“Energy supply and demand plays an increasingly vital role in our national security and the economic output of our nation.” US Department of Energy, 2006
Where humanity’s CO₂ comes from

91%  33.4 billion metric tonnes
Fossil Fuels & Cement  2010

9%  3.3 billion metric tonnes
Land Use Change  2010

Where humanity’s CO₂ goes

50%  18.4 billion metric tonnes
Atmosphere  2010

26%  9.5 billion metric tonnes
Land  2010

24%  8.8 billion metric tonnes
Oceans  2010

2010 data updated from:
Le Quéré et al. 2009, Nature Geoscience
Canadell et al. 2007, PNAS
In COP21, the Paris agreement, for the first time in over 20 years of UN negotiations, countries ratified an agreement ‘to achieve a legally binding and universal agreement on climate, with the aim of keeping global warming below 2°C.’
NDVI=vegetation cover

Source: NASA MODIS
Tanzania Dutch Energy Capacity Building Project

Tanzanian consortium members:
• University of Dar es Salaam
• Karume Institute of Science and Technology
• Dar es Salaam Institute of Technology

Netherlands consortium members:
• University of Twente
• University of Utrecht
• Delft University of Technology
• Hanze University of Applied Sciences Groningen

The program is initiated and funded by the Dutch Ministry of Foreign Affairs under the NICHE scheme of EP-NUFFIC.

Outputs:
• Training of staff
• Curriculum development
• MSc and PhD research
• Establishing an Energy Platform
• Investment in equipment
• Improvement of gender balance

Outcomes: requesting organizations will have the academic and organizational capacity to deliver quality research and well trained, competent and qualified professionals, involving the private sector and taking into account environmental, gender and labor market needs.
Vocational Training

- Level 9 (2 years)
  - Master diploma
- Level 8 (1 year)
  - Bachelor diploma
- Level 7 (2 years)
  - High level diploma
- Level 6 (1 year)
  - Advanced diploma
- Level 5 (1 year)
  - Technic. certificate
- Level 4 (1 year)
  - Basic certificate

Academic Training

- KIST
- DIT

Developed in previous HUAS project

Developed in K2K RVO project

Accreditation by NACTA

- Renewable and Sustainable Energy
  - Master of Engineering (ME)
  - Oil, Gas and Renewables
  - Bachelor of Engineering (BE)
- Oil and Gas
- Petroleum Geology
  - Master of Science (MSc)
- Geology and Geothermal
  - Bachelor of Science (BSc)

Developed in previous HUAS project

Accreditation by Ministry of Education

- Academic Training Vocational Training
- Oil, Gas and Renewables
  - Bachelor of Engineering (BE)
- Geology and Geothermal
  - Bachelor of Science (BSc)
Level 7 accredited oil and gas program at DIT developed during 2014-2016

Dar es Salaam Institute of Technology
Hanze University of Applied Sciences
EP-NUFFIC funded
with Statoil, BG Shell and Songas.
Knowledge to Knowledge Cooperation (K2K) on Geology and Applied Geology/Petroleum Engineering between the Netherlands and Tanzania (2014-2016)

Consortium:
University of Dar es Salaam
University of Twente
Faculty ITC
Delft University of Technology
Faculty of Civil Engineering and Geosciences
Utrecht University
Faculty of Geosciences

Funded by:
Netherlands Enterprise Agency (RVO)
Ministry of Economic Affairs
The Netherlands
Trilateral collaboration Netherlands-Tanzania-Indonesia

- Workshop funded by WorldBank ESMAP in supporting capacity building within Tanzania Geothermal Development Company (TGDC).
- Prepare TZ for exploration drilling for geothermal.
- ITC, ITB and TNO joined the workshop
- TGDC study visit to Indonesia 27-30 Sept. 2016