Viessmann's Largest Condensing Boiler Helps Resort Reach New Levels of Fuel Efficiency

Challenge: Assume 100% of luxury resort's heat/Domestic Hot Water (DHW) load

For the Jordan Hotel at Sunday River, a 187-room luxury ski resort in Maine, the same winter weather that attracts tourists brings immense fuel challenges. To achieve significant savings without incurring large capital costs, the Jordan Hotel has contracted its heating services to Alodyne, a Portland based clean energy company. Under the 15-year agreement, Alodyne assumes all the risk: in exchange for a fixed monthly payment, Alodyne is responsible for monitoring performance, mechanical upgrades and guaranteed efficiency targets. Should the equipment fall short of expectations, Alodyne would suffer the loss.

Solution: Large-scale, high-mass condensing technology

In the first phase of work, completed in 2013, Alodyne swapped one of four 4.6 MBtu cast iron sectional boilers with a Viessmann Vitorond 200 950kW boiler (VD2-950), assuming 90% of the load for heat, DHW, pool and Jacuzzi. With an approximate 85% efficiency, the Vitorond 200 installation achieved a 30% reduction in Jordan's fuel costs.

Phase II, completed May 2017, completes the transformation by taking on 100% of the load. According to Christine Rogers, Alodyne Operations Manager, in addition to the improved efficiency for the remaining 10% of demand, Alodyne "removed the last three H.B. Smith boilers and the pumps that serve them," eliminating an unnecessary source of heat loss and electricity demand.

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But when this project was designed in 2016, Alodyne had an opportunity that was not available in 2013: condensing boiler technology capable of meeting huge heat demands. Hans Roth, Jr., Chief Engineer at Alodyne explains: "We were thinking of adding another VD2-950," he says. "But when we talked to Viessmann, they introduced us to a new boiler, the Vitocrossal 300 CA3, a high-mass boiler that condenses and is much more efficient." Three years ago, the largest available condensing boiler was 1,700 Btu, much too small for the resort's demands. But with the Viessmann Vitocrossal 300 CA3, the hotel can get 4 MMBtu from one boiler.

There was another large advantage to the Vitocrossal 300 CA3: it can support two separate loops for heating and hot water. "We get the high temperatures we need for DHW," Roth explains, "while heating the main building with much more efficient lower temperatures." The Vitocrossal 300 CA3's large size, with two built-in burners and exchangers, also "guarantees we can go as low as 15% - 20% of capacity to reduce cycling."

Results: An additional 12% reduction in fuel consumption

Once the Vitocrossal 300 CA3 installation was completed, the three old boilers were removed and the previously installed Vitorond 200 transitioned to support for peak loads and redundancy. Alodyne expects the CA3 to reach 90% efficiency, reducing the Jordan Hotel's fuel consumption by another 12%, and its greenhouse gas emissions by an estimated 153 metric tons a year.

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Technical Data

Vitocrossal 300, CA3 gas-fired condensing boiler

Model	CA3	**CA3 2.5****	**CA3 3.0****	**CA3 3.5**	**CA3 4.0**	**CA3 5.0**	**CA3 6.0**
BTS 2000 efficiency	%	≥96	≥96	≥96	≥96	≥96	≥96
Minimum Input (NG)	MBTu	250	300	300	400	300	400
Maximum Input (NG)	MBTu	2500	3000	3500	4000	5000	6000
Output*	MBTu	2400	2880	3360	3840	4800	5760
Overall Dimension assembled+							
Width	Inches	34	34	39	39	39	39
Height	Inches	79	79	84	84	84	84
Depth (Length)	Inches	94	94	102	102	138	138
Overall Dimension disassembled++							
Width	Inches	32	32	37	37	37	37
Height	Inches	77	77	79	79	79	79
Depth (Length)	Inches	89	89	97	97	133	133
Weight (burner, control and insulation)	lbs	3580[1]	4284[1]	4982	5093	6592	7187
Boiler Water Content	USG	120[1]	130[1]	151	143	227	218
Heat Exchanger Surface	ft.[2]	116[1]	136[1]	170	193	244	288
Maximum Operating Pressure	psig	160	160	160	160	160	160
Flue Outlet Size	dia	10	10	12	12	16	16
Power Requirements		120V/1Ph	120V/1Ph	120V/1Ph	120V/1Ph	208V/3Ph	208V/3Ph

* Target efficiency rating
** Available in April 2017
[1] Estimated
+ Includes boiler with burner, boiler panels, thermal insulation, boiler control unit and electrical connection box
++ Disassembled top section and side panels