



# Programme

## Sunday 8 May – Thursday 12 May

### Palacio de Congresos de Zaragoza



| Sunday      |                                                                |
|-------------|----------------------------------------------------------------|
| 18.00–20.00 | Registration in the Foyer                                      |
| 19.00–20.30 | Reception in the Foyer of the Palacio de Congresos de Zaragoza |

| Monday      |                                                                                               |
|-------------|-----------------------------------------------------------------------------------------------|
| 09.00–10.00 | Auditorio – Welcome and Opening Addresses by Alfonso Beltrán, Javier Velasco and Nobuo Tanaka |

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| Address by<br>Alfonso Beltrán, Director<br>General of IDAE (Institute<br>of Diversification and<br>Saving of Energy) [Spain]  |  | Mr Alfonso Beltrán serves as Director of the Institute for Diversification and Saving of Energy (IDAE) which is a part of the Spanish Ministry of Industry, Tourism and Trade. Earlier, Mr. Beltrán has filled different positions in the Spanish Ministry of Science and Technology with responsibilities in the development of R+D+I policies in the Spanish National Strategy of Science and Technology and the different Spanish R+D+I Plans.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Address by<br>Javier Velasco,<br>Counsellor for Science,<br>Technology and the<br>University, Government of<br>Aragón [Spain] |  | Mr. Javier Velasco has served as Aragón Counsellor of Science, Technology and University since 2010. His area of responsibility includes research, development and innovation policies, and university policy. Before 2010 Mr Velasco was member of the Spanish Parliament, Counsellor of Presidency and Counsellor of Transport and Public Works.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Address by<br>Nobuo Tanaka,<br>Executive Director,<br>International Energy<br>Agency                                          |  | Mr. Nobuo Tanaka took over as Executive Director of the IEA on 1 September 2007. He has extensive national government and international experience within the Ministry of Economy, Trade and Industry in Tokyo, the Embassy of Japan in Washington, D.C. and the OECD. Mr. Tanaka was responsible for Japan's involvement with the IEA and the G7 Energy Ministers' meeting during the second oil crisis, helped establish the comprehensive energy policy of Japan, oversaw the implementation of Japan's international nuclear energy policy and co-ordinated domestic environment and energy policy during the Kyoto COP3 negotiation. He served as a Minister for Industry, Trade and Energy at the Embassy of Japan in Washington, D.C from 1998 to 2000. Prior to joining the IEA, Mr. Tanaka was Director for Science, Technology and Industry at the OECD. Mr. Tanaka has a degree in Economics from the University of Tokyo and an MBA from Case Western Reserve University in Cleveland, Ohio. He and his wife, Gloria, have two children. |

Organised by the IEA Clean Coal Centre and the Instituto de Carboquímica (ICB), Zaragoza, on behalf of the Grupo Español del Carbón



### SPECIAL INVITATION

The Regional Assembly of Aragón invites all delegates to a guided tour of the Palacio de la Aljafería on Monday 9 May

# Monday's Programme

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| 09.00–10.00 Auditorio – Welcome and Opening Addresses by Alfonso Beltrán, Javier Velasco and Nobuo Tanaka                      |                                                                                                                                                                                              |                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                            |
| 10.00–10.20 Coffee Break in the Foyer                                                                                          |                                                                                                                                                                                              |                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                            |
| 10.20–12.00                                                                                                                    | Auditorio <b><i>Oxyfiring I</i></b><br>Chair: Monica Lupion                                                                                                                                  | Sala B <b><i>Carbon Capture and Storage</i></b><br>Chair: Franz Klemm                                                                                                                                                                                         | Sala C <b><i>IGCC and Precombustion Carbon Capture I</i></b><br>Chair: Fernando Rubiera                                                                                                                                                    |
| 10.20–10.40                                                                                                                    | Impact of biomass on coal combustion under air and oxy-fuel conditions / Ms Timipere Salome Farrow - University of Nottingham [United Kingdom]                                               | Development of post-combustion capture technology - design, construction and operation of a research test facility and field demonstration units at SSE and Basin Electric Power Cooperative / Mr Matthew Hunt - Doosan Power Systems [United Kingdom]        | Analysis of coal-fired gas turbine plants with carbon capture / Dr. Karsten Riedl - E.ON New Build & Technology GmbH [Germany]                                                                                                             |
| 10.40–11.00                                                                                                                    | Oxy-firing of high sulphur coal in a 90 kWth fluidized bed / Dr. Luis M Romeo - CIRCE [Spain]                                                                                                | CCS: The effects of integration, benchmarking the different options / ir. Gerard Stienstra - KEMA [Netherlands]                                                                                                                                               | Performance of zeolite derived activated carbon on pre-combustion CO <sub>2</sub> capture / Mr Chidi Ogbuka - The University of Nottingham [United Kingdom]                                                                                |
| 11.00–11.20                                                                                                                    | NO <sub>x</sub> emissions in oxy-fuel combustion / Mr. Jorge Gimenez-Lopez - Aragón Institute of Engineering Research (I3A) - University of Zaragoza [Spain]                                 | Evaluation of an integrated post-combustion CO <sub>2</sub> capture process for pre-dried-lignite-fired power plants / Dipl.-Wirtsch.-I Sebastian Linnenberg - TU Hamburg-Harburg [Germany]                                                                   | Techno-economic assessment of oxygen-transport-membrane (OTM) integration options in coal IGCC plants with CCS / Dr Sina Rezvani - University of Ulster [United Kingdom]                                                                   |
| 11.20–11.40                                                                                                                    | Characterization of calcium based sorbents for oxy-fuel combustion in fluidized beds / de las Obras Loscertales [Spain]                                                                      | Evaluation and analysis of water usage of power plant with CO <sub>2</sub> Capture / Dr. Stanley Santos - IEA Greenhouse Gas R&D Programme [United Kingdom]                                                                                                   | Evaluation of an IGCC concept with post combustion CO <sub>2</sub> capture / Christian Kunze - TU München/ Institute for Energy Systems [Germany]                                                                                          |
| 11.40–12.00                                                                                                                    | The control of nitrogen oxides in oxy-fuel combustion / Dr. Fredrik Normann - Chalmers University of Technology [Sweden]                                                                     | Techno-economic feasibility study and environmental performance analysis of a power generation plant with CCS system / Mr Eusebio Loria - Sotacarbo [Italy]                                                                                                   | Recent developments in coal-based IGCC / Dr Ian Barnes - Hatterrall Associates [United Kingdom]                                                                                                                                            |
| 12.00–12.30 Coffee Break in the Foyer                                                                                          |                                                                                                                                                                                              |                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                            |
| 12.30–14.10                                                                                                                    | Auditorio <b><i>International and Regional Perspectives I</i></b><br>Chair: Carlos Fernandez                                                                                                 | Sala B <b><i>Mercury and Flue Gas Cleaning</i></b><br>Chair: Rafael Moliner                                                                                                                                                                                   | Sala C <b><i>Chemical Looping Combustion</i></b><br>Chair: Luis de Diego                                                                                                                                                                   |
| 12.30–12.50                                                                                                                    | The Electric Power Research Institute's large-scale demonstration program for a low-carbon future / Ronald Schoff - Electric Power Research Institute [United States]                        | Preliminary study of the Hg retention on Au/C regenerable sorbents / Dr. M. Teresa Izquierdo - Instituto de Carboquímica, CSIC [Spain]                                                                                                                        | CO <sub>2</sub> capture by in situ-gasification chemical-looping combustion using ilmenite as oxygen carrier in a 500Wth unit / Dipl. Ing. Ana Cuadrat - ICB-CSIC [Spain]                                                                  |
| 12.50–13.10                                                                                                                    | China's coal to oil, gas and chemicals developments / Dr Andrew Minchener - IEA Clean Coal Centre [United Kingdom]                                                                           | Integrated removal of SO <sub>2</sub> , NO <sub>x</sub> and Hg from simulated coal-fired flue gas in a wet flue gas desulphurization systems (WFGD) - pilot- and bench-scale demonstration. / Dr Renata Krzyzyska - Wroclaw University of Technology [Poland] | Thermodynamic analysis of a coal fired chemical looping combustion power plant / Volker Kempkes - Institute of Energy Systems/Hamburg University of Technology [Germany]                                                                   |
| 13.10–13.30                                                                                                                    | Cleaner and better energy from coal and gas / Dr.-Ing. Christian Folke - E.ON AG [Germany]                                                                                                   | Mercury and trace elements captured by activated carbon in a Canadian coal-fired power plant; Geochemistry and speciation of flyash in a full-scale test trial / Dr. Hamed Sanei - Geological Survey of Canada [Canada]                                       | CO <sub>2</sub> capture in coal combustion by chemical-looping with oxygen uncoupling (CLOU) with a Cu-based oxygen-carrier / Iñaki Adánez-Rubio - ICB (CSIC) [Spain]                                                                      |
| 13.30–13.50                                                                                                                    | Clean coal technology development in NEDO, Japan / Eri Hirai - New Energy and Industrial Technology Development Organization [Japan]                                                         | Coal foams impregnated with gold for mercury retention during coal combustion / Rodriguez-Perez - Instituto Nacional del Carbon, CSIC [Spain]                                                                                                                 | Red mud as oxygen carrier in chemical looping combustion of coal / Dr. Teresa Mendiara - CSIC-Instituto Carboquímica [Spain]                                                                                                               |
| 13.50–14.10                                                                                                                    | Carbon capture and storage: a compendium of Canadian activities / Mrs Dubravka Bulut - Natural Resources Canada [Canada]                                                                     | Abatement of environmental pollution from coal combustion processes: The mercury and PCDDF cases / Irene Diamantopoulou [Greece]                                                                                                                              |                                                                                                                                                                                                                                            |
| 14.10–15.40 Lunch Sala A                                                                                                       |                                                                                                                                                                                              |                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                            |
| 15.40–17.20                                                                                                                    | Auditorio <b><i>Carbonate Cycling and Solid Sorbents I</i></b><br>Chair: Ana Mastral                                                                                                         |                                                                                                                                                                                                                                                               | Sala C <b><i>Biomass Cofiring</i></b><br>Chair: Debo Adams                                                                                                                                                                                 |
| 15.40–16.00                                                                                                                    | Experimental investigation of synthetic solid sorbents for multi-cycling carbon dioxide uptake / Dr Stefano Stendardo - ENEA [Italy]                                                         |                                                                                                                                                                                                                                                               | Experiences on the effect biomass co-firing and full coal to biomass conversion on plant operations in Europe and North America / ir. Gerard Stienstra - KEMA [Netherlands]                                                                |
| 16.00–16.20                                                                                                                    | Experimental study on CO <sub>2</sub> capture with dolomite: the effect of sintering on uptake decay / Carlos Herce - ENEA [Italy]                                                           |                                                                                                                                                                                                                                                               | Pulverised coal/biomass co-fire modelling in full scale corner-fired boiler / Mr Kristofer Jon Larsen - CFD Centre, University of Leeds [United Kingdom]                                                                                   |
| 16.20–16.40                                                                                                                    | Demonstrating the concept of postcombustion CO <sub>2</sub> capture with CaO. Progress in the 'CaOling' project / Dr. Gemma Grasa - Instituto de Carboquímica (CSIC) [Spain]                 |                                                                                                                                                                                                                                                               | Co-combustion of various agrowastes with a high-sulfur Turkish lignite in a circulating fluidized bed combustor: effect of air staging on pollutants along the combustor / Mr. Mustafa Can Celebi - Istanbul Technical University [Turkey] |
| 16.40–17.00                                                                                                                    | Circulating fluidized bed carbonator reactor model validation with experimental data from post-combustion capture of CO <sub>2</sub> with CaO / Dr Juan Carlos Abanades - INCAR-CSIC [Spain] |                                                                                                                                                                                                                                                               | Techno-economic evaluation of biomass fired or co-fired power plants with post-combustion CO <sub>2</sub> capture / Dr. Stanley Santos - IEA Greenhouse Gas R&D Programme [United Kingdom]                                                 |
| 17.00–17.20                                                                                                                    | High-temperature CO <sub>2</sub> capture with modified CaO-based pellet sorbents: TGA results / Dr. Edward Anthony - CanmetENERGY [Canada]                                                   |                                                                                                                                                                                                                                                               | A combined experimental and computational study of fuel gas generation from low-grade fuels for CCGT / Dr Tatiana Bogatova - Ural Federal University [Russian Federation]                                                                  |
| 18.30–19.30 Guided tour of the Palacio de Aljaferia (Group 1)<br>19.00–20.00 Guided tour of the Palacio de Aljaferia (Group 2) |                                                                                                                                                                                              |                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                            |

# Tuesday's Programme

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| 09.00–10.00 Auditorio– Keynote Session I – Chair: Rob Whitney                                                                                                                                                                                                                |                                                                                                                                                                      |                                                                                                                                                                                        |                                                                                                                                                                                                                                                 |
| Role of coal, clean coal and CCS technologies in the European Union / Dr Marion Wilde - European Commission [Belgium]<br>CIUDEN Technology Development Centre for CO <sub>2</sub> capture and transport / Mr Vicente Cortes Galeano - Fundacion Ciudad de la Energia [Spain] |                                                                                                                                                                      |                                                                                                                                                                                        |                                                                                                                                                                                                                                                 |
| 10.00–10.20 Coffee Break in the Foyer                                                                                                                                                                                                                                        |                                                                                                                                                                      |                                                                                                                                                                                        |                                                                                                                                                                                                                                                 |
| 10.20–12.00                                                                                                                                                                                                                                                                  | Auditorio <b>Oxyfiring II</b><br>Chair: Luis M Romeo                                                                                                                 | Sala B <b>Carbon Capture and Storage II</b><br>Chair: Ed Lester                                                                                                                        | Sala C <b>IGCC and Precombustion Carbon Capture II</b><br>Chair: Pilar Coca                                                                                                                                                                     |
| 10.20–10.40                                                                                                                                                                                                                                                                  | Doosan Power Systems Oxycoal™ technology / Dr Hemantha Revata Seneviratne - Doosan Power Systems [United Kingdom]                                                    | CO <sub>2</sub> capture by mineral carbonation with ashes from blends of coal and culm waste / Dr Luis I Díez - University of Zaragoza [Spain]                                         | The future of integrated gasification combined cycle technology / Ronald Schoff - EPRI [United States]                                                                                                                                          |
| 10.40–11.00                                                                                                                                                                                                                                                                  | Oxycoal combustion for low carbon electric power generation / Mr. Kevin McCauley - Babcock & Wilcox [United States]                                                  | Effects on the shallow aquifers by carbon storage in a tertiary basin / Prof Carmen Clemente-Jul - ETSIMINAS/UPM [Spain]                                                               | Modelling of multi-particle reactor for carbon dioxide capture and hydrogen production / Dr Stefano Stendardo - ENEA [Italy]                                                                                                                    |
| 11.00–11.20                                                                                                                                                                                                                                                                  | Advanced air separation units and CO <sub>2</sub> purification units for oxycombustion in power plants / Mr Nicolas Perrin - Air Liquide [France]                    | Design and off-design behaviour of a CO <sub>2</sub> compressor for a post-combustion CO <sub>2</sub> capture process / Ulrich Liebenthal - Hamburg University of Technology [Germany] | Technological and economic evaluation of polygeneration concepts for load flexible electricity generation / Dipl.-Ing. Robert Pardemann - TU Bergakademie Freiberg, Department of Energy process engineering and Chemical Engineering [Germany] |
| 11.20–11.40                                                                                                                                                                                                                                                                  | Experimental investigation of flameless pulverised coal combustion under oxyfuel conditions / Arno Kellermann - RWTH Aachen University [Germany]                     | Microalgae mass culture for carbon dioxide biofixation and biofuels / Dr. Jorge Alberto Vieira Costa - Furg [Brazil]                                                                   | Techno-economic evaluation of low temperature technology for carbon dioxide capture in IGCC power plant / Dr Sina Rezvani - CST, University of Ulster [United Kingdom]                                                                          |
| 11.40–12.00                                                                                                                                                                                                                                                                  | CFD modelling of oxy-coal combustion in an entrained flow reactor / Ms Lucia Álvarez - Instituto Nacional del Carbon (CSIC) [Spain]                                  |                                                                                                                                                                                        |                                                                                                                                                                                                                                                 |
| 12.00–12.30 Coffee Break in the Foyer                                                                                                                                                                                                                                        |                                                                                                                                                                      |                                                                                                                                                                                        |                                                                                                                                                                                                                                                 |
| 12.30–14.10                                                                                                                                                                                                                                                                  | Auditorio <b>International and Regional Perspectives II</b><br>Chair: Shunichi Yanai                                                                                 | Sala B <b>Ash and Slag</b><br>Chair: Andrew Minchener                                                                                                                                  | Sala C <b>Carbon Capture Solvents</b><br>Chair: Maria Jesús Lázaro                                                                                                                                                                              |
| 12.30–12.50                                                                                                                                                                                                                                                                  | A technology package utilising coal, biomass and intermittent renewable electricity / Dr Robert S Whitney - CRL Energy [New Zealand]                                 | An integrated ash system for water elimination in ash handling / Mr Simone Savastano - Magaldi Power S.p.A. [Italy]                                                                    | Vapour-liquid equilibria measurement and modelling of CO <sub>2</sub> -H <sub>2</sub> O-amine systems / Miss Danlu Tong - Imperial College [United Kingdom]                                                                                     |
| 12.50–13.10                                                                                                                                                                                                                                                                  | German Center for Energy Resources - Technologies after the peak oil / Dr. Heiner Gutte - Technische Universität Bergakademie Freiberg [Germany]                     | Numerical method of assessing slagging propensity of pulverized coals in boilers / Mr Mohammed Usman Degereji - University of Leeds [United Kingdom]                                   | Two steps configuration for MEA regeneration in a CO <sub>2</sub> capture system / Dr. Luis M Romeo - CIRCE [Spain]                                                                                                                             |
| 13.10–13.30                                                                                                                                                                                                                                                                  | Energy technologies 2050: R&D priority setting of coal fired power plants in Germany / Dr. Peter Markewitz - Forschungszentrum Juelich (IEK-STE) [Germany]           | Biomass characterisation and the link between milling, combustion and ash deposition / Prof Ed Lester - University of Nottingham [United Kingdom]                                      | Behaviour of the mass-transfer coefficient of CO <sub>2</sub> absorption in different solvents at the PCC pilot plant at Loy Yang power / Dr Yuli Artanto - CSIRO [Australia]                                                                   |
| 13.30–13.50                                                                                                                                                                                                                                                                  | CCS and low rank coal innovation in Australia / Dr Richard Aldous - Department of Primary Industries [Australia]                                                     | Comparative study of emissions and depositions for different pulverized solid fuels / Carmen Bartolomé - Fundación CIRCE [Spain]                                                       | Application and optimization of the spray scrubbing technology for CO <sub>2</sub> capture with amine based solvents / Kevin Brechtel - Universitaet Stuttgart - IFK [Germany]                                                                  |
| 13.50–14.10                                                                                                                                                                                                                                                                  | Socioeconomic benefits of clean coal technologies in China and India / Professor Frank Clemente - Penn State University [United States]                              | Impacts of biomass addition on ash properties during coal/biomass combustion / Dr Tao Wu [China]                                                                                       | Evaluation of CO <sub>2</sub> capture process using regenerative chemical absorption in a packed column under enriched-air combustion conditions / Mr. Francisco Muñoz - AICIA [Spain]                                                          |
| 14.10–15.40 Lunch in Sala A                                                                                                                                                                                                                                                  |                                                                                                                                                                      |                                                                                                                                                                                        |                                                                                                                                                                                                                                                 |
| 15.40–17.20                                                                                                                                                                                                                                                                  | Auditorio <b>Carbonate Cycling and Solid Sorbents II</b><br>Chair: Carlos Abanades                                                                                   | Sala B <b>Combustion</b><br>Chair: José J. Pis                                                                                                                                         | Sala C <b>Gasification</b><br>Chair: Fedir Woskobenko                                                                                                                                                                                           |
| 15.40–16.00                                                                                                                                                                                                                                                                  | Effect of SO <sub>2</sub> on multi cycle carbonation-calcination of limestone for CO <sub>2</sub> capture / Mr Masoud Kavosh - Cranfield University [United Kingdom] | Applying a presumed density function for the sub grid scale distribution in LES of coal combustion / Mr Benjamin Franchetti - Imperial College London [United Kingdom]                 | Performance comparison of non-slagging, entrained-bed gasifier with different ash melting temperature coals / Dr. Yongseung Yun - Institute for Advanced Engineering [Korea, Republic of]                                                       |
| 16.00–16.20                                                                                                                                                                                                                                                                  | Engineering issues for production of clean energy via advanced calcium looping / Dr Kumar Patchigolla - Cranfield University [United Kingdom]                        | Kinetics of Sulcis coal devolatilization / Carlos Herce - ENEA [Italy]                                                                                                                 | Update on new project & design development with Lurgi's FBDB gasifier / Max-Michael Weiss - Lurgi GmbH/ Air Liquide Group [Germany]                                                                                                             |
| 16.20–16.40                                                                                                                                                                                                                                                                  | Modeling an entrained bed-bubbling bed process for CO <sub>2</sub> capture from flue gas / Professor Jeong-Hoo Choi - Konkuk University [Korea, Republic of]         | A thermogravimetric test to predict spontaneous combustion of coals / Prof Ed Lester - University of Nottingham [United Kingdom]                                                       | First experimental results of coal gasification tests on small scale plant / Claudia Bassano - ENEA [Italy]                                                                                                                                     |
| 16.40–17.00                                                                                                                                                                                                                                                                  | Clean valorization of waste coal by Ca-based multi-capture / Ms Ana Martínez - CIRCE - Universidad de Zaragoza [Spain]                                               |                                                                                                                                                                                        | Power generation through coal and biomass gasification for medium and small scale industrial applications / Dr. Alberto Pettinau - Sotacarbo S.p.A. [Italy]                                                                                     |
| 17.00–17.20                                                                                                                                                                                                                                                                  | CO <sub>2</sub> capture in a 1 MWh fluidized bed reactor in batch mode operation / Alexander Galloy - Technische Universität Darmstadt [Germany]                     |                                                                                                                                                                                        |                                                                                                                                                                                                                                                 |
| 21.00–00.00 Conference Dinner in Hotel Iberus                                                                                                                                                                                                                                |                                                                                                                                                                      |                                                                                                                                                                                        |                                                                                                                                                                                                                                                 |

## Wednesday's Programme

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| 09.00–10.40                                                                                                                                                                                                                      | Auditorio <i><b>Oxyfiring III</b></i><br>Chair: Uxue Alzueta                                                                                                                                | Sala B <i><b>Carbon Capture and Storage III</b></i><br>Chair: Juho Lipponen                                                                                                                           | Sala C <i><b>IGCC and Precombustion Carbon Capture III</b></i><br>Chair: Sina Rezvani                                                                                                                                  |
| 09.00–09.20                                                                                                                                                                                                                      | Char morphology characteristics of coal during oxyfuel combustion / Prof Ed Lester - University of Nottingham [United Kingdom]                                                              | The integration assessment of CO <sub>2</sub> post-combustion capture with MEA technology in the existing coal-fired power plant / Dr. Cristian Dinca - POLITEHNICA University of Bucharest [Romania] | WGS catalytic studies for H <sub>2</sub> enrichment and CO <sub>2</sub> capture-ready production in pre-combustion fuel decarbonisation concept / Dr Josemaria Sanchez - CIEMAT [Spain]                                |
| 09.20–09.40                                                                                                                                                                                                                      | Implications of oxy-fuel combustion environments for ethylene oxidation and NO conversion / Ms María Abián - Aragón Institute of Engineering Research (I3A). University of Zaragoza [Spain] | Analysis of steam parameters for integration of CO <sub>2</sub> scrubbing process with a coal-fired power plant / Dipl.-Ing. Elizabeth Heischkamp - University of Duisburg-Essen / LUAT [Germany]     | Power generation based on coal and low-grade fuels co-gasification with carbon capture and storage / PhD Eng. Calin-Cristian Cormos - Babes-Bolyai University, Faculty of Chemistry and Chemical Engineering [Romania] |
| 09.40–10.00                                                                                                                                                                                                                      | CIUDEN 20 MWth PC oxycombustion system: first operating experiences / Mrs Monica Lupion Cordero - Fundacion Ciudad de la Energia [Spain]                                                    | Solvent scrubbing post combustion capture - demonstration and verification / Mr Stuart Bowden - Doosan Power Systems Limited [United Kingdom]                                                         | Techno-economic evaluation of pressure swing adsorption (PSA) based carbon dioxide capture technology for IGCC power plant / Dr Ye Huang - University of Ulster [United Kingdom]                                       |
| 10.00–10.20                                                                                                                                                                                                                      | Kinetics of coal combustion under oxyfuel conditions / Dr. Osvalda Senneca - Istituto di Ricerche sulla Combustione, C.N.R. [Italy]                                                         | Post-combustion CO <sub>2</sub> capture by means of physical adsorption. a pilot scale comparative study / José María Sánchez Hervás - CIEMAT [Spain]                                                 | Commissioning of the Zecomix pilot plant / Antonio Calabrò - ENEA [Italy]                                                                                                                                              |
| 10.20–10.40                                                                                                                                                                                                                      | Impact of demineralisation on coal devolatilisation and char combustion under oxy-fuel firing conditions / Dr Donglin Zhao - University of Nottingham [United Kingdom]                      | Coal drying as a tool for elimination of the energy penalty associated with post combustion CO <sub>2</sub> capture / Dr Dimitry Popov - Technical University of Sofia [Bulgaria]                     |                                                                                                                                                                                                                        |
| 10.40–11.10 Coffee Break in the Foyer                                                                                                                                                                                            |                                                                                                                                                                                             |                                                                                                                                                                                                       |                                                                                                                                                                                                                        |
| 11.10–12.30 Final Poster Viewing in the Foyer                                                                                                                                                                                    |                                                                                                                                                                                             |                                                                                                                                                                                                       |                                                                                                                                                                                                                        |
| 12.30–14.00 Auditorio – Keynote Session II and Closing Ceremony                                                                                                                                                                  |                                                                                                                                                                                             |                                                                                                                                                                                                       |                                                                                                                                                                                                                        |
| ELCOGAS IGCC: Towards zero emissions power plants / Mr. Francisco Garcia - ELCOGAS, S.A. [Spain]<br>Carbon Capture and Storage: Potential and Challenges in the Global Context / Mr. Juho Lipponen - International Energy Agency |                                                                                                                                                                                             |                                                                                                                                                                                                       |                                                                                                                                                                                                                        |
| 14.00–16.00 Lunch in Sala A                                                                                                                                                                                                      |                                                                                                                                                                                             |                                                                                                                                                                                                       |                                                                                                                                                                                                                        |
| 16.00–17.30                                                                                                                                                                                                                      | Visit to ICB Laboratories                                                                                                                                                                   |                                                                                                                                                                                                       |                                                                                                                                                                                                                        |

## Thursday's Programme

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| 09.30–17.30 | Visit to ELCOGAS IGCC Plant in Puertollano. The train leaves Zaragoza Delicias station at 10.09 |
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