

# WECC2015 Session Descriptions (As of March 13, 2015)

Track	Sessions	Descriptions
<b>Track 1: Resilient Infrastructure for Society</b>		
1-1	Reconstruction innovation	Discussion about the construction of resilient infrastructures and how to take swift action for the recovery and reconstruction of disaster-stricken sites.
1-2	Land/city conservation and disaster mitigation	Being braced for the various natural hazards of earthquakes, tsunamis, tropical cyclones etc. are important to control and stabilize the development of the regions in the world. Urbanization and concentration of population to cities intensify the threat of the hazard and the vulnerability of the land and the cities increase. The challenge to engineering is to mitigate those disasters by modifying land and cities resilient to infrequent natural hazards, promoting education and preparing for emergency response, and beforehand incorporation of an autonomous quick recovery scenario in our social program.
1-3	Robot technology used at disaster sites and its operating system	Discuss the latest robot technologies used at disaster sites and the systems to maintain the robots ready for use in a disaster.
1-4	Strengthening national interests and creating new industries using big data	Propose the potential of the analysis and application of big data for disaster prevention and reduction.
1-5	Creating a resilient economy	Discuss how the private sector, public sector, and utility sector can cooperate on a resilient economy.
1-6	Resilience in manufacturing and energy sectors	There are three factors in having a resilient supply chain: 1) strengthening production sites, 2) decentralizing the sites, and 3) having a backup system for the grid.
<b>Track 2: Energy for a Sustainable Society</b>		
2-1	Wider applications for fossil resources: Conventional and non-conventional resources	In this session advanced production technologies for environmentally friendly fuels and petrochemicals from conventional resources will be discussed. Global potential of non-conventional supplies of shale gas, methane hydrate, extra heavy oil etc. will be reviewed. In addition, future prospects of technological developments to access and process such resources will be discussed.
2-2	Power generation technology	The power generation technology that sustains the base of modern society and industry will be discussed. Thermal power generation, nuclear power generation, advanced power generation technology such as an integrated coal gasification combined cycle, distributed power generation and so on will be included.
2-3	Renewable energy sources and energy storage technologies	Renewable energy sources and energy storage systems will be discussed from the view point of : -Technologies(Solar, Wind, Geothermal, Biomass, Micro-hydro power, Battery, Thermal energy, Flywheel, etc.) -Integration to the power systems
2-4	Energy saving and efficient energy use	High efficiency devices and systems, and the technologies for energy loss-reduction will be discussed, including: -Power-electronics, -Information and Communication Technology(ICT) -Power transmission , transformation and distribution -Energy efficient manufacturing process -Combined heat and power systems
2-5	Energy management	Energy management and energy saving technologies in demand-side will be discussed mainly from the viewpoint of software technology. Topics of interest include, but are not limited to, the following: -HEMS(Home Energy Management System), BEMS(Building Energy Management System), FEMS(Factory Energy Management System), CEMS(Community Energy Management System) -Demand Response(DR) -Thermal management -Solution of Energy service company
2-6	Smart grid, smart community	Smart grid and smart community technologies, and also demonstration projects will be reviewed. The prospect of the realization of the low-carbon and sustainable society will be discussed.
<b>Track 3: Natural Resources for a Sustainable Society</b>		
3-1	Satellite-based technology, land and marine survey, resource investigation, disaster monitoring	This session focuses on space utilization such as land and marine survey and resource investigation as engineering technology to support the sustainable development of the global industry. Other space utilization technologies such as disaster monitoring will be also discussed.
3-2	Supply chain of mineral resources and life cycle of human beings.	Secured supply chain from mineral resources to end-user materials is inevitable for maintaining life cycle of human beings. It is achieved by resources development with minimized environmental impact and maximized social responsibility which fulfill the insufficient supply only by the strong effort toward reduction and/or alternation of consumption as well as recycling.

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3-3	Water resource and environmental management	There are a billion of people still using unimproved sources for drinking water and 2.6 billion of people do not use improved sanitation (WHO/UNICEF, 2010). The treatment of waste water requires significant demand of energy. Water pollution problem complicate the issues. Sustainable management of water resources using integrated approaches is important. As a part of the approaches, engineering could contribute to improve and develop efficient systems for safe drinking water, water treatment, water recycling, desalination, sewage service for supporting big development of big cities.
3-4	Advanced recycling technology	Various valued materials accumulated in the consumer's market can be considered as a sort of new deposits. Advanced recycling technology does not only utilize valued elements and separate and stabilize the harmful elements from the deposits but also utilizes the harmful elements as functional materials This will bring about new phase of the sustainable development. Most advanced trends will be introduced.
3-5	Process technology for sustainability	It becomes evident that clear restriction exists in the field of energy/natural resources and global environmental capacity. In this session, world-wide development status of sustainable production is reviewed and discussed as well as that of Japan.
3-6	Agricultural machinery and food engineering, agricultural mechanization, agricultural structures	Reevaluation of the agriculture on the principle of local supply and local consumption has been proceeded in recent years beyond the resource and energy intensive large-scale farming. Discussion will cover the issues on agricultural mechanization and automation against the background of low birthrate, longevity, and urban centralization of population, moreover the feasibility of plant factory for adding of value and extreme environment.
<b>Track 4: Urban Development and Infrastructure</b>		
4-1	Environmental friendly and sustainable cities & housing	Sustainable and environmental friendly development of healthy and safe housing are required for increasing population in cities under threatening of non-renewable resources decreasing, global warming and climate change. Establishment of policy for housing and cities conscious to aging society with lower environmental impacts are big challenge in advanced countries, while for developing countries, supplying with safe and reliable housing for low income people in urban area are urgent issues.
4-2	Net zero energy building technology, new air-conditioning and sanitary technology, green building technology, water utilization technology	The environment friendly technique of air-conditioning and sanitary engineering to maintain healthy and comfortable indoor environment will be focused. Specifically, green building techniques, net zero energy buildings, techniques in air-conditioning and sanitary of next generation, water utilization will be discussed.
4-3	Measuring, control, security technology, robot technology	Discussion on the following issues to maintain sustainable living of humanity by control and measurement technologies. Monitoring technologies to prevent an accident. Control technologies for safe and secure systems. Concepts of engineering for social acceptance of next-generation robots.
4-4	Next generation broadcasting systems	The discussion focuses on Ultra-high definition TV which is a next-generation broadcasting such as 4K and 8K, as well as the technologies for highly realistic television broadcasts such as 3D TV and Free viewpoint TV, accessibility technologies including captioning, sign-language and commentary, and their applications for medical or other industrial fields.
4-5	Construction technology and management	Innovation in structural engineering design, construction and management for safety and quality assurance are continuing and enabling advanced buildings, civil infrastructures and lifeline systems with low environmental foot print, more energy efficient and less natural resource demand. The engineering innovation includes application of recent IT such as 3D mapping and GPS technology, which may potentially change the construction management and create new business occasions.
4-6	Innovation for maintenance and renovation of sustainable civil infrastructure	Energy conservation, reduction of environmental impact, service life extension, recycling, reuse, durability design, diagnosis and rehabilitation of existing facility are key technologies necessary to improve our society for continuous and stable development. Innovations applied to maintain housing and civil infrastructure are to discussed.
<b>Track 5: Mobility and Communication Technology</b>		
5-1	Railway technology, high-speed train, urban transportation, maintenance technology	The railway technology covered in this session focuses on topics such as environmental friendly, safe and comfortable transportation systems. Furthermore, advanced infrastructure, domestic and international high-speed trains, urban transportation systems, and maintenance technology will also be discussed.
5-2	Automotive technology, society and mobility in 2030	Toward 2030, it is necessary to make a massive improvement in fuel efficiency in developed countries, and to achieve a low pollution in emerging countries. In this session, we aim at forecasting the future of automotive technology and mobility which will be needed in the automobile society of developed countries toward 2030, as well as seeking collaboration between countries.  key words : Motorbike, Micro commuter car, Passenger car, Truck, Fuels, Vehicle fleet by type, Incremental gains in efficiency of new vehicles, ITS, Sustainable mobility

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5-3	Marine technology, ships, ocean energy utilization, marine resource developments	Discussion and review on engineering technologies associated with oceans as global frontier including energy-saving technology for ships, marine renewable energy utilizations and developments of ocean resources such as oil, natural gas and methane-hydrate.
5-4	Aeronautical technology	This session focuses on aviation industry such as technologies for aircraft design, weight reduction, and higher performance, and aircraft operation technology.
5-5	Innovative telecommunications technologies	Innovative aspects of telecommunications technologies that realizes secure and safe society are discussed, including studies on broadband, diverse and intelligent services, researches on vast number of connected terminals and sensors along with network infrastructures supporting these activities.
5-6	Information security and privacy	Big data generated by social networks and Internet Of Things enriches its value while it threatens users privacy. Security and privacy issues are discussed not only from technical but also from ethical point of view.
<b>Track 6: Industry for Society</b>		
6-1	Creating value and solving social issues through the big-data revolution	Share examples of creating value with big data, such as by combining industrial data and social data.
6-2	Trends in utilizing intellectual property for promoting innovation	Discuss the conditions necessary for facilitating the utilization of intellectual property, such as establishing IP markets, harmonizing IP laws among countries, and creating international mechanisms for resolving IP disputes.
6-3	Role of finance in industrial innovation	Explore case studies about the role of finance in industrial innovation.
6-4	Value-added manufacturing for competitiveness	Markets require solutions that are attained with products. So manufacturers should consider the value that products create.
6-5	Innovation of cutting-edge technology and next-generation devices	The semiconductor industry has to continue to transform itself from mass production to customized production.
6-6	Advanced functional materials	Developments of functional materials are indispensable for creating a sustainable society, This session covers the latest developments of advanced materials related to energy, environment and resources.
<b>Track 7: Life Innovation</b>		
7-1	Design of safe and secure communities, reflections on human and robot	Prospects for ICT in regional network construction. Robotics and interfaces in the area of home care, telemedicine and home nursing.
7-2	Molecular imaging in early diagnosis/treatment	Recent progress in optical and PET molecular imaging technology and translational research on early diagnosis/treatment monitoring.
7-3	Recovery from disease: Part 1 (Nanomedicine)	Creating innovative vital function control technologies by the modification, synthesis, delivery and molecular design of functional molecules using nanotechnology. Prospects for nanotechnologies in drug industries.
7-4	Recovery from disease: Part 2 (Minimally invasive therapy and personalized treatment)	Discussion of the possibility of further innovation and development of Japan-specific medical industries, with the focus on innovative intravascular and endoscopic surgery from the view point of medicine, engineering and industry. (This session is now being planned in collaboration with the Japan Medical Engineering Commons Organization (Ikou-Commons)).
7-5	Recovery from disease: Part 3 (Regenerative medicine, tissue engineering)	Present and future prospects for tissue engineering and regenerative medicine through studies of methods for the regeneration of organs and biological tissue. Clarifying the problems of practical use and the requirements for the development of regenerative medicine industries.
7-6	Sustaining good health (Medical and healthcare devices)	Prospects for the development of technologies for the enhancement and support of physical function through the integration of neuroscience, exercise physiology, robotics and IT. Prospects for the medical and welfare industries which are expected to support our aging society, from the viewpoint of technical problems in the fields of nursing care.

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<b>Track 8: Engineering for Society and Engineering in Society</b>		
8-1	Social missions of engineering and ethics for engineers	The actions of each country will be presented and discussed about the social missions of engineering and ethics for engineers, such as the code of ethics, the example of ethical problems for education, the prevention of corruptions and so on as a basis in achieving social missions.
8-2	Science & technology based on the societal trust & communication Part 1: Fukushima Daiichi - lessons learned	Four years and eight months has past since the Tokyo Electric Fukushima Daiichi Nuclear Power Plant accident, What has been clarified and what has not must be discussed. Also what is necessary not to happen this kind of accident and what we have to learn from this accident will be discussed.
8-3	Science & technology based on the societal trust & communication Part 2: For the society of robust and secure infrastructure	There are many incident that social infrastructure has damaged catastrophically by natural phenomena such as earthquake or tsunami. What can we do for the society of robust and secure society will be discussed such as how much robustness is required or how to embed resilience into the social infrastructure.
8-4	Engineering qualification systems and ethics	The situations of each country will be presented and discussed about the engineering qualification systems and ethics, how the engineer ethic is considered in the engineer institution such as professional engineers, what kind of activities regarding the enlightenment of engineering ethics, and so on.
<b>Track 9: Engineering Education and Women in Engineering</b>		
9-1	Promoting female leaders in engineering	Policy and activity for Women in Engineering (WIE) would be presented by three representatives in the Middle East, China and Japan , leading the common problems and the regional problems for WIE.
9-2	Promoting young women in engineering: Part 1 Information and communication technology	What are the issues for young female engineers to be more active to contribute to the society and what they have to do by themselves are discussed to get the strategies for the next action.
	Promoting young women in engineering: Part 2 Social infrastructure technology	The perspective of women is expected to be much more important to build our social system in the future. What female engineers can do for it is discussed.
9-3	World human resource development and engineering education	Report on present conditions concerning the engineering education of each country in the World, what are the features characteristic and how to deal effectively with the globalization process.
9-4	Development and contribution of the Japanese engineering education to the world	Report on the spread of the Japanese engineering education into the World, the relation between the actual circumstances of each country and the contribution of the Japanese's style engineering education. Furthermore, report about the unique education system of the college of technology and its contribution to the World.
<b>Track 10: Others</b>		