

1st International Conference and Project Meeting on: Advanced Science and Technologies for Sustainable Development in Iran, (STSD 2014), 21-22 August 2014, Freie Universität Berlin, Germany

***STSD 2014, 1st International Conference and Project Meeting on
Advanced Science and Technologies for Sustainable Development in Iran***



Organized by
**Iranian Academics and Specialists
Association in Germany (IRASA)**
21-22 August 2014
Freie Universität Berlin, Germany



BOOKLET OF ABSTRACTS

Next STSD2015 will be organized in Berlin, August 2015

Please send your abstract and comments to: STSD2015@irasa.org , cc: info@irasa.org

Introduction to STSD2014 Conference

Science and technology have always been very interesting for many people due to the human natural curiosity. The result of this curiosity can lead to very interesting knowledge, hypothesis and tools for the society and people to have a better life, or vice versa can damage our life and the environment. Then, the concept of “usefulness” of a tool and hypothesis cannot be understood easily, fast and clearly. For many important matters only time will proof the value of everything for different generation and age. However, to avoid unwanted difficult irreversible situations, an overall overview and studies on interactions of different important factors affecting human’s life and environment, are necessary. This is why IRASA and collaborators from different universities and research institutes in Germany and Iran organized the STSD2014 to bring together scientists, experts, professors and students from different fields, and try to discuss about the state of the art of each important field of science and technology considered for this year. We will look for the impact on practical applications, advantages and challenges for human’s life in context of a sustainable development.

Many people in Iran like in other developing countries understand: “We have to access advanced science and technologies to achieve a well-developed level”. This is definitely true that without a certain level of science and technologies a country cannot provide the basis for further development. However, it seems that many people forgot their own important role to achieve “sustainable development” rather than “apparent temporary development” in the country. During STSD2014 we try to discuss the importance of cultural issues, education and trainings for sustainable development as very important facts complementary to advanced science and technologies requirements.

The role of Iranian academics, elites and experts for science and technology abroad contribute to enhance the sustainable development process, which is expected from our country. However, only very few efficient organizations and NGOs are established and developed for this purpose. The Iranian Academics and Specialists Association (IRASA, www.irasa.org) in Germany is a new generation of Iranian scientists’ associations abroad that tries to play an efficient significant role for this purpose via international cooperation in science, technology and cultural aspects such as this STSD conference. Your precious contribution for this purpose is highly appreciated, welcome to join us and cooperate for STSD2015. Please inform us in this regard via our contact emails: office.de@irasa.org , office.ir@irasa.org , STSD2015@irasa.org .

Dr. Aliyar Javadi

STSD2014 Conference Chairman

Javadi@irasa.org

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21-22 August 2014

*Freie Universität Berlin, Germany
Henry-Ford-Bau, Garystr. 35, 14195 Berlin-Dahlem*

STSD 2014 Overall Plan

21-22 August 2014	Conference presentations and sessions (attached program)
23-25 August 2014	Scientific and Industrial visiting tours P2 (Berlin Technical Museum, Technical University of Berlin, Berlin waste incinerator, Details on the website)

STSD 2014 detailed Plan for talks and presentations

Thursday 21 August:

08:00-09:00	Registration and Coffee
09:00-09:30	Opening Ceremony
Session Title: Resource Management (Water section) Chairman: Dr. Farzanegan	
09:30-10:10	Prof. Reza Ardakanian, UN-Water Decade Programme on Capacity Development (UNW-DPC), Founding Director Presentation title: Multi-sectoral facets of water resources management
10:10-10:30	Dr. Mahdi Motagh, German Research Center for Geosciences, Helmholtz Center Potsdam Presentation title: Earth science and sustainability: what lessons have we learned for Iran?
10:30-10:40	Dr. Omran Garazhian, Archaeology Department, University of Neyshabur Presentation title: The Anthropology of Water & Energy in the Context of Iranian Society for Capacity Building
10:40-11:10	Prof. Beatrice Knerr, Ms. Sudeh Dehnavi (PhD student), Universities of Kassel Presentation title: cultural preconditions and required education and trainings for successful adaptation of new technologies for agriculture purposes
11:10-11:40	Coffee Break and Bilateral Discussion
Session Title: Resource Management, Part 2. Chairman: Dr. Ardakanian	

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11:40-12:10	Prof. Massarrat, Universität Osnabrück Presentation title: Perspective of Renewable Energies and Sustainable Managing of Global Changes
12:10-12:30	Dr. David Ramin Jalilvand, Berlin Centre for Caspian Region Studies, Freie Universität Berlin Presentation title: Iran's gas exports: can past failure become future success?
12:30-14:00	Lunch Break
Session Title: International Cooperation in Science and Technology Chairman: Prof. Gharehpetian	
14:00-14:20	Dr. Javadi, Max Planck Institute Presentation title: IRASA
14:20-14:50	Mr. Mühlberg, DFG Representative and Director of International Affairs Presentation title: Research in Germany universities and Extra universities
14:50-15:20	Mr. Alexander Haridi, DAAD Representative Presentation title: DAAD
15:20-15:35	Ms. Sanaz Kamali, UN university Merit/ school of Governance of Maastricht University Presentation title: Examples of Brain Gain: Some best practices of contribution of highly skilled migrants
15:35-16:00	Coffee Break
Session Title: International Cooperation in Science and Technology Chairman: Dr. Iraj Gholami	
16:00-16:15	Dr. Khodayar Javadi, Sharif University of Technology Presentation title: Sharif University, national and international education and research position: importance of international cooperation
16:15-16:30	Prof. Gharehpetian, Amirkabir University of Technology (Tehran Polytechnic) Presentation title: Iranian Technical and Vocational University: International Cooperation Opportunities?
16:30-17:10	Panel Discussion: International cooperation, importance and challenges Prof. Gharehpetian, Dr. Aliyar Javadi, Prof. Ghareyazie, Dr. Kermani, Ms. Sanaz Kamali
17:10-17:30	Mr. Mahbobi, Managing Director of axessio GmbH, Member of the Board of Directors of VIHA Association in Germany Presentation title: Internet of Things – Industry revolution and planned projects in the German Industry
17:30-17:50	Mr. Azimi, MBA, Director of Business and Technology, Eleva8 Management Consulting Part1: Design of Software Architecture and Interactions Part2: Importance of Communication on Knowledge Marketing
17:50-18:10	Coffee Break
Session title: Novel Technologies (Part 1) Chairman: Prof. Reinhard Miller	
18:10-18:30	Prof. Reinhard Schomäcker, TU berlin Presentation title: Unifying Concepts in Catalysis (UNICAT) - A cluster of excellence in catalysis research
Short presentation and Project discussions	
18:30-19:00	Dr. Hamid Reza Godini, Process Engineering Department, Technical University of Berlin Presentation title: Process design in different scales: methane utilization Dr. Kalantarinezhad, Senior Scientist and Co-founder of Hamgara Co. Presentation title: Knowledge-based companies in developing countries, challenges and opportunities, Hamgara Co. as a cases study Mr. Kanani, Ruhr-Universität Bochum, Germany Presentation title: Multi-Scale Modelling of Materials; Modeling as an Aspect of Development
19:00-20:30	Dinner including bilateral discussions

Friday 22 August:

Session Title: Novel Technologies (Part 2) Chairman: Dr. Kalantarinezhad	
09:00-09:40	Prof. Ghareyazie, Director General of Agricultural Biotechnology Research Institute of Iran (ABRII) Presentation title: State of the art of genetic development in Iran-bio technology
09:40-09:50	Dr. Yazdanbakhsh, School of Biology, University of Tehran Presentation title: Growth of plants: Circadian clock or lunisolar tides? A question brought up by a new imaging platform

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09:50-10:30	Prof. Reinhard Miller, former president of the European Colloid Interface Society and President elect of the International Association of Colloid and Interface Scientists, Max Planck Institute of Colloids and Interfaces Presentation title: Surfactant Adsorption Layers at Liquid Interfaces and their Practical Applications
10:30-10:40	Mr. Ali Pourkhalil, RWTH Aachen Uni., Aachen, Germany Presentation title: Hybrid natural gas sweetening technology by a novel physical absorber
10:40-11:00	Coffee Break
Session Title: Novel Technologies (Part 3) Chairman: Dr. Hassannejad	
10:50-11:20	Prof. Ganster, Fraunhofer Institute for Applied Polymer Research, Division Director of Biopolymers. Presentation title: Biodegradable and bio-based plastics - an overview about basics, applications, and markets
11:20-11:30	Mr Tino Zahedi, Presentation title: Polymer and optics
11:30-11:50	Dr. Oliver Schulz, Chief Customer Officer (CCO) at LayTec Presentation title: Industry and university relationships in Germany
Session Title: Novel Technologies and Energy Systems Chairman: Dr. Khodayar Javadi	
11:50-12:20	Dr. Jafar Kermani, Humboldt Fellow in Center of Solar Energy and Hydrogen Research, Head of Fuel Cell Group, Amirkabir University of Technology Presentation title: Performance Enhancement of PEM Fuel Cells Using Innovative Flow Field Designs
12:20-12:30	Maryam Bakhshi, AvH research fellow at Berlin Center for Caspian Region Studies Freie University, Berlin Presentation title: Iran's Atlas of Theoretical Energy Recovery Potential from Municipal Sewage Sludge
12:30-14:00	Lunch Break
14:00-14:30	Prof. Gharehpetian, Amirkabir University of Technology (Tehran Polytechnic), Representative of Niroo Research Institute of Iran Presentation title: P1. CHP Systems in Iranian Industry and Its Comparison with CHP Application in Europe: A Case Study P2. Optimal Distributed Generation Placement Considering Voltage Profile Improvement and Loss Reduction: Case Study on Iranian Distribution Network
14:30-14:50	Mr. Nicolas Barnier, International Project Manager of Energy Competence Centre, and representative of Corporate Energies company Presentation title: Industrial development in upcoming Renewable Energy markets
14:50-15:10	Prof. Farshad Nasrollahi, Berlin University of the Arts Presentation title: Energy Saving through Architectural Design: Building Energy Regulation for Iran
15:10-15:30	Coffee Break
Session Title: Sustainable Development (Basic Concept) Chairman: Prof. Ghareyazie	
15:30-16:00	Dr. Mohammad Farzanegan, Philipps-University of Marburg, Center for Near and Middle Eastern Studies (CNMS) Presentation title: Entrepreneurship and Natural Resources Dependency: Good Governance Matters
16:00-16:20	Prof. Knerr, University of Kassel Presentation title: The role of human resources in economic development: international competition for highly qualified labor force
16:20-16:40	Dr. Teherani-Krönner, Humboldt-Universität zu Berlin Presentation title: Environmental regulations: technical solutions or people's participation? A human and cultural ecological approach
16:40-16:50	Arash Rezaeian, Berlin Center for Caspian Region Studies Freie University, Berlin

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	Presentation title: Sustainable development, Innovation and Culture: lessons from Germany Energy policies
16:50-17:10	Coffee Break
17:10-18:30	Panel Discussion and concluding remarks: Sustainable Development Challenges: Culture and Education versus Technology and Management; Sustainable Development Roadmap Dr. Aliyar Javadi, Prof. Ghareyazi, Prof. Teherani-Krönner, Prof. Massarrat, Prof. Gharehpetian, Dr. Kalantarinezhad, Dr. Farzanegan, Prof. Farshad Nasrollahi
18:30-19:00	IRASA: achievements and perspective (open discussion)
19:00-20:30	IRASA Dinner

About STSD2014

The “*1st International Conference and Project Meeting on Advanced Science and Technologies for Sustainable Development in Iran (STSD 2014)*”, was held at *Freie Universität Berlin*, on 21-22 August 2014 (<http://www.irasa.org/stsd2014/>), organized by *Iranian Academics and Specialists Association in Germany (IRASA* <http://www.irasa.org/>). The Conference was an overview on the “state of the art of advance science and technologies for sustainable development in Iran” via national and international cooperation and practical projects through the selected following presentation topics and projects discussion.

Fortunately several key persons, professors, experts and researchers from Universities, Research Institutes and Industrial Companies attended STSD2014 (the selected list is attached, more details on the conference website:

<http://www.irasa.org/stsd2014/index.php/invited-speakers>)

- DFG (Director of International affairs as keynote),
- DAAD (Director of Iran section, as a talk),
- UN-Water (Water Decade Program on Capacity Development, Founding Director)
- Institute of Petroleum Engineering (IPE), University of Tehran (Manager of the Professional workshops).
- Sharif University (Three professors for project discussion section),
- Amirkabir University (Representative, former chair of Industry-University relationship),
- TU-Berlin (Section of process engineering join as a talk and support for the visit),
- Fraunhofer institute for applied polymer science and technology (head of Biopolymer section give a talk and provide a visit),
- Agricultural Biotechnology Institute (the Director , as keynote),
- University of Kassel, Head of Department of Development Economics, Migration and Agricultural Policy
- Humboldt-Universität zu Berlin, Social Science and Sustainable Development, Gender and Globalisation Research Group
- Freie Universität Berlin, Research Director, Caspian Region Environmental and Energy Studies
- Helmholtz Center Potsdam, GFZ German Research Center for Geosciences

we have also industrial partners and sponsors, from Renewable energies, oil and gas industry, chemical and petrochemical and Nanobiotechnology fields.

For your information we expect about 150 participants, mostly, professors, PostDocs, Ph.D. Students and experts from universities, research institutes and industry.

About IRASA:

“Iranian Academics and Specialists Association in Germany”, known as IRASA (established in 2011 and registered officially in Berlin Feb, 2013) is a non-governmental organization (NGO) for the purpose of international scientific, industrial and cultural cooperation considering universal valuable human’s right via supports of Iranian professors, experts, researchers and students (90 % of the members are Ph.D. and higher level) in Germany and their German colleagues, and also former guest scientists and graduated students from German universities and institutes (mostly from Max Planck and Fraunhofer Institutes and Universities of Berlin, Potsdam, Göttingen, Aachen, Dresden, etc in Germany and also Universities of Tehran, Sharif, Polytechnique, Shiraz, Ahvaz, Zanjan, etc in Iran). The main purpose is to be a better human and more efficient citizen for our societies in both countries via valuable international cooperation. For more details about IRASA aims and structure you can look into the attached file and also IRASA website <http://www.irasa.org> . IRASA has started a very good cooperation with some of the other Iranian scientific associations and groups in Germany as well with DAAD and DFG organizations. Your supports and considerations also would be very appreciated in this regards.

More information is available on the IRASA website <http://www.irasa.org> and attached files.

Best Wishes

STSD2014 Executive Committee

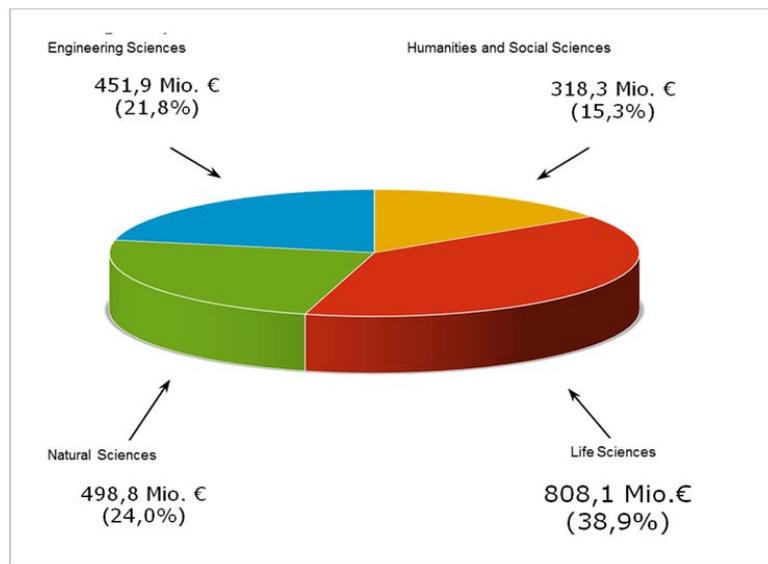
IRASA Office in Germany

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University and Extra-university Research in Germany

Christoph Mühlberg

Division of International Cooperation, DFG Bonn



DFG: Distribution of funds according to science areas

- ▶ **Section A (17)**
Humanities and Educational Research
- ▶ **Section B (17)**
Economics, Social and Spatial Sciences
- ▶ **Section C (24)**
Life Sciences
- ▶ **Section D (22)**
Mathematics, Natural Sciences and Engineering
- ▶ **Section E (9)**
Environmental Research



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Locations and Research Areas

Multi-sectoral facets of water resources management

Reza Ardakanian

Founding Director, UN-Water Decade Programme on Capacity Development (UNW-DPC), United Nations University, UN Campus, Platz der Vereinten Nationen 1, 53113 Bonn, Germany
www.unwater.unu.edu

Director, Institute for integrated Management of Material Fluxes and of Resources (UNU-FLORES), United Nations University, Ammonstr. 74, 01067 Dresden, Germany

www.flores.unu.edu

Water resources management affects

With the global trends such as population growth, climate change, economic development, and changing consumption patterns, it is expected that the demand for energy, food and water will dramatically increase. The fact that water plays a key role in all of these sectors is covered in the Water, Energy and Food Nexus concept. To ensure the sustainable use of natural resources under these conditions of change and growing scarcity, water resources management has to take into account these multi-sectoral facets.

With a focus on the role of capacity development, the presentation provides an overview of UNW-DPC's support to UN-Water, along the lines of three examples where complex issues are being addressed with cross-disciplinary and cross-ministerial involvement. These are the "Safe Use of Wastewater in Agriculture" Project, a series of events on "Drinking Water Loss Reduction", and the UN-Water Initiative "Capacity Development to Support National Drought Management Policies".

UN-Water is the United Nations inter-agency coordination mechanism on all freshwater issues, including sanitation. The UN-Water Decade Programme on Capacity Development (UNW-DPC) is a programme of UN-Water and strengthens the capacity development activities of UN-Water members and partners, supporting them in their efforts to help Member States achieve the Millennium Development Goals (MDGs) and other international goals and commitments related to water and sanitation. Established in August 2007, UNW-DPC is funded by the German Federal Government and hosted by the United Nations University.

Iran's Natural Reserves (Minerals, Energy and Water Resources) In Comparison with that of the World

Mansour Ghorbani

Shahid Beheshti University

Head of Arianzamin Research Institute

Over 5000 mineral deposits and indications have been so far discovered in Iran, from which 64 different types of minerals with an estimated reserve of about 100 billion tons are currently extracted. The energy resources of the country constitute about 9 percent of world petroleum, 16 percent of global gas, and one percent of world coal reserves. But it is unfortunate that Iran is located in arid climatic region where water resources are scarce. The average annual rainfall of the country is less than 250 mm amounting to a mere 400 billion cubic meters of available water every year. Taking into account this exceptional geographic setup eclipsed with low precipitation and high evaporation rates, paucity of water resources form a barrier on way of any developmental program, thus requiring careful attention.

The present article is an attempt to delineate the natural wealth of the country from the viewpoint of economic geology by providing statistics and comparison with that of the world. The figures presented herein are the results of the work of the author and the information provided have been obtained scientifically through processing and combining, on the basis of geological characteristics, of all available data from other parts of the world. The outcomes have led the author to believe that in certain cases the qualitative aspects of the Iranian reserves dominate over their available quantity and are worth consideration at the global scale.

Performance Enhancement of PEM Fuel Cells Using Innovative Flow Field Designs

M. Jafar Kermani

In fuel cells, high power density combined with low cost becomes crucial for a broad range of applications. One useful strategy to fulfill this target is to maximize the electrical power density; especially, but without restriction, in Polymer Electrolyte Membrane Fuel Cells (PEMFC). One way for achieving this target is to maximize the reactant concentration in all regions of catalyst layer. Appropriate flow field design can be chosen, for example, to achieve this goal. The presentation will provide brief explanations of fuel cell operations; discuss the present state of fuel cells to drive future vehicles, and will come to end by providing some innovative techniques for the performance enhancement of fuel cells.

Biography: Mohammad Jafar Kermani is an Associate Professor in Amirkabir University of Technology (Tehran Polytechnic) and Adjunct Research Fellow for Zentrum fuer Sonnenenergie-und Wasserstoff-Forschung (ZSW). He completed his B.Sc. in Mechanical Engineering (Thermal-Fluid) from Shiraz University (2nd Rank), his M.Sc. in Applied Mathematics from Manchester University (1st Rank), and his Ph.D. from Carleton University in 2001. Then he pursued a two-year Postdoc in UNB, Canada on steam turbines and PEM Fuel Cells. He has 100+ papers and supervised over 70 students. He is recipient of MITACS first prize in 2003, Halifax, Canada and Alexander von Humboldt Fellowship for Experienced Researchers.

Industry 4.0

Goodarz Mahbobi

Managing Director of axcesso GmbH, Member of the Board of Directors of VIHA Association in Germany

Internet of things (Industry 4.0) is a project related to the high-tech strategy of the German government. It promotes the computerization of traditional industries such as manufacturing - what does it mean for the German and also the world industry and how we can face it? Which effects can be expected?

Biography: Dipl.-Ing. Goodarz Mahbobi studied computer science at the Technical University in Vienna and at UC Berkeley in the United States of America.

He worked for several years as an independent consultant. During that time he acted as operational architect, strategic advisor as well as project and program manager. During this time he presided over large-scale projects with up to 150 employees.

In November 2006, he founded axcesso GmbH in association with his partner Walter Bruch. Moreover, Goodarz Mahbobi is actively involved on the board of the Association IT FOR WORK and the VIHA (Association of Iranian Faculty Members and Academics in Germany). „IT FOR WORK“ is one of Germany's leading networks for small and medium-sized enterprises in the field of information and communication technologies - with particular focus on software development.

Unifying Concepts in Catalysis (UNICAT) - A cluster of excellence in catalysis research

Reinhard Schomäcker

Department of Chemistry, Technical University of Berlin, Strasse des 17. Juni 124, 10623 Berlin, schomaecker@tu-berlin.de

UNICAT is a Cluster of Excellence within the framework of the Excellence Initiative researching the economically important field of catalysis. Since 2007 about 240 chemists, physicists, biologists and engineers of 4 universities and 2 Max Planck research institutes are involved in Berlin and Potsdam.

We unify concepts in catalysis by bridging the gaps between homogeneous, heterogeneous and biological catalysis, ranging from elementary gas-phase reactions to complex processes in highly organized biological systems, in fundamental as well as in applied catalysis research. Our research focuses on analyzing catalytic mechanisms, designing novel catalytic materials and strategies, and developing new catalytic processes on laboratory and mini-plant scales.

The Cluster is organized into four research bands (1 to 4). Each one is divided into one chemical (D) and one biological (E) part (e.g. D1 and E2). Each D1 up to E4 are coordinated by two sub-coordinators. The projects in both areas are intertwined to form four Research Bands: activation of methane; activation of carbon oxides, activation of H₂O systems, and biocatalysis in cellular systems. These are devoted to the same or similar target processes. Common to all research bands is the variation in complexity of the systems and a wide range of tailored experimental and theoretical methods.

In total, more than 50 working groups with 250 members guarantee the scientific success of UniCat's 4 research bands. The BIG-NSE Graduate School (Berlin International Graduate School of Natural Sciences and Engineering) is part of UniCat. The BIG-NSE is active in the education of excellent young researchers. As an example of the research activities the project on oxidative coupling of methane will be presented.

Process design in different scales: methane utilization

Hamid Reza Godini

Process Engineering Department, Technical University of Berlin

Depending on the easier access to various hydrocarbon resources, different feedstocks are used for producing chemicals and fuels in different parts of the world. Expensive production of the C₂+ alkanes and limited capacity of oil refinery, local difficulties for transporting the natural gas to the market, and having capabilities to produce the downstream chemical products such as methanol and polymers which have a better market in the locality, all encourage using a natural gas feedstock for production of chemicals in Iran which has the biggest resource of natural gas in the world. Alone in 2011, Iran has flared more than 11 Billion cubic meters which accounts for more than 8% of the whole global gas flare [World Bank statistics 2012]. In this presentation some of the promising natural gas conversion processes, such as direct ethylene production or indirect olefin production processes, will be presented and discussed with the special focus on the capacity, potentials and technologies which can be utilized in Iran and Germany in this regard.

Modern AgBiotech in Iran: Science and Regulation

Behzad Ghareyazie

President, Association of Agricultural Sciences Societies of Iran

Iran has paid more attention to development of science and technology after the historic victory of the Islamic Revolution in 1979. Iran's strategic plan for science and technology emphasizes on the development and use of Nanotechnology and Biotechnology as "priority fields of science and technology". Iran has decided to grow more than 0.5% of the global area of GM crops in the country. This decision indicates the government's positive attitude towards agricultural biotechnology including the deliberate release of LMOs into the environment. Iran has commercially released an insect resistant rice cultivar in the year 2004 coinciding with the international year of rice. The administrative changes however paused the development and commercialization of transgenic plants during the past 8 years. With the election of pro science President and the full support that his administration is giving for the sustainable development and use of modern scientific tools for peaceful applications, it is expected that GMOs will be soon re-commercialized in Iran. In inspirational message to the Iran's National Biotechnology Congress immediately after his election he emphasized on the "necessity of the used of genetic engineering".

'In today's world, the use of biotechnology and genetic engineering is not only a necessity but it is also a desired choice for resolving food, health, and environmental problems. Any ignorance in achieving and using modern biotechnology could certainly make us to be blamed by the next generations'.

With this strong support, the scientists from public research institutes in Iran are now seeking for the full re-commercialization of several insect resistant transgenic rice, potato, sugar beet and cotton developed in public research institutes in Iran. A drought tolerant rice, virus resistant sugar beet, and plants expressing pharmaceuticals are also in pipe line. Rooyan research institute under the direct supervision of the Supreme Leader of the country is also involved in animal transgenesis. Production of a cloned sheep Rooyana and a transgenic goats Shangool, Mangool and Habbeye Angoor expressing pharmaceuticals in their milk are also some of the achievements.

After the official release of the first biotech crop plant in Iran and in response to the demand from the anti-GMO activists, Iranian government established the NBC with the task to review the risk assessment documents and approve any further commercialization of LMOs in Iran. The Parliament has also ratified the National Biosafety Law in June 2009. According to this law a representative from scientific communities is added to the NBC; environmental release, commercial production, import, export and use of LMOs are allowed; no obligatory labeling is required for commercialized LMOs; research and development is exempted from the scope of this law and any rejection of any application for commercialization of LMOs should be based on scientific proof only. Iran's achievements in other fields

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of agricultural biotechnology and the policy making and priority setting systems will be described and challenges will be reviewed.

Iran is now recognized as a reliable partner for international scientific collaborations. Political stability, skilled technical man power, rich biodiversity, strong research infrastructure and the fastest growth rate in the world during the last decade, are some of the features that makes Iran as a “unique opportunity in the region for scientific collaboration”.

Key words: GM Rice, Biosafety, Iran, Agricultural Biotechnology

Biomimetic and Biocompatible Products

Ali A. Moosavi-Movahedi

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Biomimetics is the study of the structure and function of biological systems as models for the safe design and reverse engineering of biomaterials and biomachines. Biomimetics refers to human-made processes, substances, devices, or systems that imitate nature. Human throughout history has always sought to mimic the appearance, mobility, functionality, intelligent operation, and thinking process of biological creatures.

Nature is a perfect and safe creation and all our needs are incorporated in nature. We should just find them through integrative science, wisdom and functionalize them to our life as a natural technology.

Natural products such as biocompatible and biosafety green materials and bioenergy do exist in nature. We should first recognize them, and then propose a method for systematically mapping those processes which take place in innovation systems. These processes should then be imitated to create rehabilitation, renewable and vital technology and finally extend the green products and bioeconomy (understanding mechanisms and processes at the genetic and molecular levels and its application to industrial process. The evolution of the biotechnology industry and its application to agriculture, health, chemical or energy industries is a classic example of bioeconomic activity). Bioeconomy and green economy are the biomotor of a healthy society via the social demands of green products. Thus, it is suggested that a nucleus of biomimetic science and technology research be formed by inviting scientists, researchers, entrepreneurs, policy makers, investors as well as the sponsors in order to plan and devise policies for the advancement of integrative science and wisdom that would be in line with natural phenomena as a new structure that is coherent with science, health and wisdom innovation system.

SURFACTANT ADSORPTION LAYERS AT LIQUID INTERFACES: An Overview of the Knowledge of Colloids and Interfaces

Reinhard Miller

Max Planck Institute of Colloids and Interfaces, Potsdam, Germany

Surfactants are a very important group of chemicals and their interfacial properties are to be known for efficient applications in many modern technologies. Here, the non-equilibrium interfacial properties are the most essential. The work of surface scientists is dedicated to the quantitative understanding of surfactant effects via good experiments and quantitative theories.

A number of excellent experimental tools have been developed recently, by a large extend these are available now as professional commercial instruments. Most of these techniques are based on measurements of the surface tension. The drop profile analysis tensiometry is based on the shape of single drops or bubbles and an excellent experimental tool.

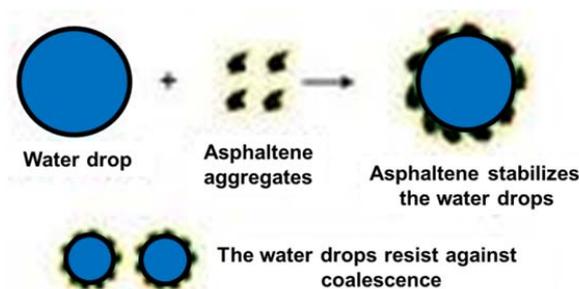


Fig. 1. Water in Oil emulsion in Oil sand fields

The report shows scientific results gained in a fruitful cooperation between Iranian and German scientists over the last ten years. These results include theoretical work as well as newly developed experimental protocols and even experiments in microgravity on the ISS.

Biography: Reinhard Miller studied mathematics in Rostock and colloid science in Dresden. He made his PhD in physical chemistry 1978 in Berlin. Since 1992 he is senior scientist at the MPI of Colloids and Interfaces in Potsdam, Germany. He is co-author of more than 500 publications. His scientific interests are dynamics of interfacial layers, interfacial rheology, foams and emulsions. He is past president of the

European Colloid Interface Society and President elect of the International Association of Colloid and Interface Scientists.

Biodegradable and bio-based plastics - an overview about basics, applications, and markets

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Plastics nowadays play a vital role in everyday life. The vast majority of them is based on fossil raw materials and attempts are being made worldwide to switch to bio-based raw materials. On the one hand, so called “drop in” solutions are sought, substituting the fossil monomeric feedstock by bio-based alternatives, resulting in products like “Green Polyethylene” (Braskem) or partially bio-based products like bio-PET (CocaCola), where only the glycol component is made from renewable raw materials. Likewise, partially bio-based polyamides, such as PA6.10, PA4.10 can be considered to belong to this group. The advantage of the drop ins is their ease of processing on existing conventional equipment and the thorough knowledge of their properties in various applications.

On the other hand biogenic polymers like cellulose or starch and their derivatives form traditionally the basis of a series of products like fibers, films, thickeners, and glues. Here efficient methods of processing and new applications of, for instance, lignin, but also alternatives to cellulose use in the paper industry are sought. Bio-based polyesters, like poly(lactic acid) (PLA, Ingeo) are conventionally synthesized (ring opening polymerization) and used increasingly in packaging applications. Improving the fracture behavior and enhancing the heat stability for durable applications are in the focus of interest here. Finally, poly(hydroxy alkanoates) are synthesized completely by microorganisms and can be used in traditional plastics applications.

In general, many possibilities exist to substitute oil-based plastics by bio-based alternatives and steady progress is being made to improve their properties and lower their prices, the most important obstacle to their break through as plastic commodity materials.

Petrochemical catalyst production in Iran, a research priority

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This presentation is about catalyst production for petrochemical industry in Iran. The presentation provides an overview of current national and international production statuses of polyolefins as the material which needs the catalyst. The presentation also provides an introduction to catalyst with emphasis on the type used in polyolefin production. It provides consumption rate and market share for each type. The presentation concludes with presenting data on the role of catalysis in Iran's national economy.

University-Industry relationship in Germany

Oliver Schulz

Chief Customer Officer (CCO) at LayTec

In Germany, the industry and the universities have a long and successful collaboration history. The contribution will give a general overview, how this close relationship works. The industry has a continuous demand on highly trained scientist and engineers, who leave the university with a high level of practical experience. This can be reached with application oriented projects funded by the European Community, the Federal Government of Germany or regional organizations. In addition also direct projects with industry funding are typical. Strengths and weaknesses will be explained. Afterwards the talk will explain the general research project process in Germany. Exemplified will be given for research in applied physics done at the TU Berlin. The last part of the talk will be focussed on the different university degrees.

Static and Dynamic Operation Improvement of Iranian Power Grid Using HVDC

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Iranian power system is a wide grid with 43000 MW peak load which has faced difficulties in recent years due to some problems such as: transmission constraints, fuel shortage of some power plants in winter beside the drought and the lack of water behind the dams, specially according to 7000 MW capacity of hydro power plants and their important role in summer peak load supply. Also some of this transmission restrictions is due to the transient stability problem. Unfortunately there is not any FACTS device, series capacitor or other controller in this grid. Recently a new project as the use of new technologies such as HVDC has been approved in Iran Power Grid Management Institute in order to resolve these operation problems. In this study according to the weak points of the network, 15 points of the grid were determined for installation of HVDC. For determination of the best choice among these 15 points, HVDC modeled in Iranian power grid by DIGSILENT power factory software and in next step the best sizing and location of HVDC were detected considering the system operation purposes such as loss reduction, transient stability improvement and short circuit current reduction.

KEY WORDS: High Voltage Direct Current (HVDC) transmission, Power System Operation, loss Reduction, Transient Stability, Iranian Power Grid

Energy Saving through Architectural Design, Building Energy Regulation for Iran

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Iran's energy consumption, while already high, is increasing per annum. More than 95% of Iran's total energy consumption is supplied from oil products and natural gas. If trends continue, Iran's energy supply, which is the country's most valuable source of foreign exchange revenue, will soon be depleted. It is possible, however; for Iran to achieve a high reduction in its energy consumption.

Buildings are the biggest energy consumer among different sectors so that residential and commercial buildings are responsible for over 40% of Iran's energy consumption. A reduction in energy consumption and the introduction of energy efficient buildings would, therefore, have a significant impact on the country's overall consumption.

On the other hand, the potential of energy saving in building sector is generally higher than others. Energy optimization in building sector can more easily be achieved in comparison with other sectors and needs less investment. Due to this cause, countries such as Germany, as a pioneer country in reduction of greenhouse gas emissions, emphasizes on building sector for reduction of overall energy consumption.

The high demand of Iran for construction of new buildings, indicate the higher potential and importance of energy conservation in building sector. Only construction of energy efficient new buildings can, therefore, lead to a high amount of energy saving.

As a result of relatively low energy costs, even after reducing the energy subsidies, high construction material costs, and the general economic conditions in Iran, energy saving in buildings through expensive methods is not economically viable. Elimination of the energy subsidies and increasing the energy costs up to regional prices have not basically change this condition. Thus, there is no social interest in energy saving, especially with measures that increase the building costs. For the situation in Iran, the use of cost-neutral or cheap energy saving methods is very important. Architectural methods of energy saving rarely increase the building costs and are only achievable through proper design.

Because of the climatic condition in Iran, the potential of architectural energy efficiency is very high in a very big part of Iran. Researches which has been done regarding reduction of energy consumption of buildings through architectural design for the cold climatic region of Iran and for the climate of Tehran region, have shown that the potential of energy saving in buildings through architectural design is very high in these climatic regions. Similar researches must be done for other climatic regions of Iran.

Introduction of architectural regulations and guidelines for different climatic regions of Iran, which are based on the results of such researches, as well as application of them in designing of buildings will lead to a high amount of energy saving. Energy saving through architectural design is not only cost-neutral and

thus economically viable, it is but also emission-free and easy to achieve. This method of energy saving is, therefore, very suitable for Iran.

Entrepreneurship and Natural Resources Dependency: Good Governance Matters

Mohammad Reza Farzanegan

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Sustainable economic development has been a challenge in natural resource rich countries. Key elements of sustainable development are independent private sector and entrepreneurs. The so-called resource curse suggests that countries which are depending on the resource rents, on average and in long run, show a slower economic growth compared with resource poor countries. There are several transmission channels for the curse of natural resources to the economy such as internal and external conflicts over rents, corruption and weak quality of political institutions, neglecting the importance of human capital, increasing spending on military and security affairs, and increasing inequality in distribution of rents motivated by ethical considerations and the channel of Dutch Disease.

Our study explores another transmission channel of curse namely lower rates of small business formation and entrepreneurship in resource rich countries. Using panel regressions, we show that resource rents dependency reduces the intensity of entrepreneurship in our sample of 65 countries from 2004 to 2011. The theoretical background is already discussed by Torvik (2002). Torvik suggests that increasing natural resource rents motivate the citizens' activity in rent-seeking, diverting them from the productive part of the economy. He concludes that the fall of income due to this reallocation of entrepreneurs outweighs the benefits of natural resource rents. Also Dutch Disease hypothesis has some implications for understanding the negative effects of rents on Entrepreneurship:

- Marginalization of manufacturing and productive parts of economy
- Appreciation of real exchange rate, making domestic products more expensive for international markets
- Unemployment and lower growth

In addition, there are empirical evidence which shows oil rich governments maximize patronage benefits by employing as many public sector workers as possible, reducing the willingness to engage in Entrepreneurship activities in resource rich states (Alesina et al., 1998, Robinson et al., 2006, Bjorvatn and Farzanegan, 2013). However, we show that that this is not the unchangeable destiny of resource rich countries. Government effectiveness among other dimensions of good governance has a statistically significant moderating effect in entrepreneurship-oil rents nexus.

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Environmental regulations: technical solutions or people's participation? A human and cultural ecological approach

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Environmental developments and the interaction of nature and culture are complex and challenging as they cannot be grasped by single disciplinary approaches from natural or social and cultural science perspectives. This is why I will refer to a scientific debate – that is not very familiar to even those who discuss and do research in the field of ecology and environmental sciences. It is the Human and Cultural Ecology that have been developed as part of the Chicago School of Sociology / Geography – which started around 100 years ago. Later it was discussed by social anthropologists who then shaped the Cultural Ecology. The theoretical approaches and models can still be useful to deal with ecological problems because environmental challenges need to include the human dimension and the institutional setting of the society. As human beings are organized by class – ethnicity – age and last not least by gender order these aspects need to be considered in an inter- and transdisciplinary approach whenever we deal with environmental issues.

I will present a case study from a water irrigation project in Behbahan / Khusestan that I evaluated some years ago for UNDP. There I can show the many different effects that this project had on the environment, on the structure of agricultural activities and people's participation. By introducing a human ecological model such a modernization project that probably intended to improve life conditions in that area can be analyzed. My special focus will go in the direction of a study that wanted to recommend activities to improve women's empowerment in that region. Unfortunately women's former economic power was neglected and the sustainability of the irrigation project was not guaranteed.

Perspektiven für erneuerbare Energien und nachhaltiges Management der globalen Energiewende

in English: Perspective of Renewable Energy and Sustainable Managing of Global Changes

Mohssen Massarrat

Universität Osnabrück

Seit Anfang des 21. Jahrhunderts funktionieren zum ersten Mal in der Geschichte die globalen Energiemärkte. Deshalb sind auch die fossilen Energiepreise von einem politisch regulierten Dumpingniveau (das amerikanische Energiepreissystem zwischen 20-25 Dollar pro Barrel) auf das reale Niveau von über 100 Dollar pro Barrel angestiegen. Dadurch sind einerseits neue fossile Alternativen zu Öl und Gas, wie beispielsweise Fracking, rentabel geworden, so dass der fossile Energiepfad auf unbestimmte Zeit fortgesetzt werden könnte. Andererseits sind auch die erneuerbaren Energietechnologien wettbewerbsfähig geworden, teils wegen gestiegener fossiler Preise und teils wegen drastischer Produktivitätssteigerung bei der Stromproduktion aus Wind und Fotovoltaiktechnologien. Offen steht allerdings weiterhin die zentrale Frage, wie es gelingen könnte, aus Gründen des drohenden *Climate change* den Systemwechsel weg vom fossilen und hin zum erneuerbaren Energiepfad national und global zu managen.

Knowledge-based companies in developing countries, challenges and opportunities, Hamgara Co. as a cases study

Reza Kalantarinezhad

Senior Scientist and Co-founder of Hamgara Co.

Historically, developing countries specifically in Middle East have faced chaotic financial environment in last couple of decades. This has led to severe increase in risk of financing and business establishment in such countries. Investors have preferred not to expend their hard earned money on long-term businesses which often lead to technological advancement for the country. Moreover, the technological gap between developing and developed countries has been heightened and lengthened due to aforementioned fact. Overall, combination of both effects simultaneously has intensified this matter in a dramatic fashion. National Innovation systems and discretized organizations in developing countries with diverged points of view and goals, have slowed down and killed the rate of acceleration towards technological milestones. While government does not sense the necessity of this process and their GDP are tightly dependent on sales of natural resources, and exporting raw materials. A 20-year effort of Iran to change the paradigm of the economy from a traditional economy to knowledge-based and innovative economy has shed lights of hope to the future generations and investors.

However Middle Eastern countries face chaotic conditions, yet Iran takes advantage of social and political security even though shadowed by under international issues as sanctions encountered to serious economic problems but its internal capacities and potentials makes this country as one of the biggest economies in the Middle East.

Young body of societal population pyramid, and development of higher educations, change Iran into one of the countries with highest scientific growth rates. Now Iran in several scientific and technological areas is on that technological world club, such as nanotechnology, space and biotechnology. Currently a sheer number of talented Iranian Student are studying in reputable foreign universities as international students, for which their come back to homeland makes a potential towards scientific achievements. Total of number of researchers, graduate students and faculty members of Iranian universities and systematic approach of government to develop innovation systems in Iran cause a big difference in last twenty years.

Hamgara is a good case study which shows sustainable technological and innovation strategies based on young talents which leads to considerable achievements in new technologies in a chaotic environment. Here, we review recent achievements of Hamgara in fields of Nanotechnology and Nanobiotechnology in terms of Supersensitive gas and biological sensors based on one-dimensional nanostructures. Additionally, we present basic innovation and technological strategies of Hamgara and their influence

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upon its success. To name but a few, we can mention low-cost research conduction, international collaboration, intensified eagerness of Iranian scholars towards meaningful research areas, Academic support by major science and technology universities in Iran and emphasized on big collaborative network and small central organizations.

Finally, we conclude that, having an efficient technological and innovative strategy, one can make establishment of R&D companies possible in Iran in light of the plus points stated earlier. In addition, the government takes advantage of international opportunities to collaborate with knowledge based companies in Iran, to develop new technologies and products with lowest budgets and high yields, as a mutual interest for private companies and government.

Growth of plants: Circadian clock or lunisolar tides? A question brought up by a new imaging platform

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Growth of individual plant organs is known to exhibit a high plasticity and occurs as a result of the interaction between various endogenous and environmental processes. Plant organ phenotyping by noninvasive video imaging techniques provides a powerful tool to assess physiological traits, circadian and diurnal rhythms, and biomass production. A new imaging approach was developed to analyze total root elongation. High pixel resolution of the images enables the study of growth in short time intervals and provides high temporal resolution and total root elongation rates are calculated from the displacement of the root tip. This set-up enables root growth of *Arabidopsis* wild-type seedlings to be followed for more than 1 month after germination.

Elongation of primary roots of *Arabidopsis* seedlings was monitored using this technique. The average daily rate of growth is increased in longer light periods or by addition of sugars. The momentary rate of growth exhibits a robust diel oscillation with a minimum 8–9 h after dawn and a maximum towards the end of the night. The diel oscillation persists in continuous light.

Root elongation kinetics in circadian clock mutants of *cca1/lhy* and *elf3* growing in light – dark periods or free running condition of continuous light demonstrate strong modifications, while *elf3* mutants exhibit no oscillations.

Analysis of root growth in conjunction with geophysical variables indicates the relationship between the hourly elongation rates and the contemporaneous variations in geomagnetic activity, as evaluated from the disturbance storm time and ap indices. Correlation between the root growth kinetics in free-running condition and the lunisolar tidal profiles indicate that the latter is the probable exogenous determinant of the rhythmic variation in root elongation rate. The periodicity of the lunisolar tidal signal and the concomitant adjustments in root growth rate indicate that both lunisolar tidal acceleration and the geomagnetic field should also be considered as modulators of root growth rate, alongside other, stronger and more well-known abiotic environmental regulators.

Hybrid natural gas sweetening technology by a novel physical absorber

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By increasing in worldwide consumption of natural gas, gas sweetening is one the key parameters in development of gas refinery plants. There are several processes that are developed for this purpose as chemical absorption, physical absorption, Cryogenic separation and membrane technology. Each process has some advantages and disadvantages. Membrane processes have considerable advantages in respect to conventional sorption methods as reduction in costs. Therefore, the necessity of investment in manufacturing and employment of membrane modules by appropriate performance in the coming future is inevitable.

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Multi-Scale Modelling of Materials; Modeling as an Aspect of Development

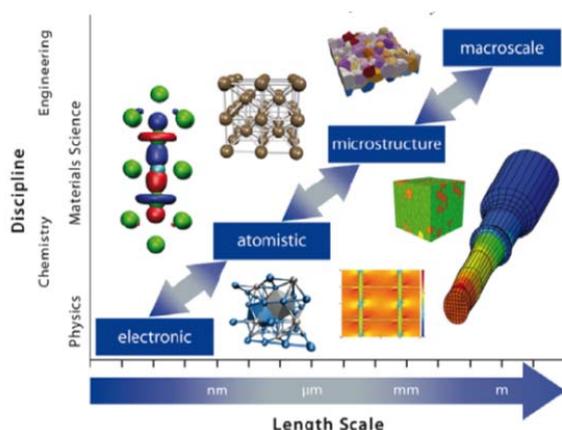
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For a developing country finding a general approach to get benefices from advanced (or developed) countries to progress is always a challenging topic. One of the common and important issues is the technology or the technological development. In this sense, mostly the focus is on something to be produced through a high-tech process while, there are also other development aspects parallel to them and might be in a same level of importance. In this talk I would like to explain a little bit more on the modeling as an additional aspect of development rather than process and product. Traditionally, simulation or in general the modeling is used to prove a specific experimental data, but recently it going to be an independent or less dependent branch of science and it could even guide experiments from itself. The concept of multi-scale modeling, which funded by combining different disciplines, can basically leads us to this goal. Therefore, we, as a developing country seeking the progression aspects, should be aware about this field of science and technology as well.

Modeling materials-related processes is not simple, as the underlying phenomena span an enormous range of lengths and timescales. Multi-scale materials modeling combines existing and emerging methods from diverse scientific disciplines to bridge the wide range of time and length scales that are inherent in a number of essential phenomena and processes in materials science and engineering. The multi-scale materials modeling

framework is based on the fundamental laws of nature and links the electronic modeling hierarchy through the atomistic and mesoscale modeling regimes to macroscopic material behavior. It is evident that such a framework may not be based on rigid, formal parameterizations alone but must emerge from a detailed understanding of the mechanistic behavior of materials, a robust knowledge of materials properties and metallurgical trends, and must take into account the processing of materials as the basis of dynamical structure property relations. A general introduction on the multi-scale modeling approach and current status of this kind of methodology will be presented also in this talk.



Traditionally different disciplines focus on different length scales. Multiscale modelling of materials across the length scales requires overcoming the borders between the disciplines for

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a seamless integration of the models on different length scales into one coherent multi-scale modelling framework (After D.G. Pettifor, 1991).

Iran's gas exports: can past failure become future success?

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Despite holding the world's second largest conventional reserves, Iran does not export natural gas apart from relatively small-scale trade with Armenia, Azerbaijan, and Turkey. Exports amounted to less than 10 billion cubic metres (bcm) in 2012. For decades, Iran announced ambitious plans to export gas but in reality the country became a net-importer in 1997 and has basically remained. As a consequence, almost 16% of the world's conventional natural gas reserves remain absent from the international markets. Officials from the National Iranian Gas Company (NIGC) repeatedly announced to aim for a 10% share of global gas trade which would have equalled gas exports of almost 70 bcm in 2011. The presentation will examine how realistic it is to expect Iran to turn past failure into future success when it comes to the export of natural gas.

The presentation will discuss Iran's failure to become a major gas exporter by reviewing Iran's role in regional and global gas as well as Iran's existing and unaccomplished gas export projects of the past decade. Thereafter, obstacles to Iranian gas exports are studied. This includes an examination of sanctions as an external factor as well as the review of the internal factors 1) subsidies and domestic over-consumption, 2) objections to foreign participation in the energy sector as well as 3) policy and institutional conflicts. Finally, the likelihood for Iran to become a major in the years ahead is assessed.

The presentation is based on a working paper which can be accessed under:

<http://www.oxfordenergy.org/wpcms/wp-content/uploads/2013/06/NG-78.pdf>

Sustainable development, Innovation and Culture: lessons from Germany Energy policies

Arash Rezaeian, Lutz Mez

From decades ago innovative activities in policy making, management, market and technology started to solve sustainability problems of industrialization.

The innovations must propose more value to economy-Society and environment not only by inventing better products and technologies but also by proposing innovative governance, stakeholder's cooperation, social networking and marketing. The entrepreneurial activities is one of the most important part of any innovation system. Entrepreneurs in this research are individuals who make a better judgment under risks and uncertainty which leads to more value for the society, economy and environment.

- We argue that sustainable development requires a deliberate system transition
- The core motive force of any intentional system transition is innovative activities in the economy from entrepreneurs
- Innovation itself is a function of many internal and external factors. one of the most important factor is the culture

Based on economic theory of entrepreneurship and culture the four main dimensions of culture are:

- 1- High- trust vs Low trust
- 2- Individualism vs Collectivism
- 3- Pragmatism vs Proceduralism
- 4- High tension vs Low tension

In the case of Germany, With 48% (86 GW) of installed capacity with distributed generation and 25% electricity from renewables at now, Germany sets goals for year 2050 to reduce 50% of its energy consumption (according to level in 2008) and replacing the remaining Energy demand from renewable resources.

We argued that such an ambitious energy policies for transition to a highly sustainable energy system, get supports from German culture of high Individualism, highly pragmatic, high tension and high trust.

Iran's Atlas of Theoretical Energy Recovery Potential from Municipal Sewage Sludge

Maryam Bakhshi

AvH research fellow at Berlin Center for Caspian Region Studies Freie University, Berlin

The interest for recovering energy in wastewater treatment plants is rising because these plants have a great demand of conventional energy; whereas the sewage contains considerable amount of energy which is technically feasible to be recovered as a renewable one. The recovered energy can be directly used in wastewater treatment process, reducing the facility's dependency on conventional electricity and the greenhouse gases emission as well.

In this paper, in order to estimate theoretical potential of energy recovery from sewage sludge, some common methodologies and technologies were reviewed. Biogas generation through anaerobic digestion and methods based on population statistics were selected for potential estimating and GIS-based data were used to prepare the nationwide atlas.

Results were shown that total theoretical energy recovery potential from about 2.5 million cubic meters annual flow rate of municipal wastewater into the treatment plants is 1,755,031±87,751 Gigajoules and about 195,003,666±9,750,183 kilowatt-hours of electricity.

The provinces with more potential of energy recovery were Isfahan, Tehran, East Azerbaijan, Razavi Khorasan and Kermanshah with 8467, 3919, 2910, 2513, and 2167 Gigajoules of Energy, respectively.

Prepared atlas in this paper shows the feasible sites for implementing this project and this will be useful for policy makers, energy and water planners, stakeholders of the wastewater treatment plants, investors, scientists and researchers.

Keywords: Energy Recovery, Renewable Energy, Sewage Gas, Wastewater

Optimal Distributed Generation Placement Considering Voltage Profile Improvement and Loss Reduction: Case Study on Iranian Distribution Network

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Due to transmission system constraints and load growth and in order to properly supply the consumers, Distributed Generation (DG) penetration in power systems has been increased. Therefore, DG placement is one of the major topics in power system studies in recent years. In order to have a better voltage profile and minimize losses in distribution networks, optimal allocation of DGs must be noticed. The optimal placement of DGs reduces the operational cost and network losses and improves the power quality. Different methods have been developed by researchers to determine the optimum location and size of the DGs. These solutions are based on either analytical tools or heuristic global optimization methods. In this paper, Genetic Algorithm (GA), Particle Swarm Optimization (PSO), and Harmony Search Algorithm (HSA) are used to find the optimal location and operating point of DGs considering the voltage profile improvement and losses reduction. The optimization procedure is applied to a 682-bus radial distribution network of Iran. This distribution network has problems such as, supplying outland villages and a lot of agriculture water pumps. These issues result in increase in power losses and poor voltage profile.

The basis of the losses calculation and voltage profile determination is the load flow studies. The forward-backward sweep load flow method is used in this paper. The simulation results show the importance of the application of DGs in Iranian distribution networks.

Comparison of Effect of Energy Prices in Iran and USA on Short-term Planning of an Industrial Microgrid

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In this study, day-ahead operation planning of a typical microgrid (MG) that has been installed in an Iranian resin factory, is optimized in order to achieve the maximum profit considering technical and economical constraints without any load shedding in the next 24 hours. The MG consists of a diverse variety of power system components such as gas turbine, photovoltaic system, fuel cell, electrolyzer, hydrogen storage tank, reformer, a boiler, and electrical and thermal loads. Moreover, MG is connected to an electrical grid and it is possible to exchange power. The MG is managed and controlled through a central controller. The system costs include the operational cost, thermal recovery, power trade with the local grid, and hydrogen production costs. The total profit of the MG via gravitational search algorithm (GSA) and genetic algorithm (GA) with Iranian prices on June 2014 is obtained and compared to the profit with US prices in the same time. The results show that even with eliminating subsidies in Iran from 2011, installing the microgrid in the US with their current prices is much more beneficial compared to Iran.

Water Saving Irrigation Technologies: Challenges, Preconditions and Solutions; The case of Darab Central Valley, Iran

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Utilization of water saving irrigation systems is an approach to increase agricultural water availability without additional pressure on ground-water resources, which is particularly important in arid and semi-arid regions with ground-water scarcity. In Iran, the government subsidizes the modernization of irrigation systems in order to motivate farmers to adopt these technologies. Nevertheless, and despite the obviously positive effects modern irrigation systems have for the country's water use efficiency, wheat production level and farmer revenues, only a minor share of farmers has implemented water saving irrigation systems. Considering the case of Darab Central Valley, our research intends to find out the reasons of the low adaptation rate for those technologies and based on that suggests possible solutions.

Darab is a dry region with low precipitation rates. The agriculture sector is highly dependent on ground-water resources. However, over-exploitation of ground-water has led to increasing water shortages, and as a result more and more farmers either give up or turn to new strategies to enhance water access, like the construction of new wells or deepening of old ones, which leads to even higher ground-water extraction levels, pushing the region into a vicious circle of water table decline.

To investigate the reasons behind the low rate of irrigation modernization, we conducted a comprehensive survey among 362 farmers in nine villages, who had been selected by multiple two-stage sampling. The data collected provided information about the effects of irrigation modernization on water use, wheat productivity and farm income, as well as the possible solutions in political and social levels. The data were analyzed by descriptive statistics, multiple regression analysis and profitability analysis. The results are calculated with regard to four village groups, differentiated according to their level of ground-water availability.

It turned out that 23.5% of farmers used non-pond irrigation systems. The most commonly mentioned reason for refraining from irrigation system modernization was lack of funding. Lack of knowledge, small land parcels and multi-user wells (up to 20 farmers used one well) also contributed to a lack of implementation of modern systems. Our results demonstrate that the government's guaranteed wheat minimum price increases the farmers' profit margins, and therefore moderates the necessity to modernize the irrigation systems. Hence, by eliminating that minimum price policy, only farmers from one village (Behruz-abad) with higher water availability could benefit from wheat production. Also, low interest subsidized credits led to underrating of water extraction costs. As a result, not only low interest subsidized credits directly enhanced ground-water extraction, but also reduced the incentives to implement water saving irrigation technologies.

Our results suggest that saving water irrigation systems are promising instruments of water management. However, they could only be successfully applied if the political, social and economic preconditions are realized and adopted. In Iran, credits with low interest rates and minimum guaranteed price policy run counter to a sustainable use of ground-water resources and impede the modernization of irrigation systems. To improve the situation, it would be useful to establish water user cooperatives as a platform for improving the communication and negotiation among farmers and to approach on-farm problems for irrigation system modernization. Moreover, governmental subsidized credits should be directed from

strategies that increase water access toward irrigation modernization, and policy packages that unify irrigation modernization policy and the policy of minimum wheat purchase prices should be developed.

Wind Farm Site Selection Criterion Assessment Base on Technical and Environmental Management Techniques in Iran

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Today, in all projects it is essential to conduct an assessment about the impacts of industrial development on the environment. In the studies, a special attention is paid to different parameters affecting optimum use of natural resources. This research has introduced some assessment standards and criteria to prevent and mitigate the harmful environmental effects of establishment and operation of wind power plants. By this way, this study attempts to provide technical, environmental, and geographical criterion for the installation and operation of this technology. The foundations of this research have been compiled by literature review and comparison of such studies in different regions of the world. The materials have been collected from a wide variety of geographic and statistic data. Geographic Information System (GIS) has been employed to carry out the assessment. The results are represented as a set of effective criterion. These criterion are categorized into three sets of environmental, technical, and geographical data. The results can be helpful for practitioners in development of renewable energies and organizations of environmental conservations. However, there are not enough new related criteria in Iran and the results of this research as comparison of different studies can be applicable to provide guidelines and standards for development of wind farms.

Keywords: assessment of development impacts, wind energy, environment, criterion, site selection

CHP Systems in Iranian Industry and Its Comparison with CHP Application in Europe: A Case Study

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Nowadays, due to increasing price of fossil fuels and also the low efficiency of conventional energy conversion systems, more attention has been paid to use of co-generation systems such as, Combined Heat and Power (CHP) and Combined Cooling, Heating and Power (CCHP) systems. The applications of the CHP system can increase the total efficiency of power generation units and moreover save large amount of valuable fuel consumption in industrial and urban system and consequently reduce the environmental pollution.

This paper discusses the CHP system application in one of the Iranian industry from economic and technical point of view. This industrial plan includes thermal and electrical loads. The cost function including the installation and running cost of CHP system should be minimized by PSO algorithm. Also the optimal capacity of the CHP system should be determined. In this study, the real data of the electricity and gas consumption is used and it is assumed that the CHP system has a useful life of 20 years and has a gas turbine as prime mover.

In this paper, an economic comparison has been made for the installation of the CHP system in Iran and Europe. Considering the energy tariffs and installation and running costs, the economical analysis shows that the total operation cost of this system in Iran is more than that of in Europe. Also the effect of energy price subsidies is discussed.

Examples of Brain Gain: Some best practices of contribution of highly skilled migrants for development of their home countries

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In Iranian Context, the term “Brain Drain” is mostly applied to former winners of international Olympiads and students with highest scores in Iranian University Entrance Exam (Konkour), once they left the country. However; in international context brain drain usually refers to migrants of a bigger group of high skilled individuals, including those, who hold a higher educated degree or possess certain (not necessarily academic) competencies.

Another difference between Iranian and international contexts appears in the debates about the ways migrants could contribute to development of their country of origin: In Iranian context, it is often discussed in poles of “staying home” or “coming back” as only possible ways. Meanwhile many interim possibilities known as “brain gain” and “brain Circulation” etc. became unavoidable within the international migration and development debate in recent decades.

Many migrant groups are contributing to development of their countries of origin even from abroad through different forms of sending money, investing, knowledge and technology transfer etc. This short talk will illustrate few concrete and practical examples of best practices of contribution conducted by other non-iranian migrant networks. In following discussion, it can be outlined whether and under which conditions such examples can be scaled and applied to Iran as well.

Biography: After graduating in Mathematics at the universities of Tehran and Bonn and working as a researcher, Sanaz studied international development with specialization on migration and development at ETH Zurich and spent some years in Afghanistan and Tajikistan working in the field of development and humanitarian aid. At the moment, she advises highly skill diaspora networks on the ways to contribute to their countries of origin within her own non-profit organisation Brain-Re-Gain gUG . Sanaz's special focus is the contribution of diaspora networks in innovation and entrepreneurship in the middle east and north Africa, a topic, on which she currently is concentrating within the scope of her PhD at UN university Merit/ school of Governance of Maastricht university.

The Role of International Education Programs in Case of Kazakhstan

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One of the important ways to develop the country's economy is to provide a good quality education to the population. Today in Kazakhstan, about 30% of the population is young people, so education issue plays an important role in economic development. As whereas Kazakhstan is an industrial country, training qualified specialists in technical consideration is vital.

Although modern education system is not sufficient for training specialists, thus it requires International joint programs to increase and improve the experience of engineers. So joint programs could help to the future engineer to be in contact with wider and update knowledge bank from foreign institutes and universities to gain more and variant ideas and experience for future of our country.

One of such programs is cooperation with the SCO University (University of Shanghai Cooperation Organization) to provide chance and support for students to study at the same time in two countries, through a coordinated development of curriculum of the student. Beside that there is an agreement to give two diploma on joint programs.

So joint programs could provide the opportunity for students to study and pass scientific training, as well as learning from the experience of foreign expert scientists in the best universities around the world. Studying in such programs will make engineer more qualified and will decrease brain drain because after graduation they can easily find job in their country relevant to their education .

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The Role of Human Resources in Economic Development: International Competition for Highly Qualified Labor Force

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The presentation focuses on the phenomenon of the global race for talents which is later on exemplified by looking at the example of Iranians in Germany. It starts by discussing the value of education and skill formation at the private as well as at the public level, with a view on the relationship between human capital and economic development. After having addressed some facts about the global competition for highly skilled labor force and general policies applied to attract them, it turns to the situation of Germany which is one of the countries with the most pronounced policy of attracting high-potentials from abroad. For many years, Iranians are playing an important role in filling the demand-supply gap of highly qualified labor force in Germany. The presentation demonstrates this against the background of available information about the global “brain drain” from Iran. Finally, an own survey among Iranian students is presented which had been conducted to find out what the future location plans of these students are. The final discussion is intended to concentrate on the question who might be the losers and the winners in the international competition for highly qualified, and if, maybe with the support of appropriate policies, there is any chance of a win-win outcome.