



U.S. Department of Energy

OAK RIDGE NATIONAL LABORATORY

CHP Subcontractors Coordination Review Meeting

CHP Deployment in the Pacific Northwest

(ORNL Subcontract No. 4000021765)



April 14, 2005

Energy & Environmental Analysis, Inc.

West Coast Office

12011 NE 1st Street, Suite 210

Bellevue, Washington 98005



Project Overview

Title	CHP Deployment in the Pacific Northwest
Contractor	Energy and Environmental Analysis
Objective	<ul style="list-style-type: none">▪ Identify CHP Market Opportunities▪ Increase CHP Deployment in Pacific Northwest (Washington, Oregon, Idaho, Alaska)
Tasks	<ol style="list-style-type: none">1. Market Assessment2. Resource Development3. Western States CHP Analysis

Project Subtasks and Status

Scheduled Completion (FY)	Subtask	Title	Status
2003	1-1	Existing CHP	Complete
	1-2	Technical Market Potential	Complete
	1-4	Hurdles	Complete
	2-1	Interface & Content Outline	Complete
	2-4(a)	Excel Spreadsheet & Topical Report	Complete
2004	1-3	Economic Potential	Complete
	2-4(b)	Calculator Support	Complete
	2-2	Case Studies (first set of 4)	Draft Complete
	2-5(a)	Policy Document	Draft Complete
2005	2-5(b)	Information Dissemination	Draft Complete
	2-3	Case Studies (second set of 4)	Jun-05
	3-1	Arizona and Nevada Assessments	May-05
	3-2	Western States Summary Evaluation	Jul-05

Progress in Past Year

- Task 1 – Market Assessment
- Task 2 – Resource Development
 - Case Studies (Subtasks 2.2 and 2.3)
 - Screening Calculator (Subtask 2.4)
 - Policy Document (Subtask 2.5a)
 - Information Dissemination (Subtask 2.5b)
- Task 3 – Western States CHP Analysis

Task 1: Market Assessment

- Market Assessment Completed (WA, OR, ID, AK)
- Presented at Regional Stakeholders Meeting on 15 Sep 04
- Results in Use
 - Oregon PUC
 - Portland General Electric
 - Alaska Energy Authority
 - Northwest CHP Application Center

ENERGY AND ENVIRONMENTAL ANALYSIS, INC.

Report No. B-REP-04-5427-004r

Combined Heat and Power in the Pacific Northwest: Market Assessment

Task 1 – Final Report

Submitted to:

OAK RIDGE NATIONAL LABORATORY

August 2004
Revised

Submitted by:

Energy and Environmental Analysis, Inc.
www.eea-inc.com

Headquarters Office
1655 N. Fort Myer Drive, Suite 600
Arlington, Virginia 22209
Tel: (703) 528-1900
Fax: (703) 528-5106

West Coast Office
12011 NE First Street, Suite 210
Bellevue, Washington 98005
Tel: (425) 688-0141
Fax: (425) 688-0180

Market Assessment – Summary of CHP Potential in Pacific Northwest (WA, OR, ID, AK)

CHP Potential (MW) by Capacity Range

50-500 kW	500-1000 kW	1-5 MW	5-20 MW	20-50 MW	> 50 MW	Total MW
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Technical Potential	2,565	3,135	3,980	2,646	1,818	1,346	15,490
Economic Potential -- Business-as-Usual	127	242	223	378	422	714	2,106
Economic Potential -- Accelerated Case	798	1,307	1,118	1,144	678	1,105	6,150

Task 2: Case Studies

D R A F T

CHP Case Studies in the Pacific Northwest

U.S. Department of Energy
Energy Efficiency and Renewable Energy

52 MW Wood-Chip Fired Steam-Turbine Generator



Kimberly Clark Mill

Site Description
Kimberly Clark (KC) is the largest tissue manufacturer in the world with sales in excess of \$14 billion. Everett, Washington consists of tissue manufacturing, paper packaging, and distribution centers and a 52 MW generation facility employs 550 people.

The Snohomish County PUD (then owned by Scott Paper) construction of a \$115MM cogeneration facility in 1993. The PUD provided...

Kimberly Clark Paper Mill

D R A F T

CHP Case Studies in the Pacific Northwest

U.S. Department of Energy
Energy Efficiency and Renewable Energy

525 kW Wind/Diesel Hybrid CHP System



TDX Power Wind Turbine Integrated with Diesel CHP on St. Paul Island in Alaska (courtesy of Northern Power Systems)

Site Description
Tanadgax Corporation (TDX), an Alaskan native corporation, owns and operates several facilities on the island of St. Paul, part of the Pribilof Islands in the Bering Sea. In remote areas such as this one, electric power comes from diesel engine generators serving individual facilities or small community microgrids. With electricity costs around 20¢ a kWh and diesel costs exceeding \$1.30 a gallon, TDX looked for a way to utilize wind energy effectively in their power system. TDX also wanted to reduce their diesel fuel consumption for environmental reasons.

TDX selected POSG Camp, an 80,000 sq. ft. industrial facility and the island's airport under their ownership for a stand-alone hybrid wind/diesel system. POSG Camp has an average load of 60 to 125 kW and almost year-round space heating requirements.

The system, designed and installed by Northern Power Systems, is comprised of a 225-kW wind turbine and two 150-kW diesel gen-sets. The system supplies electricity and space heat to an airport and industrial complex with airline offices, equipment repair, and storage facilities.

Two primary considerations drove the power system design process: reducing overall energy costs for the POSG Camp electrical and heating loads, and maintaining reliable, utility-grade service. Northern Power Systems met these design goals with a high penetration storage wind-diesel configuration. High penetration is defined as a high percentage of wind power capacity versus peak load. This

D R A F T

CHP Case Studies in the Pacific Northwest

U.S. Department of Energy
Energy Efficiency and Renewable Energy

Lewis & Clark College: 30 kW Microturbine CHP



generated from waste heat recovery is used to maintain the swimming pool water temperature. Additional heat is available to support facility domestic hot water needs.

A decade earlier when making a much needed replacement decision on its 50 year old steam boilers, Lewis & Clark considered installing a much larger CHP system to meet the needs of the entire campus. However, there wasn't enough round thermal load to support such a plan. Instead, the college installed a small, efficient boiler plant.

When a large CHP project did not make sense at the time, the environmental benefits of a CHP project are of great interest to the college. In 1994, discussions with the local heating plant in 1994, discussions led concerning the financial feasibility of a CHP project that would provide electricity for the campus and heat for the indoor swimming pool - the Lewis & Clark College.

On October 1, 2001, electricity rates charged to most of the state's industrial customers, including SP Newsprint, jumped in excess of 80%.

"When you have a facility the size of ours, that is a huge impact to your business," said Dennis Lakay, SP Newsprint manager of power and utilities in Newberg. The company realized the Newberg facility wouldn't remain financially viable under the new rates. SP invested \$50 million to expand the mill output and optimize the use of recycled material in its newsprint products. In addition, SP invested \$75 million for a 94 MW gas-fired power plant consisting of natural gas-fired turbines generating electricity to power the mill and

CHP Case Study



96 MW Gas Turbine Power Plant



SP Newsprint Mill in Newberg, Oregon

Site Description
SP Newsprint in Newberg, Oregon is a pulp and paper mill with an annual capacity of around 400,000 tons using a 90% recycled old newsprint (ONP) and 10% wood fiber mill.

Power Magazine Award
"For demonstrating the simultaneous combustion of coal and dense sludge in a fluidized-bed boiler and for achieving gas turbine-based generation in the pulp and paper industry, thereby reflecting industry's commitment toward meeting the nation's energy conservation and environmental goals."

Subtask 2.2: First Set of 4 Case Studies (completed, under review)

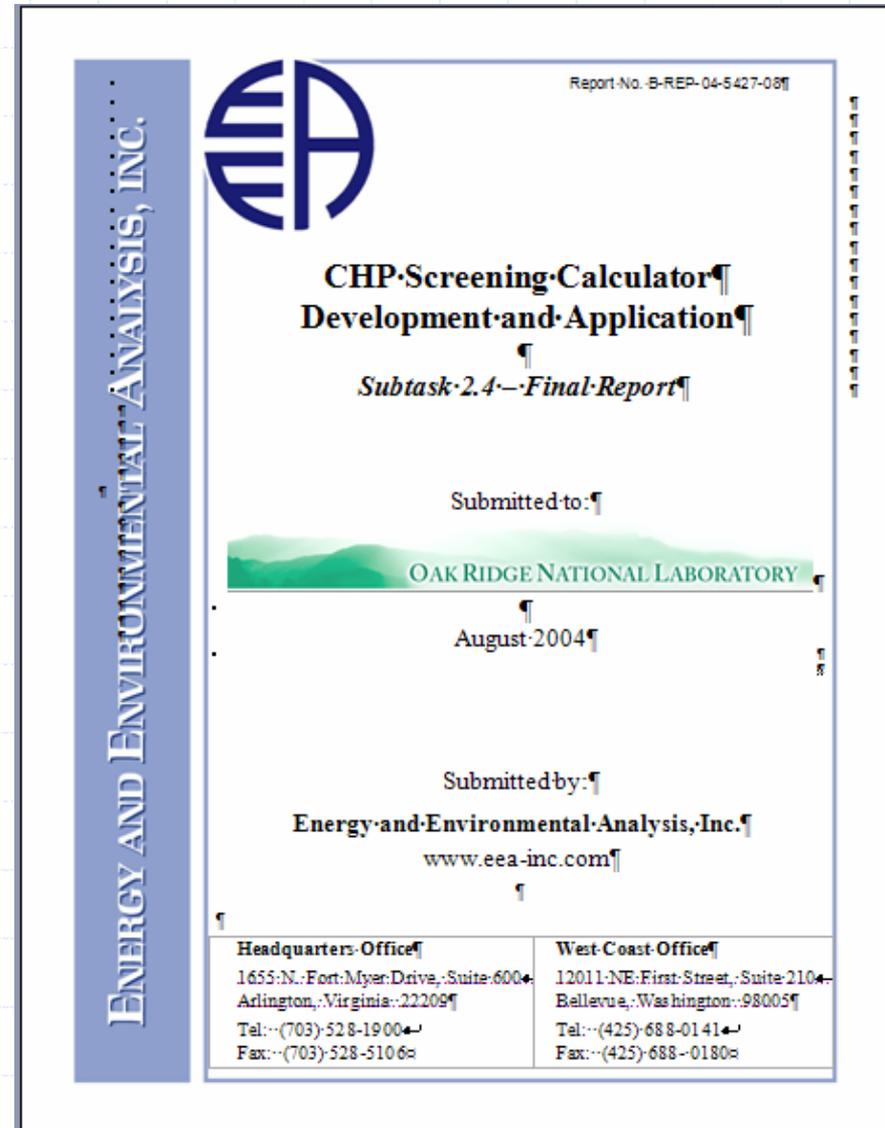
- **TDX** – 525 kW Wind Diesel Hybrid – a village power system in on a remote island in Alaska
- **SP Newsprint** – 130 MW GTs and STs– Paper mill in OR GT for power and steam, hog fuel boiler produces steam for additional power and process heat, 30 MW export power
- **Kimberly Clark** – 52 MW – Paper mill in WA, wood fired, power plant owned by Snohomish PUD operated by Kimberly Clark
- **Lewis & Clark College** – 30 kW Capstone Microturbine providing power and heat to an indoor swimming facility

Subtask 2.3: Second Set of 4 Case Studies (under development)

- **Idaho – Glenns Ferry and Rupert:** Twin identical 10 MW GT projects at potato processing plants
- **Washington – Camas:** 40 MW wood-fired system at paper mill
- **Oregon – Columbia Boulevard Wastewater Treatment:** 200 kW PAFC and 120 kW microturbine demonstration project
- **Alaska:** Project to be identified

Subtask 2.4: CHP Calculator

- Updated methodology
- Developed default data for 4 cases representative of Pacific Northwest
- Validated model with 4 default cases

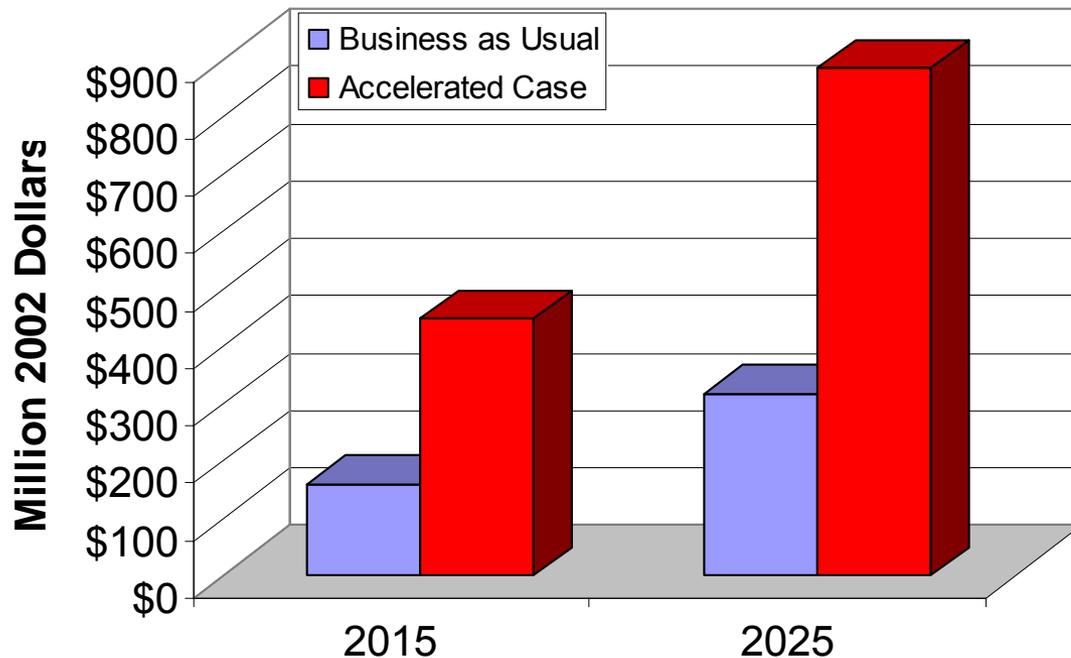


Subtask 2.5a Policy Document

Objective:

Develop a clear regional message on the value of CHP as a high efficiency system that reduces resource consumption in the region and increases end-use efficiency and productivity

**Total Annual User Cost Savings from CHP
AK, ID, OR, WA**



Contents:

- Explanation of CHP
- Existing CHP
- Market Potential
- Economic Benefits
- Energy Efficiency
- Resource Adequacy
- Environmental Benefits
- Ancillary Benefits
- Recommended Policy Actions

Subtask 2.5b – Information Dissemination

15 Sep 04 – Presented results of the Market Assessment to regional stakeholders group

28-29 Sep 04 – Attended BPA “Energizing the Northwest” Meeting and talked with people at the DOE Western Regional Office (WRO) exhibit

30 Nov 04 – Attended Energy Trust of Oregon / Oregon Public Utility Commission Meeting on CHP

Task 3: Western States CHP Assessment

- Original Task 3 was to hold a series of outreach workshops – this scope of work overlapped and conflicted with other work planned and underway in the Pacific Northwest
- Reprogrammed task to extend the CHP market analysis to all 8 states in DOE's Western Region
 - AK, ID, OR, WA – based on Task 1 of this study
 - CA – based on current EEA work for the California Energy Commission – to be made public April 28th
 - AZ and NV – new market studies to be undertaken
 - HI – evaluate recent resource study completed by the State in context of EEA's analysis in the other states
- Overall summary and comparison of the market in each of the 8 states

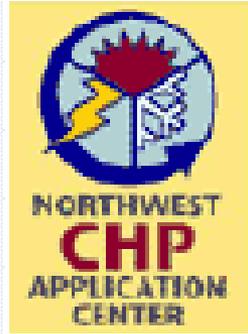
Coordination with Stakeholder Groups and Other Project Teams

- Close coordination with DOE Western Regional Office (WRO)
- Coordination with local stakeholders – facilitated by DOE WRO meetings
- Coordination with the Northwest CHP Application Center (Washington State University Energy Program)
 - Coordination in selection of case studies
 - Portal for results

Summary of Deliverables and Availability

Deliverables will be made available through the NW CHP Application Center

www.chpcenternw.org



Deliverable	Status
Market Assessment (WA, OR, ID, AK)	Report posted
Screening Calculator	Report and Excel spreadsheet complete and delivered
Case Studies	4 drafted and under review, 4 to be developed
Policy Document	Draft document under review
Western States Analysis	To be developed

FY05 Plans

- Case Studies (8 total)
 - Finalize and release first set of 4 (Apr)
 - Develop and release second set of 4 (Jun)
- Policy Document
 - Finalize review and release (Apr)
- Information Dissemination
 - Summarize results of 3 meetings (Apr)
- Western States Analysis
 - Complete AZ and NV assessments (May)
 - Prepare summary report for 8 states (Jul)

Questions?



For more information

Rick Tidball

(425) 688-0141 x26

rtidball@eea-inc.com

Ken Darrow

(425) 688-0141 x25

kdarrow@eea-inc.com
