

# For the Good of the Earth

A case study on the efficient use of wood-waste

Avista's Kettle Falls Biomass Generation Station requires a steady stream of wood waste to generate electricity. To secure a reliable supply early on, Avista initiated a project in 2007-2008 with Washington-state's Department of Natural Resources (DNR).

DNR had just designated 250 acres of forest near Deer Lake, Washington, as a hazardous fuel site. To help prevent forest fires, DNR planned to thin and harvest the trees and burn slash piles on site. Avista asked for permission to use the wood waste toward renewable energy generation instead.

Avista ended up gathering over 2.4 million pounds of wood waste, more than twice the amount DNR originally estimated. Burning leftover slash piles on site would have emitted over 400,000 pounds of carbon into the atmosphere but using it for energy generation at Kettle Falls reduced emissions to just 5,401 pounds.

In addition, the Kettle Falls plant reduced suspended particulates typically emitted by smoke from 30,252 pounds to just over 62 pounds. It also generated enough electricity to power 37,000 homes for almost 18 hours.

Publicity around the project increased interest in biomass energy, resulting in Avista getting five new contracts with wood-fuel providers. Avista's eco-friendly approach to eliminating wood waste lets federal and state government entities like DNR save on fire suppression costs, improve forest health, reduce carbon emissions and create jobs. It is a win-win for all.

## Renewable Portfolio Standards

Biomass energy generated at Kettle Falls helped Avista meet Washington-state's Energy Independence Act (EIA). The Act mandated electric utilities with 25,000 or more customers to use eligible renewable resources and energy conservation to meet targeted energy-load percentages. The targets increased from 3% in 2012, to 9% in 2016, to 15% by 2020.

### EIA Targets for Renewables



## Major Plant Awards

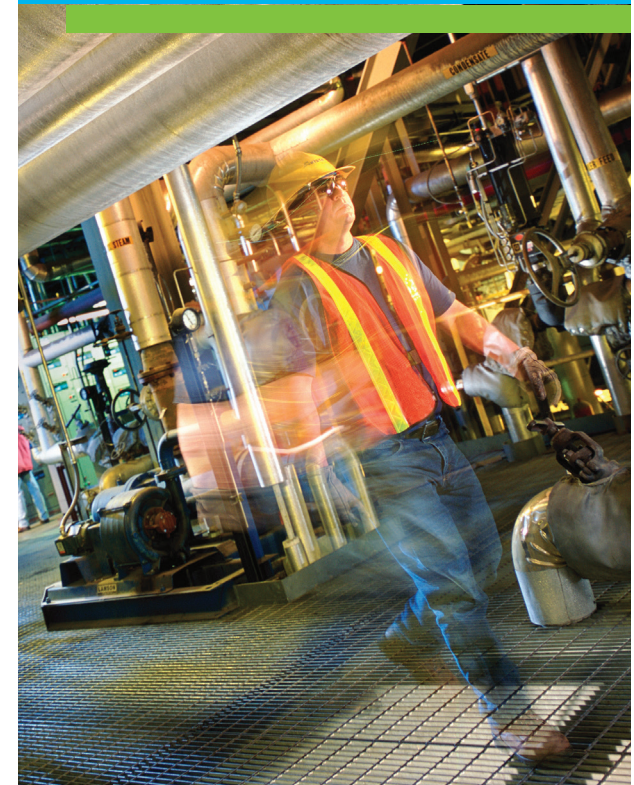
- Association of Washington Businesses Environmental Excellence for Clean-Up Power Plant of the Year (Power Magazine)
- Outstanding Achievement Award for Conservation, U.S. Forest Service
- Environmental Excellence Award, State of Washington
- Energy Conservation Award (Power Magazine)

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# Kettle Falls Biomass Generating Station



Avista's Kettle Falls Biomass Generating Station is the first utility-owned electric generation plant built in the United States for the sole purpose of producing electricity from wood waste. In operation since 1983, the plant is located in Kettle Falls, Washington, to take advantage of wood waste produced by numerous logging and sawmill operations in the area.

The biomass plant burns about 1,600 tons of wood waste per day when in full operation—enough to fill over 50 semi-trucks. Even so, it doesn't emit the level of smoke associated with a campfire. The installation of cleaning equipment removes 99 percent of suspended particles before the exhaust leaves the plant's flue stacks.

The plant significantly reduces carbon emissions that would harm the environment by only releasing about a half a pound (0.52) of particulate per ton of fuel burned. Any plume seen above the stacks (generally only visible when humidity is high or it's cold out) is mostly water vapor released from the wood as it burns.

During the generation process, wood fuel is fed into a 7-story furnace where it is burned. The inside furnace walls have multiple rows of closed-loop pipes filled with water that becomes superheated. At an optimum 2,000-degree burning temperature, 950-degree pressurized steam is created which is used to spin a generator to create electricity.

Avista's Kettle Falls Biomass Generation Station has garnered many environmental awards over the years and helps us meet the Washington-state's Energy Independence Act for renewable portfolio standards. Together with Avista's legacy hydropower projects and purchased wind power, the plant is just one example of the steps we are taking to meet our clean energy goals, now and into the future.

We're proud that our biomass generation investment lets us provide reliable, affordable energy and be good stewards of the environment.

## Kettle Falls at a Glance

- 1 The plant generates up to 53 megawatts of electricity, enough to power over 37,000 homes.
- 2 The plant employs about 30 full-time Avista employees, with more than 75 additional workers employed through contractors.
- 3 An average of 50 semi-truck loads of wood waste are unloaded each day the plant is in operation.



## Burning 1,000 Tons of Wood Slash Comparison

Emissions	Pounds of Carbon	Pounds of Particulate
Open Burning	± 335,999*	25,200*
Kettle Falls Plant	4,490	52

\*California Licensed Foresters Association



Unrestricted CO2 vs. Power Generation

Avista's Kettle Falls Biomass Generating Station creates renewable electricity from approximately 183,000 tons of sustainably harvested timber waste annually.

