

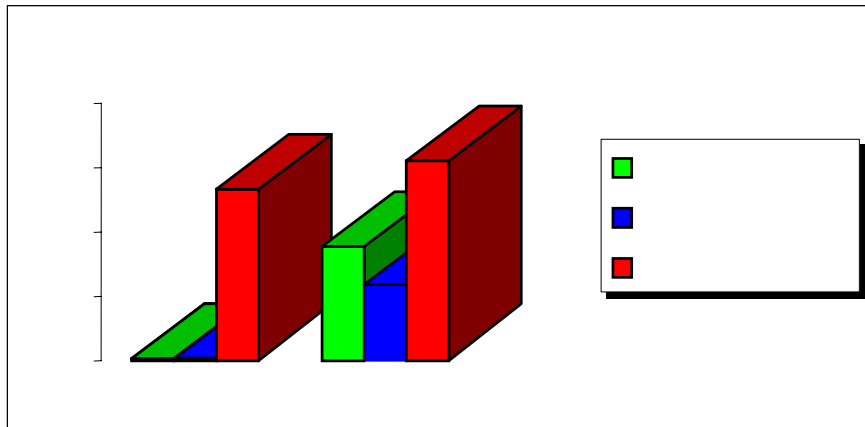
Alberta Oil Sands Technology and Research Authority (AOSTRA)

HISTORY OF AOSTRA AND ACCOMPLISHMENTS

AOSTRA's Formation and Mandate

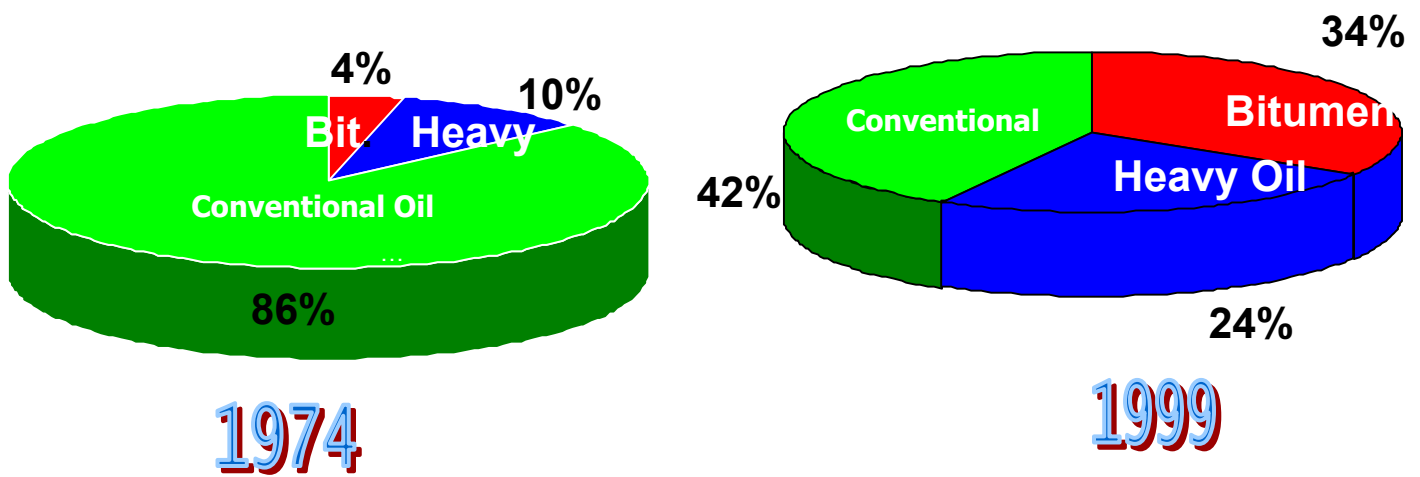
AOSTRA was formed in 1974 as the Province's proactive response to:

- ❖ Develop oil sands technologies that would allow Alberta's vast resources to be exploited at relatively low costs
- ❖ To fill the gap that declining conventional oil production would leave.



This strategy has been extremely successful

- ❖ \$50 billion in announced projects (about half of them approved)
- ❖ Growth in heavy oil and bitumen production has more than made up for decline of about 60% in conventional production



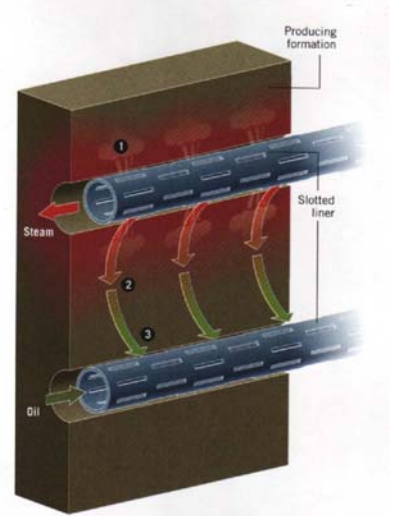
Total 81.8-million m³/year

84.0-million m³/year

Two Examples of Enabling Technologies led by AOSTRA:

Steam Assisted Gravity Drainage (SAGD)

- ❖ AOSTRA expenditures of over \$80 million
- ❖ Only viable in situ technology in Athabasca
- ❖ Provided additional reserves of 250 million m³
- ❖ Over 20 projects underway
- ❖ Estimated production of 250,000 barrels per day over the next 10 years
- ❖ Spawning several less energy intensive variations



OSLO Cold Water Extraction

- ❖ AOSTRA expenditures of \$6.5 million
- ❖ Less energy intensive than hot water process for separation of bitumen from oil sands
- ❖ Planned for use in expansion of Syncrude
- ❖ Being evaluated by new players such as Shell
- ❖ Offers 60% reduction in CO₂ emissions

AOSTRA Funding – 1976 to 1999

- ❖ Illustrates that it took several years to build up research capacity in the province ("patient funding")
- ❖ Several years after that to take technology to the field
- ❖ Investments in the 1980's now paying dividends estimated in the billions of \$
- ❖ Impact of research in developing the current industry leaders, the knowledge work force and in building community should not be underestimated.

