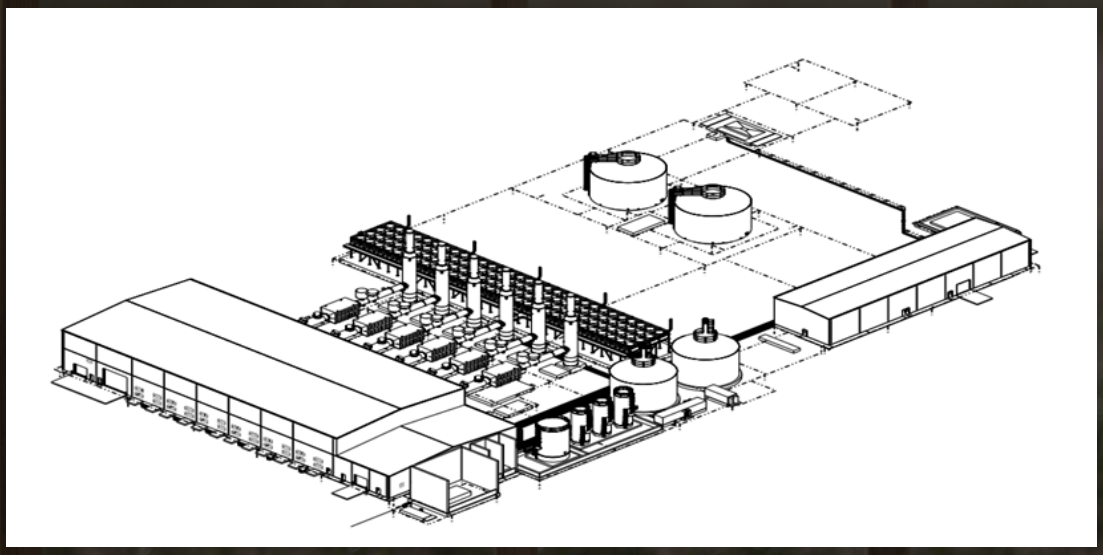
Lange II Generating Station

February 2026

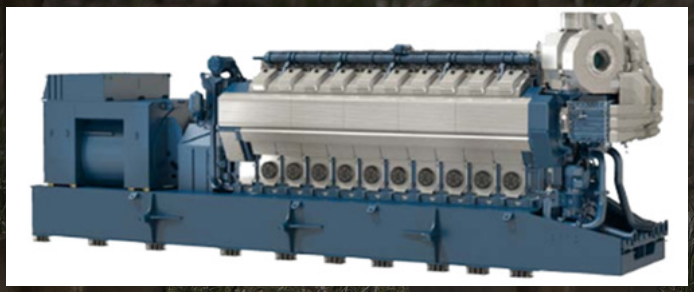
Black Hills Energy

Summary

The Lange II Generating Station (Lange II), is a 99.6 megawatt (MW) dual fuel power facility under construction at 3650 Deadwood Avenue in Rapid City, South Dakota. Lange II consists of an engine hall building on the lower left of the architectural rendering. This engine hall contains six 16.6 MW dual fuel natural gas and diesel reciprocating internal combustion engines (RICE) all capable of starting without grid power (black start capable). The exhaust from these engines exits the engine hall building and enters emission reducing catalyst prior to exiting through six exhaust stacks. A transformer to connect to the adjacent 230-kilovolt (kV) substation, various tanks for water, lubricating oil, aqueous ammonia, and diesel as well as a control room/warehouse building are all included with the project.



Lange II Architectural Rendering



RICE rendering

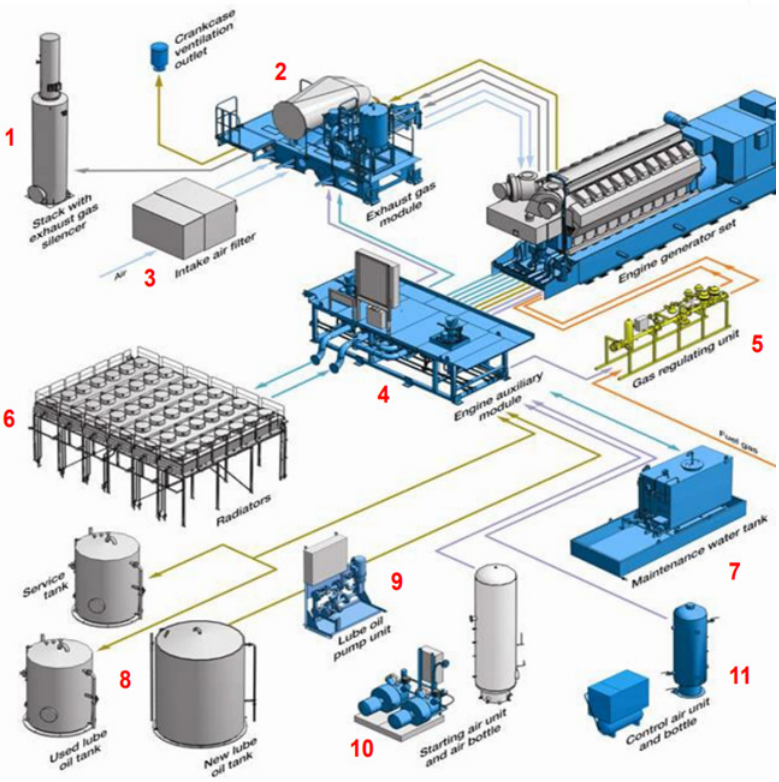
The Lange II RICE are configured in a v-18 configuration with 18 pistons per engine and equipped with two turbo chargers and coupled to an electric generator. Each engine has 22,720 horsepower and weighs 391 tons dry (782,000 pounds).

Scope Supply — One RICE

Lange II has six RICE
Shown below is the scope of supply for one RICE.

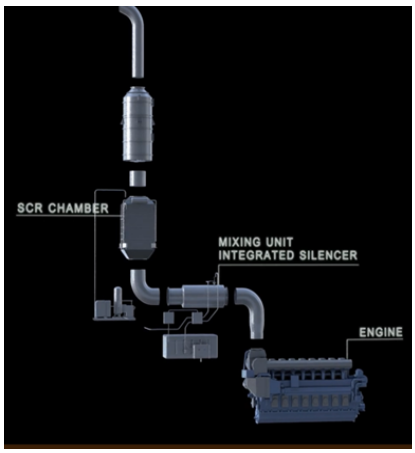
Typical Scope of Supply

1. Silencer + stack
2. Exhaust gas module
3. Inlet air filter
4. Engine auxiliary module
5. Gas regulating unit
6. Radiators
7. Maintenance water tank
8. Service tanks (lube, reagent)
9. Lube oil transfer pump
10. Starting air compressor
11. Instrument air compressor and receiver
12. SCR system (not shown)



Air Quality Emission Controls (SCR System)

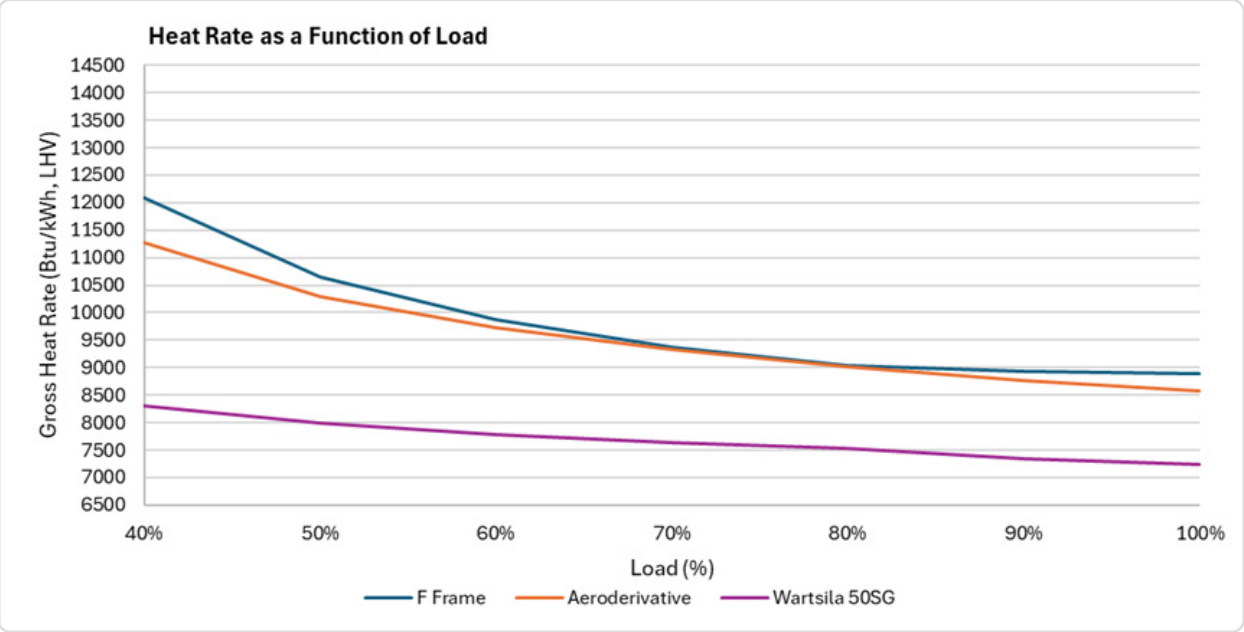
- The project requires a minor source permit from SD DANR and is not subject to PSD permitting under 40 CFR 52.21
- The Warsila engines are equipped with advanced selective catalytic reduction (SCR) and oxidation catalyst systems to control emissions
- The SCR systems reduce NOx emissions and the oxidation catalyst systems control emissions of CO and VOC's
- Clean, low sulfur and low particulate fuel is utilized to mitigate SO2 and Particulate Matter (PM) emissions
- The black start engine and diesel fire pump meet all new source performance standards (NSPS) emission requirements



Fuel Efficiency

The fuel efficiency of the RICE is measured as heat rate (Btu's/KWH). The heat rate performance and assumptions for Lange II are shown below. These curves are shown in low heating value or LHV so at full load the LHV heat rate is 7,614 btu's/kWh. The high heating value or HHV heat rate is 1.11 x the LHV heat rate or 8,506 btu's/kWh and represents the expected actual heat rate utilizing the expected natural gas supplied to Lange II. HHV takes into account the moisture in the actual natural gas supplied to Lange II.

The heat rate when utilizing diesel fuel at full output of the engine is 7,772 btu's/kWh LHV. An approximation for HHV with diesel fuel is 1.06 x LHV heat rate or 8,238 btu's/kwh. HHV takes into account the moisture in the diesel fuel supplied to Lange II.



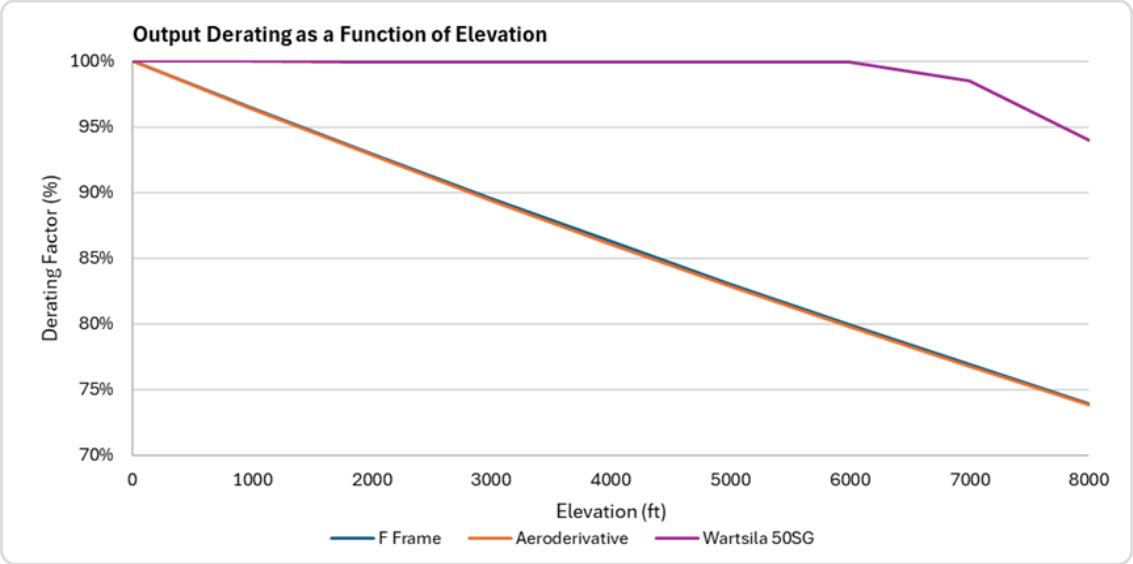
Fuel Supply Plan objectives

The RICE fuel supply pressure requirements are low compared to other aero derivative natural gas-fired turbines. For Lange II, 88 psi or greater is the highest gas pressure required to achieve full output. This is relatively low when compared to aero derivative engines that require in excess of 500 psia. The methane number of the natural gas fuel supply for Lange II averages between 69-75 This is based on five years of gas analysis provided by the gas supplier. The methane number is a rating for the knock resistance in engines similar to Octane rating for vehicle engines. A higher methane number indicates that the engine will be less prone to auto ignition or knocking which could cause premature failure of the engine.

The ideal methane number is 100 so gas analysis is compared to a reference of 100. Most manufacturers of natural gas engines require a minimum of 80 to meet nameplate capacity of the engines.

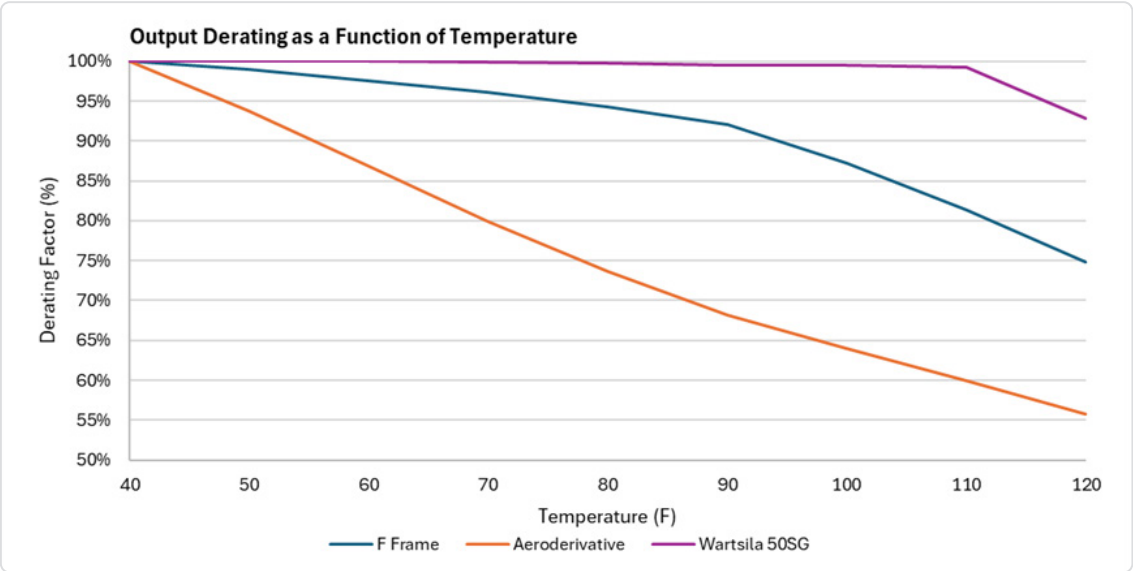
Site Elevation Performance Impacts

The elevation of Lange II is 3,490 feet above sea level. When comparing elevation power output derates the RICE perform much better than other gas turbine technologies. Other technologies (aero derivative and frame units) would be derated by 12% as compared to RICE at the Lange II elevation.



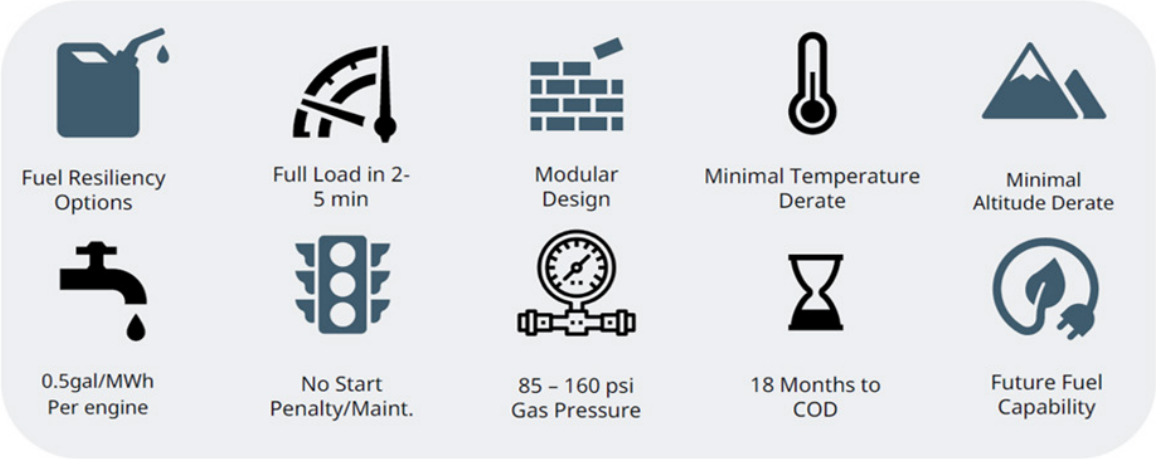
Air Temperature Humidity performance Impacts

At Lange II, until the ambient air temperature exceeds 97 degrees Fahrenheit, there is no derate in electric power output. If the humidity is 40% or less there is no derates up to 100 degrees Fahrenheit. This is exceptional performance since there are very few days that exceed these temperatures at the Lange II site.



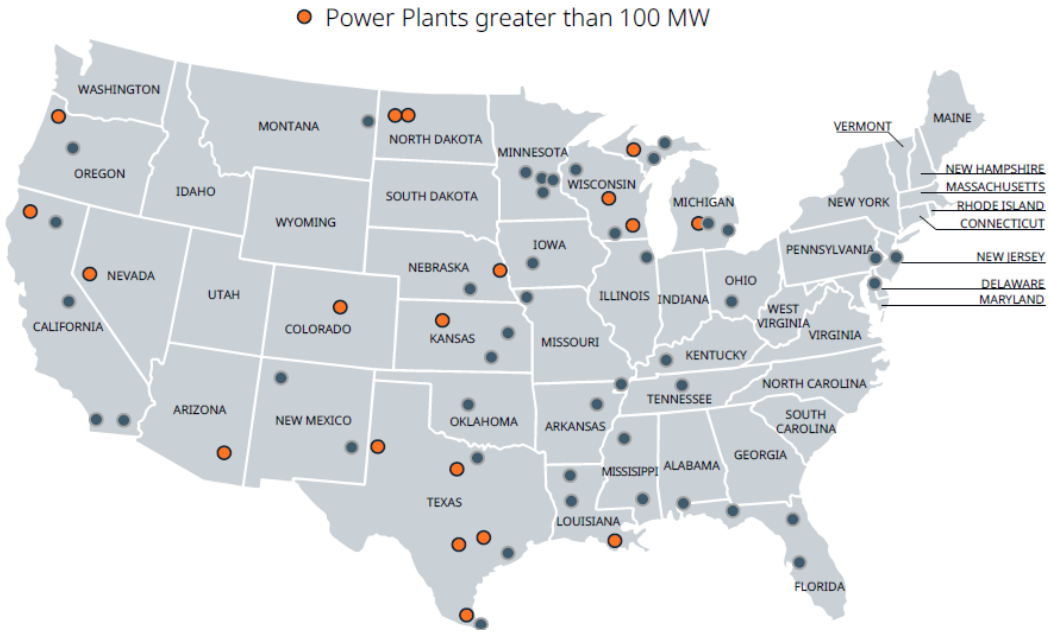
RICE Benefits

RICE has several inherent benefits. The dual fuel capability provides fuel resiliency. RICE is an excellent dispatchable resource capable of fast ramping to support regulating the intermittency of renewables as an example. RICE has very low water use and low gas pressure with minimal power output derate based on ambient air temperature and elevation. RICE has a modular design, reducing the time to construct in less than 18 months. RICE also has the future capability of less carbon intensive fuels like ammonia.



WARTSILA National Market Share

Wartsila is the original equipment manufacturer (OEM) for the Lange II RICE. Wartsila has over 5,000 MW of installed capacity in the United States with 75 projects.



RICE Delivery Logistics

The RICE are manufactured in Finland and loaded onto a cargo vessel for delivery to the United States. The cargo vessel crosses the Atlantic Ocean and then enters the great lakes where the RICE are offloaded at Duluth, Minnesota. From Duluth, the RICE are delivered to Rapid City on rail. Once in Rapid City, the RICE are off-loaded on 20 axle trucks to deliver to the Lange II site.

1

Loading the RICE in Finland.

2

The vessel route from Finland to Duluth, MN, via Atlantic Ocean, St. Lawerence seaway and the five Great Lakes.

3

From Duluth, the RICE are loaded on rail cars, and the following is the rail route to Rapid City where they are delivered to the Pete Lien rail siding near the Lange II site.

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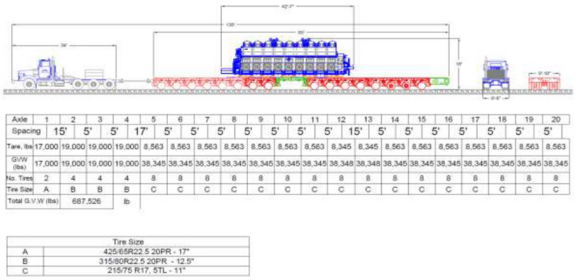

Axle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Spacing	15'	5'	5'	17'	5'	5'	5'	5'	5'	5'	5'	15'	5'	5'	5'	5'	5'	5'	5'	
Tare, lbs	17,000	19,000	19,000	19,000	8,563	8,563	8,563	8,563	8,563	8,563	8,563	8,345	8,345	8,563	8,563	8,563	8,563	8,563	8,563	8,563
GVW (lbs)	17,000	19,000	19,000	19,000	38,345	38,345	38,345	38,345	38,345	38,345	38,345	38,348	38,348	38,345	38,345	38,345	38,345	38,345	38,345	38,345
No. Tires	2	4	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Tire Size	A	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Total G.V.W (lbs)	687,526	lb																		

Tire Size	
A	425/65R22.5 20PR - 17"
B	315/80R22.5 20PR - 12.5"
C	215/75 R17, 5TL - 11"

At the Pete Lien Rail siding, the RICE are off-loaded onto a 20 axel, 142 tire haul truck to deliver to the Lange II site.

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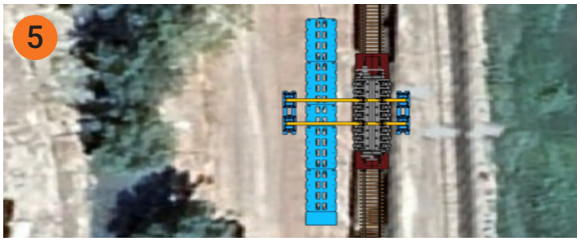

The following is the truck route from the Pete Lien rail siding to the Lange II site.

6

Rail siding location and route to site.