THE SURFACE AREA REQUIRED to equal the energy of ATHABASCA TAR SANDS (BTU COMPARISON) WITH SOLAR POWER:

Open pit mining destroys the boreal forest and muskeg. Muskeg patches form gradually from decomposing plant matter and sphagnum moss and are ideal habitats for beavers, pitcher plants, agaric mushrooms and a variety of other organisms.
It can extend as deep as 30 meters. 400 year old trees such as shore pine and black spruce grow slowly in the acidic soils. The oil industry refers to this complex ecosystem as "overburden."

"Based on current mining leases, the oil sands may transform that Florida-sized swath of forest into a massive lunar landscape – much of it unlikely ever to return to its original state. As well, the mining operations are licensed to draw 349 million cubic metres of fresh water from the Athabasca every year, twice the amount used by Calgary, a city of one million people. Some of the water is recycled, but most of the muddy leftovers, or tailings, wind up in those toxic "ponds" that are large enough to be seen from space."
- Globe and Mail, January 26, 2008.

SUPERIMPOSED AREA OF FLORIDA

100 Quad (quadrillion BTU)

Amount of energy that the United States uses every year. This number is combined from all energy sources.

14 Quad (quadrillion BTU)

Amount of energy that Canada uses every year. This number is combined from all energy sources.

1.6 Quad (quadrillion BTU)

Amount of energy produced every year from the Athabasca tar sands.

Synthetic crude oil from tar sands costs about $40 per barrel to produce.

To produce 1 m^3 of synthetic crude oil requires about 4 m^3 of water.

tar sands

900 km^2 (222,394 acres)

Area of active open pit surface mining (black areas)

4,700 km^2 (1,161,395 acres)

Surface mining area (SMA) as defined by Alberta government (light blue + black area)

65,400 km^2 (16,160,691 acres)

Entire extent of Athabasca tar sands

solar

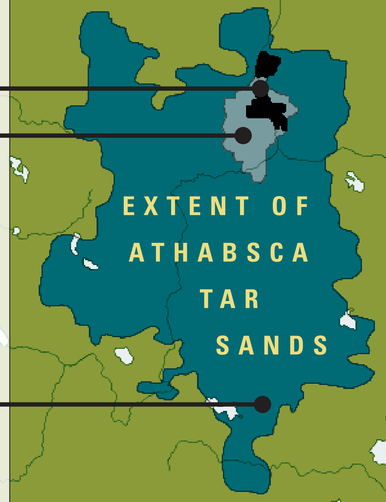
4,600 km^2 (1,136,685 acres)

Surface area of solar panels that would equal the extractable Athabasca oil energy as measured in BTUs

Only 25% of this area is required if comparison is made in miles per gallon equivalent for automobiles (darker area). This is because electric vehicles are more efficient per BTU of energy when compared to internal combustion vehicles.

Assumes 100kWh per year is generated from each m^2 of land area.

Energy from tar sands is based on production of 1.2 million barrels of oil per day, less the 1.5 billion ft^3 of natural gas and the 86,000 barrels of oil required each day to arrive at this amount of extraction.



At an oil sands mine the overburden is stripped away and large mining machines load the sand into trucks that haul it to a nearby processing plant.
At the processing plant the oil sand is crushed and then treated with hot water and chemicals to liberate the bitumen.
The liberated bitumen is then separated from the water, blended with lighter hydrocarbons to reduce its viscosity, and pumped through a pipeline to a refinery.

Sources:
- en.wikipedia.org/wiki/Athabasca_oil_sands
- geology.com/articles/oil-sands/
- www.eia.doe.gov/

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