recognize the importance of Canada's energy potential; our vast reserves of hydroelectric power, uranium, gas, synthetic crude, and coal. In fact, Canada is one of the under-exploited areas of the world."

World trends

Mr. Goyer produced statistical data on world oil and petroleum and spoke of current world trends:

"First," he said "there has been a tremendous change in the world cash flow. Therefore there is a potential destabilization of international monetary flows caused by the accumulation of oil revenues. 'Petro-dollars' received by Middle East and African countries in 1972 were valued at $15 billion. Predictions as high as $89 billion were made for 1974.

"Second, in Europe, North America and Japan, there has been a growing concern as to how reliable the supply of oil from certain oil rich countries is.

"Third, the United States is attempting to become self sufficient in energy by 1980.

"Fourth, Japan and Europe would like to diversify their energy/oil supply.

"Finally, the high price and short supply of oil could put a strain on trade balance in developed countries (higher prices of imported oil and perhaps reduced exports of manufactured goods).

"Such a project will need the co-operation of provincial and federal governments and private enterprise: the provincial government since natural resources fall within provincial jurisdiction; the Federal Government since the investments are so massive as to require government to government negotiations with respect to loans, contracts, etc. The Federal Government must also ensure that the development projects fulfil Canada's long term objectives, thus enhancing national interests, and finally, the corporations which will provide the 'know-how' and the management would benefit from normal profits."

Artificial cells: new hope for patients with kidney problems

Some 20 years ago it was demonstrated that patients with only one kidney could depend on rather complicated dialysis machines to carry out the functions of a normal kidney. Unfortunately, because of the cost and bulk of the standard dialysis machine, only a few of the patients who require artificial kidney units have access to them. Furthermore, the problems of dialysis (separation and purifying of blood) are far from being solved.

A large step towards making the lives of such patients easier has been the development of the artificial cell by Professor Thomas M.S. Chang of McGill University's Department of Physiology, who originated the idea in 1956. In some respects, the artificial cells he prepared, containing hemoglobin and enzymes obtained from red blood cells, behaved like real ones.

In 1966 he started using artificial cells for the construction of a compact artificial kidney. He developed artificial cells containing absorbents which can remove toxins or poisons from the body, and demonstrated the feasibility of using this for treating patients with uremia. In the last two years, he has carried out clinical trials of this compact artificial kidney at the Royal Victoria Hospital in Montreal. In this case, cells containing activated charcoal with an albumin coating, have been able to supplement some of the kidney's functions. Dr. Chang's artificial kidney is cylindrical and weighs less than 1 lb. The blood is circulated through the cylinder which is loaded with microcapsules. Waste products such as creatinine, uric acid and uremic toxin are absorbed directly by the cells.

Comparison of methods

Standard dialysis units are far less efficient than the new artificial kidney. The basic principle for the former is that the blood flows through one compartment and large-quantities of dialysate through another. This process, in simple terms, washes the blood clean, Considerable volume and time are required. From the point of view of time, Dr. Chang's artificial kidney is much more convenient for the patient. From the psychological viewpoint, the new kidney has evident advantages: It is much smaller, lighter, less expensive and easier to operate.

On the other hand, his machine will at present reproduce renal functions to the extent that it will remove waste products from the body such as creatinine, gaunidine, uric acid and uremic toxin but it does not remove water or electrolytes. Further research is required to perfect artificial cells to carry out these functions. Meantime the patient must be supplemented with the standard dialysis machine from time to time to remove the water and electrolytes.

Arctic sewage-disposal reactor

About 60,000 people who live in some 60 communities in Canada's Arctic have virtually no sewage-treatment facilities. In most northern settlements, human waste has to be taken by truck for disposal elsewhere.

To help overcome the problem, the Department of Chemical Engineering of the University of Toronto is developing a cheap, small device that can sterilize and oxidize sewage in the Arctic. In its present form, it consists of a reactor chamber in which waste is kept at a controlled temperature and pressure while being mixed and irradiated by sterilizing ultraviolet light.

In a typical run in the ten-gallon prototype, the number of micro-organisms in a mililitre was reduced in two hours from six million to 200.

Such a device, it is claimed, could easily be installed in northern households to quickly clean waste for safe disposal in rivers or seas.

CP in Brazil

A consortium of two Brazilian engineering companies and Canadian Pacific Consulting Services Ltd of Montreal, has been chosen to plan and construct a new rail complex to be built by Rede Ferroviaria Federal S.A. (RFFSA), the Brazilian federal railways.

The new facilities, designed to handle a fleet of 300 locomotives and 5,000 cars, will be located at Conselheiro Lafaiete, in the state of Minas Gerais. The complex will include locomotive and car repair shops, rail yards, fueling systems and other related facilities.