Background & Status

The positive impacts of an increasing share of renewable energy on the mitigation of climate change and on decreasing the dependence of fossil fuel imports are indisputable. However, the full economic impacts of renewable energy technologies are frequently disputed. The debate lies in whether the beneficial effects on the renewable energy industries might be offset by the economic burden of financing the costs that are incurred to support renewable energy technologies. The need to understand the impact of renewable energy sources on the economy is even more pronounced in the future when renewable energy sources are like to play a key role in a country's energy mix.

The Renewable Energy industry is seen as an engine of growth and territorial development despite the high costs associated with RES. This project will create a framework to assess the macroeconomic impact of renewable energy deployment and compare the costs and benefits that accrues to a country by transitioning to a more renewable intensive energy supply.

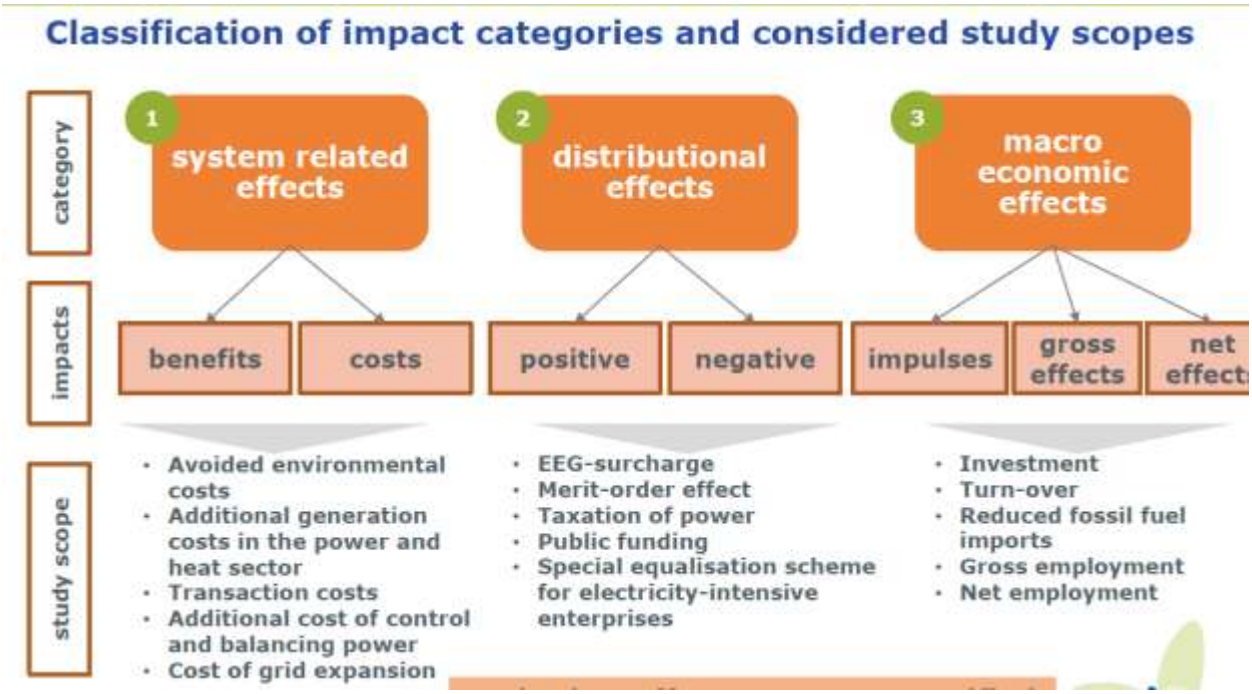
Objective and Methodology

The objective of this study will be to conduct a cost-benefit analysis of renewable energy deployment in countries around the world. It is imperative to analyze the macroeconomic impacts of renewables in a holistic manner, going beyond just the much discussed issue of support costs but rather weighing the true costs of employing renewable energy and comparing it with the benefits that accrue from it.

In order to develop a framework to comprehensively assess the effects of renewable energy deployment, without double counting or gaps, the cost and benefit effects should be divided into three main categories[1] to allow for simple comparison while accounting for policy costs for society, external costs, costs of innovation etc.:

- **System-related cost and benefit aspects**, which comprise direct and indirect costs of the system as well as benefits of RE expansion – this includes costs of installation, opportunity cost of investing in RE friendly technology over non RE technology, use of resources, environmental damage saved.
- **Allocation aspects**, which indicate which economic actors or groups enjoy benefits or suffer burdens as a result of the support for renewable energy expansion. This includes distributional and price effects faced by the communities such as impact of regulatory policy etc.
- **Macroeconomic aspects**, which identify national or sectoral growth effects at the macroeconomic level, for example effects on the gross domestic product, total investment, industry turnover and employment.

[1] As found by the Fraunhofer Institute for Systems and Innovation Research (ISI, Karlsruhe)



Aggregate cost and benefit effects can only be determined within the respective categories. This will include studying the following macro economic variables amongst many others and dividing them and assessing their impact in context to the categories defined above:

- The direct contribution of the Renewable Energy sector to the country's GDP
- Industry revenue generated by RE technologies
- Number of people employed directly or indirectly by the RE Industry
- Salaries and wages earned by the workers in comparison to national averages
- Rate of growth of the RE sector as compared to the energy sector as a whole
- Subsidies paid out to RE producers/consumers/suppliers from the national exchequer
- Consumption of fixed capital (depreciation)
- The trade balance of the renewable energy sector
- Impact of policies adopted in other countries
- Market prices of fuels and weather conditions
- Existing level of difficulty of the administrative system
- Existence of or creation of regulatory framework for minimizing the impact of restrictive trade practices

Thus, once all variables are classified into their respective categories, a cost benefit analysis can be conducted in each category.

Such a framework will also allow countries to compare their performance of the cost benefit matrix with the performance of others, thereby allowing exchange of best practices, comparative analysis between countries/regions, assessment of impact of imports, impact of indigenous industry, impact of individual RE technologies and comparability of data across countries. The final product will be a framework that allows all the countries in the world to assess the macroeconomic impacts of RES on their country.

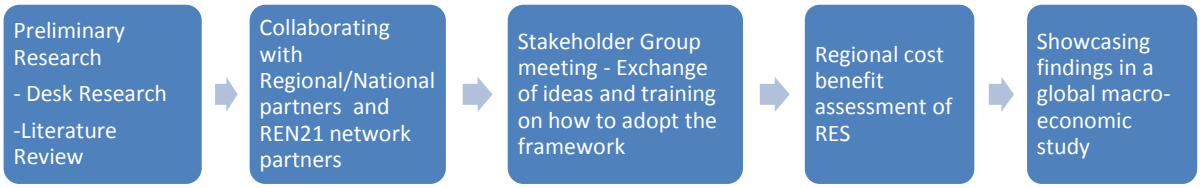
Project Outline

Starting from the macroeconomic model developed by a consortium of German research institutes (IZES, Fraunhofer ISI, DIW, GWS), a discussion will be initiated how to develop an assessment tool on macro-economic aspects of renewable energy deployment applicable to countries of varying levels of economic affluence. The assessment tool will be developed in a manner that makes the tool effective and suitable for RES impact assessment in the different regions of the world.

In a first step, REN21 aims at bringing together a group of experts from different world regions (Latin America and Caribbean, North America, Europe, Africa and Middle East as well as Asia Pacific) in order to develop a framework to assess the macro-economic impact of renewable energy deployment.

In addition to regional research institutes, the REN21 network partners working on related topics such as IEA, IRENA, and UNEP etc. will be invited to the meeting in order to share their work and experience.

A stakeholder group meeting bringing together the various perspectives from the different regions and institutions will be organized to initiate a dialogue on parameters of a common assessment framework. Such a common framework could then be implemented by the regional partners to conduct national/regional RES assessments. Based on these findings and under the guidance of a leading specialist, a REN21 flagship report on macro-economic aspects of renewable energy deployment will be developed.



Possible Regional Partners for expert group:

1. Asia Pacific: Datok Loo Took Gee, Secretary General, Ministry of Energy, Green Technology and Water of Malaysia
2. China: Li Junfeng, Center for RenewableEnergy Development, Energy Research Institute, State Planning Commission, Beijing, China
3. India: Centre for Global Environment Research, The Energy and Resource Institute (TERI), New Delhi, India
4. North America: Daniel Steinberg and Gian Porro, National Renewable Energy Laboratory; Dan Kammen, University of California, Berkeley
5. South America and Carribean: Caribbean Community (CARICOM) Secretariat; Fondacion Bariloche
6. Africa: R.E. Malimbwi, A.P.C. Faaij,European Union Energy Initiative; RECREEE; ECREEE
7. Europe: European Commission, Fraunhofer Institute, Energy Economics Group (University of Vienna)

Project Phases

The following project phases are envisaged:

1. February 2013:
   Constitution of a stakeholder group incl. institutional partners and regional research institutes
2. March 2013:
   First meeting of the stakeholder group focusing on discussing key parameters of a common macro-economic assessment framework
3. April - September 2013:
   Application of common macro-economic assessment framework in national/regional context
4. October 2013:
   Second meeting of the stakeholder group to discuss regional assessments & result comparison
5. January 2014:
   First draft of Renewables Global Economics Report
6. June 2014:
   Launch of REN21 flagship report on macro-economic aspects of RE deployment (e.g. Renewables Summer Academy)

Annex: Further Reading

Policy Overview

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iii. Package of Implementation measures for the EU's objectives on climate change and renewable energy for 2020: Impact Assessment; European Commission, January 2008
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v. Macroeconomic Benefits of Investing in Offshore Wind; Centre for Economics and Business Research Ltd. (CEBR), London, U.K.; June 2012
vi. Mobilising Bond Markets for the Low carbon Transition: An eight point plan, Sean Kidney, Climate Bonds Initiative, Modern Energy Review, Volume 4, Issue 1, 2012
vii. Opportunities for Economic Value Creation along the Solar and Wind Value Chain, Multilateral Working Group on Solar and Wind Energy Technologies, December 2011
viii. Value Creation for Local Communities through Renewable Energies, Muhlenhoff, J; Renews Special, Issue 46/December 2010.
ix. Green Jobs: Towards decent work in a sustainable, Low carbon world. Worldwatch Institute, 2008.
x. Laying the Foundation for a Bright Future Assessing Progress Under Phase 1 of India's National Solar Mission; Council on Energy, Environment and Water Natural Resources Defense Council, April 2012.
xi. Renewable Energy & Employment, IEA- Renewable Energy Technology Deployment; November 2011

Case Studies

xii. Study of the Macroeconomic Impacts of Renewable Energies in Spain; Deloitte and the Spanish Renewable Energy Agency (APPA), 2010
xiii. Economic impact analysis for renewable energy, energy efficiency and new gas generating plant; 2012 Integrated Resource Plan for Connecticut, Connecticut Department of Energy & Environmental Protection, 2012
xiv. An Assessment for Technical, Economic, and Environmental Challenges Facing Renewable Energy Strategy in Egypt; Ehab Mohamed Farouk Abd El Aziz Mohi El Din; Kassel University and University of Cairo, 2011

xv. Renewable Energy: Employment Effects; Impact of the Expansion of Renewable Energy on the German Labour Market. Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), Germany, June 2006

xvi. Economic impacts from the promotion of renewable energies: The German experience; Rheinisch-Westfälisches Institut für Wirtschaftsforschung, October 200 9

xvii. The Economic Impact of Renewable Energy, Stephen Lacey, Renewable Energy World, April 2007

Technical Studies

xviii. Xviii. Innovation, Renewable Energy and Macroeconomic Growth; James A. Baker III Institute for Public Policy of Rice University, 2010

xix. EmployRES; The impact of renewable energy policy on economic growth and employment in the European Union, European Commission - DG Energy and Transport, April 2009