

Grand Renewable Energy 2014 International Conference

— CONFERENCE DIGEST —

Conference Date and Venue

- July 27 (Sunday) to August 1 (Friday), 2014
- Venue Tokyo Big Sight, Tokyo, Japan

Conference Slogan

“Advanced Technology Paths to Global Sustainability”

Organization

The organizer is the organizing committee which owes full responsibility of the conference. To support this committee, 10 corporate organizations agreed to be Co-Organizers, including ISES from International Conference organization, socio-governmental organizations like NEDO, AIST, and JST, public corporate organizations like EAJ, NISRI, NEF, and the academic societies like JSES and JWEA. In addition, the 80 Japanese academic societies and industrial leagues assented to support the conference. The seven central government organizations, heading METI, and Tokyo Metropolitan Government played the role of supporter. Fuji-Sankei from the mass media, two publicized foundations of Takahashi Industrial and Economic Research Foundation and Kansai-Osaka 21st Century Association were also great supporter.

Organization committee members are composed of about 450 experts involving 100 oversea countries mainly as members of International Advisory Committee. Professor Kenji Yamaji, the University of Tokyo, played a role of conference chairperson.

In addition, the Conference was conducted together with The International Solar Energy Society Asia Pacific Conference 2014, and also together with The Second Asia Wave and Tidal Energy Conference.

Glance of Conference Result

The conference was carried out successfully as originally planned with 1,357 participants from 48 countries. The 936 presentations had been held at onsite, composed of paper presentations by researchers/engineers 892, Speeches by invited speakers 17, and the 27 of Keynote speeches in Opening session and open Special sessions.

The number of visitors in the exhibition, which is free of entrance fee, cumulated 44,210 in three days, also as planned.

Conference Objectives and Areas covered

The slogan since the start of conference, 2006, is “Advanced Technology Paths to Global Sustainability”. This time is the third, followed by the 2006 and 2010. This is same. Reflecting upon the consistency, we have five objectives in this conference as described below,

- ① Implementation of the former RE2010 Communique, where we confirmed that solid policy and technology development are indispensable to develop synergy in endeavors toward a biologically sustainable society. Therefore, we meet again at the 2014 conference to discuss and share the cutting edge technology.
- ② Big significance of well development of strategic ideas in gathering specialist together, especially considering the recent globally odd climate, unstable energy market resources, and gray world economy.
- ③ Releasing the actual vital recovery projects through workshop of the conference subject to the Large East Japan earthquake, and to share the consensus and to develop ideas on the business and onward researches.

④ To promote talent young personnel development having international business ability on sustainable global environment and renewable energy , by means that we submit such a venue as the conference.

⑤ To aim the achievement of first class international conference in organizing together with international exhibition on renewable energy to enable participants to access visual world of advanced technologies at the same site.

Both conference and exhibition cover 12 areas; (1) Policy and Integrated Concept, (2) Photovoltaic, (3) Solar Thermal Application, (4) Innovative Bio-Climatic Architecture, (5) Wind Energy, (6) Biomass, (7) Hydrogen and Fuel Cell, (8) Ocean Energy, (9) Geothermal Energy and Ground-source Heat Pump, (10) Energy Network and Power Electronics, (11) Heat Conservation and Heat Pump, (12) Small Hydro and Non-Conventional Energy.

OVERVIEW of CONFERENCE

1. Conference Communiqué

It was authorized through the discussion meeting among the key leaders; Professor Kenji Yamaji of the chairperson, Dr. Dave Renne of International Advisory Committee chairman, the selected specialists of International Advisory Committee members, and Organizing Committee leaders.

Communiqué from Grand Renewable Energy 2014 “Advanced Technology Paths to Global Sustainability”

TOKYO BIG SIGHT, TOKYO, JAPAN, 27 July – 1 August 2014

Tokyo, Japan, August 1, 2014

Over 1350 specialists, 30% being young scientists and researchers, from 48 countries gathered for the Grand Renewable Energy 2014 International Conference in order to contribute to the progress of a wide range of renewable energy technologies and to promote sustainable energy systems. Based on the various presentations and discussions at the Conference, held at the Tokyo Big Sight in Japan, the following fundamental understandings and proposals have been reached to show our direction to the world.

- Since the beginning of this conferences series (Makuhari in 2006 and Pacifico Yokohama in 2010, both in Japan), we have observed a continuous growth in renewable energy deployment worldwide. Expectations for renewable energy have further increased and recognition of its importance is widely shared among the public.
- The work of the Intergovernmental Panel on Climate Change (IPCC) has reconfirmed the relationship between global climate change and greenhouse gas (GHG) emissions by human activities and has identified serious consequences associated with climate change. The IPCC has recognized that renewable energy is part of the solution to deeply reduce GHG emissions and thus minimize the consequences of climate change.
- Renewable energy markets are expanding and the installation of renewable energy technologies is accelerating throughout the world. In its recent report, REN21 has stated that the total, worldwide renewable power capacity is in the order of 560 GW (not including hydropower) at the end of 2013, but the contribution to the total electricity production in the world was approximately 5.8% (2012 data). Thus, renewable energy in the global energy supply is still relatively small, and its deployment needs to be significantly accelerated to achieve a considerable fraction of the total energy supply by the middle of this century.
- Further research and development focused on advanced and innovative technologies are required to accelerate the penetration of renewable energy, to further reduce costs and to improve the efficiency of renewable energy systems. Not only individual renewable energy

technologies, but also energy efficiency, the integration with energy storage and the management of integrated energy systems have become crucially important to realize the low carbon society.

- To achieve its full potential, the renewable energy sector needs a competent and diverse workforce. The sector thus offers opportunities for new jobs. This will require new education and training programs, both at the technical and university levels. There are also significant opportunities for the continuous education and training of the existing workforce who will migrate to the renewable energy sector.
- While various policies have been implemented by governments to promote renewable energy, more efforts need to be done. Strong, innovative and reliable policy frameworks will be required to significantly enhance the deployment of renewable energy. Not only will these policies assure a security of energy supply, but will provide a stable investment environment that will reduce financial risks, minimize costs, and achieve economic growth.

We, the specialists involved in the field of renewable energy technologies and their policies, accept the technical and policy challenges. We will continue to contribute to growing the renewable energy market to realize a sustainable world. The Grand Renewable Energy 2018 International Conference, to be held in Japan, will provide an opportunity to assess the work and to share the accomplishments that will be done in the next four years.

2. Conference Detail

1) The number of Participants and Countries in the conference

Finally actual participants, coming to Tokyo Big Sight, were counted from 48 countries, while it was 55 in maximum at the abstract paper review stage. Total registered participant to the conference sums 1,357, whose area and country distribution were as follows.

962-Japan, 231-Asia, 90-Europe, 15-North America, 19-Oceania, 21-Africa, 9-Middle East, 4-South America, 6-Russia and its territory

The breakdown of Asia was, 60-Taiwan, 58-Korea, 53-Republic of China, 28-Thailand, 10-Malasia, and others-22

The breakdown of Europe was, 36-UK, 17-Germany, 8-Sweden, 7-France, 22-Others

2) Paper Presentation

① Structure of Presentations

1,036-Total of Abstract submitted, 974-Passed the check review and listed on Program Book, 892-Actual Participants onto Tokyo Big Sight, 17-Invited Speakers at actually in Onsite, 5-Keynote Speaker and Government Speaker in Opening Ceremony, 22-Keynote and Invited Speaker at Government initiated Special Sessions (NEDO, AIST, and JST)

As that result, the 936 presentation was held during the International Conference.

② Attendance Rate for Paper Presentation

For the 974 papers listed in Program Book, actual presentation at onsite was 892. In other word, 92% was presented. This rate will be well evaluated. We confirmed for the persons not to have attended and found out almost all persons no allowance for the travel expense to Japan.

As of Japan, the 10 persons among the 625 listed were absent, corresponding to 2%, and we confirmed that it was understandable reasons.

③ Area breakdown of total 974 papers listed on Program Book

As shown below, the areas of Photovoltaic, Wind, and Ocean Energy have had many presentations. Especially, Area VIII Ocean Energy was steeply increased since the conference is held together with The 2nd Asia Wave and Tidal Energy Conference.

- I. Policy and Integrated Concept 34 (Oral 21, Poster 13)
- II. Photovoltaic 158 (Oral 82, Poster 76)
- III. Solar Thermal Application 74 (Oral 35, Poster 39)
- IV. Innovative Bio-Climatic Architecture 54 (Oral 41, Poster 13)
- V. Wind Energy 165 (Oral 71, Poster 94)
- V&VIII Offshore Wind 26 (Oral 26)
- VI. Biomass 74 (Oral 40, Poster 34)
- VII. Hydrogen and Fuel Cell 45 (Oral 29, Poster 16)
- VIII. Ocean Energy 157 (Oral 113, Poster 44)
- IX. Geothermal Energy and Ground-source Heat Pump 58 (Oral 42, Poster 16)
- X. Energy Network and Power Electronics 47 (Oral 23, Poster 24)
- XI. Heat Conservation and Heat Pump 47 (Oral 21, Poster 26)
- XII. Small Hydro and Non-Conventional Energy 35 (Oral 27, Poster 8)

④ Session Contents by Area

The total 974 papers, Oral 571 and Poster 403, were listed onto Program Book. Based on that, the conference sessions were programmed taking the room capacity and its available numbers into account. Described below are the session structures and number of sessions. The parenthesis figure shows number of papers.

● Oral Session (571)

Area I: Policy & Integrated Concept (21)

Renewable Energy Development (10), Energy System Assessment (5), Renewable Energy and Economy (6)

Area II: Photovoltaic (82)

PV Systems and Grid Integration (14), Outdoor Performance, Failure Analysis, and Reliability (9), Dye-sensitized Solar Cells (4), PRESTO Session "Next Generation Solar Cells"(9), RATO Session "Organic Thin Film and Dye-sensitized" (7), Hybrid Solar Cells Based on Organic Materials (3), Symposium on Reliability of Photovoltaic Modules (10), Industrial Session(4), Crystalline Si Technology (5), Thin Film Technology (5), Novel PV Technology (6), Renewable Energy Innovation from Fukushima (6)

Area III: Solar Thermal Applications (35)

Solar Driers (3), Solar Cookers and Solar Thermal Application (4), Concentrated Solar Power Systems (7), Solar Thermal Collectors and Thermochemical Systems (7), Solar Collectors and Systems for Houses and Buildings (3), Solar Heating and Cooling (11)

Area IV: Innovative Bioclimatic Architecture (41)

Vernacular Architecture/Passive Design (10), Green Building / Zero Energy Building (8), ZEMCH International Workshop (8), Building Stock Activation / Comfort Indoor Climate (7), Building Evaluation / Energy Management (4), Elements and Materials (4)

Area V: Wind Energy (71)

Site Assessment and Forecast (13), Wind Turbine Technology (16), Social Environment Issue (7), Grid Connection and Electrical Systems (6), Policy for Wind Turbine Development (4),

Plant Design, Management, and Monitoring (6), Small Wind Turbine (19)

Area V & VIII (26)

Offshore Wind (26)

Area VI: Biomass Utilization & Conversion (40)

Biofuel (11), Bio Diesel Fuel (2), Marine Biomass (4), Anaerobic Digestion (2), Biomaterials/Forestry (2), Bioethanol (5), Gasification / Pyrolysis (11), Sustainability (3)

Area VII: Hydrogen & Fuel Cell (29)

Outlook of Hydrogen Energy (4), Renewable Energy and Hydrogen (3), Hydrogen Storage and Production for Vehicles (4), Hydrogen Production and Catalysts (4), Hydrogen Storage Materials(4), Electrochemical Reactions (3), Fuel Cell (7)

Area VIII: Ocean Energy (113)

Ocean Energy Opening except Invited Talk (5), Recent Progress of Ocean Renewable Energy (11), Tidal Energy (37), Wave Energy (34), Ocean Current Energy (5), Ocean Thermal Energy Conversion (4), Ocean Resources (9), Offshore Wind (8)

Area IX: Geothermal Energy & Ground-Source Heat Pump (42)

Environmental Aspects of Geothermal Energy (4), Geothermal Frontier (6), Geothermal Field, Reservoir Engineering (8), Power Generation (3), Exploration and Mapping (4), EGS (Engineered Geothermal System) (4), Ground-Source Heat Pump (13)

Area X: Energy Network & Power Electronics (23)

Micro/Smart Grid (8), Application of Transportation (2), Energy Network, Demand Response (6), Distributed Energy Resources (4), Battery (3)

Area XI: Energy Conservation & Heat Pump (21)

Thermal Energy Utilization (6), Various Air Conditionings (4), Environment and Heat Pump (5), Energy Conservation and Others(6)

Area XII: Small Hydro & Non-Conventional Energy (27)

Small Hydro Development(6), Small Hydro and Practical Examples(4), Hydropower Development and Utilization(6), Non-Conventional Energy (11)

● **Poster Session (403)**

Area I: Policy & Integrated Concept (13)

Area II: Photovoltaic (76)

Area III: Solar Thermal Applications (39)

Area IV: Innovative Bioclimatic Architecture (13)

Area V: Wind Energy (94)

Area VI: Biomass Utilization & Conversion (34)

Area VII: Hydrogen & Fuel Cell (16)

Area VIII: Ocean Energy (44)

Area IX: Geothermal Energy & Ground-Source Heat Pump (16)

Area X: Energy Network & Power Electronics (24)

Area XI: Energy Conservation & Heat Pump (26)

Area XII: Small Hydro & Non-Conventional Energy (8)

⑤**Paper Presentation Award**

The 30 papers, 15 from Oral and 15 from Poster, were selected as the best presentation paper, composed of one each of Oral and Poster from all 12 areas, except Area II, V, and VIII. These three areas were applied two of each for Oral and Poster because of numerous numbers of paper.

The honorable persons in award and its title of presentation were listed below;

Area I: Policy & Integrated Concept

Oral O-Po-1-6 **Dr. Pranab Baruah**

A deep decarbonization scenario of the UK energy system with demand-side options and renewable energy

Poster P-Po-6 **Mr. Tenjimbayashi Daishi**

Cost analysis of measures against fluctuating electricity output caused by renewable energy in Hokkaido

Area II: Photovoltaic

Oral O-Pv-5-5 **Dr. Hiroyuki Yoshida**

Low energy inverse photoemission study of the lumo levels of acceptors for organic photovoltaic cells

Oral O-Pv-6-6 **Dr. Hirofumi Motegi**

Long-term stability of dye-sensitized solar cells with organic dyes: Anchoring groups and stability

Poster P-Pv-2-7 **Mr. Tamura Hidetoshi**

Analysis of prediction errors in solar irradiance by meteorological model WRF

Poster P-Pv-3-20 **Dr. Kang Min Kim**

Characterization of Cu/SnSe thin films prepared by coevaporation and post-annealing

Area III: Solar Thermal Applications

Oral O-Th-5-2 **Dr. Hiroki Miyaoka**

Thermochemical water-splitting by alkali metal redox cycle

Poster P-Th-8 **Mr. Tomomichi Seki**

Study of the diffusion factor of solar water heaters and pv systems for detached houses based on the word-of-mouth advertising effect

Area IV: Innovative Bioclimatic Architecture

Oral O-At-7-3 **Mr. Tsukasa Ogino**

A study on an energy saving air-conditioning control system utilizing adjustment behavior of occupants

Poster P-At-8 **Ms. Meita Tristida Arethusa**

A field survey of window-opening behavior and environmental conditions in apartments of Surabaya

Area V: Wind Energy

Oral O-Wd-7-4 **Prof. Gundula Hoebner**

Annoyance and stress effects due to wind turbines

Oral O-Wd-5-4 **Mr. Harutaka Oe**

Numerical investigation of the aerodynamic interaction between wind turbine tower and blades with rFlow3D code

Poster P-Wd-2-41 **Mr. Raji Atia**

Energy loss analysis of multi-flywheel energy storage system for regulation of renewable power fluctuation

Poster P-Wd-1-31 **Dr. Hiroshi Imamura**

Development of turbulent inflow noise model for wind turbine rotor blades

Area VI: Biomass Utilization & Conversion

Oral O-Bm-4-1 **Mr. Kenichi Furuhashi**

Hydrocarbon extraction from concentrated slurry of green microalga *Botryococcus braunii* cultured in diluted seawater

Poster P-Bm-2-11 **Mr. Takahiro Kimura**

Promotion of the "Wood Biomass Local Recycling System Business Model Project"

Area VII: Hydrogen & Fuel Cell

Oral O-Hf-3-1 **Mr. Aoi Miyake**

A verification test of solar hydrogen station in Japan

Poster P-Hf-13 **Mr. Keitaro Fujii**

Investigation on MEA-performances of highly durable silica-coated Pd/C electrocatalysts

Area VIII: Ocean Energy

Oral O-Oc-9-2 **Prof. Domenico P Coiro**

Numerical and experimental tests on a scaled model of a point pivoted absorber for wave energy conversion

Oral O-Oc-7-2 **Dr. Tom G Mitchell Ferguson**

Phase averaging of PIV flow fields of an oscillating water column in polychromatic waves
Australia

Poster P-Oc-2-18 **Mr. Yuta Tamagawa**

A suggestion of pitch control to avoid negative damping of floating offshore wind turbine by dynamic analysis

Poster P-Oc-2-13 **Dr. Tae Gyu Hwang**

Study on active/passive hybrid type yaw control device using rudder at tidal current power system

Area IX: Geothermal Energy & Ground-Source Heat Pump

Oral O-Ge-8-2 **Dr. Ayako Funabiki**

The effects of aquifer on vertical borehole ground source heat pump system

Poster P-Ge-16 **Mr. Sho Takeyama**

Mechanical and hydraulic characteristics of a rock material under brittle-ductile transition

Area X: Energy Network & Power Electronics

Oral O-Pe-5-2 **Dr. Taketsune Nakamura**

Challenge to superconducting drive motor for advanced electric transportation equipments

Poster P-Pe-2-3 **Dr. Yutaka Sasaki**

Probabilistic constrained dynamic economic load dispatch for renewable energy sources

Area XI: Energy Conservation & Heat Pump

Oral O-He-2-2 **Ms. Jie Li**

Measurement and a model of absorbed energy distribution for numerical simulation in a desiccant rotor regenerated by concentrated solar irradiation

Poster P-He-20 **Dr. Takuya Tsujiguchi**

Fundamental study on the temperature rising for the low grade heat using an adsorbent desiccant wheel operated with humidity swing

Area XII: Small Hydro & Non-Conventional Energy

Oral O-Sh-4-3 **Prof. Hidechito Hayashi**

Performance of fresh water permeation in hollow fiber membrane module for pressure retarded osmosis

Poster P-Sh-4 **Mr. Hiroshi Uno**

Development of easy installation type small-scale-hydropower equipment which aimed at easy-installation at low cost and a construction permit

⑥ English Journal

The Grand Renewable Energy 2014 Organizing Committee provides the proceedings with all full papers presented in the conference, and distributes to all registered participants. In addition, we coordinate with Japanese academic societies in joint cooperation to make paper access easy to them in accordance with author's option. This time, we talked with ten academic societies.

The 257 out of 892 papers presented at onsite expressed intention to re-submit to English Journal again. Following is the result. Parenthesis shows the appropriate number.

1. The Japan Society of Mechanical Engineers (87)

- ①Fluid Science and Technology(48), ②Thermal Science and Technology(25), ③Biochemical Science and Engineering(0), ④Advanced Mechanical Design, Systems and Manufacturing(14)
2. The Institute of Electrical Engineers of Japan (36)
 - ①Fundamentals and Materials(2), ②Power and Energy(31), ③Electronics, Information and Systems(1), ④Industry Applications(2), ⑤Sensors and Micro-machines(0)
 3. The Japan Institute of Energy (64)
 4. The Electrochemical Society of Japan (2)
 5. The Geothermal Research Society of Japan (13)
 6. The Japan Society of Naval Architects and Ocean Engineers (17)
 7. Architectural Institute of Japan (18)
 8. The Japan Society of Applied Physics (11)
 9. The Chemical Society of Japan (3)
 10. The Society of Chemical Engineers, Japan (6)

3) Invited Speakers

In Call for Papers, following 18 experts were selected as Invited Speaker with the acceptance from himself or herself. Arabian number shows the area in selection.

- I Hans-Martin HENNING (Deputy director, Fraunhofer Institute for ISE, Germany)
- I Adam BROWN (Senior Energy Analyst, IEA, UK)
- II Arnulf Jaeger-WALDAU (Scientific Officer, EC's Joint Research Center, Germany)
- II Michael GRAETZEL (Professor, Ecole Polytechnique de Lausanne, Swiss)
- III Werner WEISS (Chairman of IEA Solar Heating and Cooling Program, Austria)
- IV Deo PRASAD (Professor, the University of New South Wales, Australia)
- V Stephen SAWYER (Secretary General, Global Wind Energy Council, USA)
- V Peter Hauge MADSEN (Professor, Technical University of Denmark, Denmark)
- VI Jin-Suk LEE (Principal Researcher, Korea Institute of Energy Research, Korea)
- VII Etsuo AKIBA (Professor, Kyushu University, Japan)
- VIII Atilla INCECIK (Professor, Strathclyde University, UK)
- VIII Abubakr S. BAHAJ (Professor, University of Southampton, UK)
- IX Roland N. HORNE (Professor, Stanford University, USA)
- X Roland BAUER (Team Leader of Stratagic Network, 50Hertz, Germany)
- X Michael H. CODDINGTON (Principal Engineer, National Renewable Energy Lab, USA)
- XI Monica AXELL (General Manager, IEA Heat Pump Centre, Sweden)
- XI John GRIMES (Chief Executive, Australian Solar Council, Australia)
- XII Eduard DOUJAK (Assistant Professor, Vienna University of Technology, Austria)

Among the above, next five persons could not attend, Dr. A.J.WALDAU, Mr. S. Sawyer, Dr. Roland BAUER, Mr. M. H. CODDINGTON, Dr. M. AXELL. Therefore, we asked following experts to play a role of Invited Speaker for the corresponding person. Only Dr. M. AXELL was impossible to find the appropriate alternative, thus total 17 persons had presentation as plenary speaker.

We thank from the heart for the following persons;

- II Makoto KONAGAI (Professor, Tokyo Institute of Technology, Japan)
- V Shigehito NAKAMURA (Managing Director, Japan Wind Power Association, Japan)
- X Kazuhiko OGIMOTO (Professor, the University of Tokyo, Japan)
- X Brian JOHNSON (Senior Engineer, National Renewable Energy Lab, USA)

4) Opening Ceremony and Keynote Speech

On July 30, 10:30 to 12:30, Opening Ceremony was held with 650 participants, matching with the opening day of International Exhibition, whose almost organizers are co-organizers of International Conference. At first, Conference organizing chairperson, Professor Kenji Yamaji had a welcome speech, then, all the invited speakers were introduced using the screen and bowing to the audience. After that, the commemorative speech was held from Mr. Yoichi Kimura of METI representative and Mr. Yoichi Masuzoe of Governor, Tokyo Metropolitan Government. Mr. Taichi Sakaiya of founder of Sunshine project also had a welcome speech through the alternate reading by moderator. Then, three keynote speeches were held by Mr. Toshiaki Higashihara of President in Hitachi Ltd., Dr. Hans-Martin Henning of deputy director in the Fraunhofer Institute, and Dr. Dave Renne of president in International Solar Energy Society.

This opening ceremony was implemented through the English language.

5) Workshop

- **FUKUSHIMA** was held on August 1 AM as the special workshop within the frame of International Conference, titled as Renewable Energy Innovation from Fukushima. The conference aim was to show the residential recovery process in the earliest possible time from the big earthquake and Tsunami damage. To do that, Consortium was organized by the Fukushima related organizations like four universities located in Fukushima prefecture, and the Fukushima AIST of newly opened National Research Institute. The Recovery is the big challenge in Japan. Recent research developments on advanced photovoltaic cell, small wind turbine, ground heat source utilization, smart community with advanced micro grid were presented by the consortium members, and discussed. All are planned to be developed so as to be fit with Fukushima area.

- **ZEMCH** Workshop was held on July 29 organized by the international team of Zero Energy Mass Custom House, led by A. Prof. Masa Noguchi, Melbourne University. The former week from July 22, the team had visited Japanese housing manufacturers to see the mass custom house in Japan, and then the next week, workshop was held at the place of International Conference. The experts of architecture from six countries, Japan, UK, Australia, UAE, Korea, Italia had the presentation and discussion aiming the safety, amenity, and structural environment in addition to how to achieve zero energy in custom house.

- **Communique** workshop was held on July 31, chaired by Kenji Yamaji of Conference Chairperson to discuss and finalize the conference communiqué which is mandatory to disclose in the closing ceremony. Eleven experts from eight countries gathered together. Final sentence was shown in this digest. To have Conference again in 2018 was involved in the final sentence taking the necessities of sustainability and continuous renewable energy development into account.

6) Special Session (Open Session)

The following three sessions were held in the open session without registration fee, organized by each governmental body. Many audiences participated to all the sessions.

- **NEDO Session**

NEDO Session was held on July 29PM with the title of ‘Large Scale Introduction of Renewable Energy: Beginning of a New Era’. It was composed of three parts, Keynote speeches, Panel discussion about Policy and Technology, and Panel discussion about International Cooperation. The 280 personnel participated in the session. In the keynote speech, Dr. R. K. Pachauri (The Energy and Resources Institute), Mr. Hugo Lucas (ex-Director, IRENA), and Dr. Hiroto Tamai (Solar Frontia

K.K.) were invited, while Dr. Pachauri became screen presentation. In panel sessions, experts were invited internationally from USA, UK, Japan, Nigeria, and Spain. Vital discussion was held on how to accelerate renewable energy introduction involving developing countries.

- **AIST Session**

AIST Session was held on July 31PM with the theme of two categories, Solar Thermal Application and Hydrogen. The 250 audiences participate to this session. At first, Mr. K. Nakamura, president of Mitaka Kohki had a keynote presentation on “Concentrating Solar System for Thermal Use”. After this talk, the experts from AIST had three presentations regarding Thermoelectric Power Devices, Artificial Photosynthesis, and Hydrogen Safety. All were the presentation involving advanced and innovative technologies.

- **JST Session**

JST Session was held on July 29 full day with the 160 audiences. Session title was the International Workshop "Innovative energy saving technology for the reduction of carbon dioxide emission from energy-intensive industry". It was composed of two sessions, (1)Trends of available energy strategy in industry and expectation to academia, and (2)Future trend in academic research on Exergy Recuperation to reduce the CO2 emission everywhere globally. Experts from china also participated as presenter and panel discussion. JST participation as organizer of Special session was the first time.

- **URL of Grand RE2014 International**

<http://www.grand-re2014.org/>