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Integrating Energy Policy and Adaptation Measures for Europe, Including a Focus on Coasts, Island, Marine Areas and Watersheds

Sustainable energy development, in conjunction with adaptation to climate and other changes, is increasingly important with Europe and globally. Fossil fuels have supported modern societies and lifted billions of people out of poverty. They have also changed landscapes and polluted air and water. Now the production of carbon dioxide is changing the climate, and European energy policy must continuously change.

The integration of more sustainable energy uses, and climate adaptation and mitigation, is extremely important across all of Europe and globally. Here, the focus on the specific vulnerabilities, needs, and opportunities for European coasts, islands, and watersheds, which are important economically and socially throughout Europe. These areas will have increasing and shifting energy needs due to climate and population, and will also be most pressed to adapt to climate change.

Energy enables the three pillars of sustainable development – economic development, social development, and environmental protection. Europe needs flexibility in how it generates energy, but this energy can be cleaner, low carbon or renewable; and generated and delivered locally and used more efficiently with the assistance of European policy tools and measures.

Terrestrial and offshore winds, solar, geothermal energy, biomass and biofuels, and other renewable resources can meet energy needs, while supporting local development, achieving greenhouse gas emission reductions, and addressing crucial issues such as energy, water and food security.

Energy, water and food security are all intertwined throughout Europe, particularly for arid and remote coasts and small islands. Energy and water systems, and renewable energy and aquifer management, can assist in providing vital energy, water and food security. Further adaptation initiatives and research are required in Europe to understand this nexus of energy, water and food security with islands, coasts, countries and regions.

Offshore wind and oceans resources, and offshore wind and ocean energy development along with related grid infrastructure, can provide greater energy and water security, while supporting and sustainable economic development for coast and oceans. For example, there are excellent initiatives underway with the application of the Renewable Grids Initiative and marine spatial planning for marine renewable energy and offshore grid infrastructure in the North Sea, which will benefit all of Europe once implemented.

Because there is the possibility of displacing imported hydrocarbons for electricity generation and transportation, there are also real opportunities for the use and integration of renewable energy particularly for northern and southern regions, and remote locations within Europe. Appropriately designed climate finance and international, European and national climate financing instruments along with climate mitigation measures - such as carbon sequestration, and emissions reduction and trading regimes - can underpin and financially support these renewable opportunities.

Another aspect of European energy policy and adaptation is the integration of energy, water, cooling and heat systems and the clarifying the role that more sustainable energy can play in coasts, islands and watershed regions in managing for managing seasonal flooding, and the increased heat and aridity occurring. In turn, these measures will support improvements in the built environment and coastal and island infrastructure, and more sustainable communities and tourism development.

Many coastal and island communities have significant energy needs for heating and cooling that will be aggravated by climate shifts and increasing economic development and human settlement. In so doing, these communities may rely on imported hydrocarbons for electricity generation, transportation and the provision of water services. However, renewable energy resources - such as hydro, geothermal, wind, and ocean - may also be available. Longstanding issues of water quality, sanitation and the treatment of waste water, and heating and cooling services, could also be addressed by cleaner and more sustainable energy development.

Adaptation Governance for Climate and Energy

Integrating energy policy and adaptation requires changes in how government and communities engage and interact. Climate, economic, environmental and societal stresses will be magnified without appropriate decision making processes for people, communities, businesses and governments. Vulnerabilities, impacts and adaptations differ across Europe given such factors as geographical location, heritage and ethnicity, socio-economic status, occupation and business, and prosperity.

Local, national and regional decision-making and leadership is required to adapt to change. Complexity and uncertainty around climate and other changes make existing governance approaches and structures inadequate. Hierarchical and regulatory models of decision making will not be as successful, given the expanding and exponential nature of change and increasing citizen expectations of participation and informed decision making. Without decentralization and greater access to decision making, local and traditional knowledge will not be incorporated into decisions for the businesses, communities and peoples most affected by change.

Effective adaptation governance requires scientific and societal understanding of vulnerabilities, impacts and adaptation, supported by scaled-down scenario building and forecasts. Foresight and shared learning are key aspects of integrating scientific and social scenarios and successful decision processes, and can engage people in thinking and learning about the future together, so robust responses and commitments can be developed.

Extensive communication and continuous interactive dialogue is necessary among people, communities and governments to equitably and ethically allocate the benefits, burdens and risk of adaptation, and to make societal choices on adaptation that will be broadly accepted and implemented. This communication and dialogue can incorporate web based platforms and social media to provide wide-spread real-time access to monitoring, information and analysis; and to support communications and interactive dialogue among governments and stakeholders. Internet-based platforms, facilitated by satellite and space technology, are already prevalent in much of the Europe. Academic institutions and networks, and civil society organizations can play very useful in facilitating and supporting this communication and dialogue, as well as providing trusted objective scientific knowledge, and contextual knowledge and information, to their communities and all levels of government.

Further information:

Dr. Magdalena A.K. Muir closely follows European developments and impacts of climate change for coastal and marine biodiversity and ecosystems, fresh water, sustainable energy development and infrastructure in coastal and marine zones, and ocean acidification. In this capacity, she participates in governance and policy development for climate adaptation and mitigation, sustainable energy development and ocean acidification at the European, Mediterranean, Nordic level, and UN level, working with projects at the local level. She can be contacted directly at makmuir@ieels.com and mamuir@ucalgary.ca.

The **Sustainable Energy Development Project** is implemented by the Coastal and Marine Union (EUCC) in cooperation with the Arctic Institute of North America and other institutions and programs at the University of Calgary; the Masters of Science- Energy Policy and Climate Program at John Hopkins University in Washington DC; the Aarhus School of Business and Social Sciences and the Nordic Centre of Excellence for Strategic Adaptation Research (NCoE NORD-STAR).

One component of this project is renewable energy and desalination for small islands and coasts in the Caribbean and globally, which is being implemented in 2013 to 2014 under a Fulbright Scholarship in collaboration with the Center for Carbon-free Power Integration and the Mangone Center for Marine Policy in the College of Earth, Ocean, and Environment at the University of Delaware; the Earth Institute at the University of Columbia, New York City; the Coastal and Marine Union (EUCC) in Lieden, Netherlands; United Nations Department of Economic and Social Affairs; and the Sustainable Cities Initiative Energy Lab.

The **Adaptation Governance for Global and Climate Change Project** addresses adaptation governance, and making the most effective societal decisions to enable adaptation to changes at local and regional scales. The adaptive research is being implemented in cooperation with other academic institutions and colleagues, local and international communities and organizations, and communications and scenario development specialists.

The Aarhus School of Business and Social Science at Aarhus University, and the Nordic Centre of Excellence for Strategic Adaptation Research. By pursuing innovative science, sound economic analysis and effective communication, NCoE NORD-STAR's enables Nordic decision makers and stakeholders to design and implement successful adaptation policy and practice.

John Hopkins University's Energy Policy and Climate Program, and the Nicholas School of Environment at Duke University are supporting and collaborating in adaptive governance research projects. Civil society organizations such as the Coastal and Marine Union (EUCC) and the Sustainable Cities Initiative Energy Lab engages local communities and all levels of governments in these efforts.

Please see the following web links for further information:

http://www.eucc.net/en/climate_change/index.htm

http://arctic.ucalgary.ca/research/sustainable_energy_development

<http://arctic.ucalgary.ca/research/adaptation-governance>

- See more at: <http://commentvisions.com/discussion/9271/climate-and-energy-policy-is-it-adapting-fast-enough-#comment18402>