



Internationale Konferenz
für Erneuerbare Energien, Bonn
International Conference
for Renewable Energies, Bonn

Geothermal Energy Training in Iceland for Professionals from Developing Countries

Prof. Ingvar B. Fridleifsson, Director,
United Nations University, Iceland

2004

renewables



Geothermal energy training in Iceland for professionals from developing countries

Ingvar B. Fridleifsson

Director

United Nations University

Geothermal Training Programme



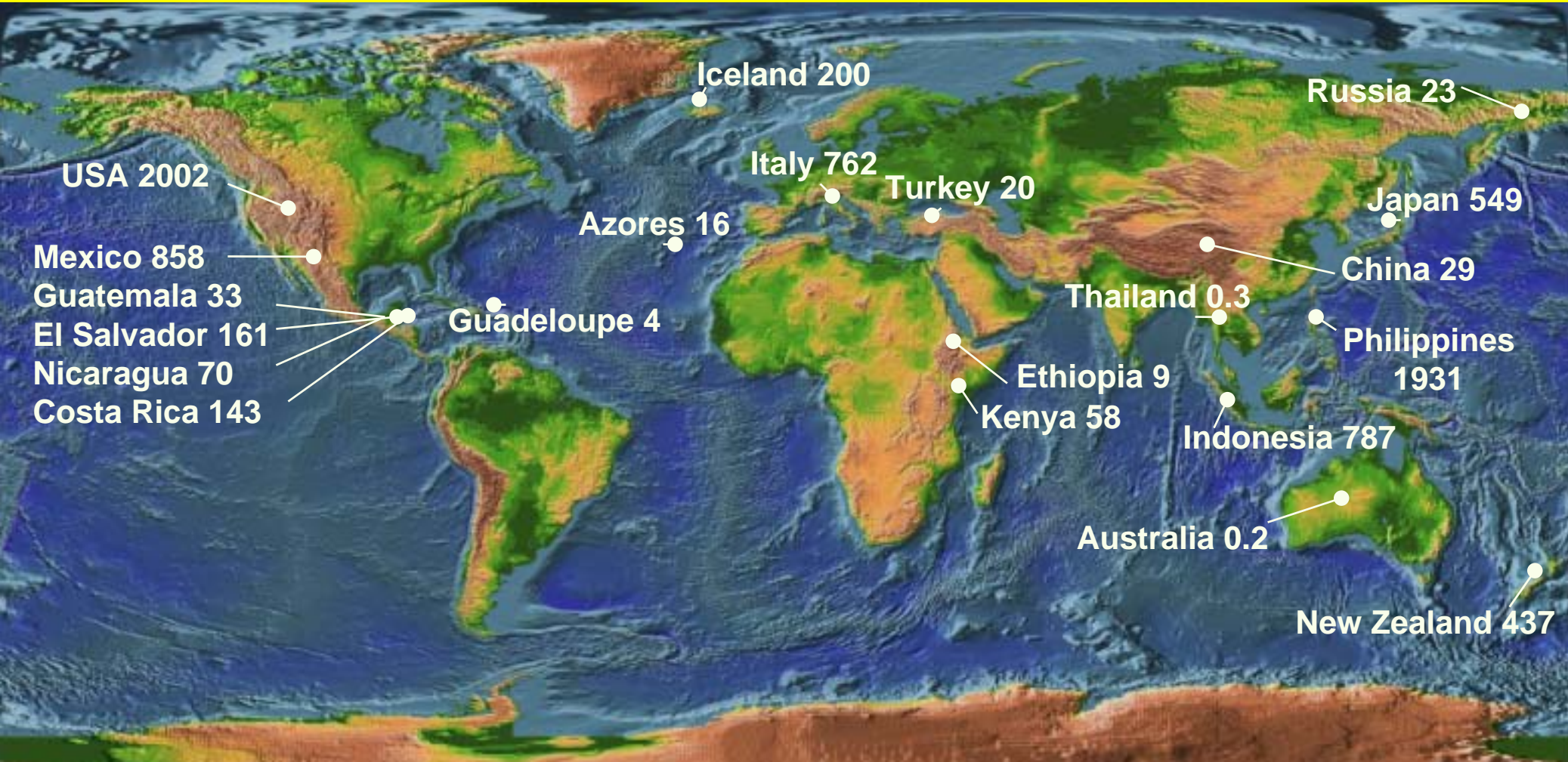
What is geothermal energy?

- A clean, renewable and environmentally benign energy source based on the heat in the earth
- Used in 58 countries of the world. Known in over 80
- Electricity generation 53 TWh/a in 22 countries
- Direct heating use 53 TWh/a in 55 countries
- Geothermal is number three of the renewable energy sources in world electricity production after hydro and biomass. It is followed by wind and solar energy



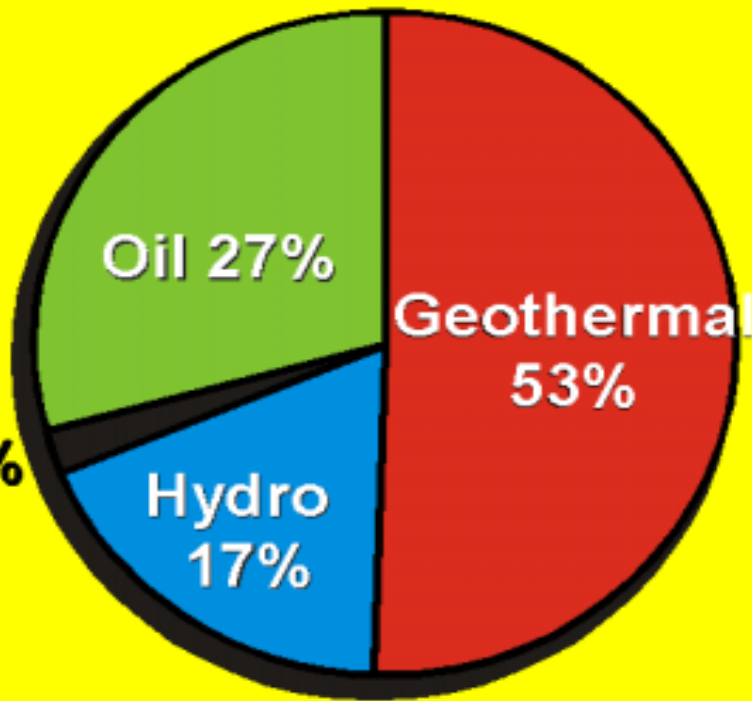
UNU Geothermal Training Programme

Geothermal electricity Installed capacity MWe 2001



Geothermal energy in Iceland

Total Primary Energy Consumption in 2002



- 86% of houses in the country are heated by geothermal
- 17% of the electricity (200 MW) comes from geothermal
- Other uses include greenhouses, fish farming, industry, snow melting, swimming pools etc.
- Only a fraction of the potential is used



United Nations University Geothermal Training Programme

- .. has operated in Iceland since 1979
- .. aims at assisting developing countries with significant geothermal potential to build up or strengthen groups of specialists that cover most aspects of geothermal exploration and development
- .. offers annually six month specialised courses for professionals in geothermal work
- .. is hosted at Orkustofnun – National Energy Authority (NEA)



UNU-GTP cont.

- .. gives priority to candidates from institutions where geothermal work is already under way
- .. trademark of the training is to give university graduates engaged in geothermal work very intensive on-the-job training in their fields of specialization
- .. trainees work side by side with geothermal professionals in Iceland
- .. training is tailor-made for the individual and the needs of his institution/country
- .. gives an opportunity to extend the studies for a MSc degree at the University of Iceland since 2000



Organization

- UNU-GTP is operated as an independent unit within NEA
- Three permanent staff members (employed by NEA)
- Academically governed by Studies Board
- About 50 specialists work part-time each year
- Teachers hired from NEA, ISOR, University of Iceland, energy utilities, research institutions, and consulting companies
- Support staff and facilities hired from NEA

The success of the UNU-GTP is mainly due to the excellent teachers and facilities



Candidates and Fellowships

- Selected by personal interviews in their home country by UNU-GTP representatives

Candidates must have:

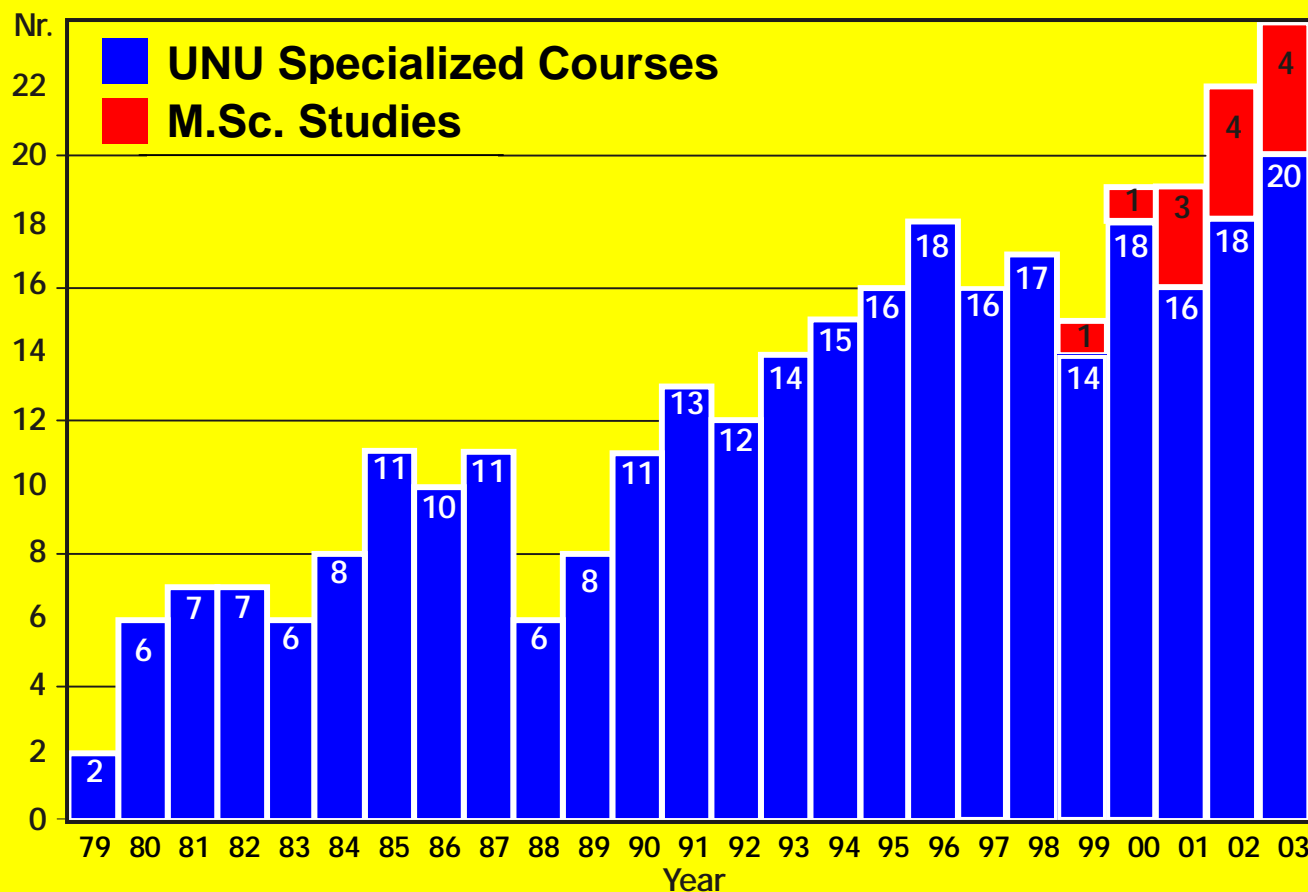
- A university degree in science or engineering
- A permanent position at a public energy company, research institution or university
- A minimum of one year practical experience in geothermal work

Fellowships:

- Fellowships are awarded to candidates from developing countries and most Central and East European countries
- Financed by the Government of Iceland and UNU



Fellows completing 6 month courses and M.Sc. students 1979-2003



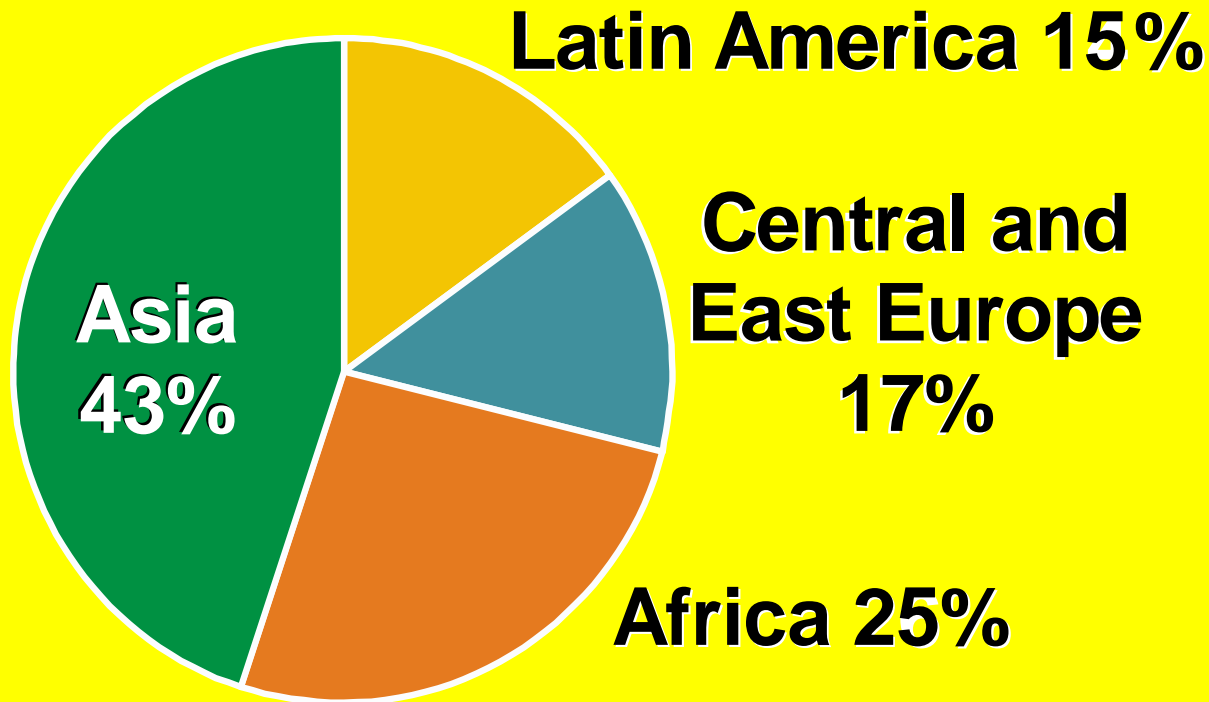


25th Anniversary class

**Class
of
2003**



Participation



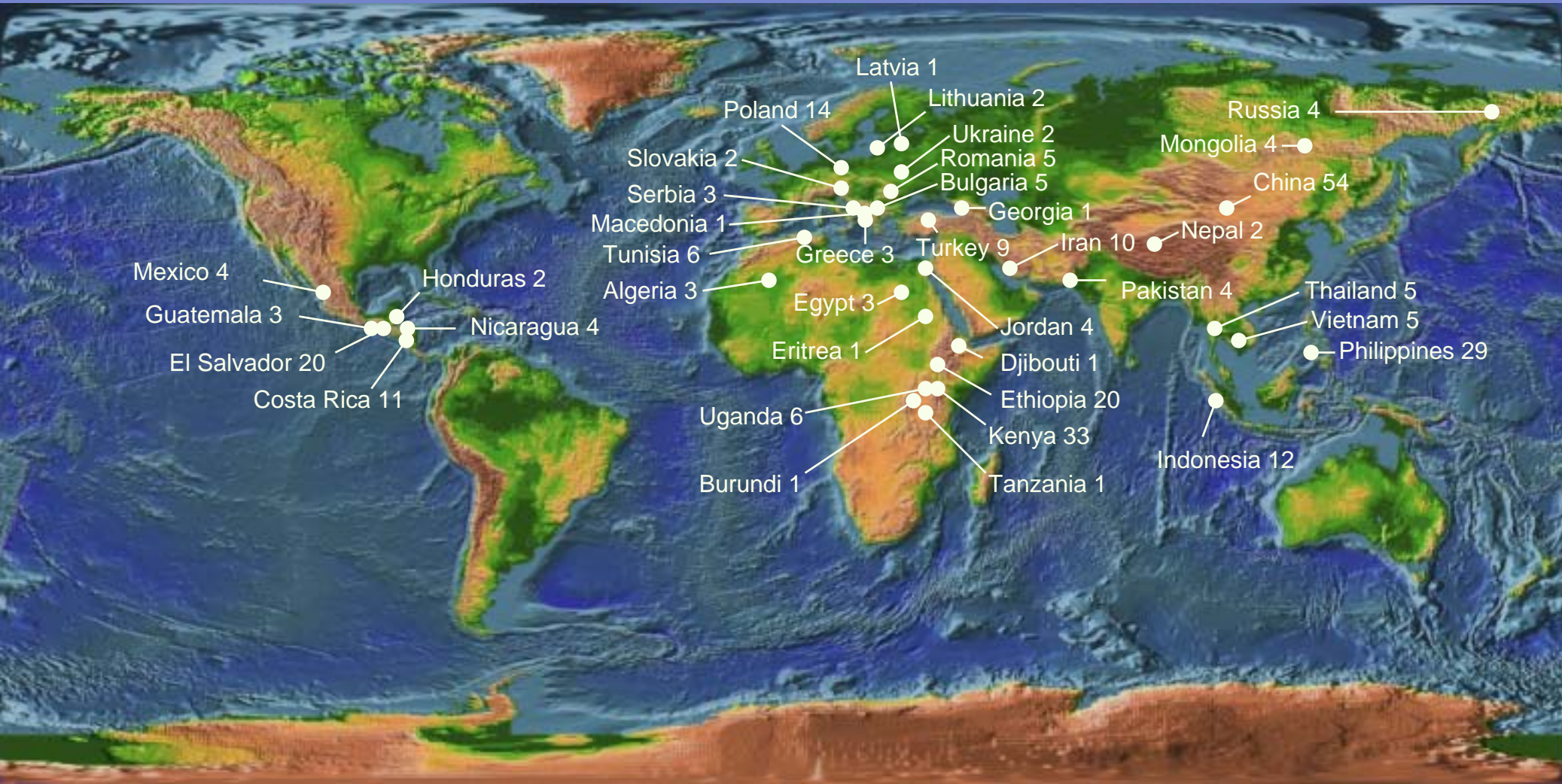
1979 - 2003

- 300 scientists and engineers from 39 countries have completed the 6 month specialized courses
- Thereof 46 ladies (15%)



UNU Geothermal Training Programme

Fellows of the UNU Geothermal Training Programme in Iceland 1979-2003





Top five countries and specializations

	China	Kenya	Philippines	El Salvador	Ethiopia
Geological Exploration		1		1	
Borehole Geology	3	4	3	1	3
Geophysical Exploration	1	7	5	2	3
Borehole Geophysics	2		4	2	1
Reservoir Engineering	20	5	9	4	4
Chemistry of Fluids	11	6	5	4	3
Environmental Studies	5	5		2	
Geothermal Utilization	10	1	3	1	4
Drilling Technology	2	4		3	2
Total	54	33	29	20	20



Site visits to cooperating countries

- Evaluation of potential role of geothermal in energy plans of the country/region
- Evaluation of institutional capacities and training needs
- Personal interviews with candidates for training
- Since 1979, total of 138 site visits, average 5 per year
- Very valuable to ensure quality of the training which is tailor made to the needs of the cooperating country



International Geothermal Conference to celebrate 25th Anniversary

- Opened by President of Iceland and UNU Rector
- 200 participants from 32 countries, thereof 24 present and 20 former UNU Fellows
- Of 91 papers, 30% by former UNU Fellows
- Pre-Conference course 60 people, 18 countries





UNU-GTP graduates

- .. are among the leading specialists in geothermal research and development in many countries in Africa, Asia, Central America and Eastern Europe
- .. have been very successful, and have contributed significantly to renewable energy development in their parts of the world
- .. are very active in the international geothermal community
- .. were authors or co-authors of 85 technical papers at the World Geothermal Congress in 2000



UNU Geothermal Training Programme

World Geothermal Congress 2000

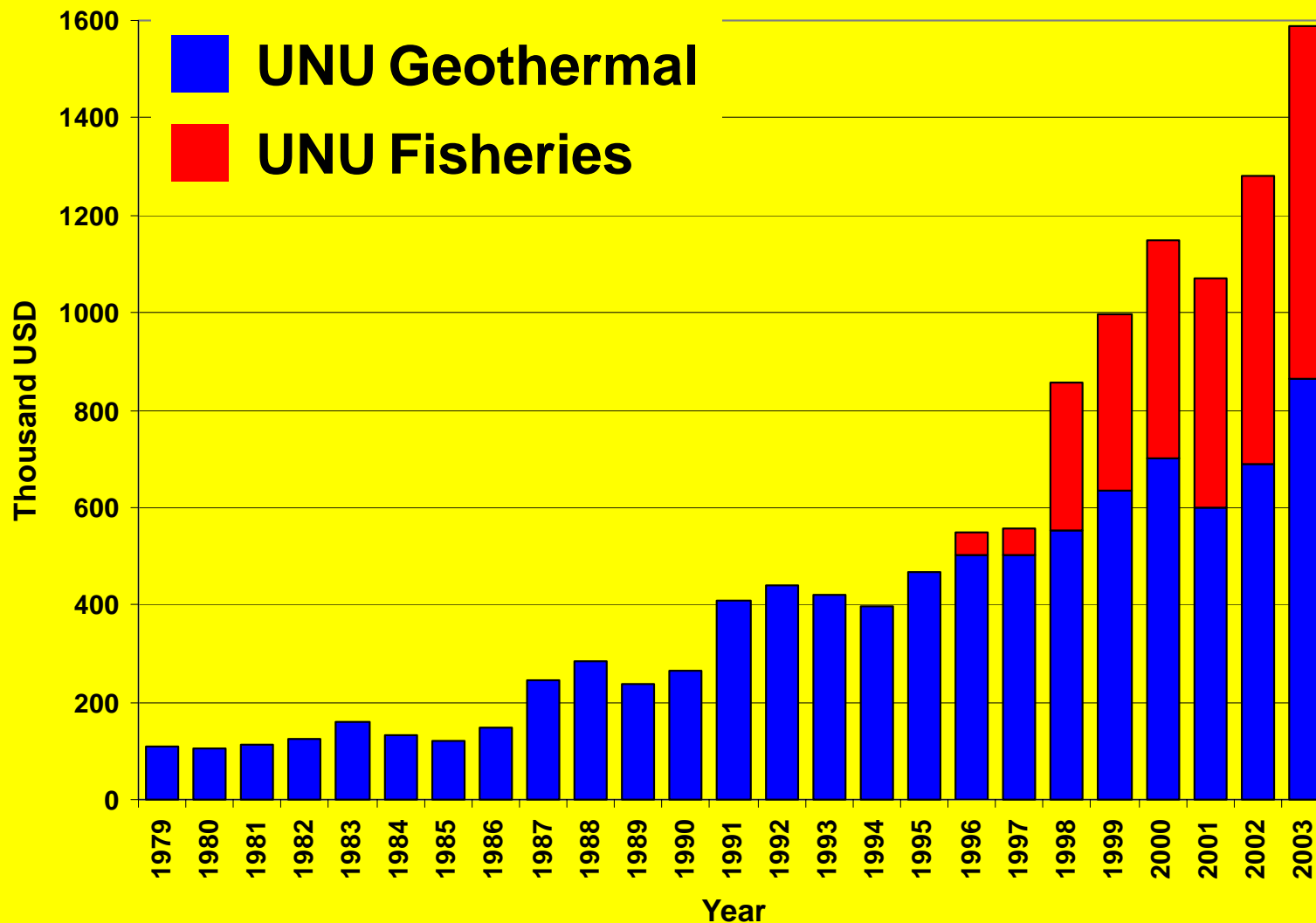
61 UNU Fellows from 24 countries presented papers





UNU Geothermal Training Programme

Icelandic Contribution to UNU per year





UNU-GTP plans for 2005-2008

- Core activity will continue to be specialized six month training with about 20 Fellows annually
- MSc programme with University of Iceland will expand from 5 to 8-10 MSc students per year
- Short courses in Africa (Kenya, Ethiopia, Uganda) under the REEEP initiative (Johannesburg Summit) probably start in Kenya in 2005 in cooperation with KenGen and UNEP/GEF
- Longer term goal to establish formal training centres with former UNU Fellows as main teachers in e.g. China, El Salvador, Kenya, and Philippines



For further information please contact:

United Nations University
Geothermal Training Programme
UNU-GTP, Orkustofnun
Grensasvegur 9, 108 Reykjavik
Iceland

Tel: 354-569 6000

Fax: 354-568 8896

E-mail: unugtp@os.is

Internet: www.os.is/unugtp/



Internationale Konferenz
für Erneuerbare Energien, Bonn
International Conference
for Renewable Energies, Bonn

Geothermal Energy Training in Iceland for Professionals from Developing Countries

Prof. Ingvar B. Fridleifsson, Director,
United Nations University, Iceland

2004

renewables