



**NATO PROGRAMME FOR SECURITY THROUGH SCIENCE
SCIENCE FOR PEACE PROJECT
SFP - 982620**

**SAHARA TRADE WINDS TO HYDROGEN:
APPLIED RESEARCH FOR SUSTAINABLE ENERGY SYSTEMS**

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Project Description Summary:

The NATO “Sahara Trade Winds to Hydrogen” project consists in building two applied research platforms within Morocco and Mauritania’s main research centers in partnership with large local end user groups to initiate a far ranging, comprehensive program aimed at integrating intermittent sources of renewable energies in the weak grid infrastructure of the Saharan/Sahel region. The equipping of both labs in Morocco and Mauritania in the first months of the program will enable field measurements to be geographically spread and this cooperation extended to other countries in the region. Countries like Senegal, Mali, Niger and Chad dispose of extremely limited electric generating capacities (120MW on average) with a need to cover vast territories.

The trade winds that blow along the Atlantic coast from Morocco to Senegal represent the largest and most productive wind potentials available on earth. Because of the erratic nature of winds however, wind electricity cannot be integrated locally on any significant scale, unless mechanisms are developed for storing these intermittent renewable energies. Wind-electrolysis for the production of hydrogen can be used in grid stabilization, as power storage, fuel or chemical feedstock in specific industries. Initiated by the private sector, this project is before all end user driven and seeks to demonstrate the potential for synergies emerging from sustainable carbon free energy technologies and their related economies. The utilization of wind energy and electrolysis bi-products is likely to reinforce significantly the value added processing of Morocco’s and Mauritania’s main extractive mining industries (Phosphates and Iron-ore respectively) in providing most environmentally friendly solutions.

Tackling the global consequences of climate change, environmental degradations and rampant desertification on largely agricultural based societies currently under high demographic pressure is a key social priority, as they generate economic distress leading to mass migration. This constitutes a significant security threat to the stability of the region and that of NATO countries. Developing alternative wind energy solutions to feed smaller electricity markets are essential for solving decentralized energy access issues and enabling the development of local, viable industries which could address the regions economic challenges currently under pressure from Sub-Saharan migrant populations. The involvement of NATO to assist local academia to support, sensitize and train capacities necessary to develop upstream energy alternatives is also relevant to the Alliance’s strategic challenges to initiate the development of technologies that address energy security and the need for diversifying away from highly concentrated fossil fuel reserves and infrastructures.