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GOVERNMENT OF INDIA  
MINISTRY OF POWER

## **AGENDA**

# **KNOWLEDGE DISSEMINATION WORKSHOP ON COAL GENERATION FLEXING PRACTICES TO SUPPORT VARIABLE RENEWABLE ENERGY INTEGRATION**

**UNDER GREENING THE GRID (GTG)  
RENEWABLE INTEGRATION AND SUSTAINABLE ENERGY  
(RISE) INITIATIVE,**

**A JOINT INITIATIVE BY USAID AND MOP**

**IN PARTNERSHIP WITH  
GUJARAT STATE ELECTRICITY CORPORATION LIMITED  
(GSECL)**

**February 18-19, 2019**

**Venue: Gujarat Energy Training & Research Institute  
(GETRI), Gotri Rd, Beside 132KV, Gotri, Vadodara,  
Gujarat, India**



**GUJARAT STATE ELECTRICITY  
CORPORATION LIMITED**

## GREENING THE GRID

USAID/India's Greening the Grid (GTG) is a five-year program implemented in partnership with the Ministry of Power (MOP), Government of India under the ASIA - EDGE (Enhancing Development and Growth through Energy) Initiative. The GTG program aims to support the Government of India's (GOI) efforts to manage the large-scale integration of RE into the grid. A central piece of GTG is the Renewable Integration and Sustainable Energy (RISE) initiative, spread over a period of four years, which involves implementation of grid integration pilots. Deloitte Consulting LLP is implementing the GTG-RISE initiative in India. The grid integration pilots are multi-implementer work programs aimed at testing and evaluating building blocks to improve the integration of Renewable Energy (RE) in India's state and national power grids.

One of the pilots focuses on introducing flexibility in the operations of conventional coal based power generation plants to address the variance and intermittency of RE generation. The pilot is being implemented in partnership with Gujarat State Energy Corporation Ltd. (GSECL) in two units of its Ukai thermal power station.

## WORKSHOP BACKGROUND & OBJECTIVES

### **Workshop Background:**

The two-day workshop aims to discuss flexing operational practices, infrastructure improvements and damage mitigation techniques to limit impacts caused by flexing. Traditionally, coal power plants are designed to run at constant output, and electric utilities feel that ramping and cycling may reduce efficiency, increase costs, lower equipment lifetime, and is generally ill-advised or even impossible. However, in a number of countries, such ramping and cycling has long been considered normal practice. India with high coal dependence but ambitious goals for integration of variable renewable energy, "hourly ramping" and "daily cycling" of coal power plants, is set to become an increasing operational necessity.

GTG-RISE with support from its technical partners (Intertek AIM U.S) has successfully carried out damage cost modeling studies at two units (200 MW and 500 MW) of GSECL's Ukai thermal power station. On a similar pilot, GTG-RISE assisted NTPC to conduct damage cost modeling studies at Jhajjar and Ramagundam stations and is advising on implementation of flexible interventions including regulatory support.

### **Workshop Objectives:**

The objective of this two-day workshop is to advance participants' knowledge of coal flexing generation operational improvements and mitigation techniques to confront impacts. During the workshop, delegates will discuss:

- Operational modifications to existing coal plants to increase their flexibility to allow for increased load gradients (ramping rates), reduced minimum stable outputs, faster startup (from zero output).
- Infrastructure improvements that can be made to coal generators, including control software and equipment.
- Measures to minimize operational and maintenance (O&M) impacts.
- Successful international case studies on coal based flexible power operations including cost implications.
- Key findings from studies and analysis carried out under GTG-RISE Coal flexibility pilot at GSECL's Ukai thermal power station.

## ORGANIZERS

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## AGENDA (DAY I - February 18, 2019)

10:00-10:30 am **Welcome Tea & Registration**

### INAUGURAL SESSION

10.30 - 10:40 am **Welcome of dignitaries & Introduction of speakers and participants**  
*Moderated by B.A Gandhi, GSECL*

10.40 - 10.50 am **Welcome remarks**  
*Monali Zeya Hazra, USAID*

10.50 - 11.00 am **Inaugural Address**  
*MD, GSECL*

11:00 - 11.10 am **Vote of Thanks**  
*Shubhranshu Patnaik, Chief of Party, GTG-RISE*

11:10 - 11.30 am Group photo followed by tea

### TECHNICAL SESSIONS

11.30 am - 12:15 pm **Flexible Operations in Coal Based Plants- India Scenario**  
*A.K Sinha, GTG-RISE*

12.15 - 1.00 pm **Coal Flexing Operational Practices: Session One**  
*Cycling damage and damage or life management of steam turbines in cyclic operation*  
*Doug H/Nikhil K, Intertek*

1.00 - 2.00 pm **Lunch**

2:00 - 3.00 pm **Coal Flexing Operational Practices: Session Two**  
*Introduction to Cost of Cycling*  
*Nikhil Kumar, Intertek*

3:00 - 3.45 pm **Operational Strategies for Flexing in Thermal Plants**  
*GTG-RISE*

3.45 - 4.00 pm **Tea**

4.00 - 5.00 pm **Coal Flexing Operational Practices: Session Three**  
*Boiler Flexible Operation (Impacts & Countermeasures)*  
*Doug H, Intertek*

5:00 pm **Adjourn**

## AGENDA (DAY II- February 19, 2019)

- 10:00 – 10:30 am      **Welcome Tea & Registration**
- 10:30 – 10:40 am      **Welcome of dignitaries & Introduction of speakers**  
*Moderated by B.A Gandhi, GSECL*
- 10:40 – 12:45 pm      **USAID GTG - RISE Flexible Generation Pilot – Ukai Unit # 4 Review**  
*Nikhil Kumar/Doug H, Intertek*
- 12:45 - 2:00 pm      **Group photo and Lunch**
- 2:00 - 3:00 pm      **USAID GTG - RISE Flexible Generation Pilot – Ukai Unit # 6 Review**  
*Nikhil Kumar/Doug H, Intertek*
- 3:00 - 4:30 pm      **Flexible Operation for Coal Fired Boilers**  
***(Low Load Operation, Damage Mechanisms, Cycle Chemistry and High Energy Piping)***  
*Nikhil K, Doug H, Marv C/Tom B, Intertek*
- 4:30 – 5:00 pm      **Q&A & Adjourn**