

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

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

Major Head	Actual 2013-2014			Budget 2014-2015			Revised 2014-2015			<i>(In crores of Rupees)</i> Budget 2015-2016			
	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	
Revenue	1405.48	3372.34	4777.82	1483.00	2971.25	4454.25	1173.00	3217.00	4390.00	1582.00	3257.31	4839.31	
Capital	2067.70	715.54	2783.24	3427.00	855.75	4282.75	2327.00	983.00	3310.00	3418.00	942.69	4360.69	
Total	3473.18	4087.88	7561.06	4910.00	3827.00	8737.00	3500.00	4200.00	7700.00	5000.00	4200.00	9200.00	
1. Secretariat-Economic Services	3451	...	41.83	41.83	...	50.53	50.53	...	44.00	44.00	...	43.00	43.00
2. Atomic Energy Regulatory Board	3401	1.73	40.85	42.58	2.00	46.53	48.53	7.00	50.00	57.00	2.00	46.99	48.99
	5401	2.67	...	2.67	30.00	...	30.00	2.00	...	2.00	30.00	0.01	30.01
<i>Total</i>		<i>4.40</i>	<i>40.85</i>	<i>45.25</i>	<i>32.00</i>	<i>46.53</i>	<i>78.53</i>	<i>9.00</i>	<i>50.00</i>	<i>59.00</i>	<i>32.00</i>	<i>47.00</i>	<i>79.00</i>
Atomic Energy Research and Industries													
3. Bhabha Atomic Research Centre, Mumbai (BARC)	2852	...	388.11	388.11	...	421.76	421.76	...	424.48	424.48	...	437.35	437.35
	3401	...	1027.58	1027.58	...	1109.63	1109.63	...	1236.65	1236.65	...	1254.63	1254.63
	4861	365.02	42.10	407.12	300.00	39.00	339.00	145.00	39.00	184.00	250.00	26.92	276.92
	5401	840.32	16.59	856.91	1000.00	27.00	1027.00	953.50	27.00	980.50	1174.40	16.00	1190.40
<i>Total</i>		<i>1205.34</i>	<i>1474.38</i>	<i>2679.72</i>	<i>1300.00</i>	<i>1597.39</i>	<i>2897.39</i>	<i>1098.50</i>	<i>1727.13</i>	<i>2825.63</i>	<i>1424.40</i>	<i>1734.90</i>	<i>3159.30</i>
4. Indira Gandhi Centre for Atomic Research, Kalpakkam (IGCAR)	3401	...	278.95	278.95	...	306.02	306.02	...	306.00	306.00	...	318.00	318.00
	4861	56.90	...	56.90	555.00	...	555.00	225.00	...	225.00	225.00	...	225.00
	5401	155.01	1.00	156.01	260.00	1.00	261.00	150.00	1.00	151.00	275.00	1.00	276.00
<i>Total</i>		<i>211.91</i>	<i>279.95</i>	<i>491.86</i>	<i>815.00</i>	<i>307.02</i>	<i>1122.02</i>	<i>375.00</i>	<i>307.00</i>	<i>682.00</i>	<i>500.00</i>	<i>319.00</i>	<i>819.00</i>
5. Nuclear Recycle Board	2852	...	214.30	214.30	...	170.98	170.98	...	260.00	260.00	...	352.00	352.00
	4861	...	2.40	2.40	200.00	45.00	245.00	148.00	50.00	198.00	220.00	50.00	270.00
<i>Total</i>		<i>...</i>	<i>216.70</i>	<i>216.70</i>	<i>200.00</i>	<i>215.98</i>	<i>415.98</i>	<i>148.00</i>	<i>310.00</i>	<i>458.00</i>	<i>220.00</i>	<i>402.00</i>	<i>622.00</i>
6. Safety Authority Strategic Activities	3401	...	...	...	...	10.00	10.00	...	3.00	3.00	...	3.00	3.00
7. Raja Ramanna Centre for Advanced Technology, Indore (RRCAT)	3401	...	157.97	157.97	...	163.98	163.98	...	175.00	175.00	...	180.00	180.00
	5401	153.70	0.28	153.98	150.00	1.26	151.26	168.00	1.00	169.00	170.00	1.00	171.00
<i>Total</i>		<i>153.70</i>	<i>158.25</i>	<i>311.95</i>	<i>150.00</i>	<i>165.24</i>	<i>315.24</i>	<i>168.00</i>	<i>176.00</i>	<i>344.00</i>	<i>170.00</i>	<i>181.00</i>	<i>351.00</i>
8. Variable Energy Cyclotron Centre, Kolkata (VECC)	3401	...	75.89	75.89	...	76.02	76.02	...	80.00	80.00	...	83.00	83.00
	5401	89.84	4.82	94.66	110.00	7.10	117.10	61.00	5.00	66.00	120.00	5.00	125.00
<i>Total</i>		<i>89.84</i>	<i>80.71</i>	<i>170.55</i>	<i>110.00</i>	<i>83.12</i>	<i>193.12</i>	<i>61.00</i>	<i>85.00</i>	<i>146.00</i>	<i>120.00</i>	<i>88.00</i>	<i>208.00</i>

(In crores of Rupees)

	Major Head	Actual 2013-2014			Budget 2014-2015			Revised 2014-2015			Budget 2015-2016			
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	
9.	Directorate of Purchase and Stores, Mumbai	3401	...	46.49	46.49	...	51.45	51.45	...	47.00	47.00	...	48.00	48.00
10.	General Services Organisation, Kalpakkam	3401	...	77.62	77.62	...	83.66	83.66	...	76.20	76.20	...	78.00	78.00
11.	<i>Autonomous Bodies</i>													
11.01	Tata Institute of Fundamental Research, Mumbai	3401	265.00	249.80	514.80	285.00	265.91	550.91	205.00	306.00	511.00	350.00	316.00	666.00
11.02	Tata Memorial Centre, Mumbai	3401	139.98	200.93	340.91	315.00	210.00	525.00	174.00	217.00	391.00	315.00	225.00	540.00
11.03	Saha Institute of Nuclear Physics, Kolkata	3401	30.00	65.94	95.94	35.00	70.28	105.28	30.00	75.00	105.00	35.00	84.00	119.00
11.04	Institute of Physics, Bhubaneswar	3401	6.92	17.08	24.00	10.00	24.68	34.68	9.00	22.00	31.00	10.00	26.00	36.00
11.05	National Institute of Science, Education and Research (NISER)	3401	220.00	...	220.00	50.00	45.45	95.45	18.83	33.00	51.83	50.00	41.00	91.00
11.06	Harish-Chandra Research Institute, Allahabad	3401	9.68	18.92	28.60	15.00	21.86	36.86	8.50	23.00	31.50	15.00	24.00	39.00
11.07	Institute of Mathematical Sciences, Chennai	3401	11.00	32.10	43.10	18.00	35.33	53.33	12.63	33.00	45.63	15.00	34.00	49.00
11.08	Institute for Plasma Research, Gandhinagar	3401	580.00	62.16	642.16	550.00	69.23	619.23	540.00	77.00	617.00	550.00	80.00	630.00
11.09	Atomic Energy Education Society, Mumbai	3401	1.50	43.73	45.23	8.00	46.92	54.92	6.00	60.00	66.00	10.00	62.00	72.00
11.10	Homi Bhaba National Institute (HBN)	3401	...	...	...	...	...	...	...	...	...	...	4.00	4.00
	<i>Total- Autonomous Bodies</i>		<i>1264.08</i>	<i>690.66</i>	<i>1954.74</i>	<i>1286.00</i>	<i>789.66</i>	<i>2075.66</i>	<i>1003.96</i>	<i>846.00</i>	<i>1849.96</i>	<i>1350.00</i>	<i>896.00</i>	<i>2246.00</i>
12.	Assistance to Universities, etc. (Grants to Other Institutions)	3401	139.67	...	139.67	165.00	...	165.00	132.04	...	132.04	200.00	...	200.00
13.	Directorate of Construction, Services and Estate Management (DCS&EM), Mumbai	3401	...	90.58	90.58	...	102.10	102.10	...	98.45	98.45	...	102.48	102.48
14.	<i>Housing Projects</i>													
14.01	Projects under DCS&EM	5401	107.58	...	107.58	130.00	...	130.00	95.00	...	95.00	130.00	...	130.00
14.02	Other Housing Projects	5401	10.32	...	10.32	47.00	...	47.00	32.50	...	32.50	57.60	...	57.60
	<i>Total- Housing Projects</i>		<i>117.90</i>	<i>...</i>	<i>117.90</i>	<i>177.00</i>	<i>...</i>	<i>177.00</i>	<i>127.50</i>	<i>...</i>	<i>127.50</i>	<i>187.60</i>	<i>...</i>	<i>187.60</i>
15.	Atomic Minerals Directorate for Exploration and Research, Hyderabad (AMDER)	3401	...	179.65	179.65	...	191.14	191.14	...	195.00	195.00	...	201.00	201.00
		4861	40.13	...	40.13	35.00	...	35.00	30.00	...	30.00	35.00	...	35.00
		5401	43.65	1.00	44.65	50.00	1.20	51.20	58.00	1.20	59.20	60.00	1.00	61.00
	<i>Total</i>		<i>83.78</i>	<i>180.65</i>	<i>264.43</i>	<i>85.00</i>	<i>192.34</i>	<i>277.34</i>	<i>88.00</i>	<i>196.20</i>	<i>284.20</i>	<i>95.00</i>	<i>202.00</i>	<i>297.00</i>
Nuclear Fuel														
16.	<i>Nuclear Fuel Complex (NFC)</i>													
16.01	<i>Fuel Fabrication Facilities</i>													
16.01.01	Fuel Fabrication Facilities - Gross	2852	...	1346.10	1346.10	...	1276.13	1276.13	...	1500.35	1500.35	...	1436.61	1436.61

(In crores of Rupees)

	Major Head	Actual 2013-2014			Budget 2014-2015			Revised 2014-2015			Budget 2015-2016			
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	
16.01.02	Less Receipts	0852	...	-1587.99	-1587.99	...	-2264.94	-2264.94	...	-2418.43	-2418.43	...	-2593.03	-2593.03
	<i>Net</i>		...	-241.89	-241.89	...	-988.81	-988.81	...	-918.08	-918.08	...	-1156.42	-1156.42
16.02	Common Facilities	2852	...	134.53	134.53	...	148.00	148.00	...	140.98	140.98	...	157.83	157.83
16.03	Stainless Steel Tubes Plant	2852	...	28.23	28.23	...	80.04	80.04	...	30.07	30.07	...	88.05	88.05
16.04	Capital Outlay on NFC	4861	47.89	...	47.89	62.00	...	62.00	52.00	...	52.00	70.00	...	70.00
	<i>Total- Nuclear Fuel Complex (NFC)</i>		47.89	-79.13	-31.24	62.00	-760.77	-698.77	52.00	-747.03	-695.03	70.00	-910.54	-840.54
Heavy Water														
<i>17. Heavy Water Board</i>														
17.01	Maintenance of Housing Colonies for Heavy Water Plants	2852	...	9.16	9.16	...	10.16	10.16	...	9.00	9.00	...	10.00	10.00
17.02	Central Office (Other Heavy Water Plants)	4861	72.02	23.77	95.79	87.00	27.58	114.58	59.00	26.40	85.40	90.00	27.73	117.73
	<i>Total- Heavy Water Board</i>		72.02	32.93	104.95	87.00	37.74	124.74	59.00	35.40	94.40	90.00	37.73	127.73
<i>18. Heavy Water Production</i>														
18.01	Heavy Water Plant, Baroda	4861	...	30.87	30.87	...	33.78	33.78	...	32.31	32.31	...	33.49	33.49
18.02	Heavy Water Plant, Kota	4861	...	107.43	107.43	...	155.39	155.39	...	171.59	171.59	...	171.95	171.95
18.03	Heavy Water Plant, Tuticorin	4861	...	19.89	19.89	...	21.61	21.61	...	21.77	21.77	...	22.33	22.33
18.04	Heavy Water Plant, Talcher	4861	...	9.15	9.15	...	9.80	9.80	...	9.42	9.42	...	10.41	10.41
18.05	Heavy Water Plant, Thal	4861	...	121.10	121.10	...	130.91	130.91	...	183.88	183.88	...	176.97	176.97
18.06	Heavy Water Plant, Hazira	4861	...	141.87	141.87	...	143.06	143.06	...	172.27	172.27	...	156.37	156.37
18.07	Heavy Water Plant, Manuguru	4861	...	319.45	319.45	...	308.53	308.53	...	342.36	342.36	...	342.75	342.75
18.08	Less-Loss of Heavy Water	4861	...	-126.31	-126.31	...	-96.67	-96.67	...	-101.40	-101.40	...	-100.24	-100.24
	<i>Net</i>		...	623.45	623.45	...	706.41	706.41	...	832.20	832.20	...	814.03	814.03
Total-Heavy Water			72.02	656.38	728.40	87.00	744.15	831.15	59.00	867.60	926.60	90.00	851.76	941.76
<i>19. Feedstock</i>														
19.01	Gross	4861	...	948.28	948.28	...	1110.00	1110.00	...	1128.00	1128.00	...	1155.00	1155.00
19.02	Less - Heavy Water Production	4861	...	-948.28	-948.28	...	-1110.00	-1110.00	...	-1128.00	-1128.00	...	-1155.00	-1155.00
	<i>Net</i>		...	...	...	...	...	...	...	...	...	...	...	...
20.	Board for Radiation and Isotope Technology (BRIT)	2852	...	55.95	55.95	...	69.80	69.80	...	64.00	64.00	...	67.00	67.00
		4861	8.92	0.13	9.05	50.00	0.20	50.20	8.00	0.20	8.20	50.00	...	50.00
	<i>Total</i>		8.92	56.08	65.00	50.00	70.00	120.00	8.00	64.20	72.20	50.00	67.00	117.00
<i>21. Other Programmes</i>														
21.01	Management Services Group	2852	...	0.40	0.40	...	0.61	0.61	...	0.39	0.39	...	0.40	0.40
21.02	O&M of Thorium Plant, Trombay	2852	...	...	...	...	...	...	...	...	...	...	...	...
21.03	International Atomic Energy	3401	...	20.58	20.58	...	24.00	24.00	...	21.00	21.00	...	21.00	21.00

(In crores of Rupees)

	Major Head	Actual 2013-2014			Budget 2014-2015			Revised 2014-2015			Budget 2015-2016		
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
Agency													
Total- Other Programmes		...	20.98	20.98	...	24.61	24.61	...	21.39	21.39	...	21.40	21.40
22. DAE Projects													
22.01 R&D Projects	3401	...	15.46	15.46	...	11.44	11.44	...	6.00	6.00	...	6.00	6.00
	5401	33.73	...	33.73	200.00	...	200.00	53.00	...	53.00	250.00	...	250.00
Total		33.73	15.46	49.19	200.00	11.44	211.44	53.00	6.00	59.00	250.00	6.00	256.00
22.02 I&M Projects	2852	...	39.44	39.44	30.00	42.55	72.55	30.00	21.86	51.86	30.00	20.00	50.00
	4861	...	...	...	11.00	...	11.00	1.00	...	1.00	11.00	...	11.00
Total		...	39.44	39.44	41.00	42.55	83.55	31.00	21.86	52.86	41.00	20.00	61.00
Total- DAE Projects		33.73	54.90	88.63	241.00	53.99	294.99	84.00	27.86	111.86	291.00	26.00	317.00
23. Investment in Public Enterprises - Uranium Corporation of India Limited	4861	40.00	...	40.00	150.00	...	150.00	86.00	...	86.00	200.00	...	200.00
Total-Atomic Energy Research and Industries		3468.78	4005.20	7473.98	4878.00	3729.94	8607.94	3491.00	4106.00	7597.00	4968.00	4110.00	9078.00
Grand Total		3473.18	4087.88	7561.06	4910.00	3827.00	8737.00	3500.00	4200.00	7700.00	5000.00	4200.00	9200.00
	Head of Dev	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total
B. Investment in Public Enterprises													
23.01 Electronics Corporation of India Limited	12859	...	39.28	39.28	...	27.50	27.50	...	27.50	27.50	...	25.00	25.00
23.02 Uranium Corporation of India Limited	12861	40.00	1.44	41.44	150.00	191.00	341.00	86.00	97.30	183.30	200.00	220.78	420.78
23.03 Indian Rare Earths Limited	12861	...	22.09	22.09	...	65.70	65.70	...	67.80	67.80	...	65.14	65.14
Total		40.00	62.81	102.81	150.00	284.20	434.20	86.00	192.60	278.60	200.00	310.92	510.92
C. Plan Outlay													
1. Telecommunication and Electronic Industries	12859	...	39.28	39.28	...	27.50	27.50	...	27.50	27.50	...	25.00	25.00
2. Atomic Energy Industries	12861	630.88	23.53	654.41	1480.00	256.70	1736.70	784.00	165.10	949.10	1181.00	285.92	1466.92
3. Atomic Energy Research	13401	2842.30	...	2842.30	3430.00	...	3430.00	2716.00	...	2716.00	3819.00	...	3819.00
Total		3473.18	62.81	3535.99	4910.00	284.20	5194.20	3500.00	192.60	3692.60	5000.00	310.92	5310.92

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 six R&D Units, including Global Centre for Nuclear Energy Partnership (GCNEP) Haryana, three industrial units, three service organizations and five PSUs apart from nine aided institutions in the Department of Atomic Energy. DAE also 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. BARC gives R&D support to all other units of DAE and provide necessary support for national security. Nuclear Recycle Board (NRB) has been created as a separate accounting units to meet the operational requirements of the Fuel Reprocessing plants at Tarapur and Kalpakkam with its Head Quarters at Mumbai.

4. **INDIRA GANDHI CENTRE FOR ATOMIC RESEARCH:** Indira Gandhi Centre for Atomic Research (IGCAR) 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. The centre has undertaken various strategically important projects to develop mature fast breeder fuel cycle technologies with international standards.

5. **NUCLEAR RECYCLE BOARD (NRB):** NRB was a part of Bhabha Atomic Research Centre and has been created to carry out activities relating to Nuclear Fuel reprocessing.

6. **SAFETY AUTHORITY STRATEGIC ACTIVITIES:** The provision is for strategic nature of activities.

7. **RAJA RAMANNA CENTRE FOR ADVANCED TECHNOLOGY:** Raja Ramanna Centre for Advanced Technology (RRCAT), Indore, is engaged in development of technology and applications of particle accelerators and lasers, besides carrying out substantial activities in cryogenics and materials research.

8. **VARIABLE ENERGY CYCLOTRON CENTRE:** The Variable Energy Cyclotron Centre (VECC) at Kolkata is operating the nation's largest and the first indigenously built Cyclotron and has been delivered first time in India energetic Neon 20 and Argon 40 beams. A series of experimental run were accomplished for a national facility Indian Gamma Ray Array (INGA) by a large nuclear physics community. Radio-active Ion Beam Project (RIB phase II) started experiment with 187 keV after installation of LINAC I.

9. **DIRECTORATE OF PURCHASE & STORES:** The objective of Directorate of Purchase & Stores is to ensure availability of quality material at right time, at right place and 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.

10. **GENERAL SERVICES ORGANISATION:** General Services Organisation (GSO), Kalpakkam is one of the service organisations 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.

11.01. **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.

11.02. **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. The Advanced Centre for Treatment, Research and Education in Cancer (ACTREC) conducts basic, community-based and clinically oriented research on multiple facets of cancer, focusing on cancers of oral cavity, cervix, leukemia and lymphomas and tobacco related cancers.

11.03. **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. 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. It has offered the world a very important chip (MANAS) to help detect dimuons at CERN.

11.04-05. **INSTITUTE OF PHYSICS/NISER:** The Institute of Physics (IOP), 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. The education programme at NISER is to emphasise experimental approach and hands-on practice. The programme is to concentrate on the four main areas; Biological Sciences, Chemical Sciences, Mathematical Sciences and Physical Sciences with an emphasis on Interdisciplinary studies through an integrated approach.

11.07. **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.

11.08. **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.

11.09. **ATOMIC ENERGY EDUCATION SOCIETY:** Atomic Energy Education Society (AEES) runs 30 schools and junior colleges at 17 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.

11.10. **Homi Bhabha National Institute (HBNI):** Homi Bhabha National Institute (HBNI) has been declared as Grant-in-Aid Institution (Autonomous Body) with effect from 19.02.2014 under the Department of Atomic Energy and it is deemed to be University under University Grants Commission Act 1956. The objectives of HBNI are (i) to encourage pursuit of excellence in sciences (including engineering sciences) and mathematics in a manner that has a major significance for the progress of

indigenous nuclear technological capability, (ii) to provide a framework for integrating the basic research being done in the grant-in-aid institutions and the research centres with technology development being done largely in R&D centres of the DAE, (iii) to promote interdisciplinary research and (iv) nurture an environment for attracting high quality manpower in sciences including engineering sciences for taking up a career in nuclear science and engineering.

12. **ASSISTANCE TO UNIVERSITIES, ETC.:** 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, support to libraries, etc. Funds cancer hospitals also. DAE also initiates Neighbourhood Welfare Programme.

13. **DIRECTORATE OF CONSTRUCTION, SERVICES & ESTATE MANAGEMENT:** Directorate of Construction, Services & Estate Management (DCSEM) looks 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 units.

15. **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.

16. **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.

17. **HEAVY WATER BOARD:** HWB operates two Heavy Water Plants (HWPs) located at Kota and Manuguru based on Hydrogen Sulphide-Water Exchange Process and two plants at Thal and Hazira based on Ammonia-Hydrogen Exchange Process. Energy consumption being the major cost component of Heavy Water (HW) production, its continual reduction is a thrust area of HWB. By adopting process intensification and optimization techniques and implementing appropriate energy saving schemes, substantial reduction in specific energy has been achieved, which is exemplified during 2012-13 by achieving lowest ever specific energy consumption.

20. **BOARD OF RADIATION AND ISOTOPE TECHNOLOGY:** Board of Radiation and Isotope Technology (BRIT) 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.

21. **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.

22. **DAE PROJECTS:** The Department undertakes a few projects which are jointly executed by the constituent units in different sectors or by Public Sector Units on behalf of the Department.

23. **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.