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GE Infrastructure

Solutions for Oil Sands Upgrading



Vast deposits of sand containing viscous hydrocarbons are one of the most promising non-conventional sources of oil. GE has the experience and proven technologies necessary for the most effective exploitation of this resource.

Core Products for the Core of the Process: Upgrading

The bitumen contained in oil sands is characterized by very high viscosity and a high ratio of carbon to hydrogen in

comparison with conventional crude oils. Therefore, the bitumen has to be upgraded before being processed in conventional refineries. This process of upgrading requires huge amounts of hydrogen or the re-injection of carbon

and is usually realized through either:

- Heavy oil upgrading or
- Coking

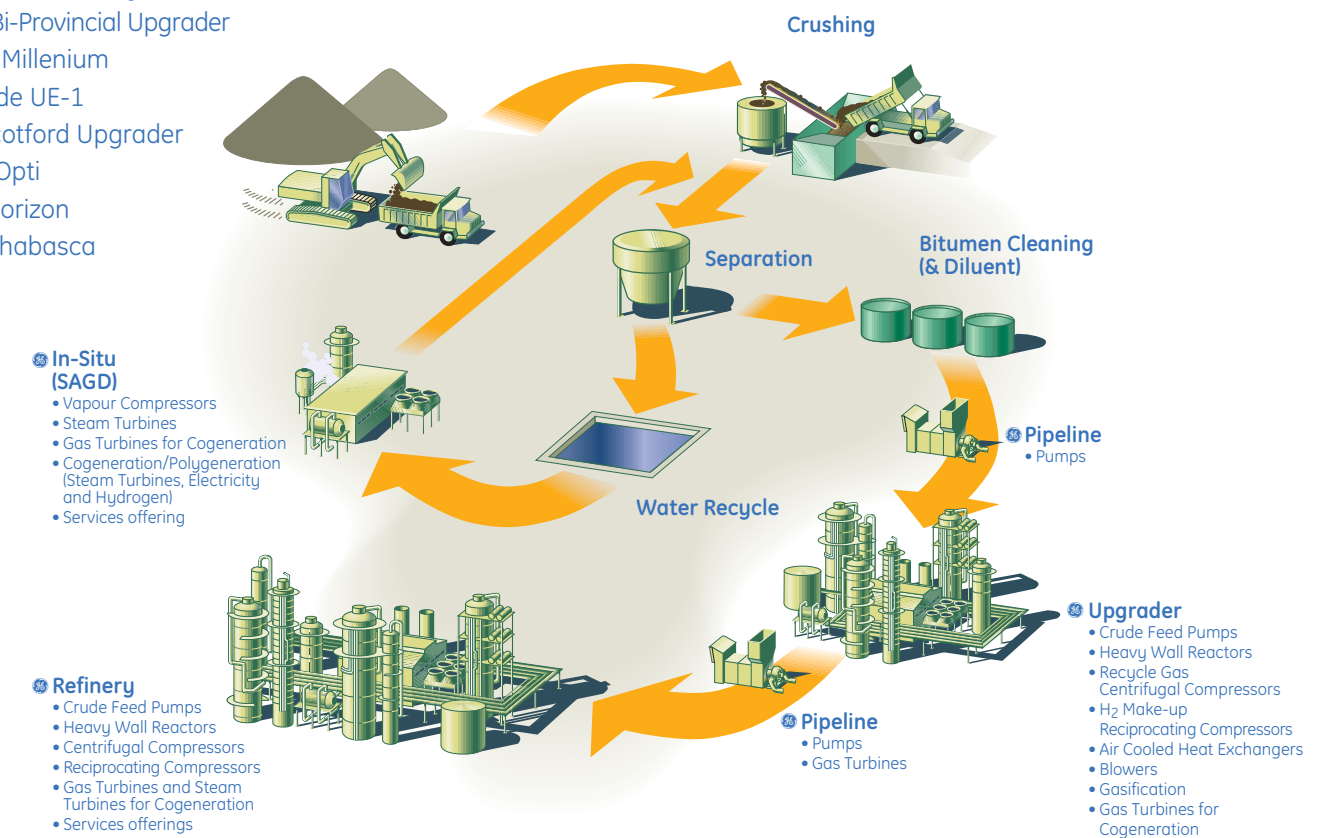
GE can supply a complete range of products for oil sands processing.



Where GE Plays a Role

Key Oil & Gas Projects:

- Husky Bi-Provincial Upgrader
- Suncor Millennium
- Syncrude UE-1
- Shell Scotford Upgrader
- Nexen Opti
- CNRL Horizon
- Shell Athabasca



High Thickness Reactors

Ideal for those applications where high pressure (up to 200 bar) and high temperature (up to 450°C) are crucial.

- Advanced technology for welding reactors up to 400 mm thick
- Full qualification with major Process Licensors (UOP, Chevron, IFP, HRI, Lummus, Shell, Exxon Mobil)
- Outstanding experience in manufacturing 21/4Cr1Mo1/4V reactors
- Proven on site assembly capabilities
- More than 80 units installed recently



Reciprocating Compressors

Designed in accordance with API618 standards for heavy duty applications, GE's Oil & Gas H series Reciprocating Compressors are the solution of choice for Hydrogen Make-up service in heavy oil processing plants.

- Highest levels of performance, reliability and availability
- More than 1000 units installed in hydro-processing plants, up to 700 bar
- Backed up by GE's Oil & Gas Global Services for installation, start-up and maintenance
- From 100 kW up to the highest power levels found in reciprocating compressors



Centrifugal Pumps

Full range of process pumps for refinery heavy duty processes designed in accordance with API610 (ISO13709) standards for continuous handling of high temperature liquids.

- Highest levels of performance, reliability and availability
- Referenced applications: first & second stage flash pump, reactor charge pump, LCF charge pump, heavy oil charge pump
- Hard facing and meticulous flow path design guarantees long pump life with highly erosive fluids



Efficient Platforms for Co-Generation

Maintaining a leadership position in turbine technology, performance and operational flexibility, GE offers both heavy duty and aeroderivative gas turbines with power output from 13 to 520 MWs.

- GE's H System – the world's most advanced combined cycle system and the first capable of 60% efficiency
- The LMS100 aeroderivative gas turbine features an intercooled cycle resulting in the industries highest simple cycle efficiency across the operating envelope
- Full range of service offerings



Integrated Gasification Combined Cycle (IGCC)

Pioneered by GE almost 30 years ago, IGCC technology produces low cost electricity from feedstocks such as coal, heavy oils and pet coke while meeting strict environmental regulations.

- Utilizing GE's gasification and turbine technology to offer a complete turnkey solution with performance guarantees
- IGCC Reference Plant – structured product with lower CAPEX and shorter cycle time
- Custom plant designs for co-production...polygen applications



Water Treatment

GE Water and Process Technologies provides the Alberta Oil Sands Industry critical services that maintain production and facilities at optimum operational efficiency. We provide a total solutions approach, including original equipment, water and process treatment chemicals, finished fuel additives and tools for monitoring analysis. The benefits of these offerings include, reduced corrosion, fouling control, increased production, enhanced product quality and asset protection. In addition, our focus on safety, water conservation and waste minimization techniques, help to keep operations within EH&S regulations.