Energy Nation, Energy Planet: Navigating the global energy transition

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Environmental sustainability and climate change are increasingly seen in absolute terms. If you are concerned with environmental sustainability and with addressing climate change you are in favor of renewable energy and electric cars – and possibly nuclear - and are opposed to the fossil fuel industries and to the infrastructure industries, like pipelines, that support them. And you believe that sustainability starts in your own backyard as per the maxim ‘Think globally, act locally.’ And you believe that all fossil fuel investments must be opposed and stopped or the world is at risk of technological lock-in to fossil fuels at the expense of emissions-free renewables – and possibly nuclear. And if you are not concerned with environmental sustainability and with addressing climate change, you are an advocate of unfettered unregulated capitalism and you probably believe that climate change is a hoax.

This absolutist dichotomy is hampering progress on environmental sustainability and addressing climate change. It is doing so because the world is not filled only with purist environmentalists and raping and pillaging capitalists. The world is in reality filled with people who care about addressing climate change, who need jobs to support their families, who are entrepreneurs looking for new technological and business model opportunities and new global markets to disseminate them, scientists making breakthroughs in how we understand the world, engineers who design new devices and processes. And all this is happening in countries that are differentially endowed with energy resources and have widely varying energy demands from their populations and have differing economic and political systems.

Consequently, what is needed is a new conceptualization of moving to a more sustainable world that addresses climate change and breaks through the log-jam that is blocking needed progress. My presentation – entitled Energy Nation, Energy Planet: Navigating the Global Energy Transition - will present such a conceptualization that accounts for these factors. The presentation will draw on my interviews and research around the world from Canada where I live, to ‘progressive’ Europe, to the hydrocarbon-rich Middle East, to rapidly growing Asia, to the new oil and gas producing nations in east Africa, to small island developing states of the Caribbean and the South Pacific. The material I will be presenting are from a book that I am writing with the same title and is expected to be published by the University of Toronto Press in late 2019

Biography

Harrie Vredenburg is a leading scholar in the areas of competitive strategy, innovation, sustainable development and corporate governance in the global energy and natural resource industries and serves as the Suncor Chair in Strategy and Sustainability. He was one of the visionaries who founded Haskayne’s Global Energy Executive MBA and served as its Academic Director from 2010 to 2018. He also holds an appointment as an International Research Fellow at the Said Business School at Oxford University in the UK. He has authored or coauthored more than 50 frequently cited articles in leading international publications including Strategic Management Journal, Organization Science, MIT Sloan Management Review, Harvard Business Review, Energy Policy, Energies, Technovation, International Journal of Economics & Business Research and Global Business & Economics Review. He has also coauthored government reports on industry regulation, innovation and competitiveness and on nuclear energy and he consults to industry. According to Google Scholar, his publications have been cited more than 5,000 times. A popular teacher, he lectures in MBA, Executive MBA, doctoral, executive development and corporate director’s programs. He was recently honored with the 2016-2017 Haskayne MBA Society Top MBA Teacher Award, based on a vote by MBA students. He was also voted 2015-2016 Haskayne MBA Society Top MBA Teacher.He serves as a non-executive member of the boards of directors of several publicly-traded and private international energy companies.

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Tackling global challenges: Trade, climate change and sustainable energy in the context of the Wise GRID project

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The novelty of this paper is that it explains the paradigm shift in the governance of sustainable development: the 20th century was characterized by a top-down approach to the governance of climate action. The 21st century, however, offers a bottom-up approach, marking one of the mega-trends of the 21st century: in climate action, the implementation of the Paris Agreement on Climate Change is done from the bottom up via citizens, NGOs, mayors, governors, businesses, or smart cities; in energy governance, we are observing energy democratization by decentralizing the governance of energy security and creating new energy actors, namely prosumers and renewable energy cooperatives. How about the governance of international trade? How can it be governed from the bottom up so that there is an open trading system in political, legal, and economic terms? How can we have greater involvement of civil society? How can we empower citizens in trade diplomacy? Traditionally, trade policy has been conducted by trade diplomats. Should we not listen to citizens’ concerns and those of small and medium enterprises?

This paper offers a paradigm shift in thinking about international trade. Traditionally, trade has been understood as a stumbling block to sustainable energy. I argue that trade is a building block and that the international community should capitalize on the proliferation of regional trade agreements (RTAs) to enhance energy security via renewable energy (RE) and achieve clean energy. Both can be achieved with the inclusion of strong chapters on trade in goods and services related to sustainable development and renewable energy in RTAs.

**Biography**
Rafael Leal-Arcas is Professor of European and International Economic Law, a Jean Monnet Chair holder (awarded by the European Commission), and Director of Research at the Centre for Commercial Law Studies of Queen Mary University of London. His research is funded by the EU Commission's Horizon 2020 program, most notably a grant of EUR14 million as part of a consortium of 21 institutions to work on renewable energy and smart grids. He is the author of more than 160 scholarly publications on international trade and WTO law, climate change law, energy governance, EU law, international investment law and the interaction among them in American and European law reviews.

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Recovery planning for damaged terrestrial ecosystems

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The State of Kuwait has lost most of its valuable and vulnerable plants in the second half of the last century due to urbanization, human impact and climate change, factors that also reduced wildlife. Plant and animal communities are disappearing from open access areas quickly due to habitat loss and land deterioration. Several rehabilitation studies have been carried out to overcome the problem of desertification and reverse the loss of habitat for both fauna and flora. One major rescue action was to increase the percentage of protected areas and natural reserves.

One particular project was the ecological assessments and restoration planning for Um Al-namil island. The island was thoroughly subjected to different ecological surveys such as soil, vegetation, wildlife, intertidal biodiversity, water movement and archaeology. The conservation planning was based on four main findings; 1) the island is a breeding site for Kentish plovers (Charadrius alexandrines), 2) huge flocks of Socotra Cormorant (Phalacrocorax nigrogularis) estimated by thousands use the island for foraging, 3) archaeology areas identified within the island are important for the natural history of the State of Kuwait and belong to Bronze age, late Islamic age and late Hillenisric age, 4) historical intertidal stromatolites were identified all around the island. Three scenarios of planning were proposed for future management of the island based on financial and social aspects.

Biography

Matrah al-Mutairi is an Associated Research Scientist at the Environment and life Sciences research Center at Kuwait Institute for scientific Research. She gained her PhD in biological sciences and wildlife from University of Bristol, UK. She is leading many biodiversity, conservation and restoration projects within the State of Kuwait and published many books and reports on these fields.

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Sustainable urban design for Downtown area with snow and wind simulations for winter cities

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Urban designs that should be symbiosis with regional environment and consider regional climatic conditions are one of the most important approaches for developing sustainable cities. In cities that suffer from heavy snow and cold winds in winter, an urban design approach different than that used for warm cities should be used. This study presents a scientific design process (the sustainable design approach) that incorporates environmental and energy assessments that use snow and wind simulations to establish guidelines for the design of urban blocks in high-rise and high-density districts so that the impact of snow and wind can be minimized in these cities. A city block in downtown Sapporo, Japan, was used as a case study, and we evaluated four conceptual models. The four high-rise urban models were evaluated for how they impacted the snow and wind conditions in the block as well as the snow removal energy. Based on the results, we were able to identify the design guidelines for urban blocks in the high-rise and high-density district in downtown Sapporo: an urban block design with higher building height ratio without the mid-rise part can reduce the snowdrifts and lower the snow removal energy. The proposed sustainable urban design approach would be effective in improving the quality of public spaces and reducing snow removal energy in winter cities.

Biography
Tsuyoshi Setoguchi is a vice-dean and professor at Faculty of Engineering, Hokkaido University, Japan. He got several prizes on these thesis as follows, Prize of Architectural Institute of Japan (AIJ) (2014), Prizes for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology (2015) and Prize for Country development technology by Minister of Land, Infrastructure, Transport and Tourism (2016). He designed Wakkanai Station which is the northernmost station in Japan that prevent from snow and wind impact with his research technology.

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Carbon Dioxide capture using Novel Green solvents

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A new generation of solvents, named Deep Eutectic Solvents (DES), has emerged as a potential green solvent. DESs can be obtained by mixing two or more components that can be chosen to be cheap, renewable and biodegradable. These compounds are capable of forming a eutectic mixture with a melting point lower than that of each individual component. DESs are generally liquid at temperatures lower than 100 °C.

Owing to their advantageous characteristics, there is now growing interest in DESs in many fields of research. DESs are chemically tailorable solvents since they can be designed by properly combining various quaternary ammonium or phosphonium salts with different hydrogen bond donors. Hence, task-specific DESs with different physical-chemical properties can be prepared.

In this work, the solubility of CO2 in amine based DESs, namely (Choline chloride + Monoethanolamine), (Choline chloride + Diethanolamine) and (Choline chloride + Methyldiethanolamine), was determined at three different ChCl: amine molar ratios of 1:6, 1:8 and 1:10. The CO2 absorption was conducted with a solvent screening set-up and the CO2 loading was measured with a total organic carbon analyzer. The solubility experiments were performed based on the conditions of the absorber in the post-combustion capture process (PCO2 = 15kPa and T = 40oC). Results showed that the absorption capacity of amine-based DESs is much higher than both 30 wt% aqueous amine solutions and conventional DESs. The solubility of CO2 was found to increase as the molar ratio of the amine in the DES increased.

Biography:
Inas M. AlNAShef is an Associate Professor at the department of Chemical Engineering/Khalifa University, Abu Dhabi, United Arab Emirates. He joined King Saud University, Saudi Arabia, after obtaining his PhD from the University of South Carolina in 2004. In 2011, He was promoted to associate professor. He is very active in research related to green engineering and sustainability. In 2014, He moved to Masdar Institute. He co-authored more than 100 peer-reviewed journal publications. He received 8 patents from US and EU Patent Offices. He is also a recipient of several prestigious awards including King Abdullah Award for best invention in 2013.

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Techniques and Methods of Artificial Intelligence to Improve the Economics of Electrical Energy Storage

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This study explores the application of artificial intelligence with regards to expanding the lifespan of grid-scale electrical energy storage (EES) projects. For deployed systems, artificial intelligence techniques, such as pattern recognition and machine learning, are applied to streamline maintenance and operation, mitigate degradation of the electrochemical cells, and optimize the battery management system (BMS). Coupled with a techno-economic analysis, this study then illustrates the benefits that prolonged EES useful life have on the overall project economics. Under this framework, the application of artificial intelligence techniques can improve the cost-effectiveness of EES as a grid modernization asset to facilitate the transition to a reliable, affordable, and clean power system.

**Biography**
Arjan brings a wealth of knowledge as a developer of large-scale solar photovoltaic and energy storage infrastructure at Intersect Power. He was a Visiting Scholar to the University of Cambridge Energy Policy Research Group, conducting techno-economic analyses on electrical energy storage systems. Previously, he was a consultant in the distributed energy resources practice at ICF International and began his career at the U.S. Department of Energy. Arjan holds a M.S. in Energy Policy & Climate at Johns Hopkins University and a B.S. in Business Administration and Energy & Resources Group at the University of California, Berkeley, Haas School of Business. 
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Lead Isotopic and morphological analysis of atmospheric dust in Panzhihua city, Southwest of China

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Urban atmospheric dust has become an important carrier of heavy metal contaminants, which eventually settle in residential area, and lead to potential hazard to the public health. Panzhihua city located at the important tectonic-metallogenic ore forming belt in southwest of China, where 76 kinds of mineral have been found. In this study, 31 samples were collected from heavy traffic, residential, and industrial areas in Panzhihua City, Sichuan, China. The elemental composition, micromorphology and Pb isotopic composition were analyzed to understand the pollution characteristics of heavy metals and sources. Pb, Zn, Cr, Cd, Cu and Ni were analyzed by inductively coupled plasma mass spectrometer (ICP-MS), the microscopic morphology and elemental composition of particles in atmospheric dust were measured by SEM-EDX, the isotopic compositions of Pb (206Pb/207Pb, 208Pb/206Pb, and 208Pb/207Pb) were determined by MC-ICP MS. The results show that the trace elements concentrations in atmospheric dust in Panzhihua city exceed the soil background values in Sichuan and in China, and most of them reached the pollution levels. SEM-EDX analysis shows that the morphology of the particles in atmospheric dust in Panzhihua featured with spherical, massive, columnar, layered, and irregular, and the minerals are mainly composed of calcite, quartz, hematite, gypsum, and feldspar. The isotope studies show that the main sources of lead in atmospheric dust in Panzhihua City are smelting, motor vehicle exhaust, and soil. Based on the results of the Pb ternary mixed model These sources contributed an average of 50.9%, 29.5%, and 19.6% of the lead, respectively.

Biography
Yi Huang is a Professor in College of Environment at Chengdu University of Technology, China. She is a Principal Investigator at Mining Area Environment, State Key Laboratory of Geohazard Prevention and Geoenvironment Protection (SKLGP). She obtained her PhD in 2007 from Chengdu University of Technology. She did her postdoctoral research at Chengdu University of Technology. Her main research areas are studies on the migration and transformation of heavy metals in soil, water, air and other environmental media near the earth surface, as well as the heavy metal pollution prevention and control techniques.

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Mexican-Caribbean: Sargassum bloom and its origin, evolution, and integral management in the short, medium and long term

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Declared a national emergency, the massive sargassum bloom is the object of urgent interdisciplinary scientific research needed to understand its origin, evolution and multiple impacts on the landscape heritage of the Mexican-Caribbean region. The phenomenon is analyzed in a comprehensive manner, from its origin in international waters, to its multiple impacts, including environmental, social, and economic impacts on the seas and coasts of Mexico, particularly in the coastal landscape of Quintana Roo.

The current research includes studies of physical and biological oceanography to understand hydrodynamics and coastal circulation associated with the marine biomass of sargassum, its transport mechanisms, seasonality and variability, as well as its implications for the region as a whole. This research is critically needed to build prediction models and early warning systems, that will allow efficient methods of collection and valorization of the sargassum resource. Anthropological and social research is also being carried out to build on the current understanding of the economic and human impacts of the phenomenon, both in the coastal populations and in the tourist industry, which represents 8% of the national GDP in this region.

Scientific and social research will help us to understand the mechanisms of cooperation and inter-institutional collaboration, the integration of methodologies for on-site measurement, integrated marine monitoring, development of early warning systems, collection and valorization of sargassum, as well as restoration and conservation of beaches, low water and wetlands, in the short, medium and long term.

Biography

A renowned biologist, with a PhD in biological oceanography and marine biochemistry specialty, Norma Patricia Muñoz Sevilla is the head of Climate Change Council for the Presidency of Mexico. A researcher and professor at National Polytechnic Institute, Mexico, and member of the group of ocean experts in UNESCO-IOC and the National Network for Interdisciplinary Research on Climate Change. With 60 scientific articles and 15 books to her credit, she has 41 awards for her professional performance, including the "Order of the Academic Palms", awarded by the Government of the French Republic in 2010.

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Waste to Wealth

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Worldwide increasing request to Electronics builds its interest to the electronic waste. The extraction of valuable materials from E-Waste and Recycling is called as E-Waste Recycling. In any case, in many nations the E-Waste administration is an exceptionally costly, energy expending or non-environmental friendly disposed method. Antagonistic human health impacts and ecological contamination were caused because of informal dispensation of e-Waste. Recycling of electronic Wastes from industrial and household items are needed to eradicate the environmental pollution. E-Waste consists of hazardous and precious metals. The requirement of metals, specifically valuable metals and rare elements has increased owing to the growth of electronic industry besides the augmented development of waste electrical and electronic Equipment (WEEE). In present situation, the annual production rate of electrical and electronic waste is around 10 million tones in European Union. Among which the most extreme electronic waste is the Printed Circuit Boards (PCB).

As of now in market, Many E-Waste Recycling techniques are available however those methods augments the pollution in the environment and also the processing cost of those methods are more. The byproduct of PCB Waste processing are polychlorinated dibenzo-pdioxins (PCDD) and polybrominated diphenyl ethers (PBDEs).

Because of the harmful waste that is created, diverse techniques were introduced to protect the environment from pollution thereby paving a way for effective E-waste management method. But these cost effective pollution free processes which are followed in well flourished countries are not useful to the under developing countries. The babyhood in the research proceeding and a high claim for a pollution free E-waste management thrives us to come out with a new solution to the threatening disease causing problem. Energy usage and production limit in industries should also be considered in finding an answer for this significant issue.
An Overview on Biofuels from Ab Initio and DFT Computations

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Computational chemistry represents a valuable tool for obtaining accurate thermodynamic and kinetic parameters needed for detailed mechanism of combustion of fuel. Our concern over the past 12 years is devoted to decomposition of biofuel derived from non-food crops (second- generation biofuel).1–6 The calculations have been conducted using ab initio and density functional theory. Uni- and bimolecular reactions have been investigated for selected alcohols, ether, esters, mono- and bifunctional systems. Rate constants and branching ratios for different reaction pathways have been estimated. Although some simple bond fission channels require more energy than needed for some complex decomposition reactions, the former pathways predominate at higher temperatures due to the higher values of the pre-exponential factors.4 For oxidation of selected alcohols with the OH radical, the reaction occurs through low energy barriers.2 The data obtained reproduce the available experimental findings.1–5

Biography
Ahmed El-Nahas is the founder of the computational chemistry group at chemistry department, Faculty of Science, El-Menoufia University. His research covers many areas of chemical interest such as thermochemistry and kinetics of biofuels, high efficient solar cells, Thermodynamic and kinetic stability of chemical systems, molecular electronics, adsorption of oils on silica, functionalized metal complexes, and corrosion inhibition. He visited many research groups in Germany, Sweden, Ireland, and Japan as a postdoc and visiting professor. He participated in 19 conferences in Egypt, Greece, England, Sweden, and Japan with his contribution cited as poster, oral and invited speaker. He supervised 27 MSc and PD projects, 17 have been awarded. Also, he has 56 papers in quantum chemical applications in chemistry. He is a member of the permanent promotion committee (nonorganic chemistry) for Professors and Associate Professors in Egypt.

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Forest plantations, between sustainability, climate change and controversies

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Climate change is now a more and more recognized reality. In France, 700 scientists recently mobilized to call on the government to start the action towards a carbon-free society. Indeed, the expected consequences are important, even dramatic: increase of the extreme events, displacements of people, conducting to the development of climate refugees. Ecosystems will also be affected, with some changes and moves of the animal and plant species; the process already begins. The change doesn't concern only climate and some authors prefer speak about “global change”. In all cases, the sustainability should now be thought in this new context, meanwhile it should allow to mitigate the climate / global change: the impacts of the anthropogenic activities on ecosystems have to be reduced. In this framework, to raise awareness of the necessity to preserve ecosystems, the concept of ecosystem services was also developed. This presentation will be the opportunity to discuss first these different concepts.

A way to mitigate climate change could be forest plantations. Indeed, they offer the possibility to capture and store CO2, thus to mitigate the greenhouse effect – knowing that climate change has also an impact on the forest plantations and should be considered (choice of the planted species, way to manage these plantations, for example to reduce fire risks). Forest plantations are also consistent with the sustainability – even if some linked practices are less favorable (example of the use of chemical inputs) –, providing an alternative for the exploitation of spontaneous forests; offering local resource, which reduces the transport-related impacts. These arguments are presented by the forestry sector, which highlights the ecosystem services of these plantations. But these ones are at the heart of controversies and, at the opposite, other stakeholders highlight disservices: spoiling of landscapes, loss of biodiversity. A trade-off has to be found.

Biography:
Amelie Robert is geographer. She defended her PhD thesis in 2011 at the university of La Sorbonne, in Paris. She is currently contract researcher at CITERES research center (University of Tours, CNRS: National Center for Scientific Research). Her research focuses on the link between Nature and Societies, in different natural and cultural contexts (France, Vietnam and Burkina Faso), by mobilizing the concepts of “ecosystem services” and “landscapes”. She is author of 43 talks in international symposiums and 16 articles in reputed journals. She takes part of the scientific committee of 5 international symposiums, including one about “Forest changing in the framework of global change” (Blois - France, November 2018).

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A smart low-cost network to assess air quality impacts from harbour activities

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A crucial hub for the maritime traffic in the Mediterranean Sea, the harbour of Livorno, located near Pisa (Italy), is expected to be involved in significant rearrangements in the next few years. To this aim, in partnership with both local Port Authority and the Tuscany Region Environmental Protection Agency (ARPAT), the Institute of Biometeorology (IBIMET) deployed in Livorno a low-cost air quality monitoring network to assess the air pollution impacts deriving from the harbour activities. The monitoring network consisted of six innovative low-cost stations (named AIRQino) equipped with sensors for collecting main atmospheric pollutants (PM2.5, PM10, NO2, O3, CO) and meteorological parameters (air temperature and relative humidity). A monitoring campaign was carried out in Livorno across a 1-year period (01/11/2017–31/10/2018). To provide further insight into the role played by harbour emissions, the analysis was performed by period of the year, thus discriminating into: (i) a “cold” period, when heating systems are on, and thus additionally contribute to air pollution in the area; (ii) a “warm” period, when heating systems are off, i.e. when harbour activities and road traffic are the predominant emission sources.

As a result, harbour activities proved to appreciably contribute to PM10 pollution during the cold months, while urban road traffic plays the leading role during the warm months. NO2 concentrations are also significantly influenced by the maritime activities, particularly by machinery and other diesel-fueled vehicles operating in the harbour’s industrial zone, and to a lesser extent by the touristic sea traffic including ferries and cruise ships.

Biography:

Technical engineer in Industrial Electronics in 1990, degree in industrial robotics and automation at University of Florence, Faculty of Engineering, in 1993. Specialized in design and development of devices and sensors for environmental monitoring, weather stations and micrometeorological investigation. Involved in scientific research projects of CNR and University. Permanent position as technical engineer at Institute of Biometeorology of CNR. Involved in national and international research projects, increasingly specializing in environmental monitoring techniques and new sensors development. Responsible for development SKY-ARROW ERA (Environmental Research Aircraft). In 2009 founded “Urban Climate Laboratory”, specialized in innovative techniques for climate and urban metabolism research.

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Are we buying the future we want? Public procurement in the context of sustainability and climate change mitigation

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Public procurement can shape production and consumption trends and represents a stimulus for both innovation and diversification in products and services, through a direct increase in demand. In recent years, the interest in demand-side policies has grown and several approaches have emerged, such as Green Public Procurement (GPP), Sustainable Public Procurement (SPP) and Public Procurement of Innovation (PPI), representing strategic goals to be achieved through public procurement. There is a need to guide and support public organisations in the uptake of GPP, SPP and PPI practices in the wider context of sustainability and climate change. This means a re-thinking of the procurement process, raising organisations’ ambitions and broadening their vision, thus changing their organizational approach towards culture, strategies, structures and practices.

This presentation examines case studies from real procurement organisations and identifies which procurement practices favour the use of public procurement as a tool for changing production and consumption patterns in the direction of sustainability and climate change mitigation.

Furthermore, the presentation proposes a new tool – the SPP Toolbox, for guiding and supporting public organizations in achieving their transformative potential, enabling to assemble a range of perspectives in a single tool. The toolbox integrates insights from GPP, SPP and PPI approaches, allowing different practices, according to the organization's vision, procurement strategy and level of ambition.

Biography:
Paula Trindade is a Senior Researcher at the National Laboratory of Energy and Geology. Since 2003 she is responsible for the development and management of European projects in the area of Sustainable Public Procurement. She holds a PhD in Environment and Sustainability from the NOVA University of Lisbon. Her research interests focus on Sustainable Production and Consumption, Sustainable Procurement and particularly in public procurement in the context of sustainability transitions.

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Environmental sustainability of the air transport sector: the bio jet potential

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The air transport sector is responsible for approximately 2% of global GHG emissions. The exponential growth of this sector can make this share even more significant. To reduce these emissions, in 2009 the International Civil Aviation Organization (ICAO) set the goal of limiting net emissions through carbon neutral growth from 2020 and reducing net emissions by half by 2050 compared to 2005. In the same vein, ICAO approved the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which provides for the limitation and compensation of any annual increase in the total carbon emissions of international civil aviation above 2020 levels.

In Brazil, the growth of the sector and the consequent increase in emissions also causes concern. Therefore, national commitment to reduce GHG emissions was assumed through the Nationally Determined Contribution (NDC) during the 21st Conference on Climate Change (COP 21). Brazil pledged to reduce its emissions by 37% by 2030 and 43% by 2030 (compared to 2005). To honor the commitments made, a transition is needed in the use of fossil fuels from renewable energy sources. The use of biojet produced from renewable raw materials can contribute to achieving these ambitious targets because of its potential to reduce GHG emissions by up to 80% throughout its life cycle. Thus, the Brazilian Agency of Oil, Natural Gas, and Biofuels (ANP) has undertaken efforts to make feasible the production and use of biojet in Brazil.

Biography

Lorena Mendes de Souza is a specialist in regulation of the Brazilian Agency of Oil, Natural Gas and Biofuel (ANP) since 2013, acting in the center of technological research. She holds a degree in Chemical Engineering from the Federal University of Uberlândia (UFU), ending in 2012. Currently, she is a PhD student in Sciences at the Federal University of Rio de Janeiro since 2015, working in biojet research. In the last year, Souza et al. Published an article about the Brazilian biojet market in one of the most biofuel impact journals: renewable and sustainable energy reviews.

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A Smart Cities Application: The Capannori Environmental Living Lab

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Close to the city of Lucca in Tuscany (Italy), the small rural town of Capannori (43°52’ N, 10°34’ E) lies within a critical area both affected by a variety of emission sources (highway, local roads massively travelled by heavy-duty vehicles, combustion plants for paper transformation, agricultural waste burning including biomass burning) and winter weather conditions unfavourable to pollutant dispersion (low wind regime, stable atmospheric conditions, shallow thermal inversions, etc.). Capannori therefore represents a particularly meaningful case study where to address a comprehensive air pollution monitoring by deploying appropriate devices. In this framework, CNR-Ibimet, Tuscany Region Environmental Protection Agency (ARPAT) and epidemiologists of the Pisa University agreed an initiative to create an environmental “living lab” aimed at assessing the impacts due to anthropogenic activities on air quality and thus on population exposure. The air quality analysis was carried out by means of a monitoring network comprising innovative low-cost stations (named AIRQino) equipped with sensors for collecting air pollution (PM_{2.5}, PM_{10}, NO_2, O_3, CO) and meteorological parameters (air temperature and relative humidity). Data reliability from low-cost stations was confirmed after validation against more than one-year observations from a reference air quality station managed by ARPAT.

The preliminary results suggested that the highest air pollution impacts are mainly due to biomass burning and pruning residues burning. Despite further investigations need to be addressed, these preliminary outcomes may be used by local authorities to support – both at municipality- and regional-level – policies for effectively managing pollutant emission sources in the area, particularly biomass burning.

Biography:

Lorenzo Brilli, PhD in Agrometeorology and Ecophysiology of Agricultural and Forestry Systems (University of Sassari). He works at the National Research Council (CNR), Institute of Biometeorology (Ibimet). His studies mainly focus agriculture and forestry systems, climate change, and modelling. He is involved in several Italian (PRIN 2011, Carbotrees) and international (FACCE-JPI, 2013; SMARTSOIL, 2011, MASCUR, AgMIP, LIFE Adpt2clima, LIFE PASTORALP) research projects. He is professor of Agrometeorology for the Natural Resources Management for the Rural Development course. He published several research articles and book chapters in agriculture and climate change field.

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Solubility of Chlorophenols in Ionic Liquids

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Chlorophenols (CPs) are chemicals that are used widely by different industries such as textile, pharmaceutical, etc. Except water, most of the solvents used in these industries are volatile and toxic. Therefore, there is an imminent need for replacing these solvents by solvents that have less negative impact on the environment. In addition, CPs are considered as hazardous pollutants due to their resistance to biodegradation and persistence in the environment.

Ionic liquids (ILs) are salts that are liquid below 100 °C, which have been used as solvents for many processes including liquid-liquid extraction and as electrolytes in electrochemical devices. ILs are characterized by negligible vapour pressure and non-flammability. ILs are liquid over a wide range of temperatures; possess high thermal and chemical stability. Solubility data of CPs in ILs is important for assessing the potential use of ILs in water treatment, but such data are scarce. To our best knowledge, no solubility data of chlorophenols in ILs were reported in the literature. Thus, in this study, the solubility of 3-chlorophenol (3-CP), 2,5-dichlorophenol (DCP), 2,4,6-trichlorophenol (TCP), and pentachlorophenol (PCP) in selected hydrophobic ILs at 25°C, 35°C and 45°C was investigated. It was found that 3-CP is miscible with all tested ILs. The solubility of other CPs in ILs decreased with increasing the number of chlorine atoms in the CP and increased with the increase in temperature, but the degree of increase depended on the structure of both the IL and CP. The tested chlorophenols have substantial solubility in pyridinium and imidazolium-based ILs.

Biography

Inas M. AlNashef is an Associate Professor at the department of Chemical Engineering/Khalifa University, Abu Dhabi, United Arab Emirates. He joined King Saud University, Saudi Arabia, after obtaining his PhD from the University of South Carolina in 2004. In 2011, He was promoted to associate professor. He is very active in research related to green engineering and sustainability. In 2014, He moved to Masdar Institute. He co-authored more than 100 peer-reviewed journal publications. He received 8 patents from US and EU Patent Offices. He is also a recipient of several prestigious awards including King Abdullah Award for best invention in 2013.

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Vegetation dynamics and the implications for ecosystem service values changes using satellite derived MODIS NDVI in Nepal

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Remote sensing for vegetation changes are potential issues for ecosystem dynamics in Nepal. Identification of vegetation changes and economic evaluation of the natural resources is very important to strengthen national economy and good environment management. In this context, this research aim to identify vegetation changes and ecosystem service values in national and provincial scales using satellite derived MODIS NDVI data. Mann Kendall test statistics, Z test, Sen’s slope and linear slope for each pixel were used. The land cover types was defined based on the corresponding NDVI values then applied ecosystem service values (ESV) coefficient based on global ecosystem service values and ecosystem service values used in Tibetan Plateau. The NDVI in Nepal has significantly increased at the rate of 0.0018 yr-1 during 2000-2017. All of the provinces have increased NDVI significantly except the Province 6 where the NDVI has increased positively but not significant. The NDVI showed 27.88% greening in Nepal whereas 56.41 % and 40.05% greening are found in province 2 and Province 1 respectively. Only 12.52% greening are found in the province 6. The result showed that the total ecosystem service values (ESV) in Nepal is 21.88 × 10^9 USD (21.88 billion USD) in 2017 which was increased compared to 2000. The forests have high ecosystem service values i.e. 19.17×10^9 USD (19.17 billion USD) in 2017 which is 78.34% GDP of Nepal. The ESV has increased in the forest but decreased in the croplands, grassland and barren lands in between 2000 to 2017. The province 1 has highest ESV i.e. 4.17×10^9 USD (4.17 billion USD) and the province 2 has lowest ESV i.e. 1.09 × 10^9 (1.09 billion USD) in 2017. The ecosystem service values should be investigated in detail using both remote sensing and ground base observation because it is important lifeline for people and prosperity in Nepal.

Keywords: NDVI, Ecosystem Service Values, MODIS, Nepal

Biography:

Binod Baniya is from Nepal. He is a PhD student of Chinese Academy of Sciences under CAS-TWAS President’s PhD fellowship program. Professionally, he is an Assistant Professor of Environmental Science in Tribhuvan University, Nepal. During his PhD study, he has published 2 original research papers in related to vegetation dynamics in response to climate changes, carbon dynamics and drought in SCI Journal. He is working with different satellite products to study climate changes and vegetation dynamics in national, regional and global scales.

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