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ARCTIC RENEWABLE ENERGY ATLAS PROJECT Singapore 2018



ARCTIC COUNCIL



Sustainable Development
Working Group

AGENDA

Gail Mosey (AREA Project Lead): Gail.Mosey@nrel.gov

Christopher Len (Singapore Convenor): esiclh@nus.edu.sg

WORKSHOP :: ESI Conference Room Day 1 (29 August 2018)	
09.30 am	Registration
10.00 am	<p>Welcome Remarks Christopher Len and Gail Mosey (Co-Convenors) (Self-introduction by participants and House-rules)</p>
10.30 am	<p>Session 1: Setting the Renewable Energy Landscapes in the Arctic and Southeast Asia—Overview and Problem Statement In this session the speakers will provide a basic overview of the two regions to set the context.</p> <p>Moderator: Christopher Len</p> <p><i>Introduction to the Arctic Energy Landscape (10 min)</i> Mikhail Pogodaev</p> <p><i>Introduction to the Southeast Asian Energy Landscape (10 min)</i> Gautam Jindal</p> <p><i>Discussion</i></p>
11.00 am	Coffee Break (& Group Photo)
11.30 am	<p>Session 2: Arctic Renewable Energy Atlas—Regional Contributions of Renewable Energy Resource Potential In this session, the AREA Project Leader will introduce the objectives of AREA Project and provide a status update.</p> <p><i>AREA Project Update</i> Gail Mosey</p> <p><i>Discussion</i></p>
12.00 pm	<p>Session 3: Data Management and Visualization—Challenges and Gaps In this session, the AREA Project Leader will provide a status update on the AREA Project which will include issues relating to metadata agreement, national contributions, sub-national resources, as well as the overall coordination and management of data and visualization.</p> <p><i>AREA Project Update</i> Gail Mosey</p> <p><i>Discussion</i></p>
12.30 pm	Lunch

1.45 pm	<p>Session 4: Regional Contributions of Renewable Energy Resource Potential and Best Practices (up to 15 mins each)</p> <p>The country representatives in this session will cover the following topics:</p> <ul style="list-style-type: none"> • Overview of the current and future energy landscape • Renewable energy resource potential • Community and energy challenges and opportunities • Best practices and success stories toward renewable energy deployment <p>Moderator: Gail Mosey</p> <p>North America and Russian contributions</p> <ul style="list-style-type: none"> • Canada (Jay Grewal) • USA (Janet Reiser) • Russia (Mikhail Pogodaev)
	<p>Coffee Break (15 mins)</p> <p>Nordic contributions</p> <ul style="list-style-type: none"> • Denmark (TBD) • Finland (Johannes Vallivaara) • Iceland (Sunna Guðmundsdóttir) • Norway (Yngve Birkelund) • Sweden (Helena Reitberger) <p><i>Discussion</i></p>
4.30 pm	<p>Break</p>
4.45 pm	<p>Session 5 The Southeast Asian Experience (up to 12 mins each)</p> <p>In this session, the speakers will share their views on renewable energy developments in Southeast Asia.</p> <p>Moderator: Liu Yang</p> <p>Renewable Energy Landscape of the Philippines <i>Alvin Culaba</i></p> <p>Renewable Energy Landscape of Myanmar <i>Natasha Allen</i></p> <p>Solar Energy Research Institute (SERIS): Research and Projects in Southeast Asia <i>Oktoviano Gandhi</i></p> <p>Low Carbon Energy Developments in Southeast Asia–Transfer and Finance <i>Leow Foon Lee</i></p> <p><i>Discussion</i></p>
6.00 pm	<p>Closing for Day 1 by Gail Mosey and Christopher Len</p>
6.30 pm	<p>Welcome Dinner</p>

**WORKSHOP :: ESI Conference Room
Day 2 (Thursday 30 August 2018)**

09.30 am	<p>Session 6 Key Takeaways: Participants Impressions of Energy Developments in the Arctic and Southeast Asia</p> <p>Free flow discussion with participants invited to share their impressions on what they learned from the day before. The discussion will be structured as follows:</p> <ul style="list-style-type: none"> • Impressions on the Arctic energy landscape • Impressions on Southeast Asia energy landscape • Comparing the two regions (similarities and differences) • Aspirations – Obstacles – Path forward <p>Moderator: Gail Mosey and Philip Andrews-Speed</p>
11.00 am	Coffee Break
11.15 am	<p>Session 7 Key Takeaways: Consolidating Lessons for the AREA Project</p> <p>This last session aims to bring the discussion back to the objectives of the AREA Project. It will be a free flow discussion to consolidate lessons for the AREA Project and provide input for the report. It will focus on:</p> <ul style="list-style-type: none"> • Review of outcomes • Potential challenges or barriers to development • Opportunities for collaboration <p>Moderator: Gail Mosey and Christopher Len</p>
12.15 pm	<p>Closing Remarks by Mikhail Pogodaev</p> <p>Vote of Thanks by Gail Mosey and Christopher Len</p>
12.30 pm	Lunch
1.15 pm	<p>[Arctic Participants and ESI Convenor]</p> <p>Session 8 AREA Project Meeting: Inputs on Workshop</p> <ul style="list-style-type: none"> • Discussion on the 2018 Arctic Circle Assembly • Arctic Participants will provide feedback and inputs on the event
2.45 pm	Return to Hotel
6.00 pm	Dinner for Overseas Participants

FIELD TRIP + MEETING Day 3 (Friday 31 August 2018)	
10.00 am	Field Trip to Marina Barrage
2.30 pm	AREA Project Meeting–Planning the Next Steps Convener: Gail Mosey

ESI-GCNS YOUTH SEMINAR Day 4 (Saturday 01 September 2018)	
12.00 pm	ESI-GCNS Youth Seminar

LIST OF PARTICIPANTS

#	Name	Affiliation
Arctic Participants		
1	Yngve BIRKELUND, PhD	<i>Head of Department of Engineering and Safety & Associate Professor Arctic Center for Sustainable Energy, UiT The Arctic University of Norway, Norway</i>
2	Jay K. GREWAL	<i>President & CEO Northwest Territories Power Corporation, Canada</i>
3	Sunna GUÐMUNDSDÓTTIR	<i>Project Manager Nordurorka, Iceland</i>
4	Gail MOSEY (Convenor)	<i>Project Lead and Senior Energy Analyst National Renewable Energy Laboratory, USA</i>
5	Mikhail POGODAEV, PhD	<i>Executive Director, Secretariat of the Northern Forum, Republic of Sakha (Yakutia), Russia; Chair of the Association of World Reindeer Herders</i>
6	Janet REISER	<i>Executive Director Alaska Energy Authority, USA</i>
7	Helena REITBERGER	<i>Counsellor and Deputy Head of Mission Embassy of Sweden, Singapore</i>
8	Johannes VALLIVAARA	<i>CEO and Cluster Manager, Arctic Smart Rural Communities ProAgria Lapland, Finland</i>
Singapore and Southeast Asia Participants		
9	Natasha ALLEN	<i>Founder & Executive Director Mee Panyar, Myanmar</i>
10	Philip ANDREWS-SPEED, PhD	<i>Senior Principal Research Fellow & Division Head Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore</i>
11	Alvin B. CULABA, PhD	<i>University Fellow and Professor, Mechanical Engineering Department Gokongwei College of Engineering, De La Salle University, Manila, Philippines</i>
12	Oktoviano GANDHI	<i>Ph.D Candidate, Solar Energy System Solar Energy Research Institute of Singapore (SERIS), National University of Singapore (NUS), Singapore</i>
13	Peter GODFREY	<i>Managing Director - Asia Pacific The Energy Institute (EI), Singapore</i>
14	GOH Shu Hui Gina	<i>Nanyang Technological University (NTU); Co-founder and Singapore Representative to the Arctic Youth Network (AYN)</i>

15	HO Juay Choy, PhD	<i>Associate Professorial Fellow Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore</i>
16	Gautam JINDAL	<i>Research Fellow Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore</i>
17	Christopher LEN, PhD (Convenor)	<i>Senior Research Fellow Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore</i>
18	LEOW Foon-Lee	<i>Adjunct Principal Research Fellow Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore</i>
19	LIU Yang, PhD	<i>Senior Research Fellow Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore</i>
20	MOCK Yuan Ning	<i>Undergraduate Student, Environmental Earth Systems Science Nanyang Technological University (NTU)</i>
21	Hema NADARAJAH	<i>PhD Candidate, Department of Political Science University of British Columbia, Canada</i>
22	Elena RESHETOVA, PhD	<i>Research Fellow Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore</i>
23	Mary Ann QUIRAPAS	<i>PhD Research Scholar, Political Science Department National University of Singapore (NUS), Singapore</i>

ARCTIC PARTICIPANTS

Yngve BIRKELUND, PhD

*Head of Department of Engineering and Safety & Associate Professor
Arctic Center for Sustainable Energy, UiT The Arctic University of Norway, Norway*

Yngve Birkelund, PhD has been working at UiT The Arctic University of Norway for almost 20 years, the last 7 years within the field of renewable energy. He is currently the head of Department of Engineering and Safety, and holds an associate professor position in renewable energy at the Department of Physics and Technology. He finished his Master's degree in Applied Physics in 1998, and a PhD in Science in 2003, both at UiT The Arctic University of Norway. Birkelund has a long and broad research background, working with statistical signal processing, non-linear systems, biomedical technology and microwave engineering. He has been a visiting researcher at University of Texas at Austin, Texas, and at Duke University, North Carolina, and he spent the spring 2018 at the National Center of Atmospheric Research in Boulder, Colorado, working with wind power prediction and numerical weather modelling. Birkelund led the development of the scientific plan of Arctic Center for Renewable Energy (ARC) established at UiT in 2017, and is currently on the scientific board of this center.

Jay K. GREWAL

*President & CEO
Northwest Territories Power Corporation, Canada*

Jay K. Grewal has a strong background focused on strategic planning, corporate development and financial strategies. As the current President & CEO of the Northwest Territories Power Corporation, Jay has led the development and implementation of a 20 Year Strategic Plan focused on economic and environmental sustainability, and revenue growth. Prior to this, Jay was SVP Strategy and Corporate Development with Capstone Mining. She was responsible for leading strategic planning, enterprise risk management, business effectiveness, stakeholder engagement and sustainability. Previously, she was Managing Director for Accenture Inc.'s B.C Practice and held a number of executive positions at B.C Hydro including acting CFO. Jay also has extensive experience within the investment banking and finance sector. Jay is a graduate of the University of British Columbia, Canada with a B.A. Honours, and also holds a M.B.A in Finance from the University of Western Ontario. Jay is an active United Way NWT Board Member, and a past member of the B.C Business Council, United Way Campaign Cabinet, Board of Governors, University of British Columbia (where she chaired the Finance Committee), and past Chair, Energy Division of the B.C. Children's Hospital Miracle Network.

Sunna GUÐMUNDSDÓTTIR

*Project Manager
Nordurorka, Iceland*

Sunna Guðmundsdóttir is an engineer. She holds a BSc in Mechatronics Engineering from Reykjavik University and a MSc in Sustainable Energy Systems from University of Edinburgh. Since graduating, in 2016, Sunna has taught mathematics at College level and she has worked as a project manager for three energy companies in Akureyri, Iceland. The companies Sunna works for are various and so are the projects she works on. She buys and sells electricity to both homes and businesses and handles correlating planning and management of power stations run by Fallorka. Sunna also works for EIMUR, a partnership in the field of energy, increased utilization of geothermal resources and innovation. The third company Sunna works for is Nordurorka, which services homes and businesses with processing and distribution of hot water and drinking water, distribution of electricity and sewer operations. Sunna has worked on risk management and process analysis for Nordurorka. As well as working in the energy sector in Iceland Sunna likes to do outdoor activities like hiking, running and camping.

Gail MOSEY

*Project Lead and Senior Energy Analyst
National Renewable Energy Laboratory, USA*

Gail Mosey has worked at the National Renewable Energy Laboratory (NREL) as a Project Lead and Senior Energy Analyst for 14 years. Gail has a Master's degree in Economics from the Colorado School of Mines and a Bachelor's degree in Finance from the University of Colorado. Gail is NREL's trans-national Arctic lead and works on strategic aspects related to the Arctic and is developing an expertise in energy solutions in remote communities to improve resilience, energy security and in aspects related to the energy-water-food nexus. A primary area of Gail's expertise is working with the U.S. Environmental Protection Agency (US EPA) siting renewable energy on environmentally compromised lands including economic and technical analysis of the viability of renewable energy on these sites and any related community impact. Another area of Gail's expertise is working with tribes and villages through U.S. Department of Energy (US DOE) on strategic energy planning that includes energy efficiency and renewable energy solutions to meet tribal energy requirements and improve resilience.

Mikhail POGODAEV, PhD

*Executive Director, Secretariat of the Northern Forum, Republic of Sakha (Yakutia), Russia;
Chair of the Association of World Reindeer Herders*

Mikhail Pogodaev, PhD is Executive Director of the Northern Forum, a non-profit, international organization composed of sub-national or regional governments from eight northern countries. He is also Executive Chair of the Association of World Reindeer Herders, an NGO that unites more than 20 different indigenous peoples from 10 countries across the Circumpolar North. Dr. Pogodaev is also the President of the University of the Arctic Institute for Circumpolar Reindeer Husbandry. He was born in 1978 in a reindeer herding village Topolinoe in Tomponsly district of Sakha Republic (Yakutia). Dr. Pogodaev graduated from the Saint Petersburg State University of Economics and Finance and has a PhD in Economics.

Janet REISER

*Executive Director
Alaska Energy Authority, USA*

Janet Reiser joined the Alaska Energy Authority as its Executive Director in January of this year. Prior to that she served on the Chugach Electric Board of Directors for 9 ½ years serving as Board Chair for 6 ½ of those years. Janet served as a Director on the Alaska Railbelt Cooperative Transmission & Electric Company (ARCTEC) since its inception in 2011. She continues to serve on the Board of Directors of the Cooperative Leadership Network, an organization dedicated to helping rural electric cooperative directors explore and share successes in the consumer – centric utility model for cooperatives. Janet has been in Alaska for over thirty years, serving in technical and executive management roles in the telecom, construction, and engineering industries. She holds a Bachelor of Science degree in Chemical Engineering from the University of Colorado, Boulder.

Helena REITBERGER

*Counsellor and Deputy Head of Mission
Embassy of Sweden, Singapore*

Helena Reitberger is the Counsellor and Deputy Head of Mission at the Swedish Embassy in Singapore since 2015. Her previous assignments include postings in London and Beijing as well as various positions at the Department for Asia and the Pacific at the Swedish MFA. Helena has an MA in East Asian Studies with minors in Business Administration and Journalism.

Johannes VALLIVAARA

*CEO and Cluster Manager, Arctic Smart Rural Communities
ProAgria Lapland, Finland*

Johannes Vallivaara is CEO and Cluster Manager of ProAgria Lapland, Finland. This organization consists of a team of 23 specialists tasked with developing rural businesses and coordinating a network of food and energy sector companies and developers. He is constantly looking for ideas to keep sparsely populated areas alive and to help the local Arctic communities where he is based develop new business initiatives. Johannes lives in Rovaniemi, which is located in Finland's northernmost region, Lapland. It is a small city with 62,000 inhabitants and known worldwide as a hometown of Santa Claus. He studied management and accounting at the University of Lapland. Johannes has also researched the use of natural raw materials as a food and for healing purposes, and has a small garage studio where he is developing new products in this area. He is also a partner in a small safari company based at the northernmost municipality of Lapland. He loves to spend time with his family in nature during his free time.

SINGAPORE AND SOUTHEAST ASIA PARTICIPANTS

Natasha ALLEN

*Founder & Executive Director
Mee Panyar, Myanmar*

Natasha Allen is the Founder and Executive Director of Mee Panyar, a business pioneering a novel business model for operations, maintenance and workforce training for rural mini-grids, starting in Myanmar. She has recognized expertise in developing training programs for solar education and a strong technical background that she has employed in improved cook stoves M&E with Potential Energy and servicing and maintenance strategy with We Care Solar. Natasha was awarded the prestigious Thomas J. Watson Fellowship for her research in best practices for building capacity and ensuring sustainability in energy access interventions. She holds a BSc in Physics from Harvey Mudd College and is completing an MSc in Engineering for International Development at University College London.

Philip ANDREWS-SPEED, PhD

*Senior Principal Research Fellow & Division Head
Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore*

Philip Andrews-Speed, PhD is a Senior Principal Fellow at the Energy Studies Institute, National University of Singapore. He has 35 years in the field of energy and resources, starting his career as a mineral and oil exploration geologist before moving into the field of energy and resource governance. Until 2010 he was Professor of Energy Policy at the University of Dundee and Director of the Centre of Energy, Petroleum and Mineral Law and Policy. His main research interest is the political economy of energy and resource governance, at national, regional and global scales. From 2010 to 2012 he led a major European Union Framework 7 Programme project "Competition and Collaboration in Access to Oil, Gas and Mineral Resources". He was also Fellow at the Transatlantic Academy of the German Marshall Fund of the US, he co-authored a report entitled The Global Resource Nexus. The Struggles for Land, Food, Water and Minerals. Although Asia has been the focus of the last 25 years of his career, his previous interest was in the Arctic when he visited Greenland on four occasions.

Alvin B. CULABA, PhD

*University Fellow and Professor, Mechanical Engineering Department
Gokongwei College of Engineering, De La Salle University, Manila, the Philippines*

Alvin B. CULABA, PhD is an Academician and focal person on energy and environment of the Philippine National Academy of Science and Technology. A multi-awarded scientist, academic, and administrator, Dr Culaba served as Philippine Energy Adviser and an independent board member of the Philippine Electricity Market Corporation. As expert panel member of the Philippine Joint Congressional Commission on Science, Technology, and Engineering, he assessed the S&T competitiveness of the energy sector. He was commissioned to undertake energy policy studies that led to the crafting of the country's energy twin-bill, the Biofuels Act of 2006 and the Renewable Energy Act of 2008. He had previously served as energy consultant for the Asian and Pacific Centre for Transfer of Technology of the United National Economic and Social Commission for Asia and the Pacific and as member of Technical Working Group of ASEAN Energy Centre-Economic Research Institute for ASEAN and East Asia, among others. Currently, Dr. Culaba is a University Fellow and Professor of Mechanical Engineering at De La Salle University where he also served as its former Executive Vice President in 2010-2016.

Oktoviano GANDHI

Ph.D Candidate, Solar Energy System

Solar Energy Research Institute of Singapore (SERIS), National University of Singapore (NUS), Singapore

Oktooviano Gandhi received Master of Physics degree from the University of Oxford, United Kingdom in 2015. He is currently working towards a Ph.D. with the Solar Energy Research Institute of Singapore (SERIS), National University of Singapore (NUS). On the research front, he has worked on the engineering aspects of solar cells and modules, all the way to analysing policies' impact on energy intensity. He is currently focusing on the integration of solar energy into power systems, especially in the fields of optimization and reactive power dispatch. Oktooviano is passionate about implementing renewable energy solutions to solve problems in Indonesia, which prompted him to co-found Alva Energi, an organization focusing on rural electrification and quality solar energy installations in Indonesia.

Peter GODFREY

Managing Director - Asia Pacific

The Energy Institute (EI), Singapore

Peter is the chief representative of the prestigious UK Energy Institute (EI) here in Singapore. In addition to his work with the EI, Peter provides customised executive advisory services through his own company Merlenergy Pte Ltd. He has gained an international reputation as a leading independent energy strategy and business development consultant with an executive-level international client-base that has included the world's leading national and international energy and mineral resource companies as well as a number of governments and regulatory agencies

Most of Peter's career has been spent in the Oil and Gas industry, mainly with BP. Here in Singapore, Peter was Head of Oil & Gas in Standard Chartered Bank's principal finance team and prior to that, he was a member of Arrow Energy's executive leadership team responsible for building Arrow's international coal-bed methane business, based on the company's successful development of CBM reserves in Queensland, Australia.

His interests have now extended into renewable and alternative energy development and addressing issues related to industry transition towards a lower carbon, greener and cleaner energy future. Within this context, Peter has majored on promoting the relevance of "The Circular Economy" as a framework for the future development of energy systems world-wide.

GOH Shu Hui Gina

Nanyang Technological University (NTU);

Co-founder and Singapore Representative to the Arctic Youth Network (AYN)

Goh Shu Hui Gina is a final year Biological Sciences undergraduate at the Nanyang Technological University. She is the co-founder and Singapore's youth representative to the global Arctic Youth Network (AYN). Being passionate about Biodiversity Conservation and Climate Change, Gina has been volunteering with National Parks Board as a Conservation Volunteer in hope to raise greater conservation awareness on local wildlife. She is also an administrator of the 'Campus Creatures' Facebook Page, a platform which allows people to share and learn about their wildlife encounters on various campuses in Singapore.

In 2011, Gina was awarded the HSBC-NYAA Youth Environmental Awards due to her outstanding leadership and contributions in Biodiversity and Environmental conservation and was given the opportunity to participate in an Earthwatch research expedition to Churchill, Manitoba, in Canada, to study on Climate Change at the Arctic's Edge in 2014. More recently in 2017, Gina was the first youth delegate to represent Singapore in the 5th Arctic Circle Assembly in Reykjavik, Iceland, where she gave a speech on 'Biodiversity Conservation and Environmental Stewardship—Igniting the Arctic Youth Movement, Making the Move', and emphasised the need for multi-lateral cooperation among

different countries in order to make conservation of Biodiversity and environmental efforts more effective.

HO Juay Choy, PhD

Associate Professorial Fellow

Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore

He is currently the chairman of the ASEAN Subcommittee on Sustainable Energy Research (SCSER). He represented ESI in the preparation of the Singapore Country Report for the study “The Economics of Climate Change in Southeast Asia: A Regional Review” conducted by the Asian Development Bank. He was also the project leader for ASEAN projects on Landfill Gas Development and Applications in ASEAN. He was also the Singapore focal point of an ASEAN project on State of Science & Technology Development in ASEAN. At ESI his activities include climate change, tracking implementation of the Paris Agreement and HFC emissions monitoring. Professor Ho is a lead author of the Asia-Europe Handbook for ASEAN Government Officials on Climate Change and SDGs.

His experience covers industrial energy efficiency, natural gas and biomass cogeneration applications, compact heat exchanger design and applications, enhanced performance of absorbers in absorption refrigeration systems and design and application of energy efficient heat pump drying systems. He obtained his Bachelor of Science (Engineering) degree from the University of London and his Master’s and PhD degrees from the University of Wisconsin.

Gautam JINDAL

Research Fellow

Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore

Gautam Jindal is a Research Fellow at the Energy Studies Institute, National University of Singapore. He holds a Master’s degree in Carbon Management from the University of Edinburgh, Scotland and a Bachelor’s degree in Electrical & Electronics Engineering. Gautam has seven years of experience in energy and low carbon policy research, corporate GHG measurement and management, and sustainability reporting. At ESI, Gautam’s research areas include renewable energy integration, climate change negotiations, and management of HFCs under the Montreal Protocol.

Christopher LEN, PhD

Senior Research Fellow

Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore

Christopher Len, PhD is a Senior Research Fellow at the Energy Studies Institute (ESI) of the National University of Singapore (NUS) and is in charge of the *Maritime Energy Futures Programme* at ESI. His research focuses on Asian energy and maritime security issues, regional infrastructure connectivity, as well as the growing political and economic linkages between the various Asian sub-regions. In recent years, he has also developed an interest in the Arctic region, focusing on energy policy-related issues in the Arctic which are also of relevance to the wider world – from the governance of sustainable energy transition, to energy access in remote locations, maritime infrastructures and shipping, and issues related to innovation, resilience and capacity-building. He obtained his PhD from the Centre for Energy, Petroleum and Mineral Law and Policy (CEPMLP) at the University of Dundee in Scotland. He also has degrees from the University of Edinburgh, Scotland and Uppsala University, Sweden.

LEOW Foon-Lee

Adjunct Principal Research Fellow

Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore

Leow Foon-Lee is an Adjunct Principal Research Fellow at the Energy Studies Institute (ESI) of the National University of Singapore (NUS) since June 2017. He has more than 25 years of experience in the energy sector, having worked for some of the world's global US, European and Asian companies, including GE (for 20 years), Shell and others with global assignments in New York, Singapore, Taiwan, Hong Kong, Beijing and Shanghai. His career portfolio encompassed leading APAC regional operations, large gas power and LNG regasification terminal project development, turbine technology transfers and coal gasification licensing as well as managing start up and operation of equity joint ventures etc. He is also the founder and CEO of Enerpower, an energy investment advisory company focused in renewable energies and projects. In 2015 he was appointed as a technology expert by the Asian Development Bank (ADB) under RETA 8105 for Transfer of Low-Carbon Technologies to Asia and the Pacific. At ESI, he is developing an interest in the Arctic. Foon-Lee holds a Bachelor of Engineering (Mechanical) degree from the National University of Singapore and an MBA from the Rensselaer Polytechnic Institute in New York. He is bilingual in English and Mandarin.

LIU Yang, PhD

Senior Research Fellow

Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore

Yang Liu, PhD is a Senior Research Fellow at the Energy Studies Institute (ESI) of the National University of Singapore (NUS). His research interests include energy economics, smart energy systems and climate finance. His current research focuses on integration of renewables and energy efficiency, and economic impacts of energy transition.

Dr. Liu has a blend of operational and academic experience in clean energy, public policy, and sustainability strategy. Over the last few years, he has published widely on the topics of energy efficiency, renewable energy and policy evaluation in well-recognised journals including Energy Journal and Energy Economics. He was previously an energy specialist at the International Energy Agency, where he co-authored the 2015 and 2016 IEA Global Energy Efficiency Market Reports, and provided technical assistance to the Chinese government and businesses to improve urban energy systems. He earned his Ph.D. in Energy Economics from the Ecole Polytechnique of France.

MOCK Yuan Ning

Undergraduate Student, Environmental Earth Systems Science

Nanyang Technological University (NTU)

Mock Yuan Ning is a final-year Environmental Earth Systems Science undergraduate from Nanyang Technological University (NTU). A Youth Environment Envoy with the National Environment Agency, she is passionate about sustainable business and sustainable finance. As a Sustainability Intern with DBS, she is contributing to the development of a bank-wide sustainability strategy. Outside of her coursework in NTU, she attended the Enterprise and Environment Summer School at the University of Oxford as well as a semester exchange at the University of Hertfordshire, and conducted research on coral reef restoration in Southeast Asia as part of the NTU URECA Programme. Yuan Ning has also presented and engaged at international events and fora such as the Arctic Frontiers Student Forum 2018 in Norway, the World Festival of Youth and Students 2017 in Russia, and UNLEASH 2018, a global innovation lab for the UN Sustainable Development Goals.

Hema NADARAJAH

PhD Candidate, Department of Political Science

University of British Columbia, Canada

Hema Nadarajah is a PhD candidate at the Department of Political Science, University of British Columbia. Her research interests concern studying the political processes of translating scientific knowledge into international policy and cooperative management, as well as the influence of legal instruments pertaining to science and technology on inter-state relations, in frontier regions such as the Arctic and Outer Space. Hema holds a Master of Environment from the Australian National University where she specialised in Climate Change Policy and Economics, and a Bachelor of Science from the University of Toronto where she majored in Geography and Geology. She used to work with the National Parks Board of Singapore.

Elena RESHETOVA, PhD

Research Fellow

Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore

Elena Reshetova, PhD is a Research Fellow at the Energy Studies Institute (ESI). She has several years of experience researching natural gas market developments in Asia and Europe, policy-making in the oil and gas industry in East Asia, ASEAN and North America, and the evolution of national energy security policies. She has in the past worked with government agencies, non-governmental organisations, and research institutes in Russia, the United States, and Singapore. During her time in the US, Elena developed a keen interest in the Arctic when she started researching US strategic interests in the Arctic for her Master's thesis. In 2016, she co-authored an ESI event report titled *Energy Transitions in a Globalised Arctic: The Role of Science, Technology and Governance*. Elena holds a PhD in Public Policy from the Lee Kuan Yew School of Public Policy, National University of Singapore, and an MA in International Affairs from Boston University.

Mary Ann QUIRAPAS

PhD Research Scholar, Political Science Department

National University of Singapore (NUS), Singapore

Ms. Mary Ann Quirapas was previously with the Energy Research Institute at Nanyang Technological University (ERI@N) as a Research Associate of the Wind and Marine Renewables Team. Concurrently, she was also the Lead Secretariat of the ASEAN Centre for Energy – Southeast Asia Collaboration for Ocean Renewable Energy (SEACORE) and ERI@N's Joint PhD-Industry Programme (JIP). She has been involved in different research projects funded by international universities and government agencies both local and regional levels. Currently, she is a PhD Research Scholar under the Political Science Department of National University of Singapore. She obtained her MSc in Asian Studies from Rajaratnam School of International Studies (RSIS), NTU. Her research focus is on community energy and Southeast Asia's regional energy security and policy studies on offshore-related renewable energy.
