Flexible Operations in Thermal Power Plants

ADEX

> If the world wants to make Energy Transition happen, existing Thermal Power assets need to operate differently, more **flexibly**.

OVERVIEW

There is demand for a **New Electricity Market,** determined by societal pressure for sustainable energy, where Energy Transition Plans, dictated by national and transnational institutions and investors, are pushing the move to Renewable Energy. The result of this is an electricity mix with a higher percentage of renewable energy, forcing Thermal Power Plants to be much more flexible, completing generation not produced by renewables and acting as their backup. Stakeholders, governments, and our society at large are literally aiming for a planet without any thermal power.

However, the reality is that the world will need at least another thirty years to achieve a scenario where 90% or more of the global electricity is produced by renewable energy. Therefore, enhancing **Flexible Operations for Thermal Power Plants** is an urgent and mandatory subject, not only to survive in this environment but to be more **dispatchable and profitable**.

THE BREAKTHROUGH

ADEX, a Cleantech software company specialized in optimizing the performance and sustainability of industrial processes, helps existing power producers to be **cleaner**, more **flexible**, and more **efficient**. Thus, they can be more dispatchable and enable renewable energy generation to be brought into the mix. Our current solutions for Thermal Power Plants fix a pain point in the Market that incumbent providers are not addressing properly. This breakthrough is the outcome of years of R&D, initially developed at MIT: the **ADEX Controller**.

This disruptive technology is multi-variable, tunes its parameters in real time and predicts the dynamics of the process. Leveraging the features of the ADEX Controller, we have developed a Self-tuning Artificial Intelligence Control Platform that is a non-intrusive software add-on to the existing control system.

> The **ADEX Controller** impacts certain mission-critical processes of the plant and does not require additional investment in I&C.

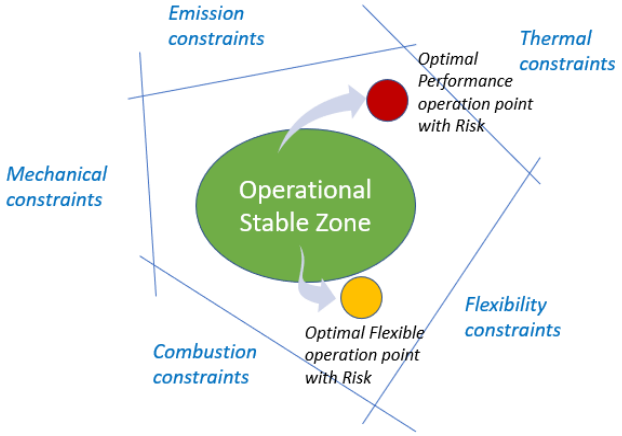
We have helped different thermal power producers to be more **flexible** and **efficient**, such as coal-fired, CCGT and biomass power plants.

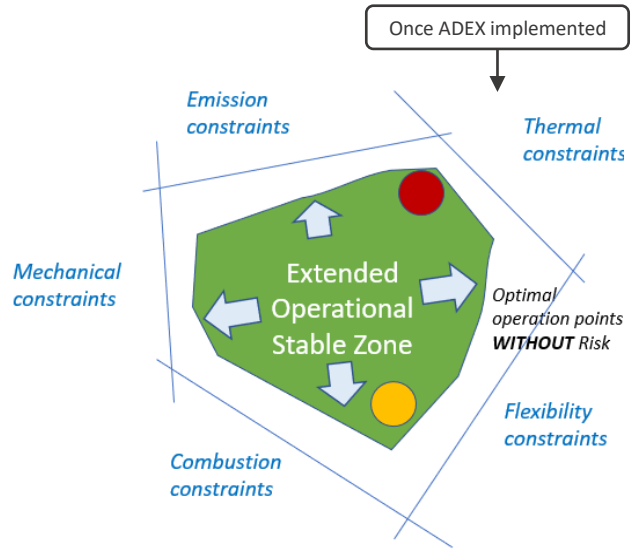
The **ADEX Control Platform** is capable of increasing ramping rates by 100%, decreasing minimum loads by 25% and decreasing the heat rate by almost 0,8%.

OUR TECHNOLOGY

ADEX can regulate a complex process with changing dynamics when the plant is cycling or swinging from minimum to maximum load but in a more **stable** and **safe** way than using current control solutions, based on PID controllers. Thermal power plants are forced to operate in changing optimal points where the plant is not stable enough with its current design, equipment, and control system.

ADEX stabilizes and automates those critical processes, ensuring that the process variables are on the **desired setpoints** and bringing processes to new performance levels.

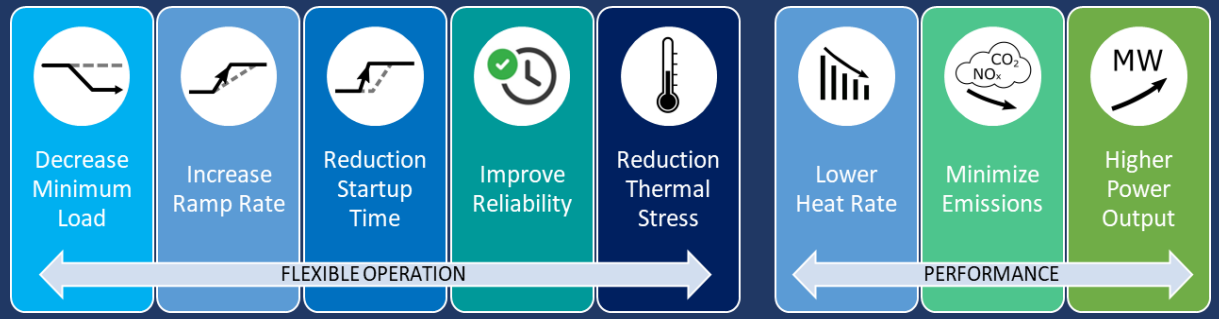




The ADEX Self-Tuning AI Platform can help your plant to decrease the minimum load, to nearly double ramping rates, to shorten startup times, to avoid the emission of thousands of tons of CO_2 and all of that with much less thermal stress, even in **more demanding conditions**. Regarding performance, ADEX can improve the heat rate with the plant, working at any load. We can also reduce $DeSO_x$ or $DeNO_x$ emissions and increase the power output, when the plant is working at full load.

OUR PRODUCTS

The ADEX Self-Tuning Artificial Intelligence Platform is commissioned on site and is agnostic to the DCS vendor. Our Platform optimizes a small list of variables that have a critical impact on the performance of the plant. ADEX Optimizers can be commissioned individually or together, according to Plant needs.



Superheater and Reheater Steam Attemperator Optimizers	Stabilize the temperature on its setpoint in all operating scenarios, especially during load changes and start-ups. For Coal-Fired and CCGT Power Plants.	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
Drum Level Optimizer	Reduces drum level oscillations by 75% anticipating drum level peaks and drops due to load changes. It limits the risk of costly trips and excursions and enables higher ramping rates. For Coal-Fired and CCGT Power Plants.	✓ ✓ ✓ ✓
Gas Heater Optimizer	Provides CCGT power plants the ability to operate across a range of gaseous fuels of varying compositions, while maintaining performance, reliability, and operating flexibility. Only for CCGT Power Plants.	✓ ✓ ✓ ✓
Combustion Optimizer	Stabilizes the combustion process, which is the first step towards increasing the ramp rate and lowering the minimum load. Only for Coal-Fired Power Plants.	✓ ✓ ✓ ✓
Primary Emissions Reducer	Can help Plants notably in reducing the primary emissions, CO_2 and NO_x, in the boiler together with combustion optimization. Only for Coal-Fired Power Plants.	✓
Secondary Emissions Reducer	Can optimize the emissions at secondary level, namely $DeSO_x$ or $DeNO_x$. Only for Coal-Fired Power Plants.	✓

Our Technology has been deployed in more than 65 processes all around the world, commissioned along 35 power blocks, collecting more than 12 GWs.

Customers such as Enel in Europe, Naturgy in Latam or Pacificorp in the US are already enjoying the benefits of ADEX's technology.

We work with the most important companies and organizations in the energy and technology sector. Here are some examples:

CUSTOMERS

PacifiCorp · ARCLIGHT · BBET Bahia de Bizkaia · GPG Naturgy Group

enel · acciona · CCI

PARTNERS

tecnatom · TCS TATA CONSULTANCY SERVICES

AWARDS & RECOGNITIONS

PLUGANDPLAY Sustainability · INTERNATIONAL CENTRE FOR SUSTAINABLE CARBON · WE SUPPORT UN GLOBAL COMPACT · DEEP TECH hello tomorrow PIONEERS

Contact

Visit the Thermal Power Plant page on https://www.adexcop.com/energy/

Email: sales@adexcop.com

About Adaptive Predictive Expert Control ADEX, S.A. (ADEX)

ADEX is a Cleantech software boutique specialized in optimizing the performance and sustainability of industrial processes. We have developed and patented a disruptive Control Technology software license, brought to life through our Self-tuning Artificial Intelligence platform.

This breakthrough is the outcome of years of Research and Development, initiated at MIT in the years previous to the launch of the company. Since then, ADEX has continuously invested in R&D and innovation, concluding in a family of patents and trade secrets that support the core Technology.

ADEX helps existing power plants to be cleaner, more flexible, and more efficient. Thus, they can be more dispatchable and enable renewable energy generation to be brought into the mix. Our current solutions for thermal power plants (coal-fired, CCGT, biomass, or WtE power plants) fix a pain point in the Market that incumbent providers are not addressing properly.

For more information, visit **www.adexcop.com** and follow our news at **ADEX Linked In page**