mitek ANALYTICS

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Analytics for Industrial Internet of Things

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IIoT Analytics

INDUSTRIAL REVOLUTION

Digital Revolution

- Software is eating the world
  - (Marc Andreessen, 2011)
- Internet Revolution
  - Connected people

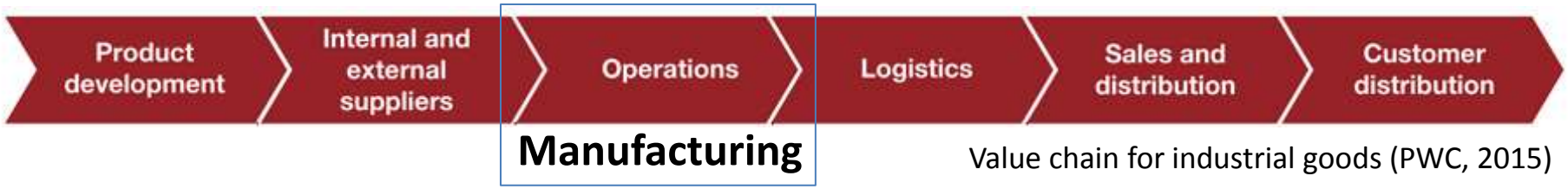
New Industrial Revolution

- Digital revolution
  - connected people
  - 10-15% of the economy
- Industrial IoT revolution
  - Connected machines
  - 80% of the economy

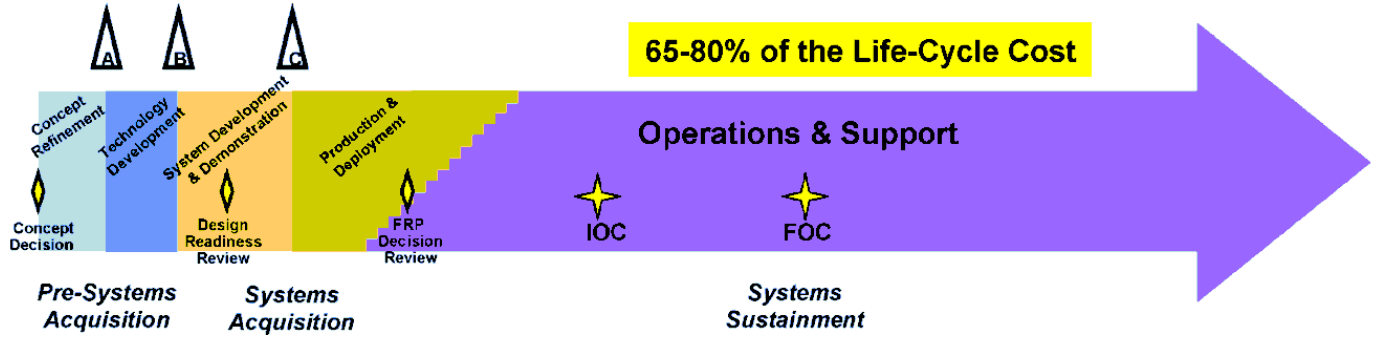
M2M

More Than Manufacturing

- Development and manufacturing
  - 10-15% of the lifecycle cost
- The IIoT will change the operations and support
  - 65-80% of the lifecycle cost



Value chain for industrial goods (PWC, 2015)



DoD CBM+ 2007

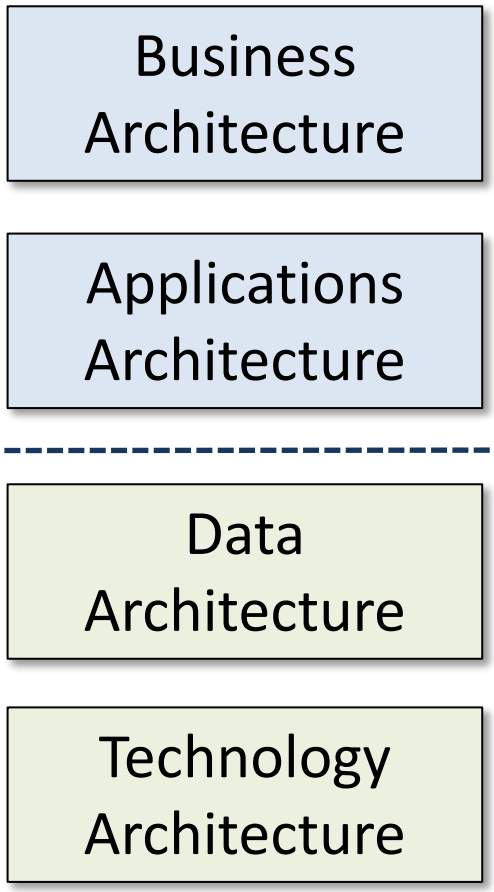
Business Value Estimates

- Analyses of the IIoT economic impact

	Value	Date	Comment
GE	$10-15 Trillion	2014	IIoT
Accenture	$14 Trillion	2015	IIoT
McKinsey	$11 Trillion	2015	IIoT
Industrie 4.0	$4 Trillion	2014	Manufacturing
Gartner	$2 Trillion	2015	Consumer IoT
Cisco	$17 Trillion	2015	IoE ≈ IIoT+CIoT

IIOT ANALYTICS

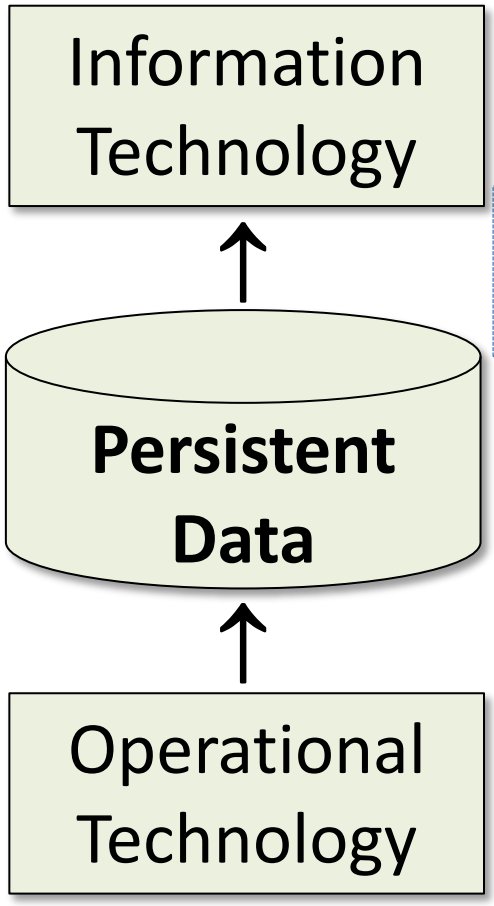
Enterprise Architecture View



- IIoT Applications
  - Analytics: process and analyze the data
  - Operations: business processes

- IIoT Platform
  - Collect and manage data
  - Needed to run applications
  - Most action, so far

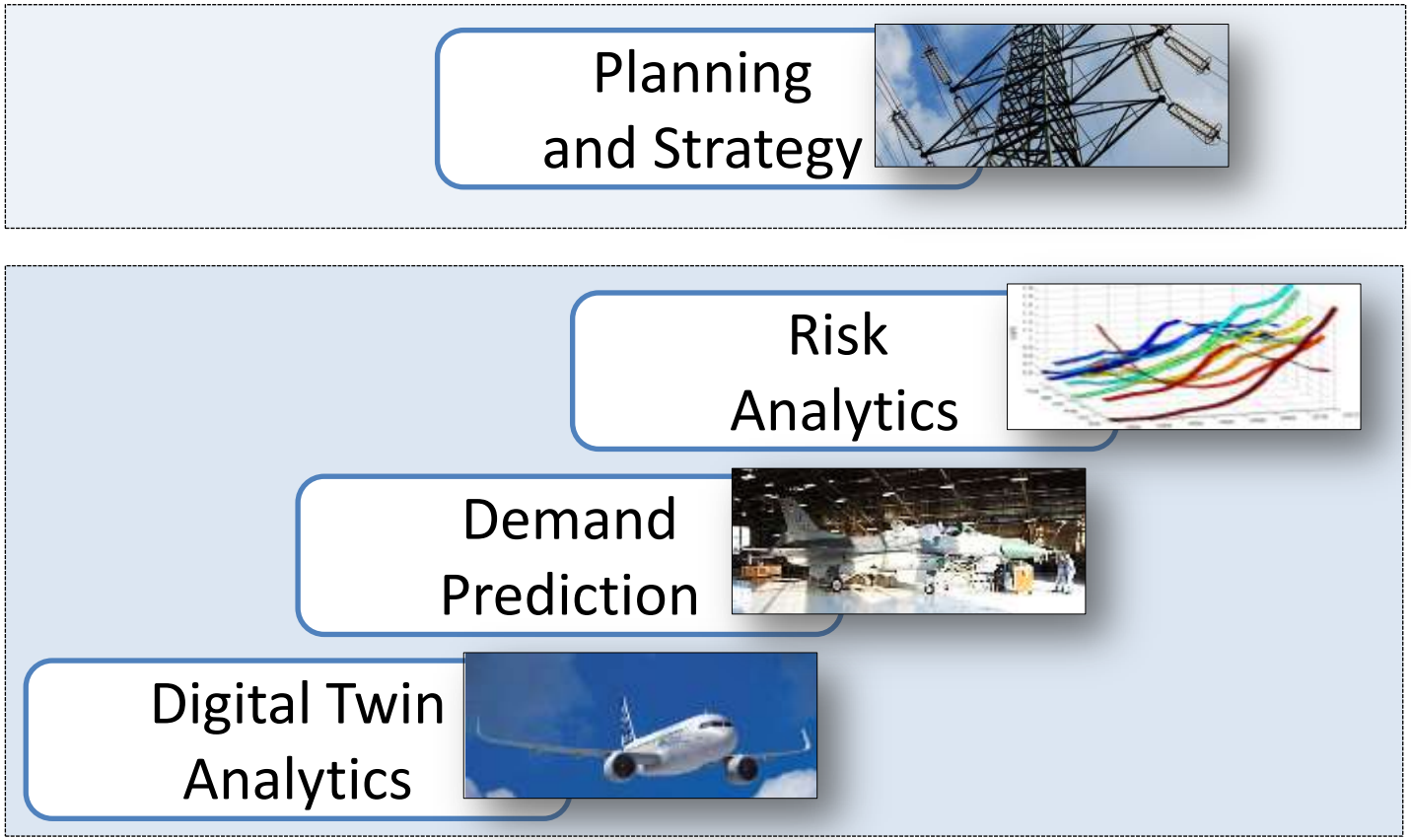
IIoT Data Analytics



- IIoT = IT systems using big OT data
- In IIoT, the OT data is accumulated as Persistent Data
- OT systems use their data on-line, but do not accumulate it

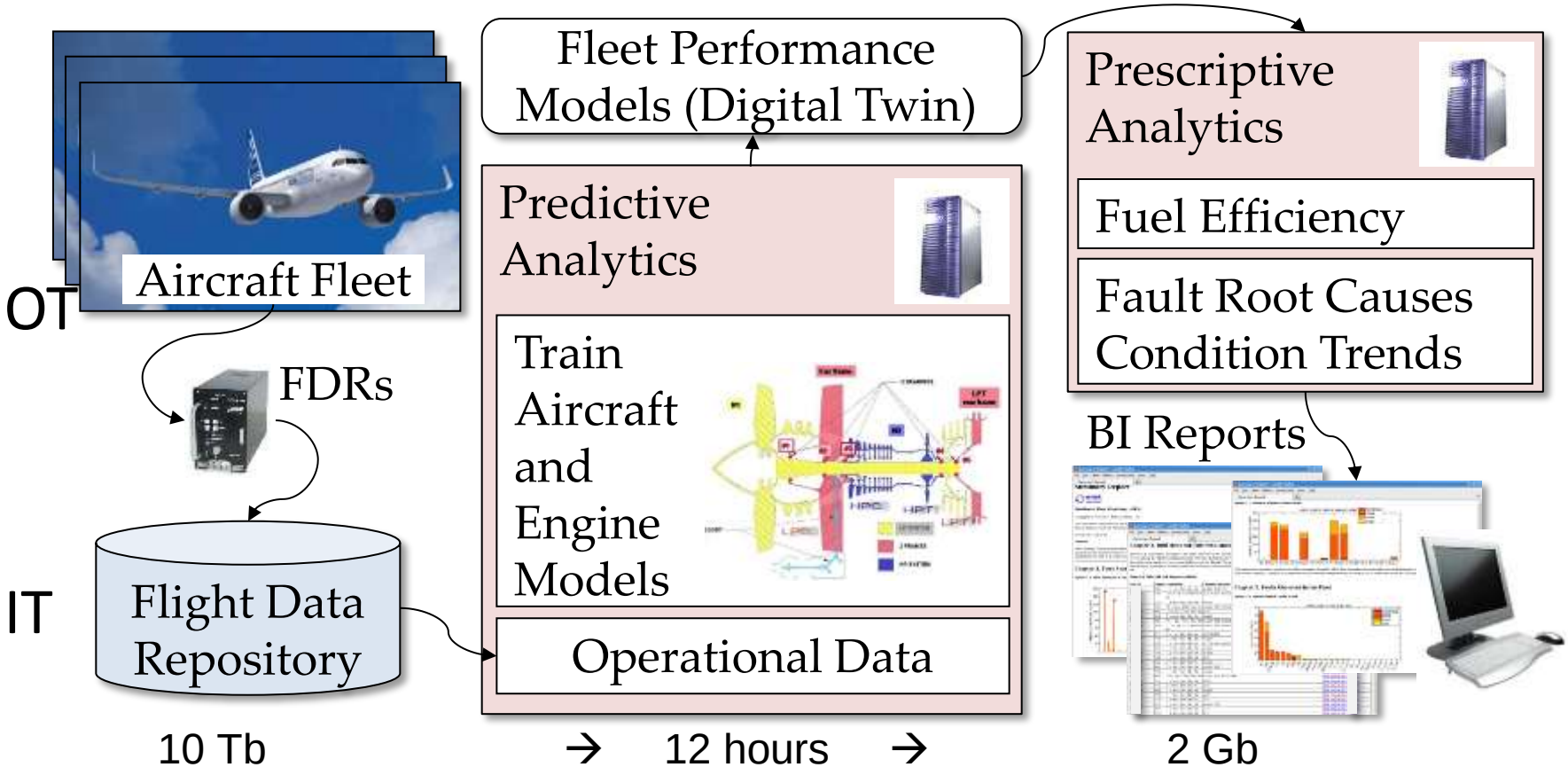
EXAMPLES OF IIOT ANALYTICS APPLICATIONS

IIoT Analytics Stack



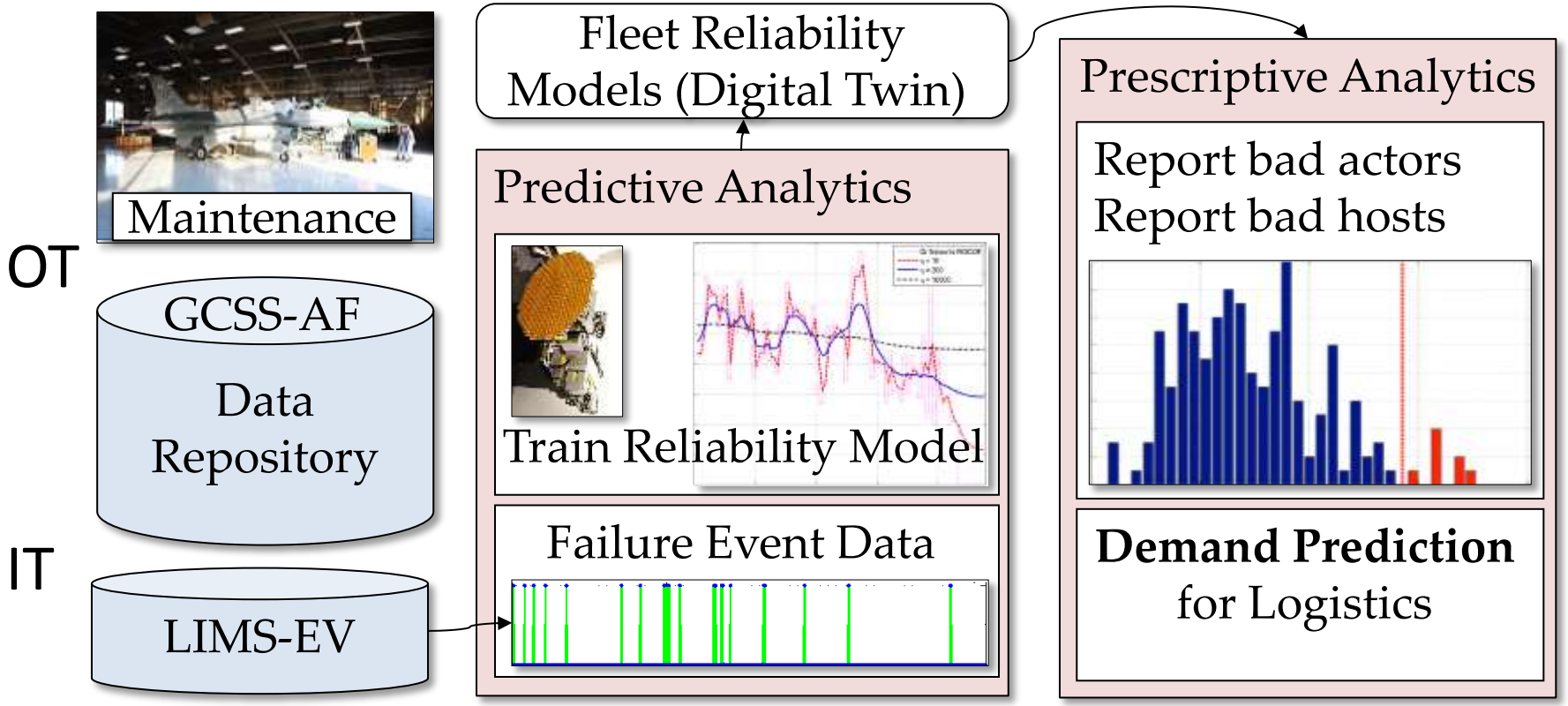
Operational Digital Twin

Air Force, NASA → Mitek, Stanford → GE, Airlines, …



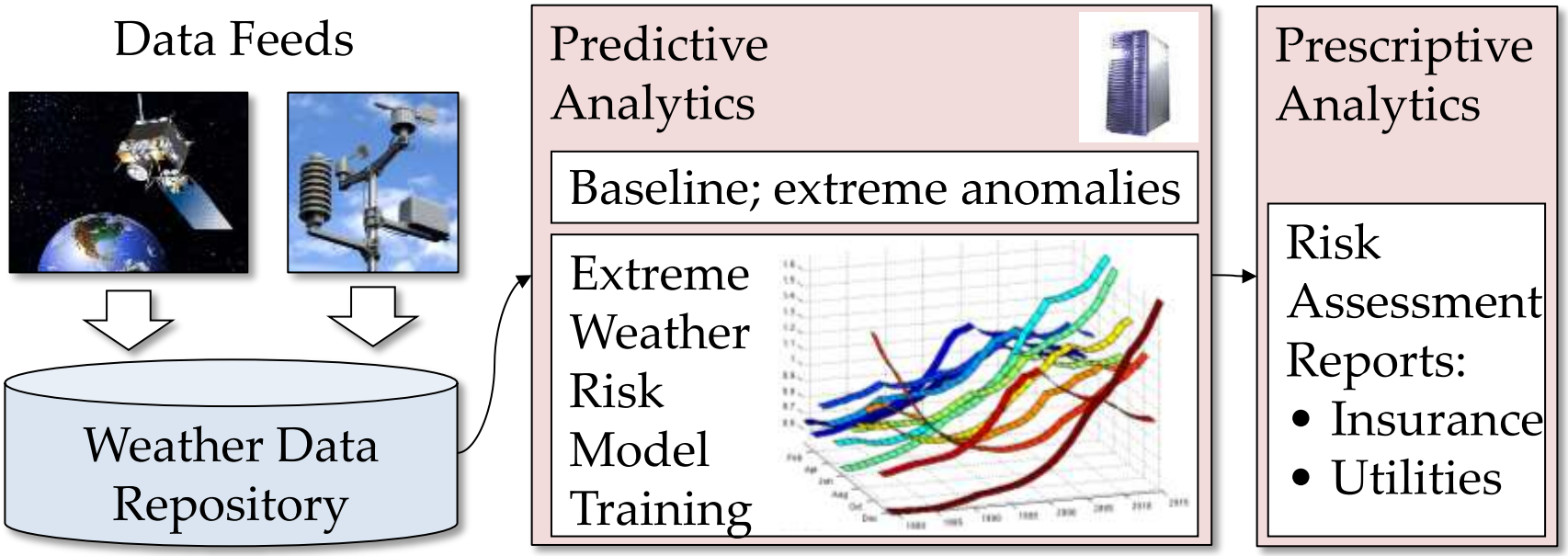
Demand Prediction

OO-ALC, Hill AFB → Mitek → Lockheed Martin



Weather Risk Analytics

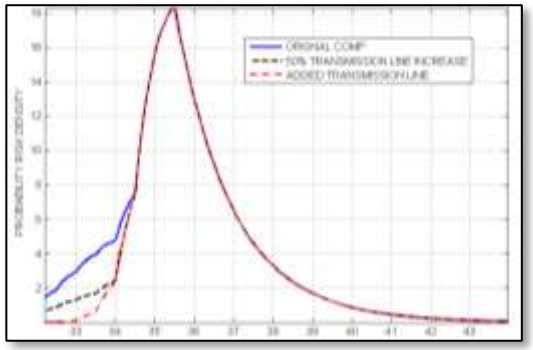
- Year-to-year trends of 100-year event risks
  - Joint work with Steven Chu, Stanford Physics, and NCAR
- High temperature risk increased x2 in last 40 years



Bulk Power System Planning

- Planning for reliable power
  - Load loss < 1 day in 10 years
  - Data driven probabilistic model for load balancing

Loss Of Load risk



system load

IIoT Analytics

CONCLUSIONS

Conclusions

- The IIoT will create value through data-driven analytics applications
  - Convergence of IT and OT computing
- Value in operations - not just manufacturing
- Many layers of analytics stack are important
- Examples of the IIoT analytics
  - Strategy: risk analytics
  - ↑
  - Logistics: demand prediction
  - ↑
  - Asset fleet analytics: Digital Twin