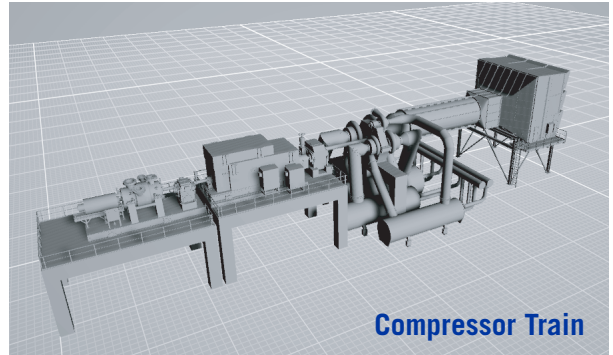
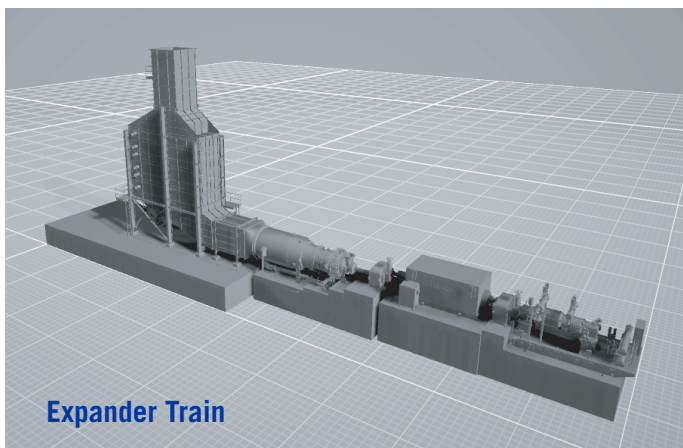


COMPRESSED AIR ENERGY STORAGE PROJECT Marguerite Lake (La Corey, AB)

Federation Engineering is currently developing a 320 MW Compressed Air Energy Storage (CAES) project near La Corey, Alberta, adjacent to the existing Marguerite Lake substation. The Marguerite Lake substation was developed in the mid 1980's to serve the projected growth of the thermal in-situ oil sands production facilities in the Cold Lake area. Due to development of cogeneration power plants at these oil sands production facilities following deregulation in 1996, the Cold Lake area is currently an exporter of surplus electrical energy making the Marguerite Lake substation and associated high-voltage transmission lines significantly underutilized.

The Marguerite Lake substation provides Federation's CAES project access to existing 240 kV double-circuit infrastructure and the Alberta Interconnected Electric System (AIES). The Marguerite Lake CAES project will enable more intermittent renewable energy development in Alberta as well as provide ancillary services to the AIES.



The first phase of the Marguerite Lake CAES project will consist of a single 125 MW compressor train and two 160 MW expander trains with compressed air storage in a solution mined salt cavern sized for 48 hours of full-load output.

The solution mined salt cavern for compressed air storage will be in the 200 meter thick Lotsberg halite of the Elk Point Group at a depth of 1100 meters below surface. The depth and thickness of the Lotsberg halite at the Marguerite Lake CAES project location provides perfect conditions for utilization of the Siemens Energy SXT-800 compressor and expander technology.

Each expander train can operate from 16 MW to 160 MW power production with 20% ramp rate per minute, and full generation in 10 minutes. The expansion trains are capable of 50% hydrogen co-firing with path to 100% in the future. The compressor trains are equipped with variable frequency drives for motor starting, have a 30% turn-down, a 30% ramp rate per minute, and full load in 4 minutes.