

March 28, 1979

NEW YORK, SATURDAY, MARCH 31, 1979

U.S. AIDES SEE A RISK OF MELTDOWN AT PENNSYLVANIA NUCLEAR PLANT; MORE RADIOACTIVE GAS IS RELEASED



Dozens of children are riding on the bus that took them to Allentown, Pa., after they were evacuated from Middletown, site of nuclear plant.

CHILDREN EVACUATED

But Governor Says Later Further Pullouts Are Not Thought Likely

By MICHAEL J. SULLIVAN
Special to The New York Times

MIDDLETOWN, Pa., March 30 — Gov. Dick Thornburgh ordered school buses and school children today to head for evacuation routes from the nuclear power plant site in Middletown, Pa., after U.S. nuclear safety officials said they saw a risk of a meltdown at the plant.

Thornburgh said that the evacuation of children from the plant site was necessary because of the possibility of a meltdown at the plant. He said that the evacuation of children from the plant site was necessary because of the possibility of a meltdown at the plant.



CONGRESS IS BRIEFED

Carter Aide at Scene: Danger to the Public Is Believed Remote

By THE ASSOCIATED PRESS
Washington, March 30

WASHINGTON, March 30 — U.S. nuclear safety officials said today that they believe the risk of a meltdown at the Three Mile Island nuclear power plant is remote.

The officials said that they believe the risk of a meltdown at the plant is remote because of the design of the plant and the actions of the operators.

Within Sight of Stricken Plant, A Town's Main Street Is Empty

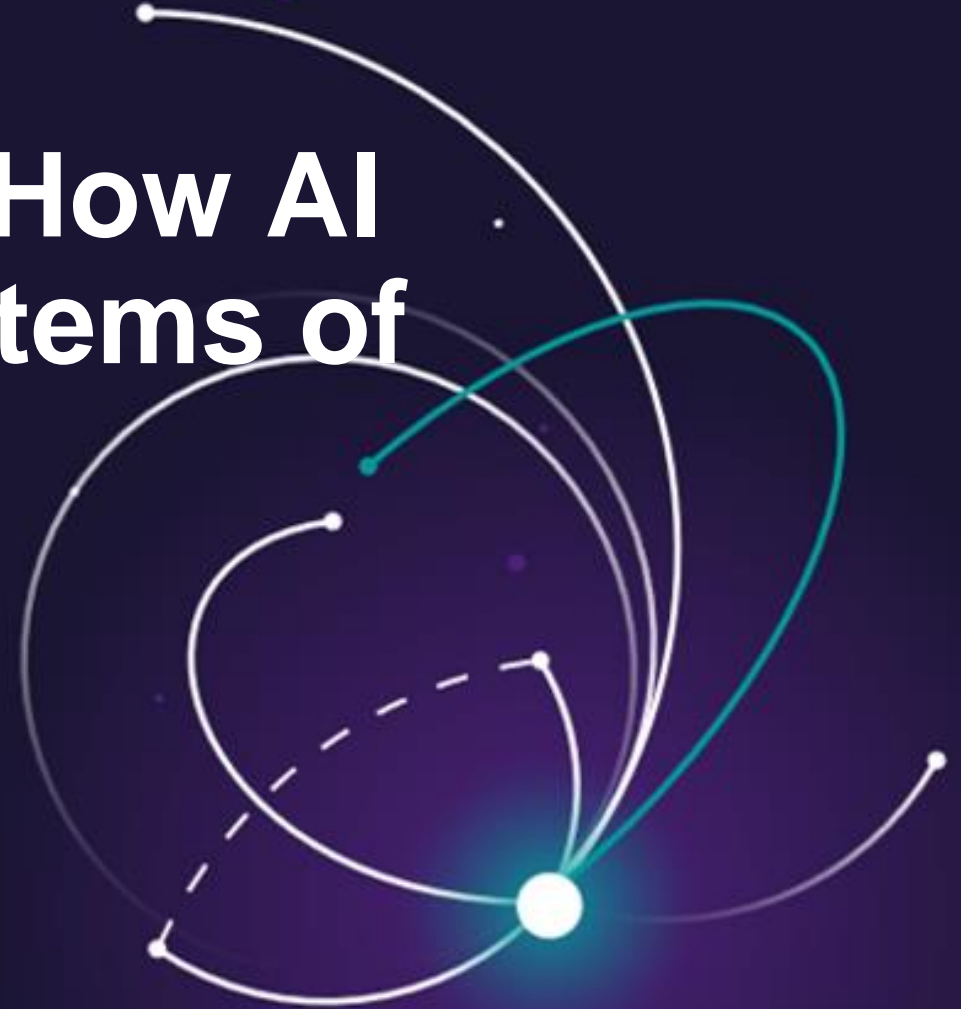
By MICHAEL J. SULLIVAN
Special to The New York Times

ALLTOWN, Pa., March 30 — The main street of Allentown, Pa., was empty today as the town's residents evacuated from the nuclear power plant site in Middletown, Pa., after U.S. nuclear safety officials said they saw a risk of a meltdown at the plant.



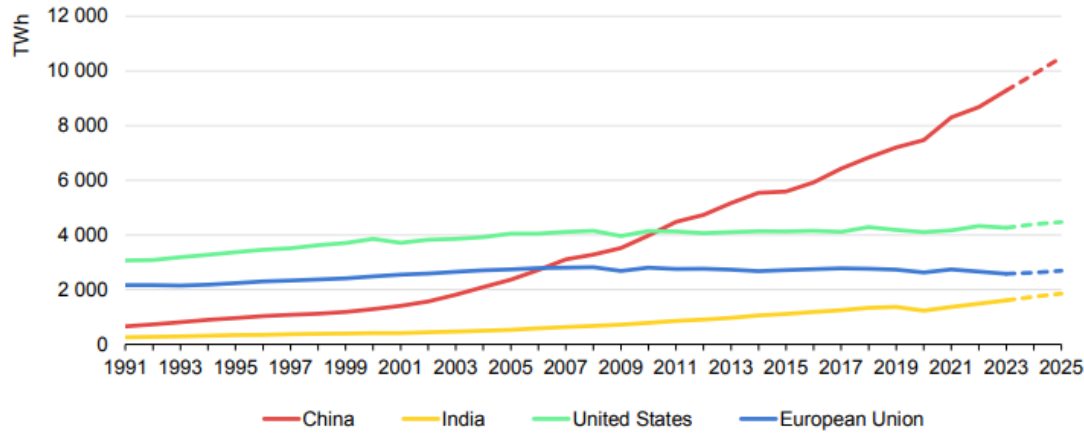
Keeping the Lights On: How AI Enables the Energy Systems of the Future

Micheline Casey



A Shifting Energy Landscape adds complexity to Energy Systems

Electricity demand in selected regions, 1991-2025

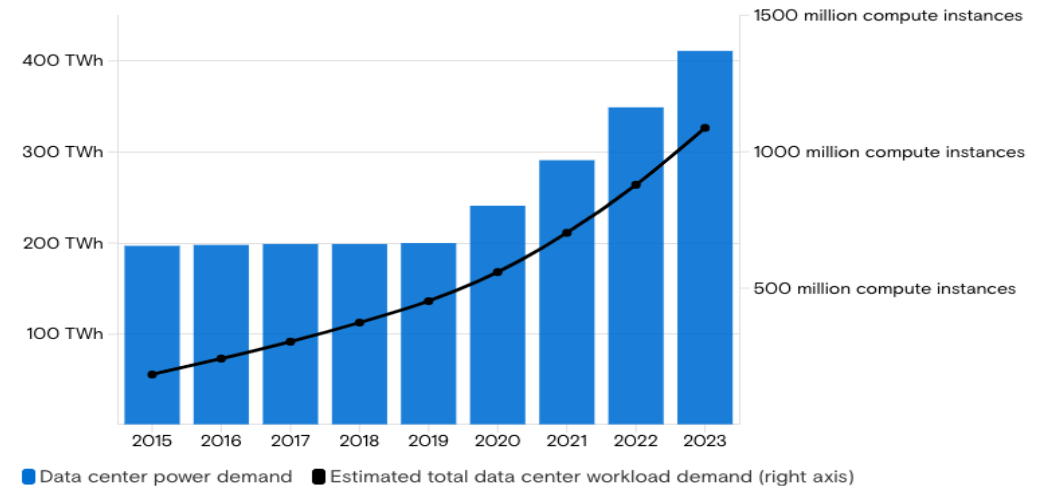


IEA. CC BY 4.0.

Energy demand is increasing at fastest pace in years

160% increase in data center power demand

The workload demand for data centers...
...and the power they consumed



Source: Masanet et al. (2020), Cisco, IEA, Goldman Sachs Research
The data center power demand for 2023 is an estimate.

Goldman Sachs

A Shifting Energy Landscape adds complexity to Energy Systems

Changing energy mix adds instability to grid operations



A screenshot of a social media post from a user with a profile picture of a man in a white shirt. The text of the post reads: "Hurricane? No problem. High water? No problem. House with no power? No problem. 110 degree heat index today? No problem. The Truck is powering my house with enough charge to last for 3 days! Perfect car for Houston! Love this truck! #PowerShare @elonmusk". Below the text are four images: a black Cybertruck in a parking garage, a video player with a play button, a screenshot of the Cybertruck's battery status showing "289 mi" and "Over 3 days of energy remaining", and a flooded street with a car. The post is timestamped "2:52 PM · Jul 9, 2024" and has 19 likes, a reply, and a copy link option.

Bidirectionality injects unplanned nodes

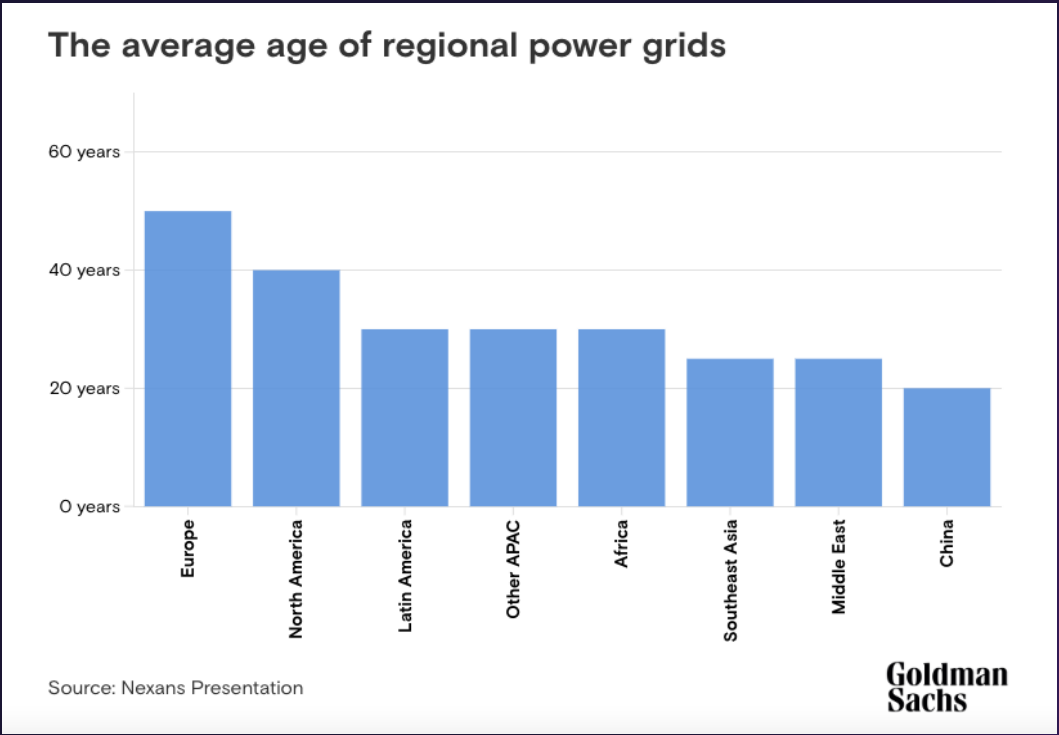
Grid infrastructure is outdated

The integration of renewables leads to increasing grid congestion and stalls renewable projects



Curtailment of energy due to network or system reasons

United States - Over 70% of transmission lines are more than 25 years old.
Europe - 40% of its grid nearing the end of its life.



Future Energy Systems:

Digital, Connected, Smart, Adaptable, Automated

SIEMENS
ENERGY



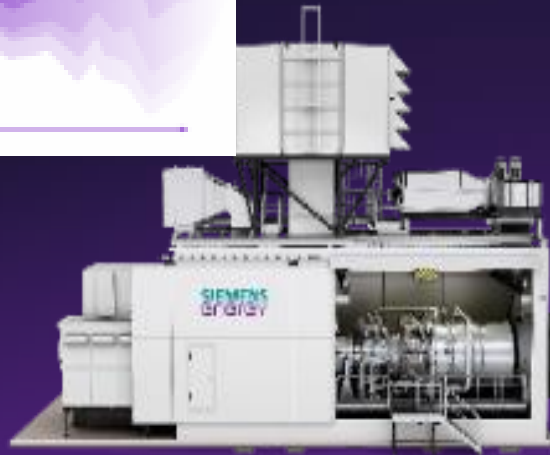
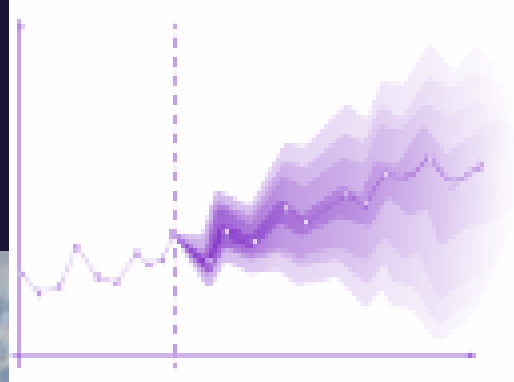
2040: Automated ,Unmanned, Configurable

SIEMENS
ENERGY



*The modular components
are being built today*

Example: Autonomous Power Plant Operations



Challenges

Electricity price/demand forecast

Capacity planning

Financial Figures

Benefits

Increased Cost Savings

Improved customer satisfaction

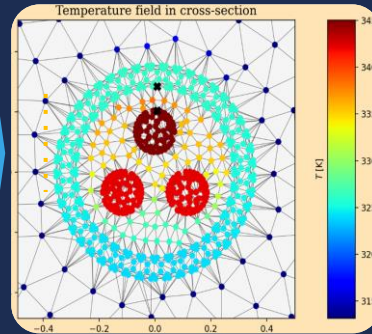
Lowered Carbon footprint

Example: Improving Grid Resiliency

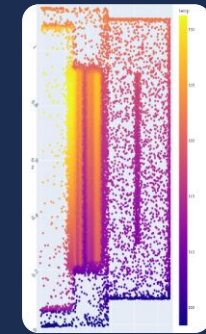
AI-based, physics informed for real time monitoring



Transformer Bushing surrogate model for real-time hot spot prediction



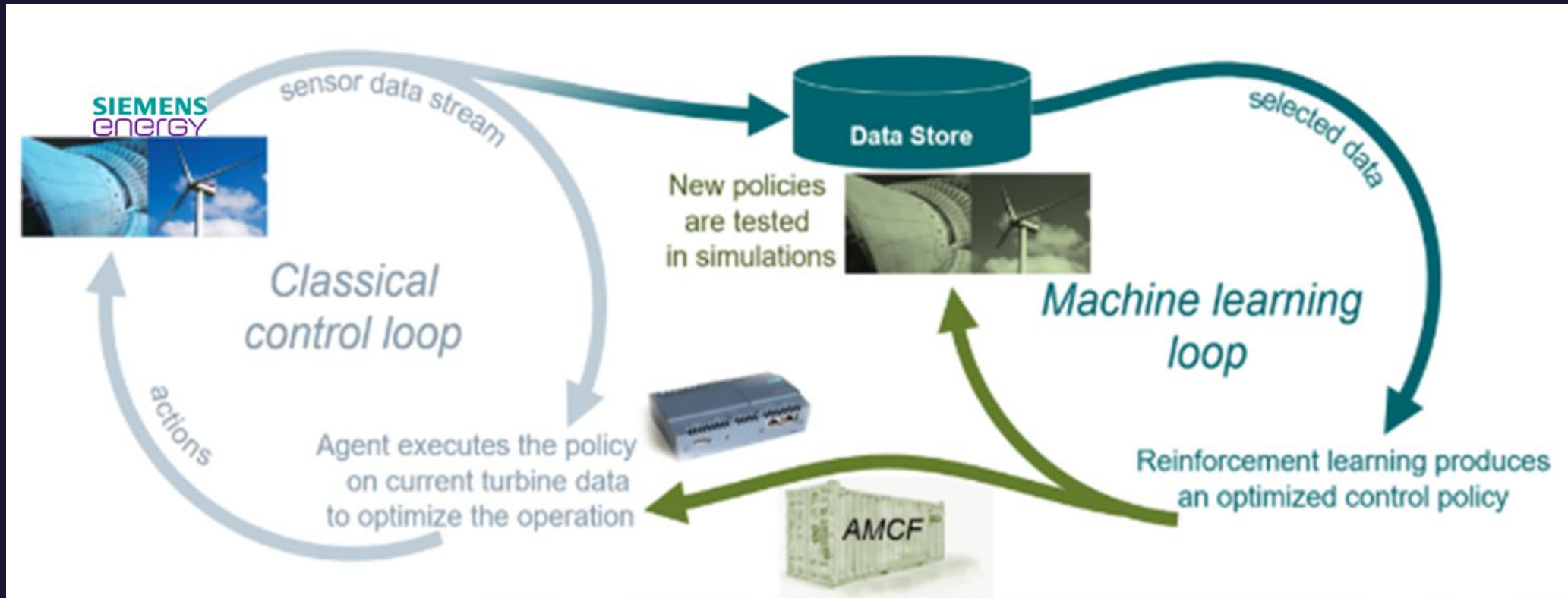
Thermal model to anticipate transient heat transfer for GIS¹ components



Thermal distribution for fluid-immersed transformer windings

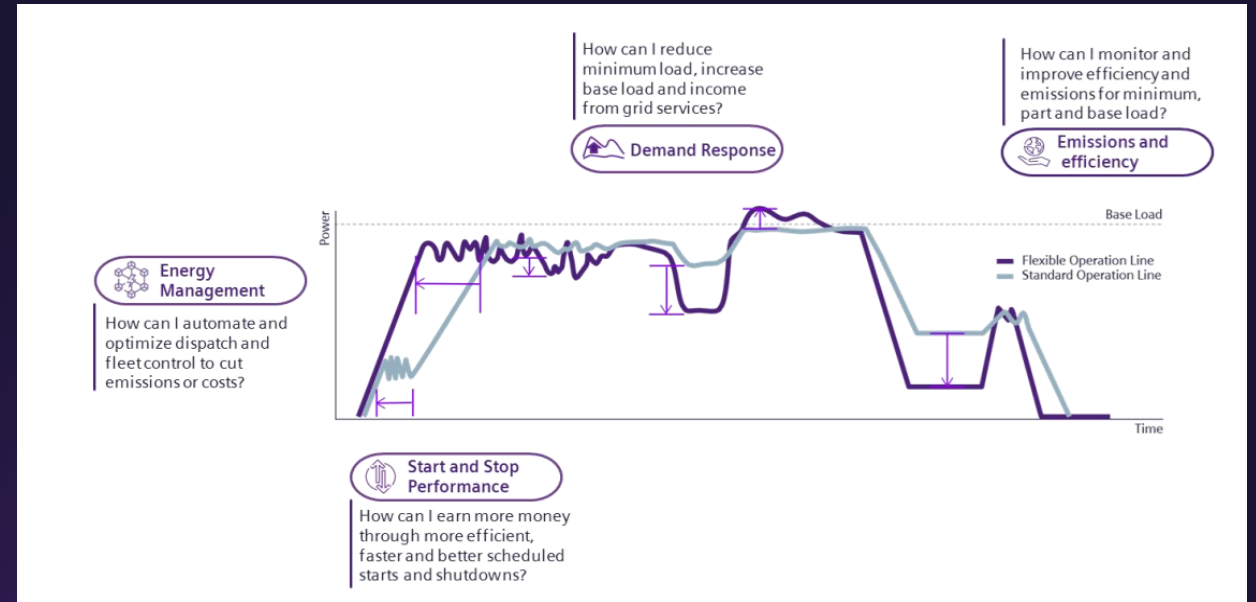
Up to ~40,000x speed-up of model response time without sacrificing precision

Example: Speeding Feedback Cycles and Decisions



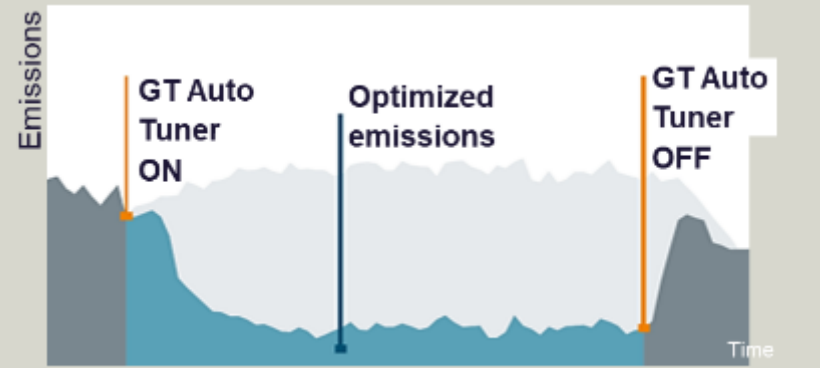
Example: Reducing Carbon Emissions

Across cycles: reduced fuel use, optimize energy dispatch, reduce CO2 emissions



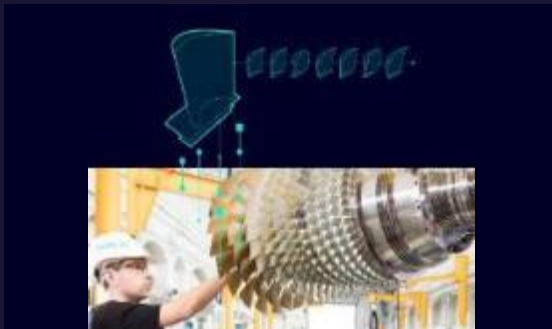
Emissions/Stability Module

- ▶ **Autonomously tune the combustion by introducing refinements to the fuel distribution.**
- ▶ **Average 10% NOx reduction at baseload.**



~10% lower emissions via refined fuel distribution and elimination of seasonal tuning

Design optimization



AI-driven surrogate-based geometry optimization...

- applied to turbine blades
- accelerates design time
- improves performance

☐ Improved sustainability through enhanced products

Reliability modelling



Utilizing neural network-based techniques for...

- modeling of shape deviations in manufacturing
- quantifying reliability of components in the field

☐ Facilitates reliability-based lifing and robust design

Asset monitoring

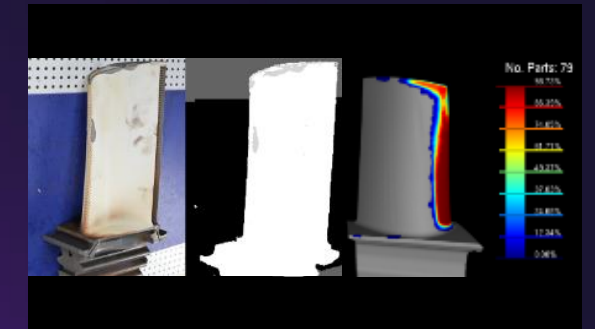


Leveraging advanced machine learning to...

- detect anomalies in asset operation (acoustic)
- monitor plant operation (computer vision)

☐ Enables autonomous operation

Service field feedback



Utilizing computer vision for automatic...

- defect detection and classification on used parts
- Calibration of design models based on service experience

☐ Improved maintenance and field feedback loop

AI and Energy Become Increasingly Symbiotic

top The Washington Post

Microsoft deal would reopen
Three Mile Island nuclear
plant to power AI



Reported: September 20, 2024

AI's transformative potential

SIEMENS
ENERGY



Digital Twins

Optimize utilization of power assets and the grid by combining machine learning with physics-based models

Autonomous Operation

Self-operating plants which continuously adapt to changes using computer vision and time series analytics

Smart Connected Services

Maximize energy system efficiency while reducing costs with multidisciplinary optimization

Reliable Grids

Demand forecasting and production optimization using machine learning and edge computing

Supply Chain Optimization

Model supply chain risks and optimize resilience to reduce non-conformance cost and unlock buffers

Thank you!

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