

Canadian oil sands is the third largest hydrocarbon reservoirs in the world. Current production is about 2.6 million barrels per day, about 1.1 million barrels from surface mining and 1.5 million barrels from in-situ recovery. Steam assisted gravity drainage (SAGD) is the primary technology deployed for the in situ recovery of bitumen. In recent years, significant efforts have been made in the development of in-situ solvent technologies. In-situ solvent technologies are processes using solvents to recover bitumen from oil sands reservoirs with or without steam. They include solvent-assisted recovery, hybrid SAGD-solvent, and pure solvent injection processes. Compared with SAGD, in-situ solvent technologies have the potential to improve bitumen recovery while substantially reducing the GHG-emissions intensity and water-use intensity. Through decades of lab testing and field pilots, in-situ solvent technologies are poised to be commercially deployed in Alberta's oil sands. In addition to in-situ solvent technologies, electromagnetic heating, direct contact steam generation, and carbon capture and utilization are also being developed.

Another important innovation in oil sands industry is bitumen partial upgrading (BPU). Key elements of BPU technologies include vis-breaking, thermal cracking, asphaltene removal, sulfur removal, olefin removal, etc. A couple BPU technologies use supercritical water for cracking or refining. BPU can improve bitumen quality, reduce viscosity, and reduce or eliminate diluent requirement for transportation. BPU technologies can improve value of bitumen for producers. Half a dozen BPU technologies are now at pre-commercial demonstration stages.

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