GEA Power Cooling Systems, Inc.

ng engineering GEA

On-Line Performance Monitoring

OSIsoft User Conference 2004

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Who is GEA?

"Process and Thermal Engineering"

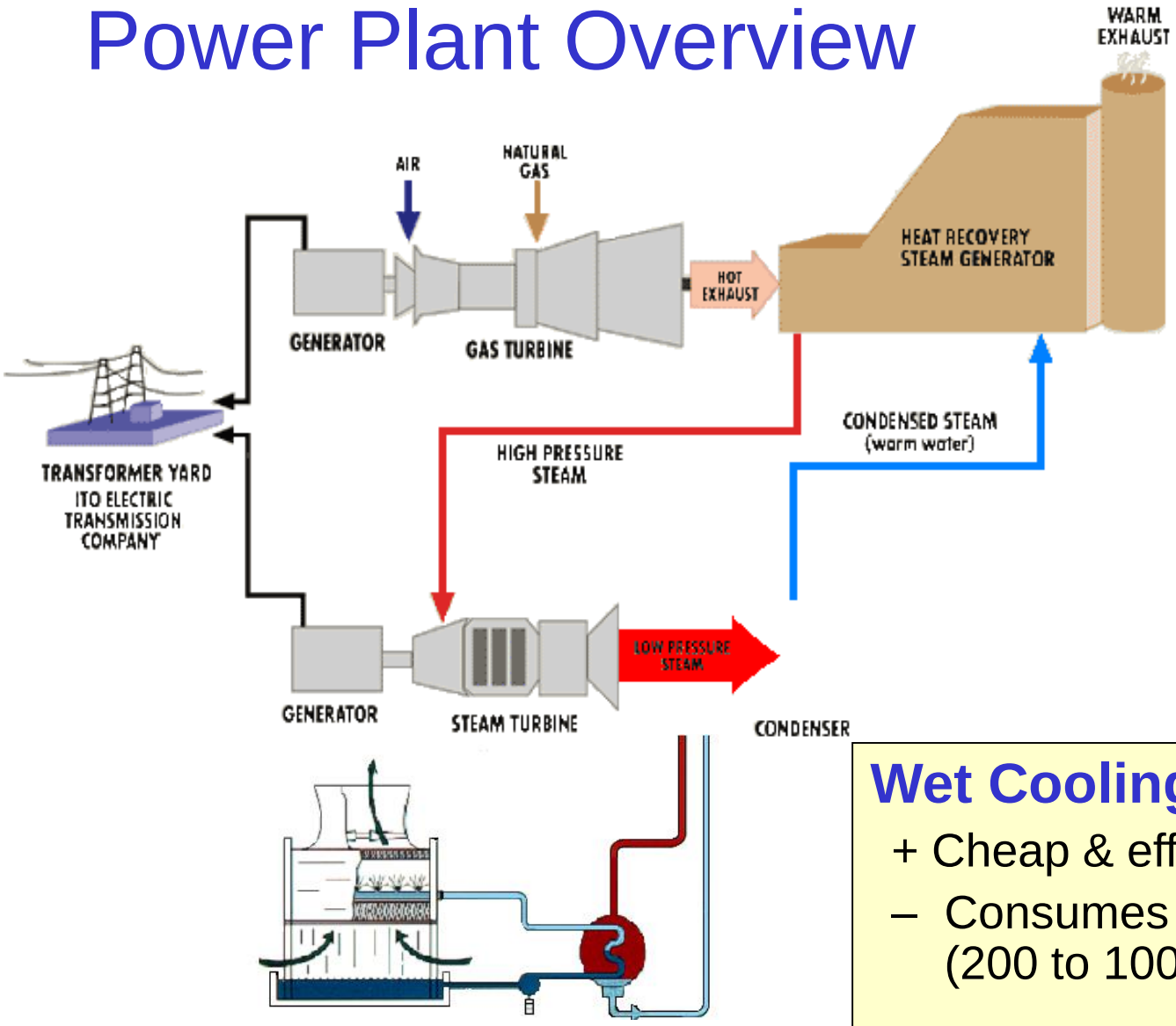
- Plant, equipment, and systems for manufacturing
- Process control for food, beverage, pharmaceutical, cosmetics, chemicals, power
- Headquartered Bochum, Germany
- 170 operating companies in some 50 countries
- 16,500 employees worldwide
- Approx. $3B in annual sales
- Part of Metallgesellschaft Group

Who is GEA Power Cooling?

“Power Plant Cooling Systems”

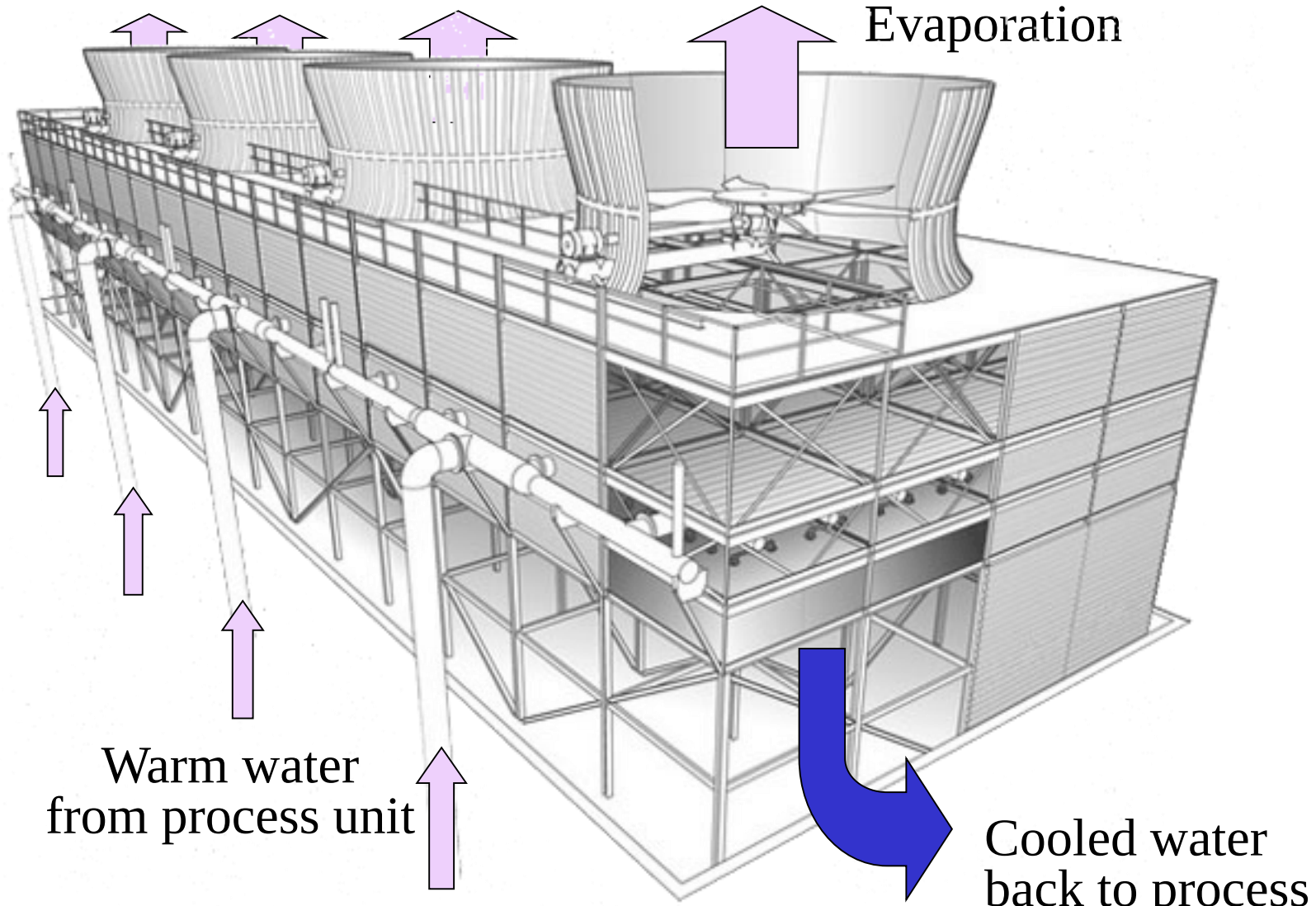
- Remove massive quantities of heat from power plant operations
- Deliver both dry & combination wet/dry condensers
- 1000+ units installed worldwide
- US Operations headquartered San Diego, CA
- Remote monitoring initiative led out of US

Power Plant Overview

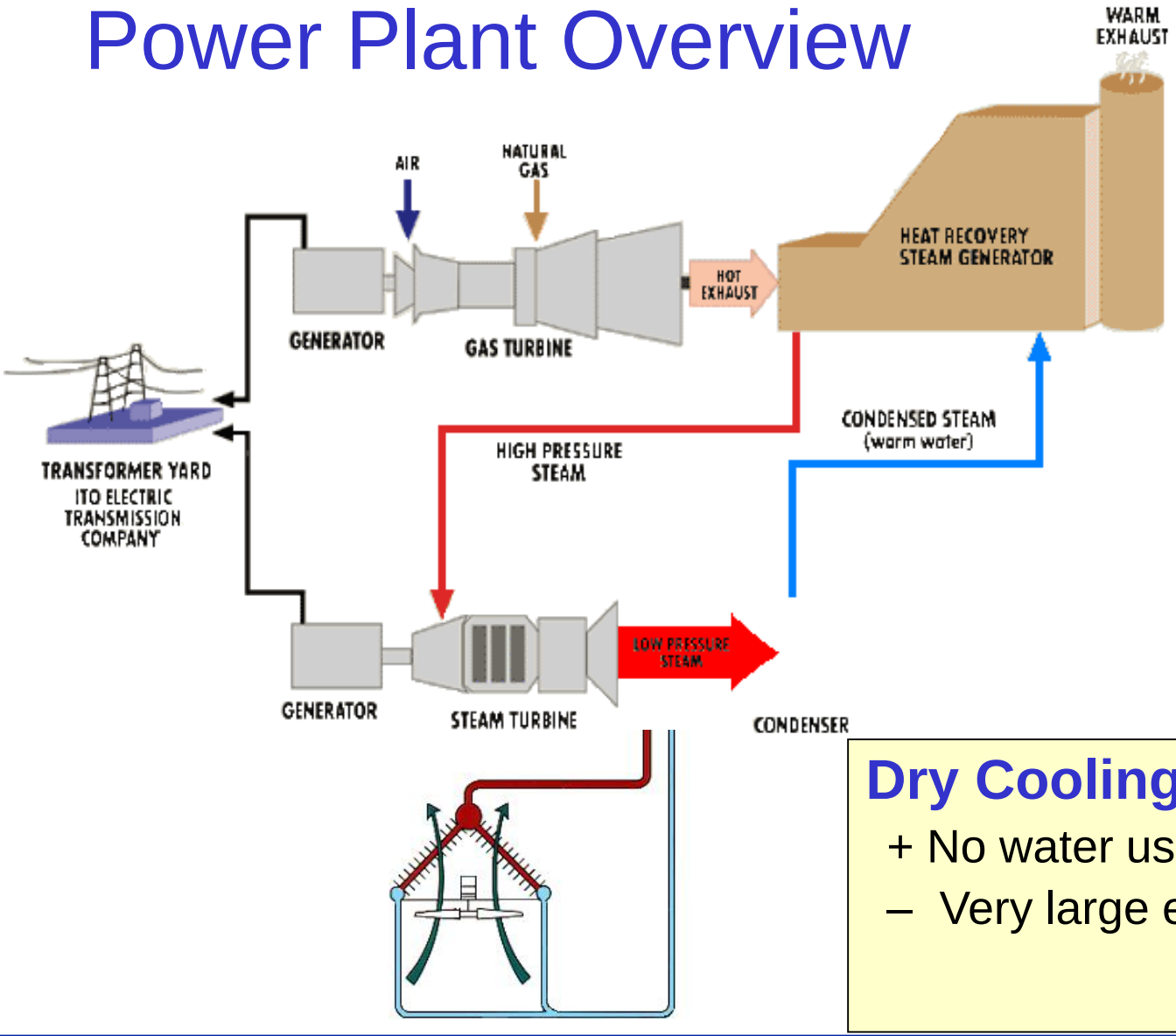


Wet Cooling

+ Cheap & effective
– Consumes lots of water (200 to 1000 Tons/hour)

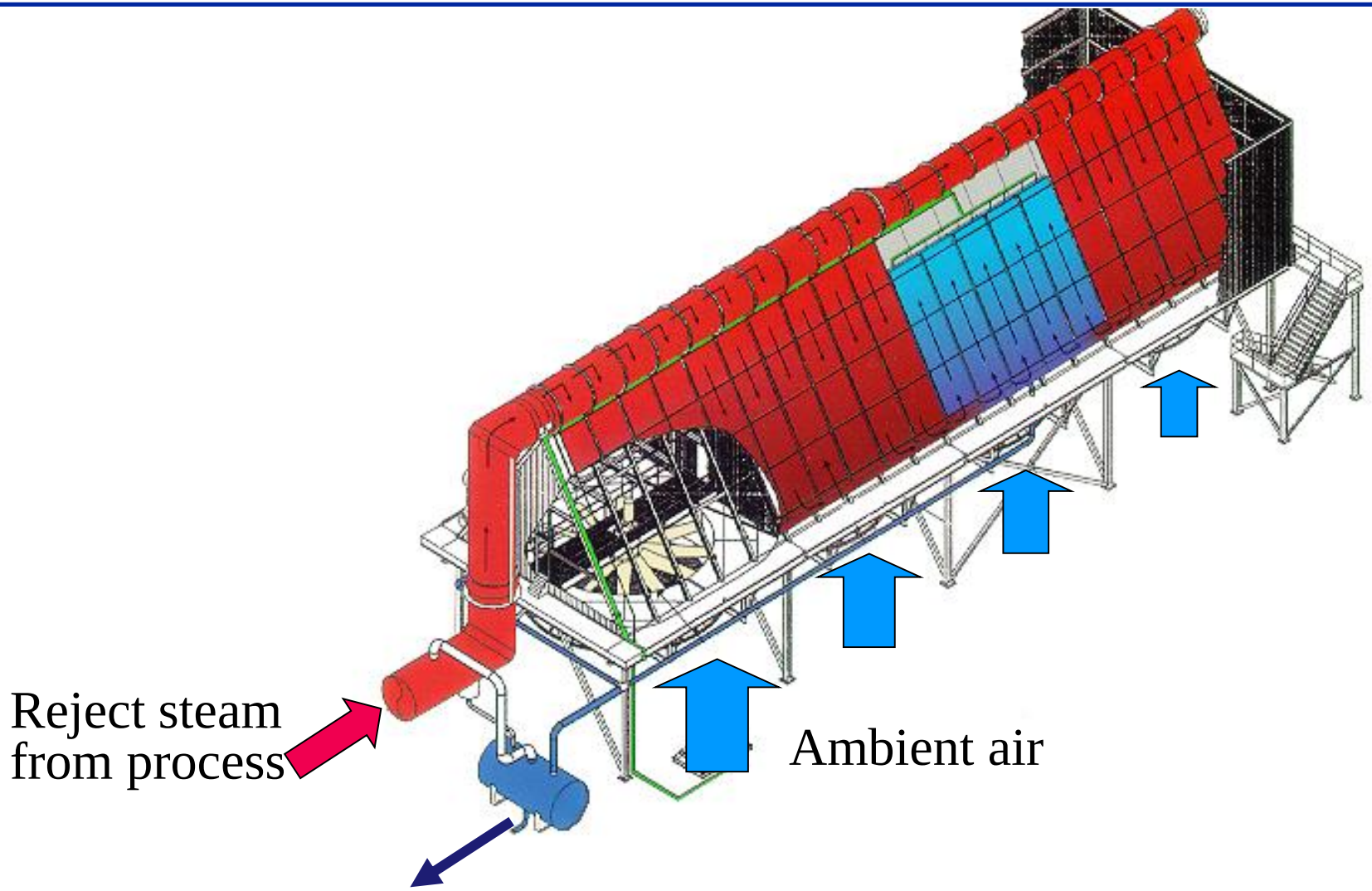

Evaporation
Warm water from process unit
Cooled water back to process

Power Plant Overview



Dry Cooling

+ No water used
– Very large equipment


Reject steam from process
Ambient air
Steam condensate returned to process

Massachusetts

Bellingham Cogeneration Plant - Intercontinental Energy Co.
300 MW - 714,900 lb/hr

GEA Power Cooling Systems, Inc.

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New Jersey

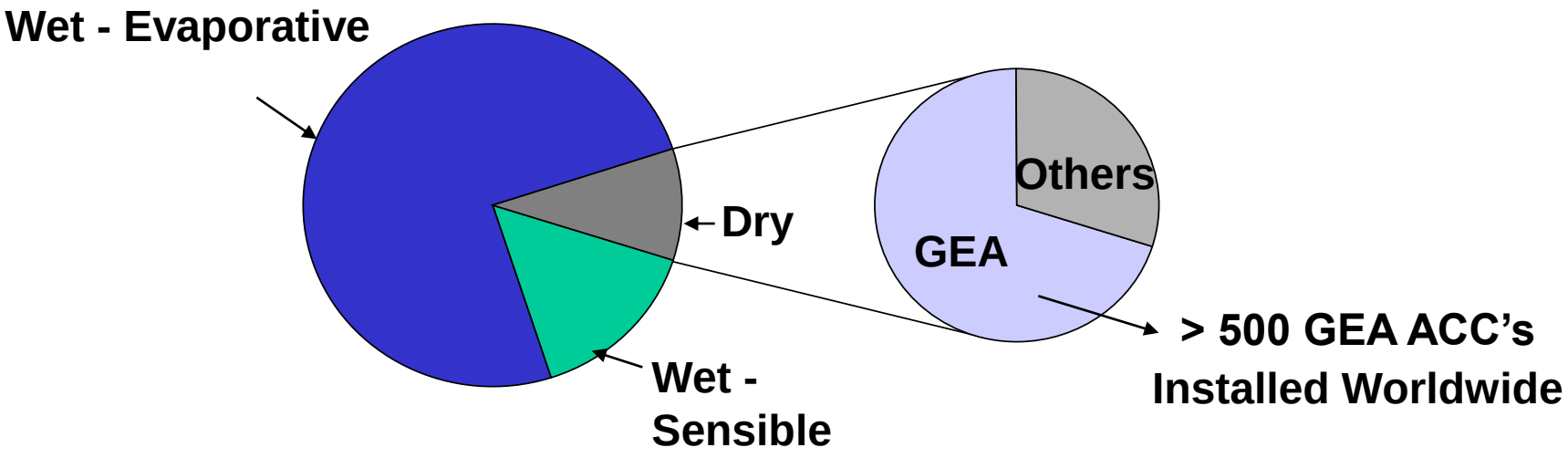
Linden Cogeneration Plant - Cogen Technologies, Inc.
285 MW - 1,911,000 lb/hr

South Africa

Matimba Power Plant

6 x 665 MW

Installed Base – Air-Cooled Condensers



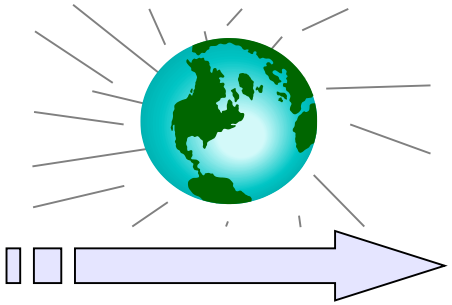
Air-Cooled Condensers are the “high-tech” portion of the large-scale power cooling market

Remote Monitoring Objectives

- Capitalize on GEA's experience
  - Expose as a differentiator in the market
- Better serve our customers
  - Improved warranty support & unit performance
- Build stronger customer loyalty
  - More frequent value-added customer contact
- Open new service business opportunities
  - Fee-based performance improvement guidance

Remote Monitoring

Air Cooled Condenser
at remote Power Station



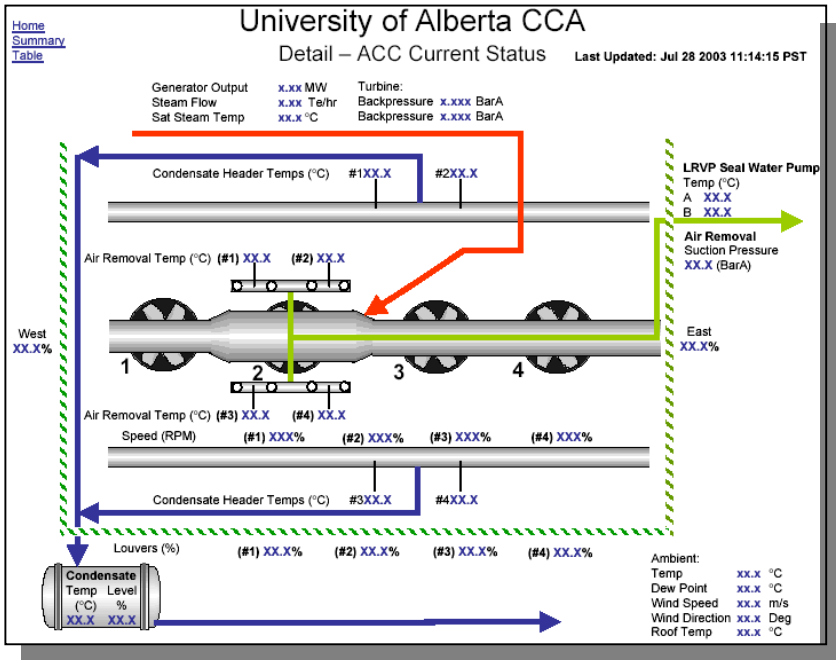
GEA ACC at
Home Office

Architecture

- Data collected from customer systems
  - PI, PHD, DCS, etc.
- Data stored into master PI System for GEA
  - Use Industrial Evolution Data Center
  - Brings PI expertise, allows GEA to focus on performance
- Remote Web views for GEA experts
  - Real-time access from anywhere
  - Immediate collaboration with customer

Program Benefits

- Facilitates plant commissioning
  (let the data travel instead of the people)
- Rapid problem identification and resolution
- GEA's intellectual property maximizes power plant's performance / revenue
- Development of service opportunities



Benefits Example

- Power plant in upstate NY
- ACC performance slowly degraded due to fouling
  - Occurred over a 2-year period
  - Not noticed by operations people (they need PI!)
- Profits were eroded by over $600,000 over 2 years
- GEA's on-line monitoring would detect this, avoiding the profit reductions

Implementations to Date

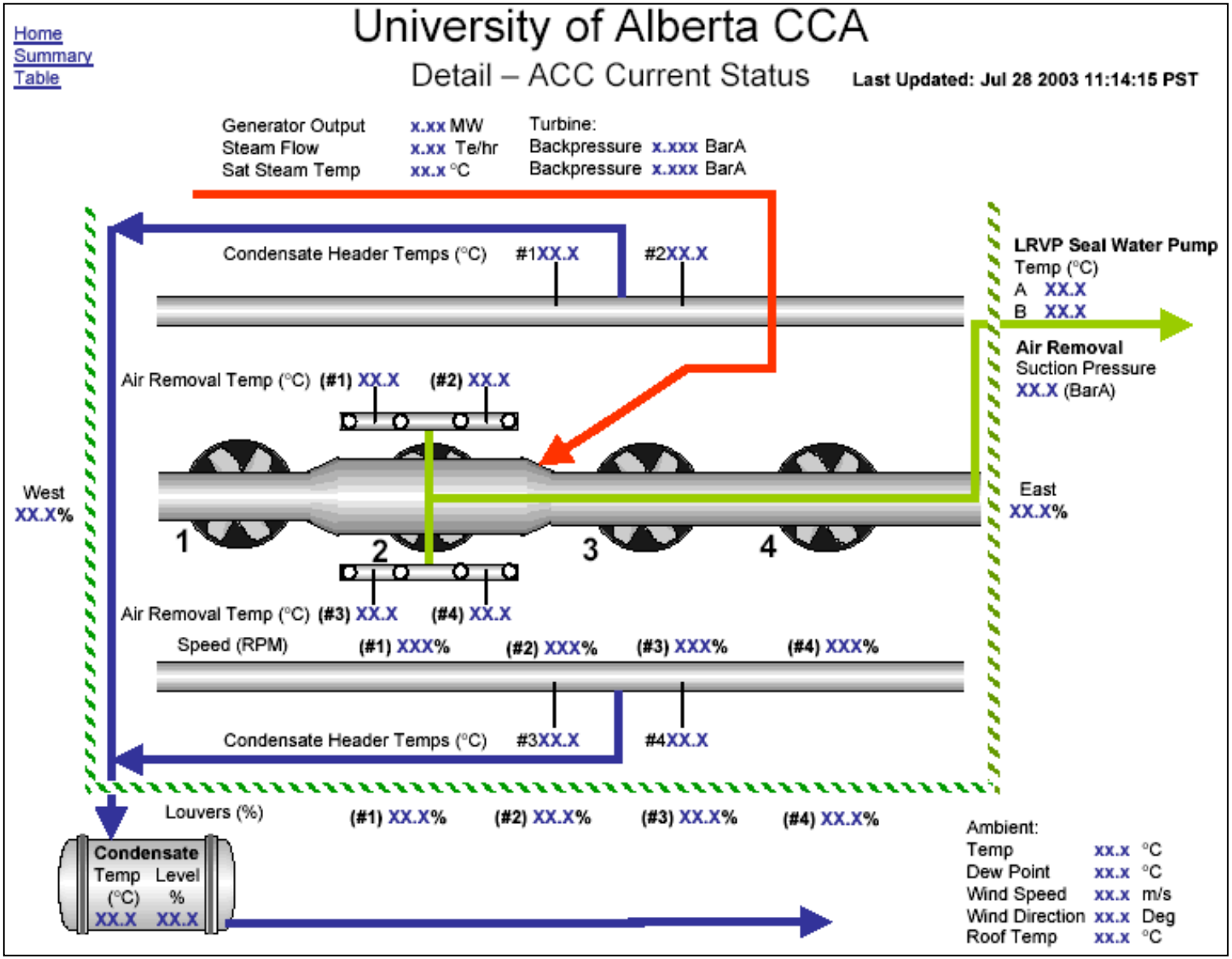
Pilot sites:

- University of Alberta
  - On-line since December 2003
- Front Range Power
  - On-line since April 2004
- Currant Creek
  - Set for September 2005

- Benefits confirmed
- Strategic investments planned for global roll-out

How PI Fits

- GEA customers are primarily in the power industry
  - Most already use PI on-site
  - Some use other systems (PHD, IP.21, etc.)
- Data collection/storage includes power cooling unit points
  - Generator power production
  - Steam flows, temperatures & pressures
  - Condensate flows & temperatures
  - Air temperatures & suction pressures
  - Fan speeds & louver positions
  - Ambient conditions: wind, humidity, temperature
- Data collection typically every 5-seconds to 1-minute


Home
Summary
Table
University of Alberta CCA
Detail – ACC Current Status
Last Updated: Jul 28 2003 11:14:15 PST
Generator Output x.xx MW
Steam Flow x.xx Te/hr
Sat Steam Temp xx.x °C
Turbine:
Backpressure x.xxx BarA
Backpressure x.xxx BarA
Condensate Header Temps (°C) #1XX.X #2XX.X
LRVP Seal Water Pump
Temp (°C)
A XX.X
B XX.X
Air Removal
Suction Pressure
XX.X (BarA)
Air Removal Temp (°C) (#1) XX.X (#2) XX.X
West
XX.X%
East
XX.X%
1
2
3
4
Air Removal Temp (°C) (#3) XX.X (#4) XX.X
Speed (RPM) (#1) XXX% (#2) XXX% (#3) XXX% (#4) XXX%
Condensate Header Temps (°C) #3XX.X #4XX.X
Louvers (%) (#1) XX.X% (#2) XX.X% (#3) XX.X% (#4) XX.X%
Condensate
Temp (°C) XX.X
Level % XX.X
Ambient:
Temp xx.x °C
Dew Point xx.x °C
Wind Speed xx.x m/s
Wind Direction xx.x Deg
Roof Temp xx.x °C

How Industrial Evolution Fits

- Provides data collection & hosting solution GEA requires
  - ~50 data points stored in central PI System at the secure Industrial Evolution Data Center, updated every minute
    - ~30 collected from customer site
    - ~20 are GEA calculation results (performance indices, efficiencies, etc)
  - GEA engineers then log on and view live customer operations from home office or any other field location
    - Periodic performance analysis & reporting
    - As-needed warranty support and/or troubleshooting with customer

Remote Power Station

IndustrialEvolution

Secure VPN

GEA Office

GEA's Objectives

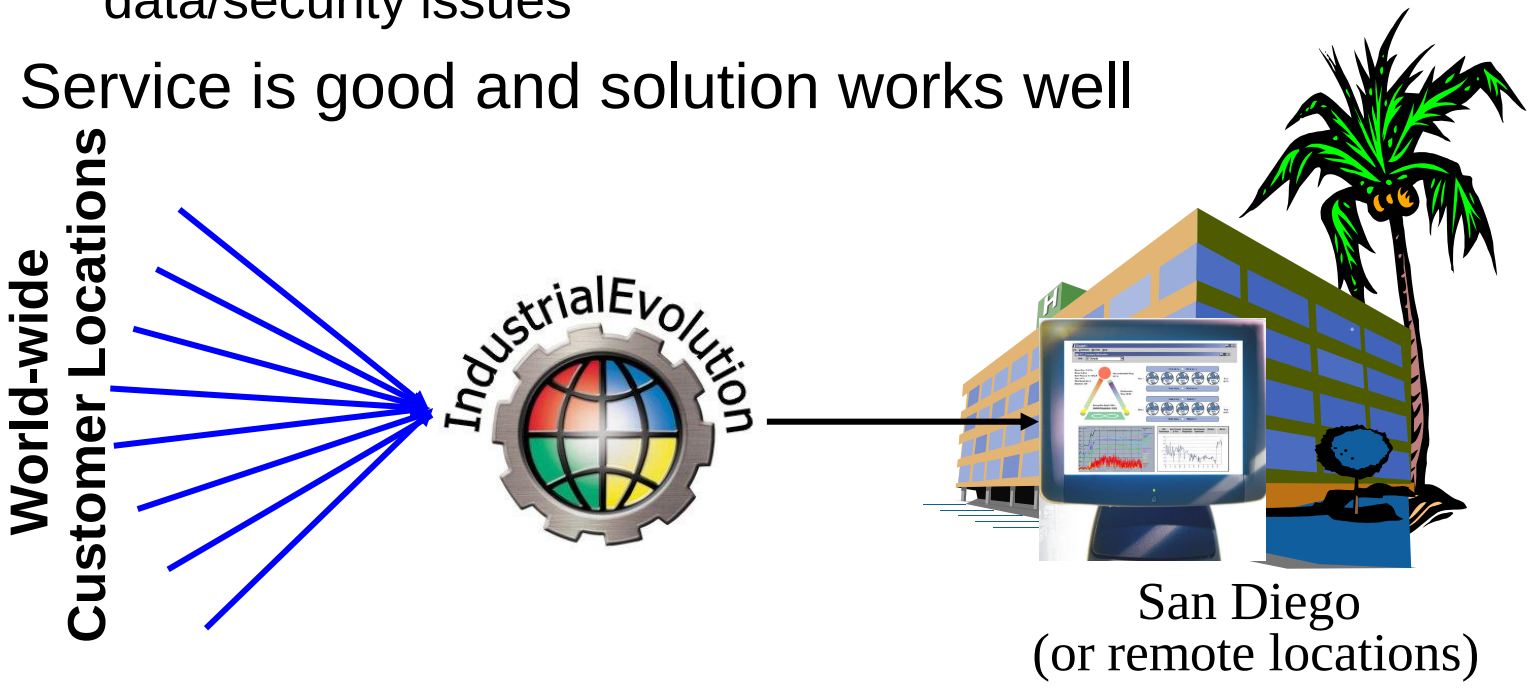
- Real-time view of cooling operations at customer sites
  - Live process data
  - Integrated GEA performance calculations
- Secure, hosted solution
  - Meet customer security needs
  - No additional IT support burden to their home office
  - Scalable to include 100's of sites

Project Experience

- 2 years looking for suitable “e-service” solution
- Found Industrial Evolution through OSIsoft
- 1 month to find first pilot site
  - University of Alberta
- 2 weeks to implement
  - Came on-line in July 2003
- Project steps
  - Discuss IT issues with UoA staff
  - Set-up VPN connection
  - Establish PI-to-PI communication

Results

- GEA sees live data from remote sites
  - Available as and when needed
- No multiple connections for GEA\
  - Industrial Evolution handles all connections & customer data/security issues
- Service is good and solution works well



Summary

- True utilization of the internet to open new potentials
- Immediate availability
  - New sites done on 2-3 weeks notice by Industrial Evolution
- Works at any data site
  - Interfaces available for any data source
- Proven improvement in product, problem resolution and increased customer profitability
  - Leads to greater customer satisfaction & more market share
- Applies across the GEA business lines
  - not limited to Air Cooled Condensers

Industrial Evolution

- Data Sharing solutions apply to all industries
  - Oil & Gas
  - Power & Utilities
  - Chemicals
  - Pipeline
  - Paper
  - ➢ Other industries using PI
- Data Sharing possible from any source
  - PI, PHD, IP.21, etc.
  - Control systems
  - PLC's, RTU's, etc.
  - ➢ Any electronic form (XML, FTP, etc.)
- **300+ Companies now use Industrial Evolution**
  - Over 1,000 distinct site data connection points
  - Global coverage

Questions?