Duke Energy Gallagher Generating Station

Opted to Retire Plant

AEP Big Sandy

Unit 1 260 MW
Wall-fired boiler

Will rebuild as a 640 MW gas-fired boiler

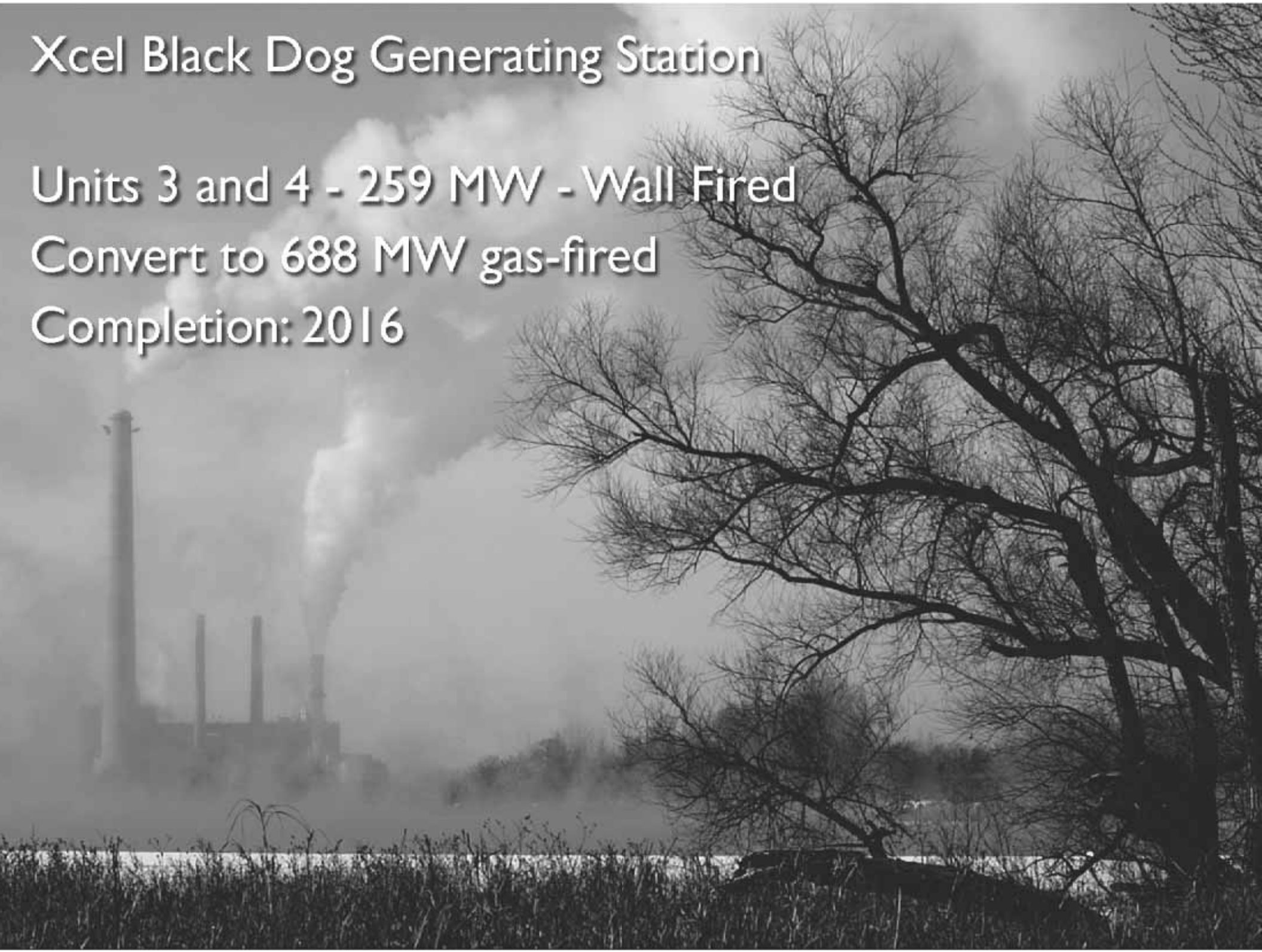
Completion: 2016

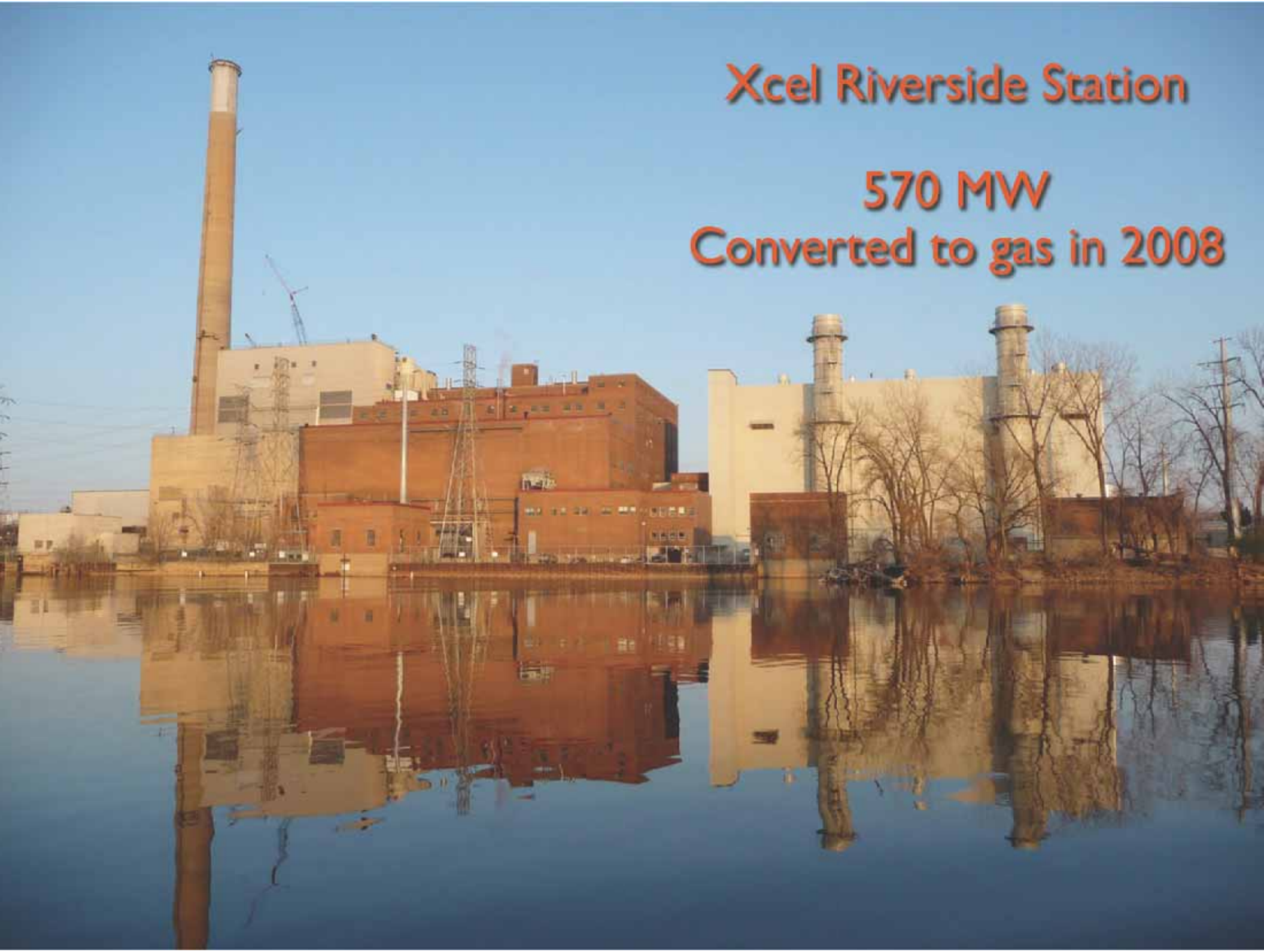
AEP Clinch River

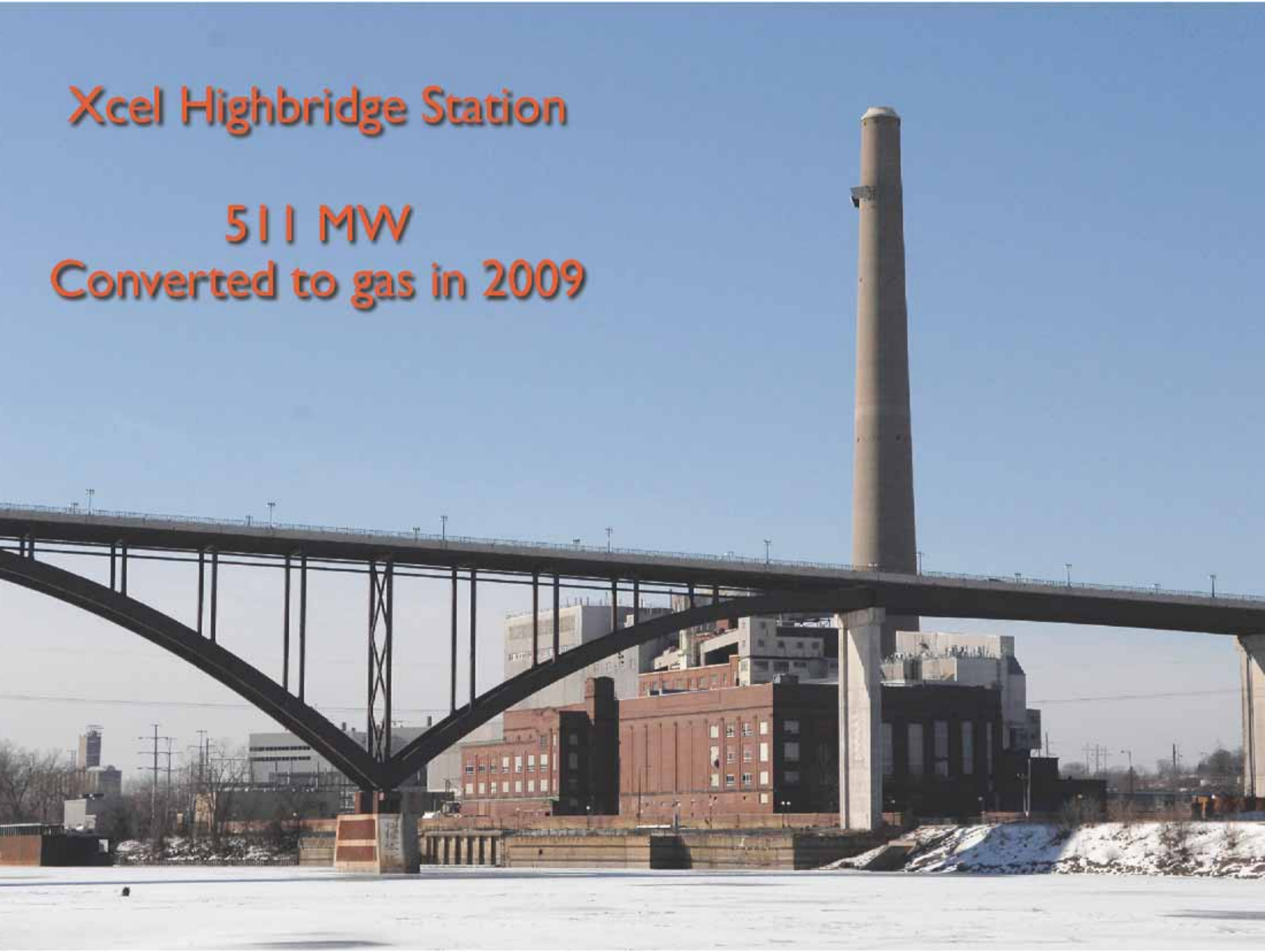
Units 1 and 2
470 MW Total
Vertical Firing

Will be refueled with
natural gas @ 422 MW

Completion: 2015


Xcel Black Dog Generating Station
Units 3 and 4 - 259 MW - Wall Fired
Convert to 688 MW gas-fired
Completion: 2016


Xcel Riverside Station
570 MW
Converted to gas in 2008


Xcel Highbridge Station
511 MW
Converted to gas in 2009

AEP
Muskingum River Plant

Unit 5
585 MW cell-fired

May be refueled with
natural gas @ 510 MW

Completion: 2014

Penn State
West Campus Steam Plant

Units 2 and 3

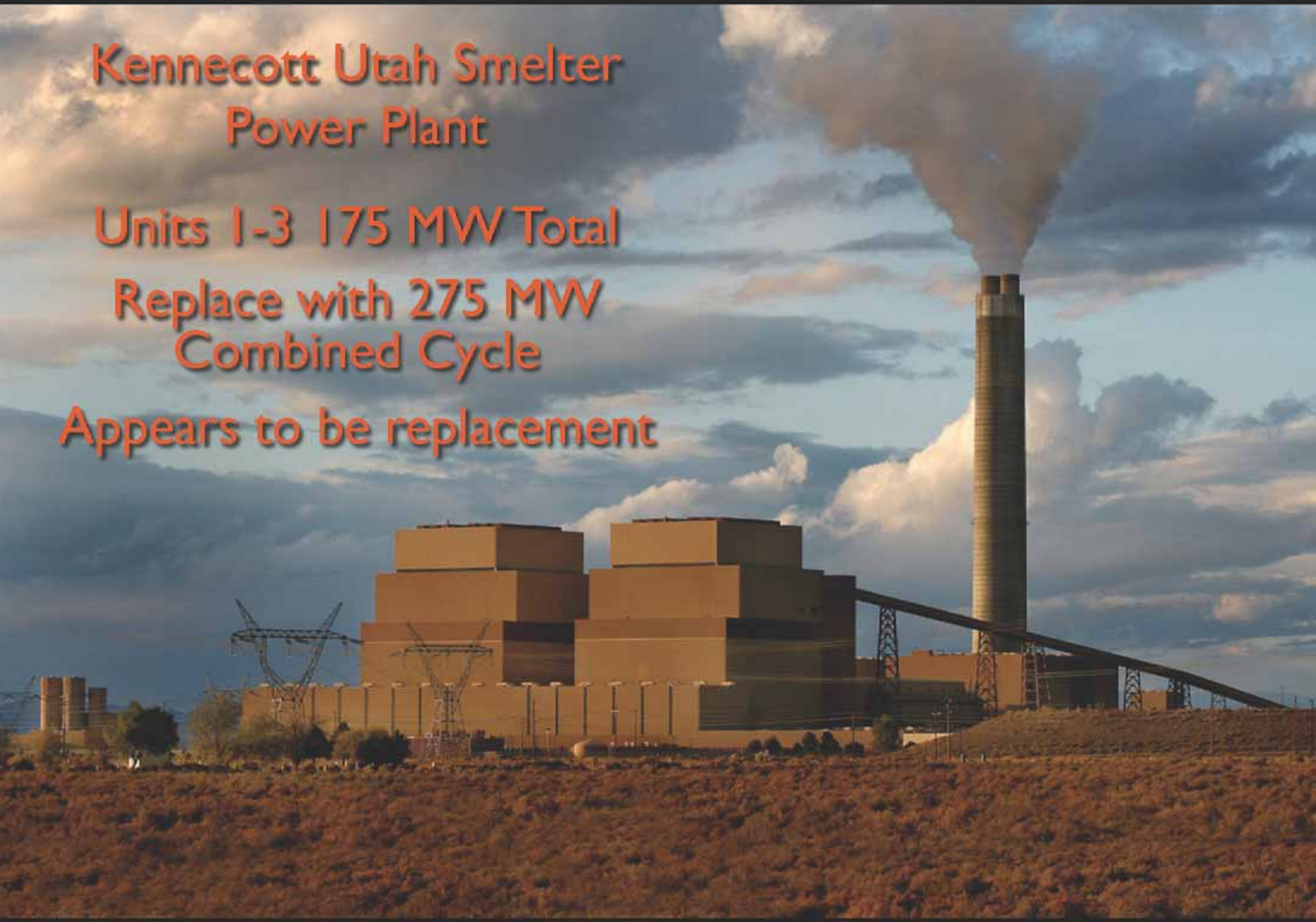
Co-gen plant

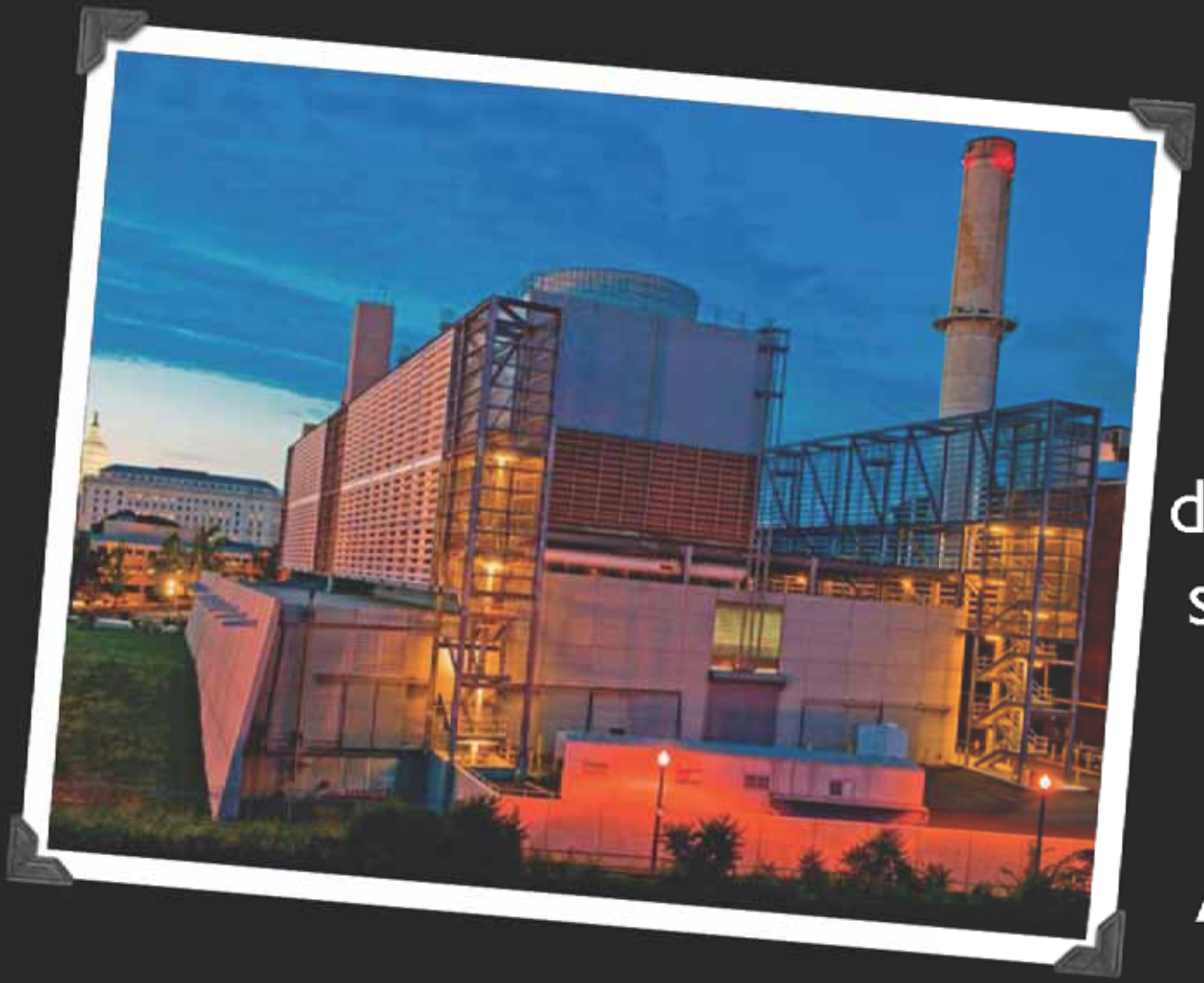
4 coal-fired stoker boilers

110,000 pph steam each

May be replacement, not retrofit

Completion: 2014


Kennecott Utah Smelter
Power Plant
Units 1-3 175 MW Total
Replace with 275 MW
Combined Cycle
Appears to be replacement



US Capitol Power Plant

In 2009 Congress directed the plant to switch from coal to natural gas

After some burner redesign, the plant now burns 88% NG

Planning on adding combined cycle unit

Units 7, 8, 9
190 MW Total
Wall-fired

Completed transition to 100 MW natural gas in 2010

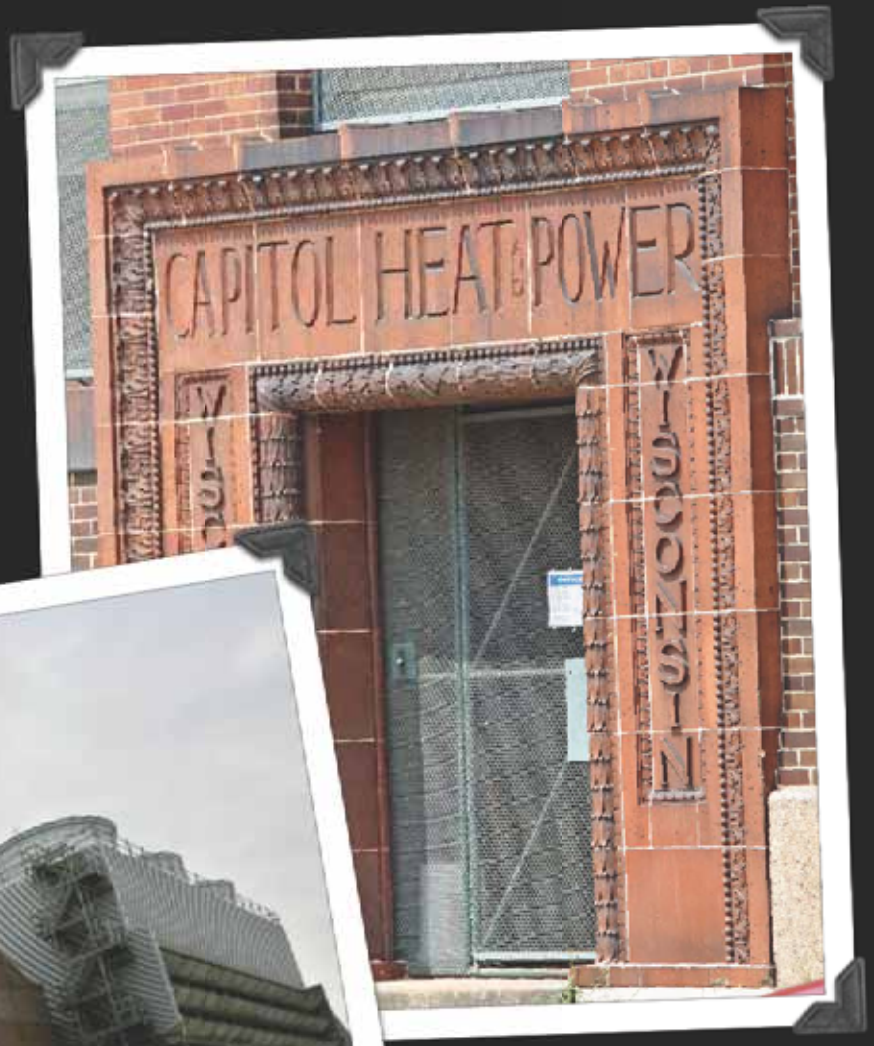
Unclear as to changes made

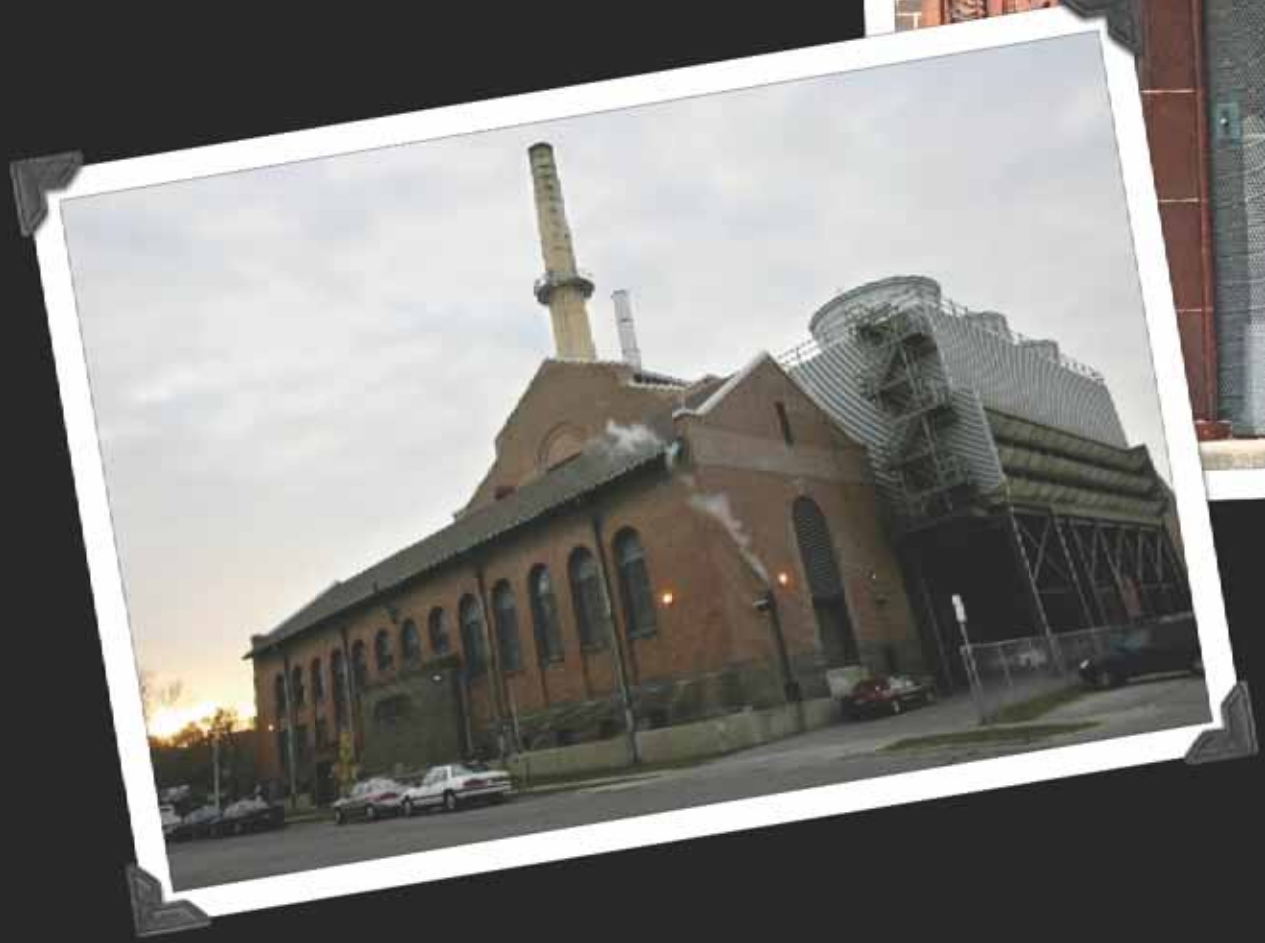
Madison Gas and Electric
Blount Street Station

Capitol Heat and Power
Madison, Wisconsin

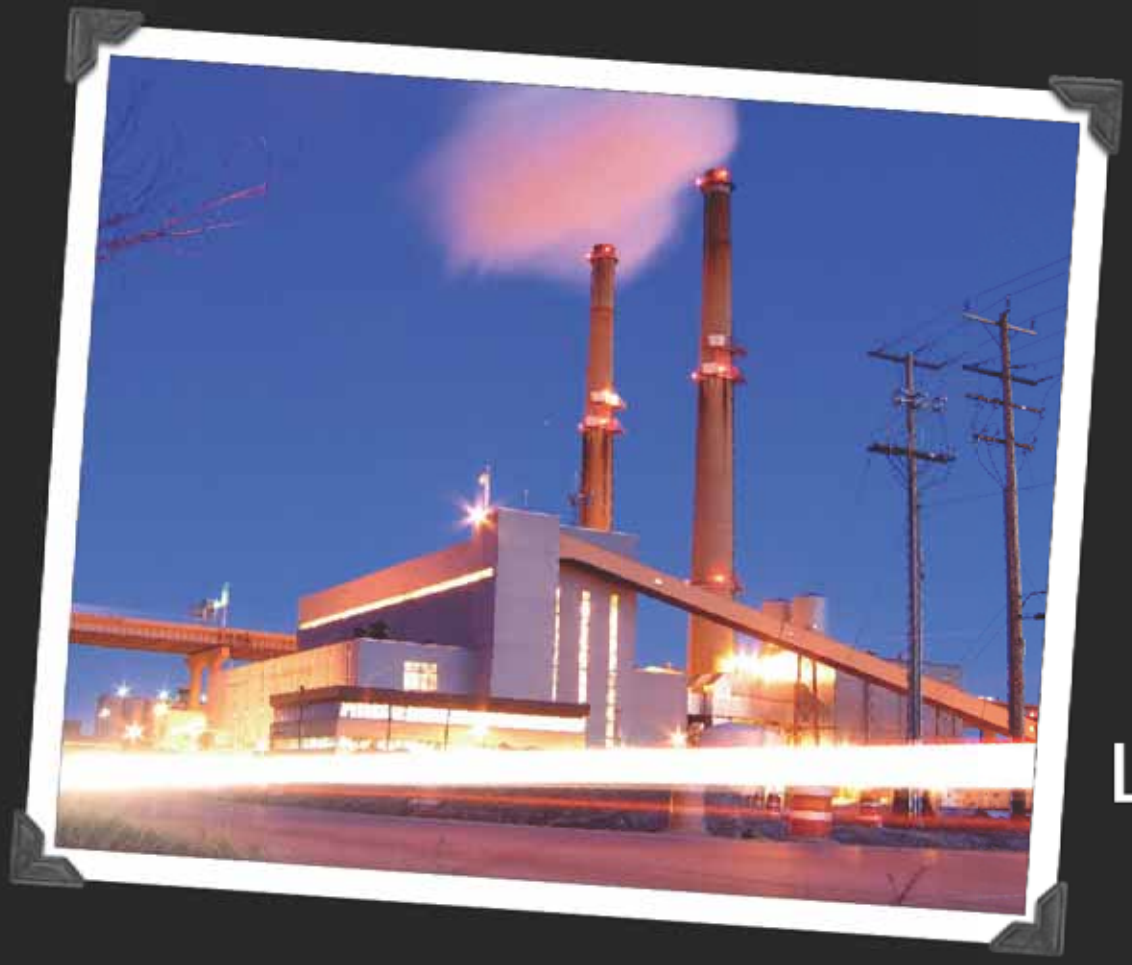
Completed

Appears to be replacement






UW Madison Charter Street Heating Plant
Units 1-4
Appears to be replacement

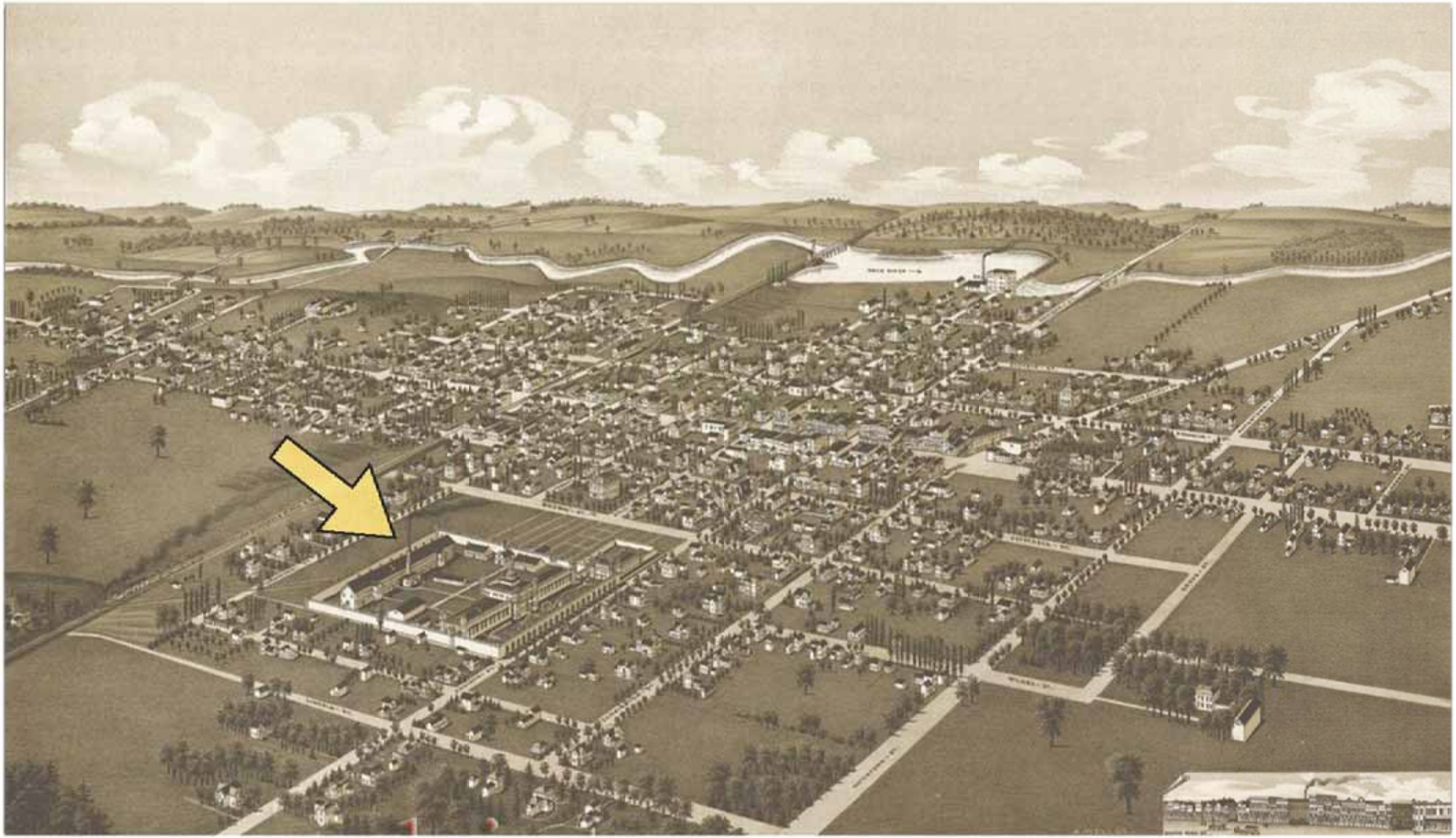


Units 1-4
280 MW Total
Wall-fired

Announced in 2011

Limited details available

We Energies Valley Station



Waupun Correction Central Heating Plant

2 Units
306 MW Total

First unit online
with NG in 2014

Ontario Power
Thunder Bay Generating Station

Taylorville Energy Center

Taylorville Energy Center (TEC) is a proposed 716-megawatt (gross), 602-MW (net) coal-fed power plant using an advanced technology called *Integrated Gasification Combined-Cycle* (IGCC) with *Carbon Capture and Storage* (CCS) to make it among the cleanest power plants in the world.

TENASKA®

MATS Impacts

HAPs Covered by MATS

Mercury
Non-mercury metallic HAPs
Acid gas HAPs
Organic HAPs

Performance testing, monitoring, work practices

Filterable PM Monitoring Options

	Initial Compliance	Ongoing Compliance
PM CEMS	30 day CEMS	CEMS w/annual RATA
PM CPMS	stack test	CPMS w/annual stack test
Stack test	stack test	quarterly stack test

Note: If monitoring total or individual HAP metals, quarterly stack testing is required

LEE: Stack test every three years

PM CEMS Example

PM CPMS Example

HCl/HF
Monitoring Options

	Initial Compliance	Ongoing Compliance
HCl/HF CEMS	30 day CEMS	CEMS w/annual RATA
Stack test	stack test	quarterly stack test
SO_2 CEMS[a]	30 day CEMS	CEMS w/annual RATA

[a] For units with FGD system only

LEE: Stack test every three years

Mercury Monitoring Options

	Initial Compliance	Ongoing Compliance
Mercury CEMS	30 day CEMS	CEMS w/annual RATA
Sorbent Trap	30 day Sorbent Trap	Sorbent Trap w/annual RATA

LEE: Stack test every year

Organic HAPs
Work Practice

	Initial Compliance	Ongoing Compliance
With Neural Net	Tune up	Tune up every 48 months
Without Neural Net	Tune up	Tune up every 36 months

LEE: Not Applicable

LEE Limits

For mercury
<10% of limit
or
<29 lb/yr potential

For non-mercury HAPs
<50% of limit

LEE Limits

Category	Pollutant	Limit	
		lb/mmBtu	lb/MWh
1, 2, 4	Filterable PM	0.015	0.15
1, 2	Non-HAP Metals	0.000025	0.00025
4	Non-HAP Metals	0.0004	0.004
1, 2	HCl	0.001	0.01
4	HCl	0.001	0.005
1, 2	SO_2	0.1	0.75
1	Hg	0.12[a]	0.0013[b]
2	Hg	0.4[a]	0.004[b]
4	HF	0.0002	0.002

[a] lb/TBtu [b] lb/GWh


CASH
Dollars Cents
National

Hg Monitoring Costs[a]

	Type	EPA Estimate[b]	Reality[c]
Capital Costs	CEMS	$220,000	$300-400,000
	Sorbent trap	N/A	$100-150,000
Ongoing Costs[d]	CEMS	$77,000	$50-75,000
	Sorbent trap	N/A	$20-30,000

[a] Costs do not include stack or platform modifications

[b] From EPA CEMS Cost Model 03/07/07 w/ 10% inflation adjustment to 2012

[c] Vendor information

[d] Annual Costs. Without capital recovery

Filterable PM Monitoring Costs[a]

	Type	EPA Estimate[b]	Reality[c]
Capital Costs	CEMS	$190,000	$200-400,000
	CPMS	$190,000	$200-400,000
Ongoing Costs[d]	CEMS	$40,000	$40-80,000
	CPMS	$32,000	$35-50,000

[a] Costs do not include stack or platform modifications. Based on beta-gauge technology

[b] From EPA CEMS Cost Model 03/07/07 w/ 10% inflation adjustment to 2012

[c] Vendor and user information (rough estimates based on limited data)

[d] Annual Costs. Without capital recovery

HCl, HF, SO_2 Monitoring Costs[a]

	Type	EPA Estimate[b]	Reality[c]
Capital Costs	CEMS	$160,000	$100-200,000
Ongoing Costs[d]	CEMS	$22,000	$15-30,000

[a] Costs do not include stack or platform modifications. Costs are for a "typical" criteria pollutant and diluent system.

[b] From EPA CEMS Cost Model 03/07/07 w/ 10% inflation adjustment to 2012

[c] Vendor and user information (rough estimates based on limited data)

[d] Annual costs. Without capital recovery

Estimated Stack Test Costs

Test	Approximate Cost
Filterable PM (M5)	$7,600 - 11,400
HAPs Metals (M29)	$12,400 - 18,600
HCl/HF (M26, M26A)	$7,600 - 11,400
HCl (FTIR)	$15,200 - 23,400
Hg (M30B - 30 days)	$15,200 - 23,400
PM CEMS RATA (PS11)	$18,000 - 26,000
HCl CEMS RATA	$9,200 - $13,800

Note: Prices are for individual tests at a single location assuming no delays. Simultaneous testing with multiple methods may reduce overall costs. Actual testing costs will vary from these estimates based on site-specific conditions, variable travel costs, and current market conditions.

Interesting comparison...

Annual cost of quarterly stack tests: ~$40,000

Annual operating cost of PM CEMS: ~$40,000

Boiler tune ups estimated at

$75,000 - 90,000

Every 36-48 months


Permitting Issues

GHG NSPS Proposal

"Although modified sources would not be subject to the 1,000 lb CO_2/MWh standard for new sources, the EPA anticipates that modified sources would become subject to the requirements the EPA would promulgate at the appropriate time, for existing sources under 111(d)" (p. 153).

"This is the battleground..."

"The reason we care desperately and have adopted a policy of leaving no coal plant unopposed is because each of them is such a massive new source of air pollution and a particularly large source of global warming air pollution."

Bruce Nilles, Sierra Club
Kansas City Star, April 11, 2006


beyond oil.


BEYOND
COAL


BEYOND
NATURAL GAS

The End?

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