Optimization of coal-fired power plant operation
(Entrusted as METI/NEDO's project)

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Optimization of coal-fired power plant operation (1/4)

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Outline

- 4 technical study to improve operation flexibility for unit NO.11 (500MW) and optimal operation study for 13 units was completed for VSTPS/NTPC in 2018.12 - 2019.6 as METI/NEDO's project

<Site Location>

Vindhyachal Super Thermal Power Station (VSTPS)

<Technical Approach>

Target Unit	Items
Select One 500MW unit (Unit NO.11)	☐ Reduction of Minimum Load ☐ Shortening of Startup time ☐ Improvement of Load Fluctuation Rate ☐ Effective partial Load Operation
The entire VSTPS (13 units)	☐ To formulate the optimum operation plan for the entire 13 units

<Expected Effect>

- ☐ *Contribution for Frequency Stability by Flexibility Improvement*
- ☐ *Reduction of Coal Consumption*
- ☐ *Reduction of CO2 Emissions*

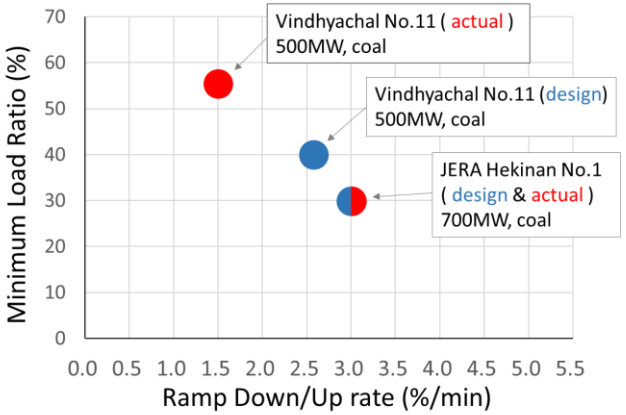
Optimization of coal-fired power plant operation (2/4)

Results & Effects (1/2)

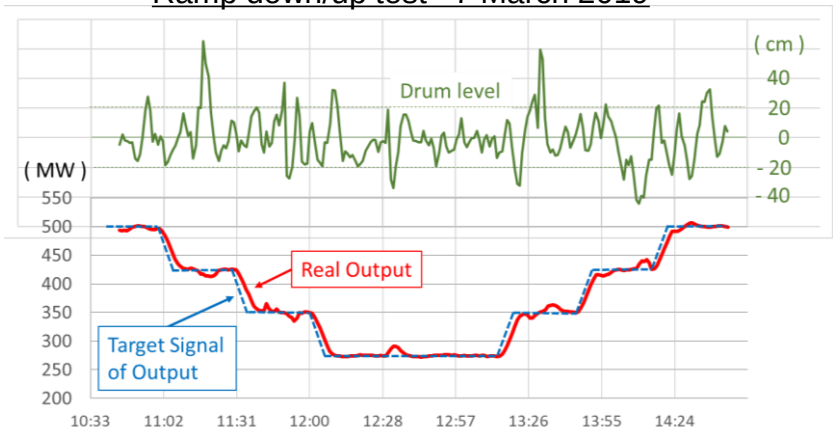
- No.11 unit of VSTPS has enough ability of operation on design basis, however actual operational ability is much more inferior to design basis ability.
- Major issue which obstruct flexible operation of No.11 unit are malfunction of MW control logic and Drum level control logic. So, JERA recommends control logic modification and tuning of control logic by test operation.

- Flexibilization study of No.11 unit of VSTPS

Operational Flexibility of No.11 unit



Ramp down/up test 7 March 2019



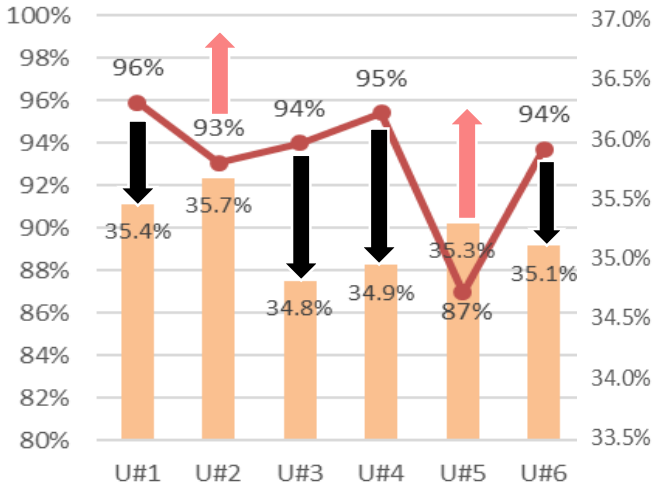
※ Control performance of network frequency of India is not very good because Automatic Generation Control (AGC) system is not widely introduced.

Optimization of coal-fired power plant operation (3/4)

Results & Effects (2/2)

- Possibility of Coal Consumption Reduction due to Merit Order by analyzing Unit 1-6 Operating Data in 2018
- In Addition, more Possibility of Coal Consumption Reduction by DSS in case of Huge Amount Introduction of Renewable Energy.

<Optimum Operation focused on Stage-I (Unit1-6) of VSTPS>



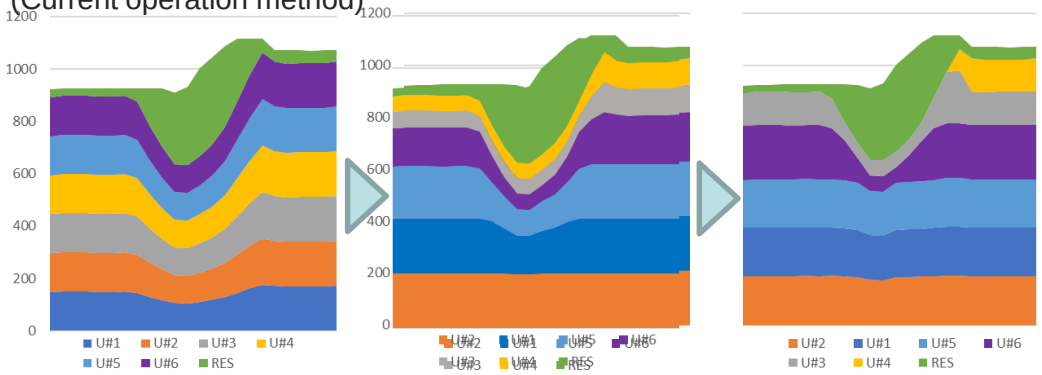
Fuel Consumption Reduction

▲140,000 t / year

~ demand forecast for 2022 following the large-scale introduction of renewable energy ~

<Load curve of 'Typical day' based on merit order operation (center) and DSS operation (right) method>

(Current operation method) Merit Order operation DSS operation



▲30,000 t / year + ▲70,000 t / year

Optimization of coal-fired power plant operation (4/4)

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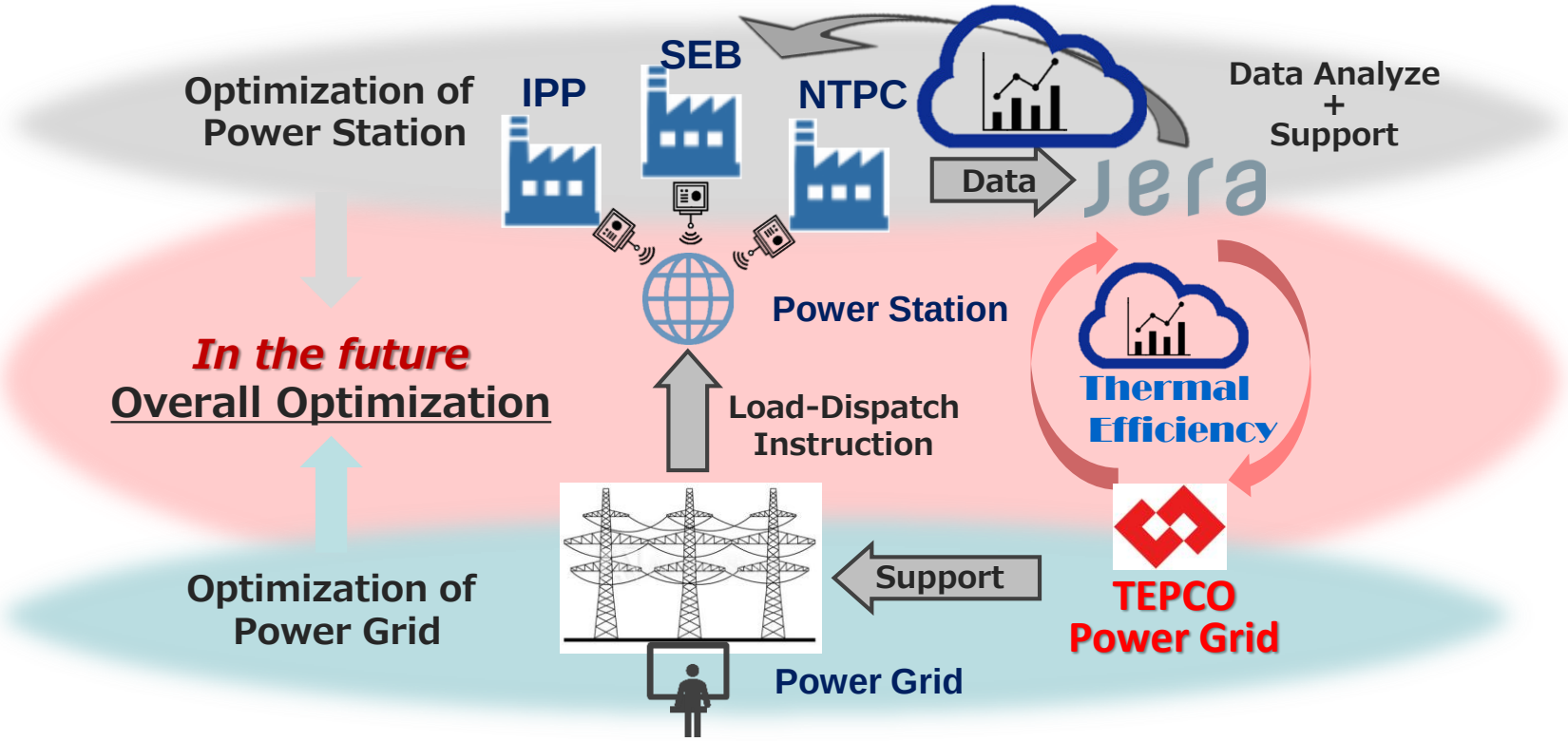
Prospects

- JERA supports to improve unit flexibility and optimum operation of the entire units for not only NTPC but also SEB and IPP, and contribute for overall power plant optimization.
- In the future as next step, both JERA and TEPCO-PG contribute for overall optimization in India.



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Thank you for your attention.