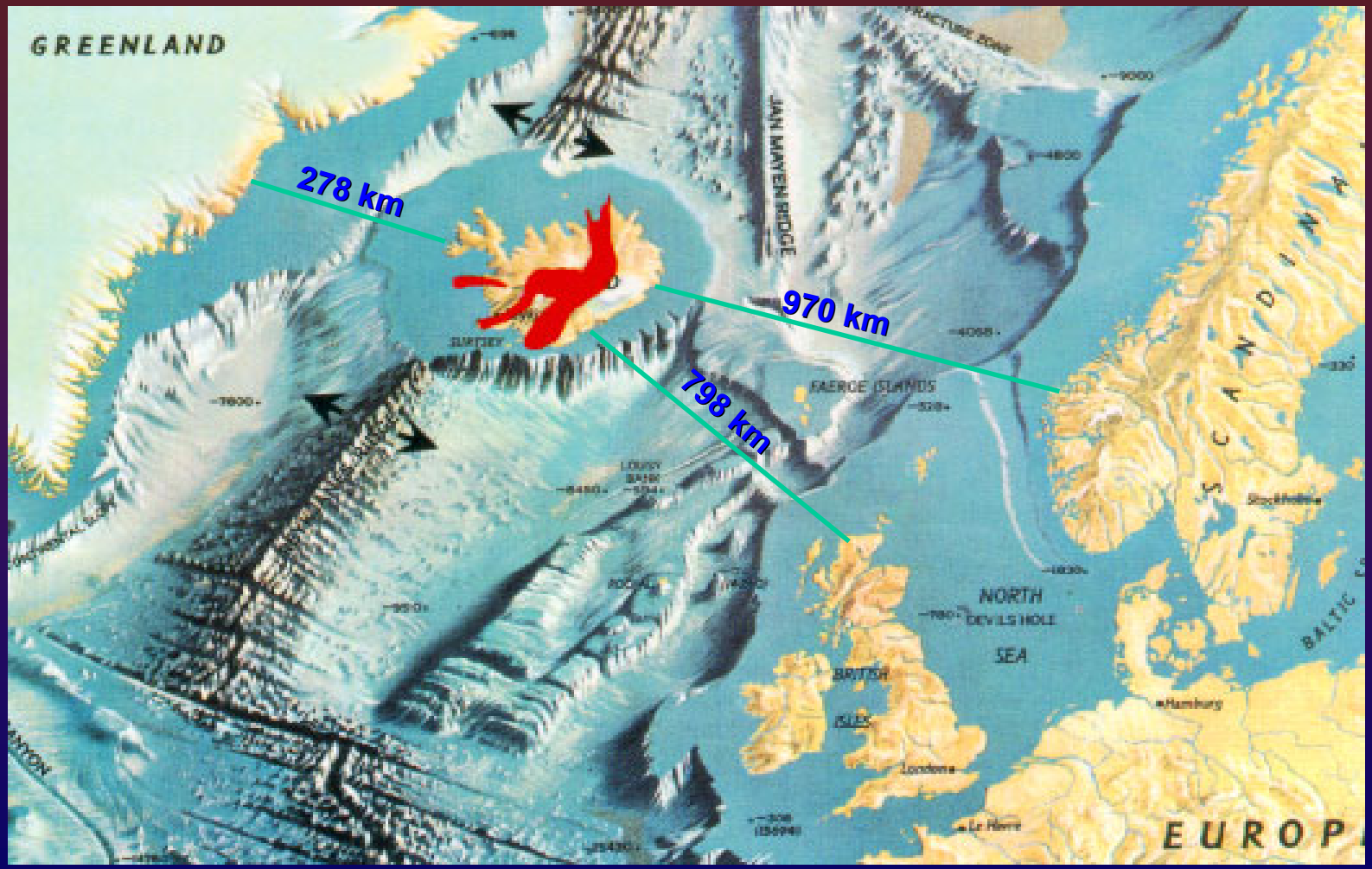
Iceland

- One of the Nordic countries
- Population approx. 300.000 people
- Capital city: Reykjavik
- Education and technology levels: High
- Unemployment rate about 1%
- Member of NATO, EFTA and belongs to EEA

Iceland lies in the north-Atlantic Ocean



The Kyoto protocol

- The Icelandic issue is the request that new high energy consuming industry (e.g. aluminium factory) should, to a large extent, not be included in the emission calculations:
- Firstly because our renewable energy sources guarantee that global emission is minimized given the probability that fossil or nuclear fuel would be used if the industry in question were situated elsewhere.
- Secondly because the economic benefits of even one such industry are great for a small economic system which is lacking in versatility.

Reykjavik Energy

- Is the result of merger of:
  - Reykjavik Electric Power Works
  - Reykjavik District Heating Utility
  - Reykjavik Water Works
- Operates according to:
  - HACCP (Hazard Analysis Critical Control Point)
  - A quality control system - ISO 9001
  - Is currently working towards ISO 14001
  - Balanced Scorecard methodology

Products involve

- The cold drinking water is pumped from holes drilled into the ground to consumers, untreated and unsterilized.
- The hot water is pumped from the earth from underground wells and the water remains hot by geothermal heat.
- Electricity is generated to Reykjavik city and neighboring communities from two hydro powerstations and one geothermal powerstation at Nesjavellir.
- The Nesjavellir powerplant generates 90 MW of electricity alongside 250 MW of thermal energy.

Nesjavellir in summer and winter

Present state of environmental affairs

- Geothermal energy is used for space heating. In Iceland about 90% of houses are heated with geothermal water.
- Reykjavik Energy utilizes four low temperature geothermal fields (<150°C) and one high temperature field (>200°C) for the district heating.
- The pumping did lower water levels in the harvested area at one point but with reduced pumping the water level rose again and balance has been maintained for a number of years in the low temperature geothermal fields.

Green bookkeeping

- Top management at RE has decided to implement the environmental management system ISO 14001.
- Reasons for specially recording and reporting environmental issues at Reykjavik Energy are:
  - To increase sorting and recycling of waste when possible.
  - To decrease emission of greenhouse gases and acid gases when possible.
- Some variables are under direct control, while other variables are not.

Environmental report

- In order to record and later regulate emissions of environmental concern, RE has completed its first environmental report.
- The environmental report is conceptualized as a journal that covers all issues of environmental concerns.
- It enlists a record of all results needed and required by:
  - ✓ Icelandic environmental and pollution laws and regulations.
  - ✓ The environmental policy of Reykjavik city.
  - ✓ Conventional green bookkeeping reports.
  - ✓ The environmental policy of Reykjavik Energy.
  - ✓ The environmental standard ISO 14001.

Key indicators

Solid waste and scrap metals

Dangerous waste

Greenhouse gases

Acid gases

Hydrogen sulfide

Safety records

Waste per staff member

Solid waste:	267,0 kg
Scrap metals:	586,7 kg
Dangerous waste:	20,2 kg

Staff included 474 employees in the year 2000

Greenhouse gases

	RE [t]	Iceland [t]	Ratio
Carbon dioxide (CO_2)	13.652	2.739.000	0,50%
Methane (CH_4)	82,7	12.571	0,66%
Nitrous oxide (N_2O)	0,1	426	0,03%
Sulfurhexafluoride (SF_6)	0,0	- - -	n.a.

Acid gases & hydrogen sulfide

Acid gases:	RE [t]	Iceland [t]	Ratio
Sulfur dioxide (SO_2)	0,24	36.000	< 0,01%
Nitrogen oxides (NOx)	5,24	26.000	0,02%
Others:			
Hydrogen sulfide (H_2S)	5.550	13.905	39,91%*)

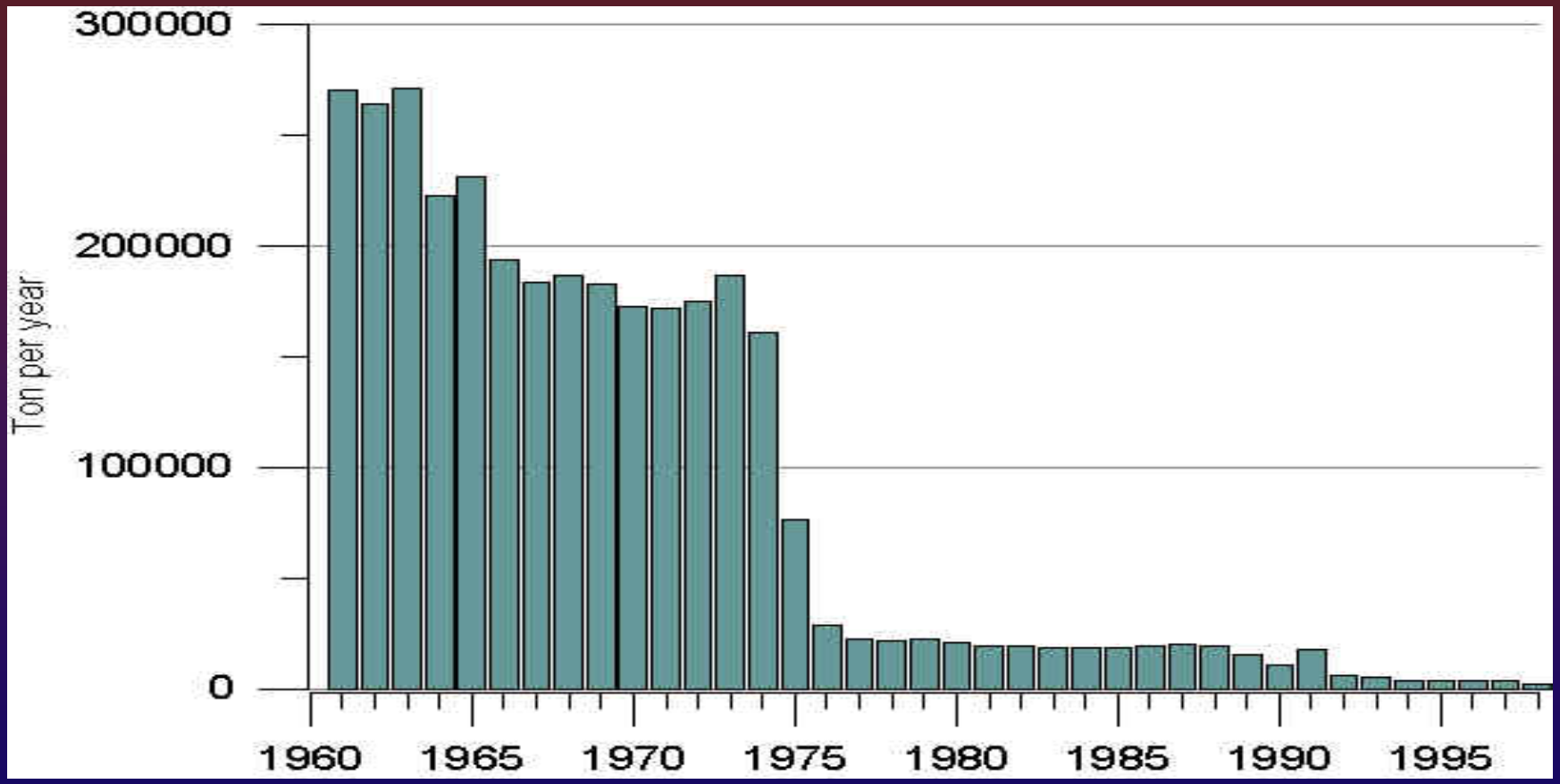
*)Estimated emission to air from Nesjavellir geothermal powerplant

Wrapping up

Reduction of carbon dioxide

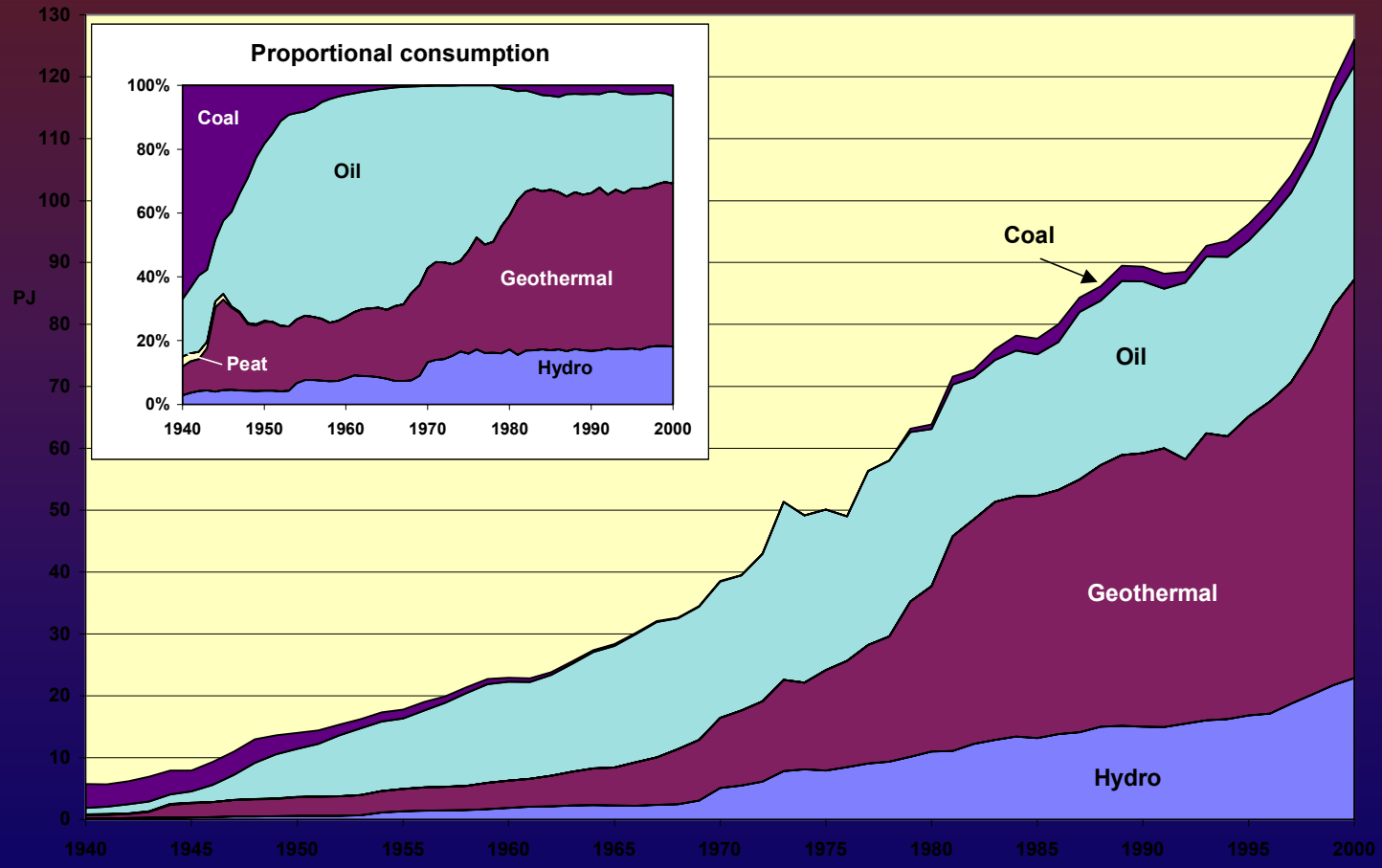
Primary energy consumption in Iceland

Reduction of carbon dioxide



Reduction in Reykjavik due to introduction of geothermal heating.

Primary energy consumption in Iceland 1940-2000



2,9 %

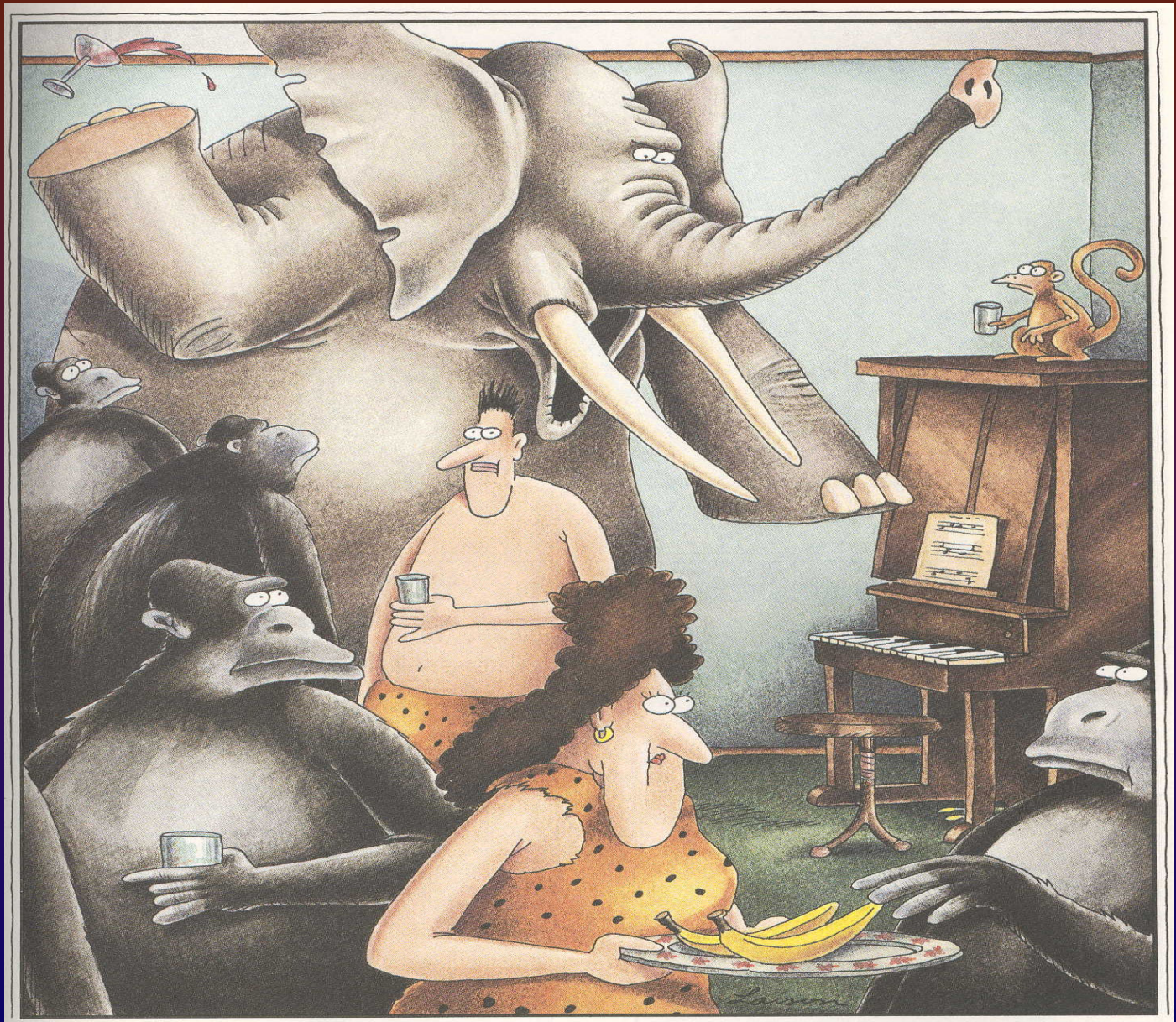
27,3 %

53,2 %

16,5 %

Final words on the future

- The environmental policy of Reykjavik city states that it aims at being a completely “clean” city using only renewable sources.
- Reykjavik Energy plans to fully cooperate and participate in this ambitious goal.
- The company strives to be a responsible member of the community and has a forward looking vision in its operations.



The party had been going splendidly—and then Tantor saw the ivory keyboard.