

DEPARTMENT OF ATOMIC ENERGY**DEMAND NO. 4****Atomic Energy**

A. The Budget allocations, net of recoveries and receipts, are given below:

Major Head	Actual 2009-2010			Budget 2010-2011			Revised 2010-2011			<i>(In crores of Rupees)</i> Budget 2011-2012			
	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	
Revenue	767.82	2940.61	3708.43	1000.00	2626.05	3626.05	1016.90	2799.76	3816.66	1382.13	2815.93	4198.06	
Capital	1719.61	747.00	2466.61	2152.00	720.95	2872.95	1933.10	785.53	2718.63	2608.87	795.48	3404.35	
Total	2487.43	3687.61	6175.04	3152.00	3347.00	6499.00	2950.00	3585.29	6535.29	3991.00	3611.41	7602.41	
1. Secretariat-Economic Services	3451	...	30.48	30.48	...	31.21	31.21	...	31.87	31.87	...	34.48	34.48
2. Atomic Energy Regulatory Board	3401	0.97	24.19	25.16	1.00	23.52	24.52	2.50	26.53	29.03	2.50	28.77	31.27
	5401	0.36	...	0.36	4.00	...	4.00	5.00	...	5.00	5.50	...	5.50
<i>Total</i>		1.33	24.19	25.52	5.00	23.52	28.52	7.50	26.53	34.03	8.00	28.77	36.77
Atomic Energy Research and Industries													
3. Bhabha Atomic Research Centre, Mumbai (BARC)	2852	...	427.82	427.82	...	350.03	350.03	...	395.92	395.92	...	411.95	411.95
	3401	...	903.91	903.91	...	837.89	837.89	...	900.45	900.45	...	909.05	909.05
	4861	302.68	8.12	310.80	520.00	15.00	535.00	460.00	10.83	470.83	550.00	11.55	561.55
	5401	489.69	21.06	510.75	610.00	30.12	640.12	540.00	31.00	571.00	640.00	31.45	671.45
<i>Total</i>		792.37	1360.91	2153.28	1130.00	1233.04	2363.04	1000.00	1338.20	2338.20	1190.00	1364.00	2554.00
4. Indira Gandhi Centre for Atomic Research, Kalpakkam (IGCAR)	3401	...	224.33	224.33	...	203.34	203.34	...	223.06	223.06	...	235.60	235.60
	4861	69.80	...	69.80	83.00	...	83.00	80.00	...	80.00	250.00	...	250.00
	5401	129.98	0.93	130.91	140.00	0.94	140.94	150.00	0.94	150.94	225.00	1.10	226.10
<i>Total</i>		199.78	225.26	425.04	223.00	204.28	427.28	230.00	224.00	454.00	475.00	236.70	711.70
5. Raja Ramanna Centre for Advanced Technology, Indore (RRCAT)	3401	...	111.21	111.21	...	92.70	92.70	...	118.74	118.74	...	123.16	123.16
	5401	97.80	0.74	98.54	115.00	1.65	116.65	106.00	1.51	107.51	123.68	1.31	124.99
<i>Total</i>		97.80	111.95	209.75	115.00	94.35	209.35	106.00	120.25	226.25	123.68	124.47	248.15
6. Variable Energy Cyclotron Centre, Kolkata (VECC)	3401	...	65.95	65.95	...	58.32	58.32	...	58.78	58.78	...	63.68	63.68
	5401	53.59	1.49	55.08	83.00	1.76	84.76	46.00	1.76	47.76	90.00	2.01	92.01
<i>Total</i>		53.59	67.44	121.03	83.00	60.08	143.08	46.00	60.54	106.54	90.00	65.69	155.69
7. Directorate of Purchase and Stores, Mumbai	3401	...	35.50	35.50	...	25.20	25.20	...	32.45	32.45	...	36.50	36.50
8. General Services Organisation, Kalpakkam	3401	...	53.22	53.22	...	48.56	48.56	...	57.13	57.13	...	63.19	63.19

(In crores of Rupees)

	Major Head	Actual 2009-2010			Budget 2010-2011			Revised 2010-2011			Budget 2011-2012			
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	
9. Autonomous Bodies														
9.01	Tata Institute of Fundamental Research, Mumbai	3401	166.00	198.05	364.05	220.00	203.50	423.50	222.30	195.00	417.30	303.48	206.90	510.38
9.02	Tata Memorial Centre, Mumbai	3401	55.30	140.79	196.09	77.00	148.00	225.00	77.00	209.60	286.60	76.60	213.18	289.78
9.03	Saha Institute of Nuclear Physics, Kolkata	3401	81.50	52.67	134.17	80.50	54.35	134.85	70.00	46.90	116.90	59.05	58.00	117.05
9.04	Institute of Physics, Bhubaneswar	3401	46.00	14.54	60.54	66.50	15.39	81.89	64.39	12.47	76.86	223.50	16.10	239.60
9.05	Harish-Chandra Research Institute, Allahabad	3401	7.00	14.32	21.32	6.00	17.00	23.00	6.00	13.74	19.74	10.00	15.80	25.80
9.06	Institute of Mathematical Sciences, Chennai	3401	3.62	21.18	24.80	5.00	21.30	26.30	2.50	25.00	27.50	2.00	26.00	28.00
9.07	Institute for Plasma Research, Gandhinagar	3401	250.00	48.30	298.30	340.00	48.04	388.04	340.00	44.63	384.63	515.00	49.48	564.48
9.08	Atomic Energy Education Society, Mumbai	3401	12.90	34.64	47.54	10.00	31.51	41.51	10.00	32.00	42.00	15.00	39.00	54.00
	<i>Total- Autonomous Bodies</i>		622.32	524.49	1146.81	805.00	539.09	1344.09	792.19	579.34	1371.53	1204.63	624.46	1829.09
10.	Assistance to Universities, etc. (Grants to Other Institutions)	3401	124.53	...	124.53	154.00	...	154.00	182.21	...	182.21	155.00	...	155.00
11.	Directorate of Construction, Services and Estate Management (DCS&EM), Mumbai	3401	...	74.34	74.34	...	62.93	62.93	...	67.06	67.06	...	71.47	71.47
12. Housing Projects														
12.01	Projects under DCS&EM	5401	12.11	...	12.11	50.00	...	50.00	38.00	...	38.00	80.00	...	80.00
12.02	Other Housing Projects	5401	7.17	...	7.17	22.23	...	22.23	13.47	...	13.47	33.74	...	33.74
	<i>Total- Housing Projects</i>		19.28	...	19.28	72.23	...	72.23	51.47	...	51.47	113.74	...	113.74
13.	Atomic Minerals Directorate for Exploration and Research, Hyderabad (AMDER)	3401	...	143.28	143.28	...	117.26	117.26	...	138.27	138.27	...	154.22	154.22
		4861	46.63	...	46.63	55.00	...	55.00	60.36	...	60.36	54.00	...	54.00
		5401	67.07	0.50	67.57	80.63	0.70	81.33	59.25	0.70	59.95	79.95	0.70	80.65
	<i>Total</i>		113.70	143.78	257.48	135.63	117.96	253.59	119.61	138.97	258.58	133.95	154.92	288.87
Nuclear Fuel														
14. Nuclear Fuel Complex (NFC)														
14.01	Fuel Fabrication Facilities													
14.01.01	Fuel Fabrication Facilities - Gross	2852	...	960.08	960.08	...	1152.54	1152.54	...	1144.48	1144.48	...	1146.66	1146.66
14.01.02	Less Receipts	0852	...	-814.39	-814.39	...	-1163.71	-1163.71	...	-1179.79	-1179.79	...	-1331.00	-1331.00
	<i>Net</i>		...	145.69	145.69	...	-11.17	-11.17	...	-35.31	-35.31	...	-184.34	-184.34
14.02	Common Facilities	2852	...	31.03	31.03	...	75.94	75.94	...	73.97	73.97	...	94.07	94.07
14.03	Stainless Steel Tubes Plant	2852	...	51.83	51.83	...	34.32	34.32	...	34.82	34.82	...	37.27	37.27
14.04	Capital Outlay on NFC	4861	76.79	...	76.79	72.00	...	72.00	45.17	...	45.17	82.00	...	82.00
	<i>Total- Nuclear Fuel Complex (NFC)</i>		76.79	228.55	305.34	72.00	99.09	171.09	45.17	73.48	118.65	82.00	-53.00	29.00

(In crores of Rupees)

	Major Head	Actual 2009-2010			Budget 2010-2011			Revised 2010-2011			Budget 2011-2012			
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	
Heavy Water														
<i>15. Heavy Water Board</i>														
15.01	Maintenance of Housing Colonies for Heavy Water Plants	2852	...	7.73	7.73	...	10.32	10.32	...	10.47	10.47	...	12.29	12.29
15.02	Central Office (Other Heavy Water Plants)	4861	64.57	25.20	89.77	70.00	20.94	90.94	50.39	20.64	71.03	61.00	22.99	83.99
<i>Total- Heavy Water Board</i>			64.57	32.93	97.50	70.00	31.26	101.26	50.39	31.11	81.50	61.00	35.28	96.28
<i>16. Heavy Water Production</i>														
16.01	Heavy Water Plant, Baroda	4861	...	50.97	50.97	...	57.31	57.31	...	53.43	53.43	...	56.25	56.25
16.02	Heavy Water Plant, Kota	4861	...	135.83	135.83	...	148.57	148.57	...	134.69	134.69	...	137.58	137.58
16.03	Heavy Water Plant, Tuticorin	4861	...	19.52	19.52	...	17.26	17.26	...	17.82	17.82	...	26.64	26.64
16.04	Heavy Water Plant, Talcher	4861	...	13.87	13.87	...	7.55	7.55	...	7.56	7.56	...	8.70	8.70
16.05	Heavy Water Plant, Thal	4861	...	114.20	114.20	...	101.82	101.82	...	140.17	140.17	...	121.87	121.87
16.06	Heavy Water Plant, Hazira	4861	...	120.70	120.70	...	118.39	118.39	...	140.61	140.61	...	141.25	141.25
16.07	Heavy Water Plant, Manuguru	4861	...	254.22	254.22	...	244.81	244.81	...	261.40	261.40	...	272.38	272.38
16.08	Less-Loss of Heavy Water	4861	...	-20.50	-20.50	...	-46.07	-46.07	...	-37.73	-37.73	...	-40.50	-40.50
	<i>Net</i>		...	688.81	688.81	...	649.64	649.64	...	717.95	717.95	...	724.17	724.17
Total-Heavy Water			64.57	721.74	786.31	70.00	680.90	750.90	50.39	749.06	799.45	61.00	759.45	820.45
<i>17. Feedstock</i>														
17.01	Gross	4861	...	874.47	874.47	...	850.00	850.00	...	927.00	927.00	...	979.00	979.00
17.02	Less - Heavy Water Production	4861	...	-874.47	-874.47	...	-850.00	-850.00	...	-927.00	-927.00	...	-979.00	-979.00
	<i>Net</i>		...	...	...	...	...	...	...	...	...	...	...	...
<i>18. Board for Radiation and Isotope Technology (BRIT)</i>														
		2852	...	46.72	46.72	...	40.95	40.95	...	44.36	44.36	...	43.80	43.80
		4861	15.48	0.15	15.63	18.00	0.20	18.20	16.00	0.20	16.20	73.00	0.20	73.20
	<i>Total</i>		15.48	46.87	62.35	18.00	41.15	59.15	16.00	44.56	60.56	73.00	44.00	117.00
<i>19. Other Programmes</i>														
19.01	Management Services Group	2852	...	0.66	0.66	...	0.79	0.79	...	0.79	0.79	...	0.99	0.99
19.02	O&M of Thorium Plant, Trombay	2852	...	10.88	10.88	...	14.03	14.03	...	8.90	8.90	...	8.25	8.25
19.03	International Atomic Energy Agency	3401	...	9.73	9.73	...	9.00	9.00	...	9.24	9.24	...	17.00	17.00
<i>Total- Other Programmes</i>			...	21.27	21.27	...	23.82	23.82	...	18.93	18.93	...	26.24	26.24
<i>20. DAE Projects</i>														
20.01	R&D Projects	3401	...	7.03	7.03	...	5.80	5.80	...	4.68	4.68	...	4.68	4.68
		5401	13.68	...	13.68	20.00	...	20.00	115.50	...	115.50	95.00	...	95.00
	<i>Total</i>		13.68	7.03	20.71	20.00	5.80	25.80	115.50	4.68	120.18	95.00	4.68	99.68

(In crores of Rupees)

	Major Head	Actual 2009-2010			Budget 2010-2011			Revised 2010-2011			Budget 2011-2012		
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
20.02 I&M Projects	2852	20.00	10.59	30.59	20.00	56.02	76.02	20.00	18.24	38.24	20.00	25.39	45.39
	4861	1.93	...	1.93	6.14	...	6.14	5.25	...	5.25	12.00	...	12.00
	<i>Total</i>	<i>21.93</i>	<i>10.59</i>	<i>32.52</i>	<i>26.14</i>	<i>56.02</i>	<i>82.16</i>	<i>25.25</i>	<i>18.24</i>	<i>43.49</i>	<i>32.00</i>	<i>25.39</i>	<i>57.39</i>
<i>Total- DAE Projects</i>		<i>35.61</i>	<i>17.62</i>	<i>53.23</i>	<i>46.14</i>	<i>61.82</i>	<i>107.96</i>	<i>140.75</i>	<i>22.92</i>	<i>163.67</i>	<i>127.00</i>	<i>30.07</i>	<i>157.07</i>
21. Investment in Public Enterprises - Uranium Corporation of India Limited	4861	270.28	...	270.28	203.00	...	203.00	142.71	...	142.71	154.00	...	154.00
22. Grants-in-aid to Uranium Corporation of India Ltd.	2852	...	...	...	20.00	...	20.00	20.00	...	20.00	...	...	...
Total-Atomic Energy Research and Industries		2486.10	3632.94	6119.04	3147.00	3292.27	6439.27	2942.50	3526.89	6469.39	3983.00	3548.16	7531.16
Grand Total		2487.43	3687.61	6175.04	3152.00	3347.00	6499.00	2950.00	3585.29	6535.29	3991.00	3611.41	7602.41
	Head of Dev	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total
B. Investment in Public Enterprises													
21.01 Electronics Corporation of India Limited	12859	...	17.64	17.64	...	31.00	31.00	...	31.00	31.00	...	27.00	27.00
21.02 Uranium Corporation of India Limited	12861	270.28	186.26	456.54	203.00	244.00	447.00	142.71	501.35	644.06	154.00	333.00	487.00
21.03 Indian Rare Earths Limited	12861	...	17.28	17.28	...	60.00	60.00	...	29.00	29.00	...	80.00	80.00
Total		270.28	221.18	491.46	203.00	335.00	538.00	142.71	561.35	704.06	154.00	440.00	594.00
C. Plan Outlay													
1. Telecommunication and Electronic Industries	12859	...	17.64	17.64	...	31.00	31.00	...	31.00	31.00	...	27.00	27.00
2. Atomic Energy Industries	12861	868.16	203.54	1071.70	1067.14	304.00	1371.14	899.88	530.35	1430.23	1256.00	413.00	1669.00
3. Atomic Energy Research	13401	1619.27	...	1619.27	2084.86	...	2084.86	2050.12	...	2050.12	2735.00	...	2735.00
Total		2487.43	221.18	2708.61	3152.00	335.00	3487.00	2950.00	561.35	3511.35	3991.00	440.00	4431.00

1. **SECRETARIAT-ECONOMIC SERVICES:** DAE Secretariat is the apex body administering the constituent units, PSUs and aided institutions spread all over the country carrying out the various activities of the Department. There are five R&D Units, three industrial units, three service organisations and five PSUs apart from nine aided institutions in the Department of Atomic Energy. It has a Branch Secretariat in New Delhi.

2. **ATOMIC ENERGY REGULATORY BOARD:** Atomic Energy Regulatory Board (AERB) enforces radiological safety stipulations. It is assisted by Safety Review Committee for Operating Plants (SARCOP), Safety Review Committee (SRC) for applications for radiation and other committees in carrying out its mandate in prescribing radiological, nuclear and industrial safety regulations.

3. **BHABHA ATOMIC RESEARCH CENTRE:** Bhabha Atomic Research Centre (BARC), a multidisciplinary organisation, pursues comprehensive Research and Development (R&D)

programmes for harnessing nuclear energy and also its utility for the benefit of the society. These R&D efforts are concentrated in the fields of nuclear sciences, engineering & technology, basic sciences and allied fields and geared up for exploitation of atomic energy for power generation and application of radiation technology in the areas of agriculture, health care and industry. The centre is engaged in the research and development of front line technologies. BARC continues to give R&D support to all other units of DAE and provide necessary support for national security.

4. **INDIRA GANDHI CENTRE FOR ATOMIC RESEARCH:** Indira Gandhi Centre for Atomic Research (IGCAR), is the second largest R&D centre of the Department and one of the internationally bench marked research centres for nuclear science and technology. The Centre is engaged in design and development of liquid sodium cooled fast breeder reactors in the country, as a part of the Nuclear Power Programme Stage 2, backed by fuel fabrication and reprocessing. Fast Breeder Test Reactor (FBTR), a prelude to the FBR programme, has been in operation with indigenously developed Uranium-Plutonium carbide fuel. The Centre has R&D activities, encompassing hydraulic

studies and reactor engineering studies of reactor components, sodium instrumentation, material development and characterization.

5. **RAJA RAMANNA CENTRE FOR ADVANCED TECHNOLOGY:** Raja Ramanna Centre for Advanced Technology (RRCAT), Indore, is engaged in development of particle accelerators and lasers along with their applications, besides carrying out substantial activities in cryogenics and materials research. RRCAT has built Synchrotron Radiation Source (SRS) Indus 2. In addition, the centre has built smaller accelerators for their irradiation applications and construction of a 10 MeV electron accelerator-based Agricultural Radiation Processing Facility (ARPF) near Mandi in Indore. The unit has built and given Cryo-coolers and turbomolecular pumps to BARC and other labs. Under the laser programme, it has also built new lasers and laser based systems, including that given to Nuclear Power Corporation of India Limited for use in Narora Atomic Power Station. RRCAT contributed to new collaborative activities with CERN which include design of transport line for CLIC Test facility and modulator for LINAC-4 which is the front-end of the SPL (Superconducting Proton Linac) Project.

6. **VARIABLE ENERGY CYCLOTRON CENTRE:** The Variable Energy Cyclotron Centre (VECC) at Kolkata is operating the nations largest and the first indigenously built Cyclotron and has been delivered first time in India energetic Neon 20 and Argon 40 beams. A very high speed computing grid interconnected real time with many other laboratories in the world is already operational and its capability is being enhanced to meet the challenges of future experiments in Large Hadron Collider (LHC), CERN, Geneva. Initial work on nano beams for Micro electromechanical systems (MEMS) and Nano electromechanical systems (NEMS) is towards completion in VECC.

7. **DIRECTORATE OF PURCHASE & STORES:** The objective of Directorate of Purchase & Stores is to ensure availability of quality material at right time and at right place. In the process, DPS should also ensure that the material is procured at right price. The materials required by the R&D Units of the Department are of developmental in nature. Hence DPS is also entrusted with the work of locating the right sources for manufacturing of complicated precision equipment required for Atomic Energy Programme.

8. **GENERAL SERVICES ORGANISATION:** General Services Organisation (GSO), Kalpakkam is one of the service organisations under the Department and the Unit is providing services such as residential accommodation, health services under CHSS, transport services, educational facilities and is also responsible for the maintenance of public buildings, roads within the colony, maintenance of water supply, etc. to all the Units located at Kalpakkam such as Indira Gandhi Centre for Atomic Research, Bhabha Atomic Research Centre (Facilities), Nuclear Power Corporation of India Limited, Central Industrial Security Force, etc.

9.01. **TATA INSTITUTE OF FUNDAMENTAL RESEARCH:** Tata Institute of Fundamental Research (TIFR) is primarily an Institute for basic research, but in this process, it also develops new technologies and creates a pool of scientific and technical manpower. The research activities of the Institute are organized under three Schools: (1) School of Mathematics (2) School of Natural Sciences and (3) School of Technology and Computer Science. The School of Natural Sciences has seven departments at Mumbai (Theoretical Physics, Astronomy & Astrophysics, High Energy Physics, Nuclear & Atomic Physics, Condensed Matter Physics & Material Science, Chemical Sciences and Biological Sciences), and three national Centres: (a) The National Centre for Radio Astrophysics (NCRA) at Pune, with the cylindrical radio telescope at Ootacamund and the Giant Meterwave length Radio Telescope (GMRT) at Khodad (near Pune); (b) The National Centre for Biological Sciences at Bangalore, and (c) The Homi Bhabha Centre for Science Education at Mankhurd,

Mumbai. The School has also set up several field stations for various research facilities, which include the National Balloon Facility (in collaboration with ISRO) at Hyderabad, the Gamma Ray Astronomy & High Energy Physics Laboratories at Ootacamund and Pachmarhi and the Gravitational Laboratory at Gauribidnur. TIFR has also been conferred the status of Deemed University by the University Grant Commission.

9.02. **TATA MEMORIAL CENTRE:** Tata Memorial Centre (TMC) comprises Tata Memorial Hospital (TMH) and Advanced Centre for Treatment, Research and Education in Cancer (ACTREC). Tata Memorial Hospital was established in 1941 for the treatment and cure of cancer and allied diseases. TMC has the responsibility to set standards of therapy for treatment modalities and a centre to train doctors, scientists and para-medical staff in the field. Cancer Research Institute (CRI) established in 1952, is one of the units of TMC and conducts basic, community-based and clinically oriented research on multiple facets of cancer, focusing on the cancers prevalent in India.

9.03. **SAHA INSTITUTE OF NUCLEAR PHYSICS:** Saha Institute of Nuclear Physics (SINP) has a two-fold objective to carry out basic research in various areas of physical and biophysical sciences and to impart manpower training in these fields. SINP has been a pioneering institute for over five decades in the area of research and manpower training. It has the oldest NMR Lab, a working Tokamak, a most sophisticated unit for surface studies and two strong groups for studies in theoretical physics and statistical mechanics.

9.04. **INSTITUTE OF PHYSICS:** The Institute of Physics, Bhubaneswar promotes fundamental research in the frontier areas of Physics. Research is carried out in theoretical as well as experimental areas, viz. Condensed Matter Physics, High Energy Physics, Nuclear Physics, and accelerator based sciences.

9.05. **HARISH-CHANDRA RESEARCH INSTITUTE:** The Institute was established in the year 1975. In due course of time the Institute was adopted by the Department of Atomic Energy which is continuing and gaining strength over the years.

9.06. **INSTITUTE OF MATHEMATICAL SCIENCES:** The Institute of Mathematical Sciences (IMSc), which had its inception in 1962, is a National Institute of higher learning with primary objective to foster high quality fundamental research in frontier disciplines of the Mathematical Sciences.

9.07. **INSTITUTE FOR PLASMA RESEARCH:** The institute has a broad charter of objectives to carry out experimental and theoretical research in plasma science with emphasis on the physics of magnetically confined plasmas and certain aspects of non-linear phenomena. The Institute also has a mandate to stimulate plasma research and development activities in the Universities and the Industrial sector. It is also expected to contribute in the training of plasma physicists and technologists in the country.

9.08. **ATOMIC ENERGY EDUCATION SOCIETY:** Atomic Energy Education Society (AEES) runs 32 schools and junior colleges at 16 different Centers with more than 28000 students on its rolls. Society also assists three special schools run by Charitable Organizations for the handicapped children of DAE employees at Kalpakkam, Mumbai and Indore.

10. **ASSISTANCE TO UNIVERSITIES, ETC.:** The research-education linkage has been always nurtured by DAE. Extra-mural funding from DAE to universities/institutions/ national

laboratories is channeled through the Board of Research in Nuclear Sciences (BRNS). National Board for Higher Mathematics (NBHM) has initiated several schemes like helping the development of mathematical centres, giving scholarships to research fellows, travel assistance to young mathematicians for attending conferences/seminars etc., support to libraries etc. The Department also funds cancer hospitals in the country which support primarily small projects and radiation related equipment for cancer treatment.

11. DIRECTORATE OF CONSTRUCTION, SERVICES & ESTATE MANAGEMENT: Directorate of Construction, Services & Estate Management (DCSEM) has been constituted to look after the construction activities of the Department including housing for its employees. This Directorate is also responsible for operation, maintenance and up-gradation of residential flats, shops, public buildings and estate management including allotment and the security for the DAE Estate in Mumbai. In addition, Directorate executes construction works for constituent unit like AMD, VECC, Aided Institutions under the administrative control of DAE viz. TIFR, TMC, IOP and also for other departments like Department of Biotechnology, etc. on deposit basis.

13. ATOMIC MINERALS DIRECTORATE FOR EXPLORATION & RESEARCH: Atomic Minerals Directorate for Exploration & Research (AMD) carries out survey, prospecting and exploration of atomic minerals required for the nuclear power programme of the country. The activities include assessment, analysis, evaluation, characterisation and categorisation of atomic minerals, design and fabrication of radiometric instruments and development of ore extraction flow sheets with the aid of state-of-the-art equipment.

14. NUCLEAR FUEL COMPLEX: Nuclear Fuel Complex (NFC) is responsible for manufacturing zirconium alloy clad, natural and enriched uranium oxide fuel assemblies for all the Pressurised Heavy Water Reactors (PHWRs) and the Boiling Water Reactors (BWRs) zirconium Alloy structural components for these reactors including Calandria and Pressure Tubes for PHWRs and Square Channels for BWRs. In addition, NFC produces Seamless Stainless Steel and Special Alloy Tubes of international standards for Nuclear and Non-Nuclear applications and Special and High Purity Materials for strategic use.

15. HEAVY WATER BOARD: Heavy Water Board operates six Heavy Water Plants located at Baroda, Tuticorin, Kota, Manuguru, Thal and Hazira. While the four Heavy Water Plants operating at Baroda, Tuticorin, Kota & Manuguru are run departmentally, Heavy Water Plants at Thal and Hazira are operated and maintained by M/s. RCF & M/s. KRIBHCO respectively. HWP(Talcher) main plant is being preserved alongwith diversified activities. A Solvent Extraction Test Facility has been set up at HWP Talcher consisting of Laboratory scale, Micro scale and Bench scale Pilot facility to carry out the applications of the solvents.

18. BOARD OF RADIATION AND ISOTOPE TECHNOLOGY: Board of Radiation and Isotope Technology (BRIT), a constituent unit of the Department of Atomic Energy is responsible for :- Production and supply of a variety of radioisotope products including radiopharmaceutical and associated products, radio immunoassay kits, radiochemicals, radiolabeled compounds and nucleotides and also sealed radiation sources such as Cobalt-60, Iridium-192, Caesium-137 etc. Radiation technology equipment such as gamma radiography cameras, blood irradiators and laboratory gamma irradiators, promoting radiation processing technology for use in healthcare, food processing and agriculture and rendering radiation processing services for medical products, spices, condiments and other products. Propagating radiation technology and providing facilitation services to private entrepreneurs to set up commercial gamma radiation processing plants. Radioisotopes produced in the

research reactors in Bhabha Atomic Research Centre and also in the power reactors of NPCIL are processed and formulated into a variety of products in the laboratories of BRIT and supplied to a large number of institutions in the country as well as abroad for use in Industry, healthcare, agriculture and supporting research in life sciences and Bio Sciences.

19. OTHER PROGRAMMES: Management Services Group (MSG) provides information services and computer systems support at the DAE Sectt. The group has set up a Local Area Network which functions on round the clock basis. MSG manages the DAE Internet web server which functions as the global web information portal for the Indian Atomic Energy Programme.

India has been a member of the Board of Governors of the International Atomic Energy Agency (IAEA) since its inception, making available the services of the departmental scientists for expert assignments besides participation in international symposia and other fellowship exchange programmes. The provision under IAEA takes care of the contribution made by the Department to the international body.

20. DAE PROJECTS: The Department undertakes a few projects which are jointly executed by the constituent units in different sectors or by the PSUs on behalf of the Department. The projects under R&D are i) International Collaboration in mega science projects. ii) DAE Emergency Response Centre. iii) DAE Intergrated Informatiion System applications. Iv) Enhancement of Annunet and DAE Grid. The projects under I & M are i) Safety Environmental Monitoring project is for safety, environment monitoring and radiological protection for existing and expanded operation of IREL plants. ii) Phosphatic Rare Element Extraction (PREE) Project is for setting up facilities for processing phosphoric acid from fertilizer plants and recover the rare element values, by Heavy Water Board (HWB) and three industrial scale uranium recovery plants. IREL also plan to set up PREE project at other locations and under the Power Sectors are i)Additional Spent Fuel Storage Facility is being implemented by NPCIL.

21. INVESTMENT IN PUBLIC ENTERPRISES- URANIUM CORPORATION OF INDIA LTD.: Uranium Corporation of India Limited (UCIL), was incorporated in 1967. The objectives of the company is to mine and refine uranium ore, produce concentrate and recover by-products at the most economic cost and market them efficiently. It is also engaged in achieving cost effectiveness through better capacity utilization, quality improvement and optimum utilization of human resources. It strives to maximize surplus generation through cost control and other measures and implement on-going projects within the cost and time frame as determined. It is also the responsibility of the company to evaluate new deposits for opening up new mines and process plants.