

The average capital investment per farm is now almost \$200,000.

Alberta's third largest industry is tourism. This is based largely on the many resorts in the Rocky Mountains which are now as popular in winter as they are in summer. The winter sports installations are so good in Sourthern Alberta that the 1988 Winter Olympics have been awarded to Calgary, partly because nearly all the necessary facilities are already in place.

THE TAR SANDS: WHAT ARE THEY?

For decades the existence of extensive tar sands in Western Canada has been taken for granted as a source of vast future wealth for Canada, once the technology to develop them is put in place. In more recent years the tar sands, or oil sands as the industry prefers to call them, have been the subject of much discussion and considerable optimism both within Canada and abroad when people are reviewing the world energy picture. Recently, Commissioner Davignon, replying to a question in the European Parliament, gave an estimate of the size and importance of these reserves and noted that the Canada/EC Framework Agreement might be an appropriate mechanism for promoting private sector cooperation on their development.

But what are the tar sands?

The Alberta reserves are part of a worldwide distribution of tar sands and heavy oil deposits that yield oil too viscous to flow at normal temperatures. The largest of these are in the Orinoco River basin of Venezuela, and other substantial deposits are found in Turkey, the Balkans, Malagasy and the Soviet Union. Canada's reserves, estimated at about 1,000,000 million barrels are located in four places in the Province of Alberta. The largest deposit, on the Athabasca river, near Fort McMurray, contains about 713 billion barrels and is already being exploited. The other three are at Cold Lake (156 billion barrels), Peace River (63 billion barrels) and the Wabasca Region west of Fort McMurray (38 billion barrels).

The oil sands consist of sand water and bitumen, the sticky substance from which oil is extracted. Each grain of sand is coated with a thin film of water, and since oil and water do not mix, the sand and bitumen are kept apart, making the oil easier to isolate. In its natural state the bitumen has the consistency of molasses. It is almost a solid. But if you heat it to 85°C, it will pour like salad oil.

The Athabasca sands are the first to be developed because they lie closest to the surface. Ten percent of the reserve lies less than 50 metres underground and can be extracted by conventional strip mining. A second ten percent lies 50 to 100 metres deep, and the technology already exists to make it minable. The balance and all the oil sands of the other three beds lie at depths of 100 to 700 metres. The technology exists but extraction is still a formidable problem. Muskeg, the surface layer above the sands, consists of 7 metres of soggy, decaying vegetation, that freezes solid in winter and becomes a treacherous bog in summer. In winter the earth is so hard that it wore down the teeth on the bucket-wheel excavators in a single 8 hour shift. The excavator teeth have now been redesigned and made with a tougher and more