total amount for next year, $7 337 500 are for estimated expenditure under the Regular Budget, while the estimates under the Operational Budget amount to $2 224 600.

Some of the major allocations under the Regular Budget are: panels and committees - $170 000; seminars, symposia and conferences - $188 000; distribution of information - $245 000; and scientific and technical services and laboratory charges - $1 110 000. Under the Operational Budget, $935 000 are allocated for exchange and training and $ 864 000 for technical assistance. The allocation for laboratory facilities is $205 600, while $180 000 are provided for the award of research contracts.

As noted earlier, the Operational Budget is financed mainly out of voluntary contributions by Member States. The target for voluntary contributions in 1963 has been set at $2 000 000.

In addition to these estimates relating to the Agency's own funds, a sum of $1 116 000 is expected to be available for the training and technical assistance programmes out of funds made available to the Agency under EPTA.

PROSPECTS OF NUCLEAR POWER IN EL SALVADOR

A nuclear power expert of the International Atomic Energy Agency, * who was sent to El Salvador at the request of that country's Government, has recommended that the possibility of using nuclear energy as a competitive source of power generation in El Salvador should be kept under review and given a more serious study within the next few years.

The report submitted by the expert after his mission to El Salvador contains a preliminary assessment of the prospects of nuclear power in the country. His main findings are:-

(a) The demand for power in El Salvador is now adequately met by a 60 MW hydro power system, supplemented by an additional 20 MW generated from steam, diesel and hydro sources. A few projects are now under way to meet the requirements up to 1965, and it is proposed to develop further hydro projects to cope with increased demand up to 1970.

(b) Nuclear energy could not be considered as an alternative means of meeting the power needs for this period, especially because of the relatively low cost of the small hydro projects envisaged. After 1970, however, the size of the generating units required will be larger, and for the period 1972-1982 nuclear power would be more competitive than it is at present. Although the country's hydroelectric potential is adequate to meet the power needs during this period also, an analysis of the probable cost of selected alternative programmes incorporating nuclear or oil-fired power generation appears promising.

(c) If a nuclear plant were to be commissioned in 1972, it would be necessary to reach a decision by 1964-66. A more serious study of the possibility of building such a plant should therefore be completed within the next two to four years, especially in the light of developments in the projected power demand and nuclear power costs, the establishment of more firm cost data and plans for the remaining hydro projects, and the price of oil for future steam plants.

Some of the data relating to the power situation and prospects in El Salvador on which these findings are based are summarized below.

Power Reserves and Present Generation

In comparison to present demand, the reserves of hydro power in El Salvador are quite large. The main source is the Rio Lempa, with an estimated hydroelectric potential of 540 MW. There are no known reserves of coal or oil. The small amount of oil that is used for power generation is imported. So far as nuclear raw materials are concerned, little prospecting has been done, and the geological conditions do not appear favourable for the occurrence of any economic deposits.

The demand for electricity in El Salvador has more than doubled in the last six years. While the present output is relatively small, the demand will reach significant proportions in the next decade if the present rate of growth is maintained.

The two principal organizations interested in the prospects of nuclear power in the country are the El Salvador Nuclear Energy Commission, and the Hydroelectric Executive Commission, called CEL (Commission Ejecutiva Hidroelectrica del Rio Lempa), which produces most of the electricity in El Salvador.

* *Mr. George Petretic, until recently a member of the staff of IAEA's Division of Economic and Technical Assistance. Mr. Petretic, who had been with the USAEC before joining the Agency, has now returned to the Commission.*

The present installed capacity is about 80 MW, composed of a 60 MW hydroelectric plant operated by CEL, 11 MW of various "run of the river" hydro plants, 5 MW of steam and 4 MW of diesel plants. All these units are inter-connected with a transmission network which links all the major centres of power consumption in El Salvador. In addition, there are about 8.5 MW of privately owned capacity, which is not connected to the national grid.

Power Needs up to 1970

To determine the country's future power requirements and the means of meeting them by utilizing the waters of the Rio Lempa, CEL engaged the Harza Engineering Company International to carry out an engineering study. Briefly, the findings of the study were:

(1) Power and energy demands on the CEL system will treble during the next ten years, requiring an increase in generating capacity of about 100 megawatts.

(2) The Upper Rio Lempa has an economical hydroelectric potential of about 200 megawatts, more than sufficient to meet demand during the next ten years.

(3) The most economical and suitable hydroelectric project for early construction is the Guajoyo Project with an installed capacity of 15 megawatts. (Construction has been initiated.)

(4) The addition of a 15 MW steam plant to the CEL system, combined with a new unit at Guayabo Project, would also be economically advantageous and would provide insurance against a deficiency of system energy in case of a critical dry year on the Rio Lempa.

(5) A programme for system expansion beginning with the Guajoyo Project, and followed by the steam plant and other Upper Rio Lempa hydroelectric projects, can be carried out under the present rate structure of CEL. All local currency requirements can be financed entirely from CEL surpluses, without additional borrowings. Foreign currency requirements must, of course, be obtained from loans.

(6) An alternative programme of expansion, with the Guajoyo Project omitted, is also financially feasible.

Power Needs after 1970

In order to examine the prospects of nuclear power after 1970, it is necessary to make an estimate of the probable growth in power demand after this date and consider the various possible means of meeting it. For this purpose, the demand for electricity projected by Harza engineers up to about 1972 (doubling time every six years) has been extended in the IAEA report for an additional decade, using a doubling time of eight years.

After 1970, the remaining hydro projects will be the 15 MW Astillero on the Upper Lempa, and the El Tigre and La Pintada on the Lower Lempa. A study of the probable cost of generating electricity by nuclear and oil-fired steam plants indicates that thermal power might be competitive with the remaining hydro projects. A detailed analysis is, however, necessary to determine their relative merits and the most economical construction programme to meet the power requirements during 1972-1982.

In attempting such an analysis, the IAEA report considers two specific construction programmes, incorporating varying proportions of nuclear and oil-fired thermal power. A cost analysis of these alternatives is given in the report. These projected cost data indicate that, under the current financing rates used by CEL, nuclear power might possibly be competitive with hydroelectric power by 1972. The report, however, points out that the question of steam versus nuclear sources has not been considered in detail. Nevertheless, the cost data do indicate that the possibility of using nuclear reactors as a competitive source of power generation deserves to be given a more serious study before being ruled out. Since it takes six to eight years to complete a nuclear power project, such a study ought to be completed by 1964-66 if it is to be used in arriving at a decision for a plant to be commissioned in 1972.