Climate Change & Environmetrics

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In October 22nd 2013, May 2013, the world crossed a symbolic threshold when observed concentrations of the main atmosphere-warming greenhouse gas, CO_2, exceeded 400 parts per million for the first time. Understanding where the world stands in relation to its low-carbon and climate-resilient investment goals is a more urgent task than ever, climate related investments have fallen well short of even the most conservative needs estimates for successive years In this document we focus upon Anthropogenic carbon dioxide (CO_2) emissions (i.e., emissions produced by human activities) which come from combustion of carbon based fuels, principally wood, coal, oil, and natural gas. Results of academic analysis, studies and research related to climate, predict an average of future global warming of between 1.1 and 6.4°C by 2100. The International Energy Agency (IEA) is in agreement with this forecast. A world average of global warming of 3 to 4°C at the end of century would be potentially catastrophic.

These changes have led to the intensification of natural disasters such as floods and droughts, rapid environmental transformation of ecosystems ; biodiversity losses; oceans acidification; melting of ice caps and sea levels rising; along with intensification of respiratory and cardiovascular diseases ; food insecurity and populations movement rising.

Hence, all these environmental and socioeconomic repercussions will continue in the absence of any proactive, adaptive and preventive measures, (Tissot-Colle and Jouzel, 2013; Jemli and Chtourou, 2010).

The world energy demand multiplied by a factor of 2.4 between 1970 and 2010. This demand will substantially increase in the future due to world population growth and the growing needs of developing economies'. However, until the 21st Century, fossil fuels have represented more than 80% of the total energy supply. These nonrenewable resources are, expensive, increasingly scarce and finite in supply. this is apart from the

vast irreversible damage which fossil fuel continues to wreak upon our natural environment.

In May 2013, just five months prior to the publication of the IPCC report, (http://www.ipcc.ch/report/ar5/wg1/) the U.N. Office for Disaster Risk Reduction warned that economic losses from disasters since 2000 are in the range of $2.5 trillion, a figure at least 50 percent higher than previous international estimates.

U.N. Secretary-General Ban Ki-moon launched the report saying the review of disaster losses in 56 countries clearly demonstrates that "economic losses from disasters are out of control" and can only be reduced in partnership with the private sector he commented that, "Our startling finding is that direct losses from floods, earthquakes and drought have been underestimated by at least 50 percent,".

Ban said. "So far this century, direct losses from disasters are in the range of $2.5 trillion. This is unacceptable when we have the knowledge to reduce the losses and benefit from the gains." For too many years, the secretary-general said, financial markets have placed greater value on short-term returns than on sustainability and resilience, which in the long-term are far more attractive and can save millions of dollars. "In the years ahead, trillions of dollars will be invested in hazard-exposed regions," Ban said. "If that money fails to account for natural hazards and vulnerabilities, risk will increase. Where such spending does address underlying risk factors, risk will go down."

Previously, renewable energy commercialization has involved the deployment of two generations of renewable energy technologies dating back more than 100 years. First-generation technologies, are mature and becoming economically uncompetitive,

Generation two has been the transition period to generation three, which includes biomass, hydroelectricity, geothermal power and heat. Third-generation technologies currently being developed require significant long term investment, both from the public and private sector in order to make the required contributions on a global scale.

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Clearly, it is imperative that more effective, affordable, alternate energy sources are quickly, financed, developed and deployed.

Future World Climate change mitigation efforts aim to maintain the average global warming to 2°C, compared with the preindustrial level.

Not exceeding this threshold means that the world GHG emissions from now (2013) to 2050 have to be reduced by half compared with late twentieth Century levels (that is almost a third of current emissions).

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The challenge is that private investors, who can and should provide the lion's share of global climate finance for good reasons - as asset owners (project developers) and end users (households, corporate manufacturers) of renewable technologies - only invest their money when the returns on offer outweigh the costs.

All of the Environmentally and Sustainably based NGO Community implemented ISO based standards, (Private standards based upon actual ISO standards), throughout their “standards”, while this methodology provided a credible platform from which to build global consensus driven standards, it soon became obvious that these standards were never designed or thought of as Investment Benchmarks, the accreditation and other required ISO processes did not and could not reflect or fulfill the requirements of the regulated Investment Industry. This failure led to investor expectations of higher risks and considerably lower returns. The solution was to implement these robust ISO based standards which could potentially provide interoperability across the 162 countries signed to The ISO and then to insert Investment grade modules which would ensure fiduciary compliance and high grade quantitive risk analytics and therefore higher performance leading to much improved returns for investors.

Environmetrics, (http://www.environmetrics.org/) is quantitative environnemental analyses. It applies to all quantitative subjects that address environmental issues – when dealing with massive data sets. All these data sets are related to the analysis of

environmental change as the result of the impact of the manmade acceleration of climate change.

This is the objective of science and environmetrics is part of that scientific structure. Environmetrics applies to the development of, environmental regulations, standards, environmental financial risk, big data applications, satellite imagery and pattern recognition. Almost always, there will be a quantitative question that has an environmetric solution.

Environmetrics is more than environmental statistics it is important to ensure this distinction. At the same time, when you have an environmental issue with a quantitative aspect to it, there is almost always an attendant statistical aspect often buried within the data sets., perhaps a general societal question with a quantitative issue, the majority of the solution is made up of statistical components.

Environmental statistics are a subset of environmetric statistics, it is the scientific method connected with the understanding and the collection of measurements. The basis of scientific methods is statistics. Environmetrics is designed to deal with a specific subset of areas which are connected with environmental issues. In the case of Probus Sigma research, this includes the development of quantitively based financial investment risk metrics. Quantitative measures where environmetrics are concerned have become extremely important. Probus has additionally pioneered the integration of Neural Finance technologies, (ref; http://dl.acm.org/citation.cfm?id=573193) within the overall framework of environmetric analysis, This integration is aimed at solving the issues of quantifying non quantifiable data sets mainly related to the social aspects of Climate Change risk.

The integration of differing layers of environmental and Neurally based financial research is a challenge, as environmental problems are a sequence of layers of connected issues, data from different scientific disciplines needs to be integrated with empirical data, The key issue of the future pricing of Natural Capital is challenging, for example, the water of the Nile is to be shared among nine countries, how do you determine the value of each share to each country in this limited water source?. When dealing with massive data sets, it is important how the data is quantified at both the regional level and the global level. Analysis has hitherto concentrated upon the metrics involved in defining environmental risk on several separate levels, by integrating accepted Neural Finance technologies, Probus Sigma began researching the development of quantitively based

investment risk metrics ten years ago and more recently in collaboration with Financial Academia based at Sfax Business School has achieved significant and important quantitively based environmental Investment metrics substantially beyond, existing methodologies