



Joint European-Latin American
Universities Renewable Energy Project

GUATEMALA, A CASE STUDY: Strategic Vision of Renewable Energy Types, in light of the JELARE Project

Cyrano Ruiz, Ph.D.

Vice-Rector and Supervisor of the JELARE Project

Galileo University of Guatemala

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 Hochschule für Angewandte
Wissenschaften Hamburg
Hamburg University of Applied Sciences



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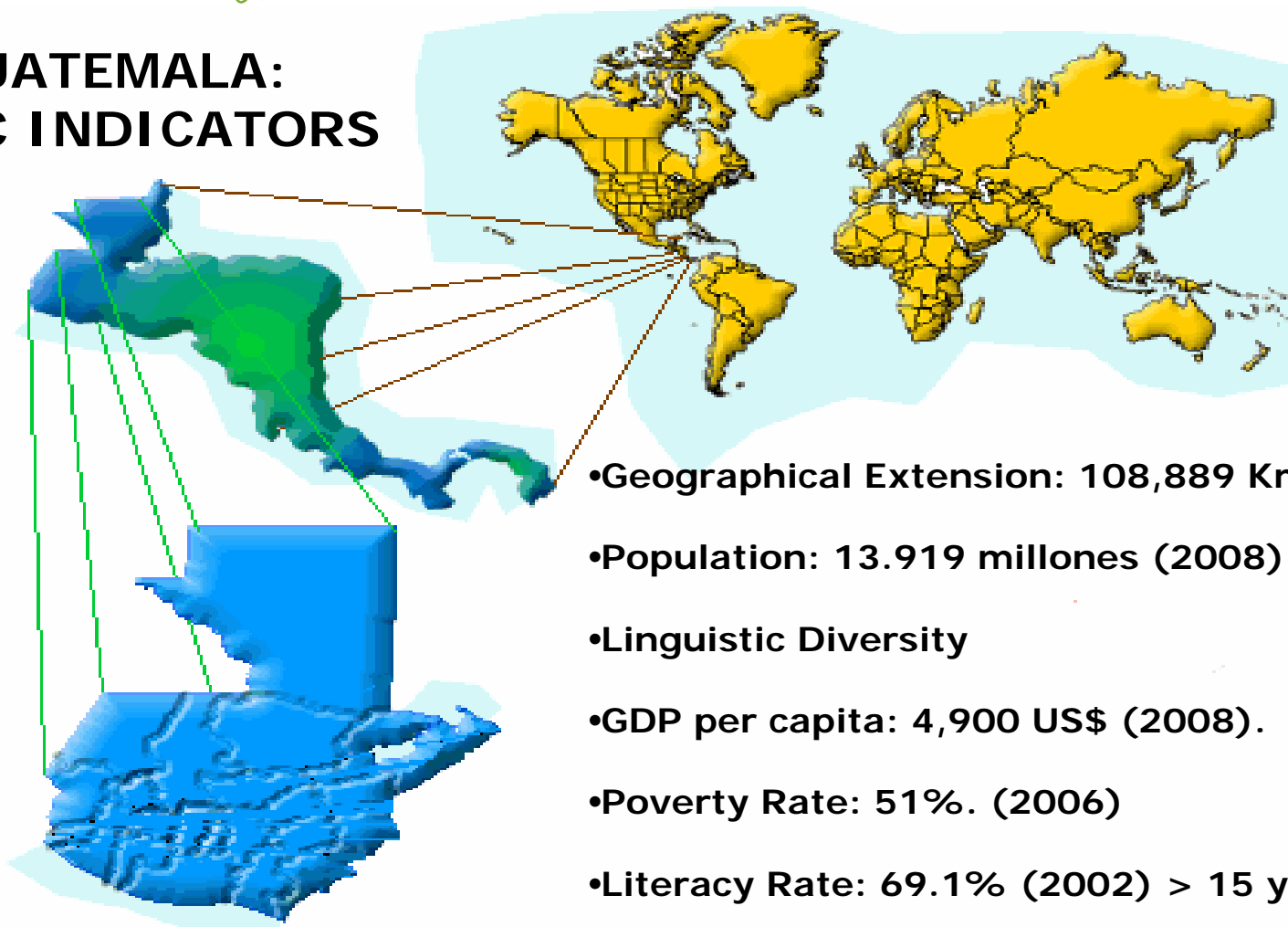
Agenda

- Context of R.E. in Guatemala
- Situation and Responses of HEIs
- Identified Challenges and Focal Points for Actions

Context of R.E. in Guatemala

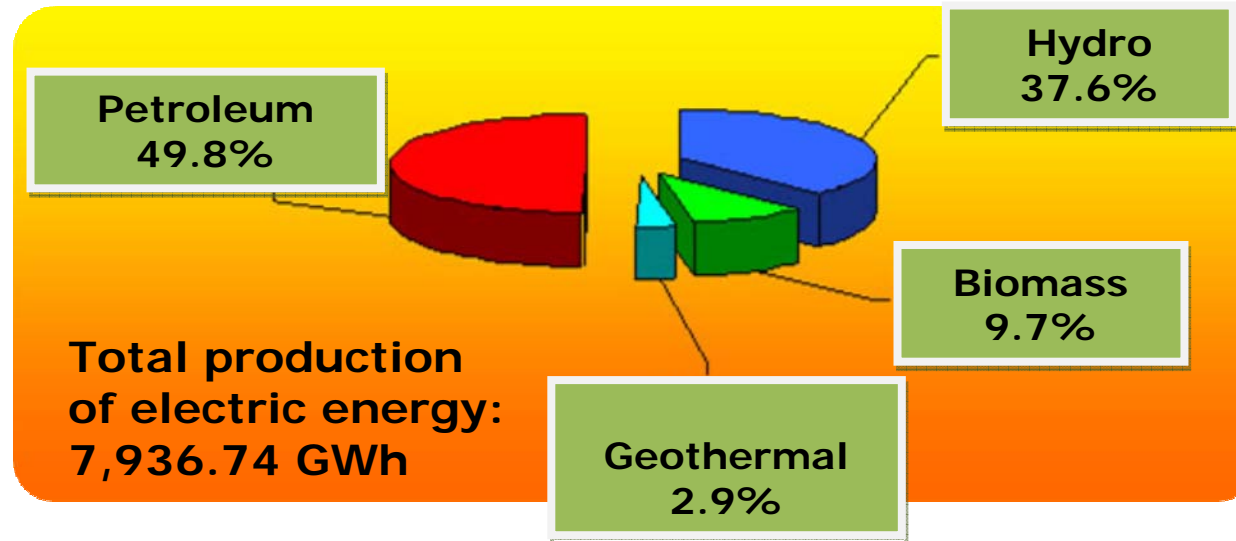
Basic Technical Facts and Legal Framework

GUATEMALA: BASIC INDICATORS



- Geographical Extension: 108,889 Km²
- Population: 13.919 millones (2008).
- Linguistic Diversity
- GDP per capita: 4,900 US\$ (2008).
- Poverty Rate: 51%. (2006)
- Literacy Rate: 69.1% (2002) > 15 years old.
- Life Expectancy: 69.9 years.

Electric Energy Production in 2007 Participation of Renewable Energies Guatemala



Source: National Association of Generators, Guatemala's Electric Sector, Guatemala, May 10, 2009. Based on data from the Wholesale Market Manager

Current capacity and RE potential, 2008.

<i>ENERGY SOURCES</i>	<i>INSTALLED CAPACITY</i>	<i>TECHNICAL POTENTIAL</i>
HYDRO ENERGY	676.8 MW.	10,000 MW.
BIOMASS	187.8 MW.	Not estimated
GEOHERMAL ENERGY	26.5 MW	1,000MW
WIND POWER	0.1 MW almost negligible	7,800 MW
SOLAR	18 solar energy systems	5.3 Kwh/m²/year

Source: Ministry of Energy and Mines and Organization of Latin American Energy, OLADE

- The government has negotiated and supported energy generation expansion projects, for the period 2008-2022, as follows:

Type	MW	%	Investment cost (in millions)
Renewable	1,608	60	US\$ 3,365
Non-Renewable	850	31	
Guatemala-Mexico Interconnection	200	7	
TOTAL	2,658	98	

Source: PRONACOM, Invest in Guatemala, 2008.

The projections show the need for Human Resources with RE training. Clearly, this is an big opportunity for HEI as long as they prepare to meet the real needs of the market, on time!

GOVERNMENT ACTIONS TO PROMOTE R.E. PROJECTS

- Creation of a R.E. Information and Promotion Center.
- Identification and evaluation of R.E. potential, (geographical locations)
- Aggressive Laws of Incentives for R.E. Projects (2003, 2005), aiming at tax reductions during the investment period, up to 10 years (income tax and value added tax, among others).

Situation of HEIs

Regulations and Examples of Responses

REGULATIONS FOR HEIs in Guatemala

- According to the Political Constitution of Guatemala, we have (only) one public university, Universidad San Carlos (USAC), and private universities (12 in 2009).
- The Constitution grants complete independence to USAC, it is self-regulated, and the private ones are regulated by an independent Council, which is NOT controlled by the government and has a constitutional rank.
- Universities are exempt from all taxes, with no exception, and choose their own academic accreditation systems.
- This makes of universities extremely agile and flexible partners for the private and public sectors. In fact, HEI in Guatemala operate within a legal framework that is unique in the region.

RESPONSES OF UNIVERSITIES

- USAC, which receives a large amount of resources from the government (5% of budget for the whole country!), has a \$25,000 wind power project! It has implemented the M.S. in Energy and Environment, with a weak international cooperation with Spain.
- On the other hand, for instance, Universidad del Valle, with strong private funding has invested \$20 million in laboratories for various R.E. projects specially in the biomass area. The Chemical Department of the School of Engineering has included RE courses in its curriculum. It collaborates with initiatives of South American countries, banks and multilateral organizations.



JELARE



RESPONSES OF UNIVERSITIES (cont.)

- There are universities with interest in environmental issues, like Universidad Rafael Landivar which is developing, along with its students, a pilot projects in environment topics, like creating a pilot plant to recycle paper and obtain toilet paper, but has no laboratories specially focused on R.E. They have a M.S. focusing in environmental areas.
- Universidad Galileo has created 3 programs: M.S. in R.E., M.S. in Energy Efficiency and a B.S. Energy Systems Engineering. It is currently working in a project regarding biomass, generating energy from weeds from a polluted lake, contributing with the environment preservation and the generation of energy. Of course, JELARE has been a key stimulating factor to “renew our energy” in R.E.



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Challenges and Focal Points for Actions

Common denominators for several
Latin American countries

Identified Challenges (“Gaps”)

1. Between R.E. and environmental topics
2. Between specialization and multidisciplinary focuses in R.E.
3. Between Research & Teaching in HEI
4. Between HEI and external entities (lack of “Tuning”)
5. Between HEI at international level

Focal points for actions: Teaching

- Make agreements that allow HEIs to access courses and seminars in different HEIs based on exchangeable programs of study.
- Internship programs in companies as a part of regular teaching.
- Introduction of R.E. courses with multidisciplinary approach, including social sciences and public policies.
- Introducing “hands on” practice into teaching, developing a connection with laboratories in R.E.

Focal points for actions: Research

- Agreements among national and international HEIs for the usage of common resources, given that investments are difficult for only one university.
- Alliances between HEI and the public sector to conduct research in R.E. but aiming at the short term economic development of the country.
- Partnerships between HEI and the private sector to establish a two-way partnership in R.E. academic programs.



Focal points for actions: Research (cont.)

- Formation of national and international research teams, through virtual modalities (video conferences, electronic forums, e-learning, etc...)
- Change the vision inside HEI to make of research, truly, an important activity.



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Focal points for actions: Technology Transfer

- Establish interchangeable lectures and activities with HEIs to keep professors updated in R.E. topics.
- Turn national and international networks, like JELARE, in effective institutional development instruments, and a way to propitiate the design of strategic long term plans, with shared responsibilities and periodic evaluations.
- Establish collaboration among laboratories with different technological levels, with the objective of transferring knowledge and equipment to allow common development in the future.



Obrigado!