

# ASIA CLEAN ENERGY FORUM 2019

**PARTNERING FOR IMPACT**

17-21 June 2019 | Manila



## Deep Dive Workshop

Wednesday, 19 June 2019, 9:00 a.m. – 12:30 p.m.

*Multifunction Hall 3*

## Grid Integration and System Flexibility: Status and Emerging Trends in Asia



**USAID**  
FROM THE AMERICAN PEOPLE



Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH



NATIONAL RENEWABLE ENERGY LABORATORY

**Point of Contact:**

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### Background

With costs for renewable energy (RE) continuing to fall, in many countries below the price of new thermal capacity, RE installations continue to increase rapidly. An increasing number of countries in Asia have shifted from planning for the integration of RE to implementing changes. In this Deep Dive Workshop (DDW), a continuation of a multi-year deep-dive series on grid integration, the United States Agency for International Development (USAID), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), and U.S. Department of Energy's National Renewable Energy Laboratory (NREL) will bring experts and practitioners to share the latest best practices and regional examples of policies, regulations, and programs for cost-effective renewable energy integration.

### Objective

This DDW will build upon several previous years that USAID and NREL have organized on grid integration. Since much progress has been made around the world on grid integration over the past few years, this session is a reboot – covering global and regional status and progress. It will discuss new approaches and state-of-the-art analysis, policies, processes, and technologies that are now being deployed in systems achieving high variable RE penetration.

## Agenda

- 9:00 a.m. – 9:10 a.m. **Welcome, Learning Objectives, and Agenda Overview**
- 9:10 a.m. – 9:30 a.m. **Grid Integration: Challenges and Solutions for Scaling Up Grid-Connected RE**
- Introduction to key concepts and spectrum of challenges for large-scale renewable energy integration
  - Getting to 100%: What tools can help inform pathways for utilities, cities, and countries to achieve a reliable, 100% clean or renewable energy power system?
- Speaker: Jaquelin Cochran, NREL*
- 9:30 a.m. – 10:00 a.m. **Deep-Dive: Grid-Connected Battery Storage Systems**
- Utility-Scale Battery Storage: Emerging Opportunities
    - *Speaker: Ilya Chernyakhovskiy, NREL*
  - Energy Storage Projects in India
    - *Speaker: Lalit Kumar Wasan, Power System Control, Tata Power*
  - Energy Storage in the Distribution Grid
    - *Speaker: Abhishek R. Ranjan, BRPL India*
- 10:00 a.m. – 10:30 a.m. **Grid Integration: Status and Opportunities for System Flexibility Across Asia**
- Overview: “Highlights of policies, regulations, operational practices and the role of flexible resources in unlocking the uptake of VRE”
  - Case Study: “Emerging Solutions for Large-Scale Grid Integration in Thailand”
- Session Moderator: Peerapat Vithayasrichareon, IEA*  
*Guest Speaker: Mr. Nattapon Rongsriyam, Electricity Generating Authority of Thailand (EGAT)*
- 10:30 a.m. – 11:00 a.m. **Break**
- 11:00 a.m. – 11:45 a.m. **Power Talks: Emerging Solutions for Large-scale Grid Integration**  
Experts will give short, intensive, though-provoking talks covering emerging topics in Asia:
- JUST Transition to Renewable Energy
    - *Speaker: Markus Wypior, GIZ*
  - Transmission Planning for RE Integration and the Philippine CREZ Process
    - *Speaker: Mr. Redi Allan B. Remoroza, National Grid Corporation of the Philippines (NGCP)*
  - Grid Hosting Capacity for Distributed PV
    - *Speaker: Leon Roose, Chief Technologist, GridSTART, Hawaii Natural Energy Institute (HNEI)*
  - VRE Integration Project Highlights
    - *Speaker: Nataliya Kulichenko-Lotz, World Bank*
- 11:45 a.m. – 12:30 p.m. **Highlights, Lessons Learned, and Country Experiences**  
Panel Session and Q&A:

- Results of audience poll
- Q&A session with invited speakers
- Closing remarks

*Facilitator: Jen Leisch, USAID*

*Panelists: Mr. Nattapon Rongsriyam, Redi Allan B. Remoroza, Lalit Kumar Wasan, Leon Roose, Abhishek R. Ranjan, Nataliya Kulichenko-Lotz*

## Speakers



**Ilya Chernyakhovskiy**  
Grid Systems Analyst, NREL

Ilya Chernyakhovskiy is the project lead and co-author for USAID's Greening the Grid platform under the USAID-NREL partnership. He leads grid integration analysis and capacity building efforts in Central Asia countries, including Kazakhstan, Uzbekistan and Tajikistan, under USAID/Central Asia's Power the Future program. Ilya is also part of the core modeling team for NREL's grid integration studies in India. Prior to joining NREL, Ilya was a researcher in economic development at the Higher School of Economics in Moscow. He holds a M.Sc. in Resource Economics and Econometrics from the University of Massachusetts Amherst.



**Jaquelin Cochran**  
Grid Systems Group Manager,  
NREL

Jaquelin Cochran, Ph.D., is manager of the Grid Systems Group at the National Renewable Energy Laboratory. Dr. Cochran analyzes best practices to integrate renewable and distributed energy resources to the electric grid. She recently co-led a renewable energy grid integration study of India and is currently leading the City of Los Angeles 100% Renewable Energy Study. Before joining NREL, Dr. Cochran was an Assistant Professor of Natural Resource Management with KIMEP University in Almaty, Kazakhstan. She also served as a Peace Corps Volunteer for two years with the Polish Foundation for Energy Efficiency (FEWE) in Krakow. She holds a Ph.D. and M.A. from the Energy & Resources Group at the University of California at Berkeley.



**Jennifer Leisch**  
USAID-NREL Partnership  
Manager,  
USAID

Jennifer Leisch manages the USAID-NREL Partnership, overseeing a portfolio of clean energy integration projects. Jennifer leads the USAID Greening the Grid initiative. She holds a Ph.D. focused on renewable energy science, and she has previously worked in the research and development of advanced solar energy and fuel cell technologies.



**Abhishek Ranjan**

Additional Vice President and  
Head of Renewables, DSM & EE  
and Energy Analytics, BRPL

Abhishek Ranjan is the Additional Vice President and Head of Renewables, DSM & EE and Energy Analytics at BSES Rajdhani Power (BRPL) Limited, New Delhi. Abhishek has about two decades of experience in Power and Information Technology sectors in India. He started his career with Infosys Technologies Limited, an IT company based in India, where he worked on development of enterprise applications for a major US utility and a technology MNC. Abhishek Ranjan is currently leading a team in the areas of Energy Efficiency & Demand Side Management, Renewable Integration and Rooftop Solar, grid level Energy Storage solutions, EV charging infrastructure, Power scheduling & demand forecasting and Energy Analytics at BRPL. BRPL serves over 2.5 Million consumers over an area of 750 sq. Km in Southern and Western parts of national capital Territory of Delhi, India.



**Redi Allan B. Remoroza**

Assistant Vice President, Head of  
Transmission Planning  
Department,  
National Grid Corporation of the  
Philippines (NGCP)

Redi Allan B. Remoroza is the Assistant Vice President and Head of the Transmission Planning Department of the National Grid Corporation of the Philippines (NGCP). Redi is involved for more than 15 years in transmission planning for the Philippine power grid which has undergone restructuring and privatizations both for generation and transmission. Redi holds a B.Sc. in Electrical Engineering from Mapua Institute of Technology, Master of Engineering major in Power System from Technological University of the Philippines and a Certificate in Strategic Business Economics from the University of Asia and the Pacific.



**Nattapon Rongsriyam**  
Senior Engineer, Operation  
Planning,  
Electricity Generating Authority of  
Thailand (EGAT)

Nattapon is senior engineer at Power System Control and Operation division, Electricity Generating Authority of Thailand (EGAT). His current position is Head, Medium-term Generation Operation Planning Section. As electrical engineer at EGAT for more than 15 years, he has been working and has experience in the field of PPA management, power system operation, and hydro generation planning of Thailand's power system. He holds M.Sc. and B.Sc. in Electrical Engineering from Chulalongkorn University and holds M.BA. from SASIN.



**Leon Roose**  
Hawaii Natural Energy Institute  
(HNEI)

Mr. Roose is tenured faculty at the Hawaii Natural Energy Institute (HNEI), University of Hawaii, where he formed and leads the Grid System Technologies Advanced Research Team (GridSTART) focused on the analysis and integration of energy technologies and power systems, including smart and micro grid applications. He served in numerous leadership roles at the Hawaiian Electric Company for 19 years including management of renewable energy planning and integration, smart grid planning and projects, system protection, distribution and transmission planning, generation resource planning and procurement, fuel purchase and supply, and negotiation of power purchase agreements. Leon is an electrical engineer and licensed attorney, formerly in private law practice and served as Associate General Counsel at Hawaiian Electric Company.



**Peerapat Vithayasrichareon**  
System Integration of Renewables  
International Energy Agency (IEA)

Peerapat Vithayasrichareon, Ph.D., leads the IEA analysis on the challenges and best practices in integrating renewables into the power system, covering technical, economic and institutional aspects. He leads grid integration analysis in many regions including China, India, Thailand and ASEAN. Prior to the IEA, Peerapat was a senior consultant in an energy consulting firm in Australia that provides energy modelling services. He was also a research fellow at the Centre for Energy and Environmental Markets at UNSW Australia, leading a project which examined the impact of high renewables in the Australian electricity sector. He has experience in power system operation and planning in Thailand. Peerapat holds a Ph.D. in Electrical Engineering from UNSW Australia.



**Lalit Kumar Wasan**

Head of Department (Power  
System Control), Tata Power Delhi  
Distribution Limited

Mr. Lalit Kumar Wasan serves as Head of Department (Power System control) at Tata Power Delhi Distribution Limited [TPDDL]. He has over twenty years' experience in the power sector, focusing on power system control, real time power management through conventional and renewable resources, operations, AMR & Energy Audit, including implementation of ERP systems in TPDDL for better process management & resource optimization. He is a professionally trained Electrical Engineer with Post Graduate Diploma in Management. He is also a certified SAP solution consultant. He is an Alternate Member of Bureau of Indian Standard (BIS) committee on renewable integration.



**Markus Wypior**

Indo-German Energy Programme  
(IGEN), GIZ India

Mr. Wypior holds a degree as an economist from the University of Bonn, Germany. He has been working in various industrial and development cooperation projects in Eastern Europe, Central Asia, South Asia, and Southeast Asia. Mr. Wypior joined GIZ in 2003 as a regional manager in the Asia Pacific department responsible for energy and environment projects. From 2005 - 2010 he was seconded to India for the implementation of the National CFC Consumption Phase-out Plan and the National CTC Phase-out Plan under the Montreal Protocol on Substances that Deplete the Ozone Layer. From 2012 - 2015 he headed the support office of the Indo-German Energy Forum in New Delhi. At present he is the Deputy Cluster Coordinator of IGEN and heads the IGEN Green Energy Corridor Project on large scale grid integration of renewable energy.