



GOVERNMENT OF BRAZIL



**INTERNATIONAL ATOMIC
ENERGY AGENCY**

COUNTRY PROGRAMME FRAMEWORK

2012 – 2017

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EXECUTIVE SUMMARY

1. The purpose of this Country Programme Framework (CPF) is to serve as a medium term planning tool to define the areas within the Brazil's national development priorities, in which technical cooperation with the International Atomic Energy Agency (IAEA) is considered of strategic relevance to contribute to the achievement of such priorities. The output of this planning exercise is a document that outlines the mainstream of national development plans and the components that could benefit from the Agency's Technical Cooperation Programme (IAEA-TCP), as well as an estimate of the cost and funding sources whenever possible.

2. This document is also a full comprehensive revision of the CPF signed in 2005 and covers the period 2012 - 2017. Its validity can be extended subject to mutual agreement between Brazil and the Agency. The National Liaison Officer (NLO) is appointed by the national authorities as the CPF National Coordinator and falls within the structure of the National Commission of Nuclear Energy (CNEN).

3. The National Nuclear Energy Commission (CNEN) is the main scientific, technological and innovative organization in nuclear sector. Its scope covers most aspects of nuclear applications from safety, security and radiation protection through basic research and innovation in nuclear energy and applications, providing services to the society, such as production of primary radioisotopes and radiopharmaceuticals, services using nuclear analytical techniques and irradiation of materials. In addition, CNEN, through its different institutes, has an extensive academic and training programme. In such context, and in collaboration with the CNEN's technical departments, an intensive consultation process with the representatives of health, nutrition, agriculture, environment, energy and water management sectors was carried out in order to identify Brazil's needs and priorities for cooperation.

4. The CPF process is a voluntary, non-binding document subject to, and limited by, the following official documents that guide the IAEA-TCP, as well as the Brazilian International Cooperation Programme:

- “Guidelines for the Development of Multilateral and Bilateral Technical Cooperation” of the Brazilian Ministry of Foreign Affairs¹.
- IAEA INFCIRC 267: The Revised Guiding Principles and General Operating Rules to Govern the Provision of Technical Assistance by the Agency.

5. As an effective planning exercise, this CPF identifies those actions embedded in the national development plan “Plano Plurianual – PPA 2012-2015”, where the IAEA-TCP can play a strategic role; as well as in coherence with the Millennium Development Goals (MDGs).

¹Copy of the document can be downloaded from <http://www.abc.gov.br/download/Diretrizes-CTI.pdf>

6. The strategic sectors defined by the national authorities as relevant for the short and medium term development activities in the Nuclear Science and Technology field are (in alphabetical order):

1. Environment
2. Food and agriculture
3. Human health
4. Industry
5. Nuclear energy for electricity generation
6. Radiation Protection
7. Regulatory issues
8. Capacity building.

1 INTRODUCTION

7. The purpose of the Country Programme Framework (CPF) is to serve as a medium term planning tool to define the areas within Brazil's national development priorities in which technical cooperation with the International Atomic Energy Agency (IAEA) is considered of strategic relevance to contribute to the achievement of such development priorities.

8. According to official sources, the recent cycle of Brazilian development has been driven by innovative public policies that combine economic growth with reducing social and regional inequalities. These policies have a common element: the recovery of the state's capacity to plan and act according to the objective of ensuring the rights of those who need it most.

9. It is in this context that the Multi Annual Plan 2012-2015 (PPA), Plan *Mais Brasil*, was born. The PPA reflects the commitments undertaken by the government to give rise to programmes of strategic dimension.

A Vision to the Future ²

10. The *Vision to the Future* is Brazil's approach for growing and developing in a sustainable way.

11. The *Vision* is an achievable ideal, which demands the sum of the efforts of everyone in the country. It is assumed that the future is built in a joint and participatory government, by corporations and the Brazilian people, establishing the *Vision to the Future* for Brazil. This view is based on the current condition of the country, from the external and internal points of view, conscious of potentials and aware of risks and, above all, of the sovereign decisions that today can be taken from the democratic election of a government aimed to guide social and economic development from a social inclusion perspective.

12. The seven values that should guide the actions of the government are:

- Sovereignty
- Democracy
- Social Justice
- Sustainability
- Cultural Diversity and National Identity
- Social Participation
- Excellence in Management

13. These values permeate all government actions, and their incorporation will be present in the following public policies described in the PPA:

Social Policies

Improving the Health System

Family Allowance

Strengthening the Social Assistance System

Food and Nutritional Security

Basic Education

Professional Education and Technology

Higher Education: Undergraduate, Postgraduate, Teaching and Research

Culture: Preservation, Promotion and Access

Sports and Major Sporting Events

² Multi Annual Plan (PPA) 2012-2015, Plan Mais Brasil.

Urban Planning
Solid Waste
Public Security and Citizenship
Coordination of Policies for Prevention, Care and Social Welfare of Users of Crack, Alcohol and Other Drugs
Citizenship and Justice
Family Farming
Agrarian Reform and Land Tenure Structure
Labour, Employment and Income
Social Security
Policies for Women: Autonomy and Fighting Violence against Women
Racial Equality and Combat Racism
Promotion of the Rights of Children and Adolescents
Promotion and Defence of Human Rights
Promotion of the Rights of Persons with Disabilities
Youth Empowerment and Emancipation
Protection and Promotion of the Rights of Indigenous Peoples.

Infrastructure Policies

Trucking
Water Transportation
Rail
Shipping
Civil Aviation
Electricity
Fuels
Oil and Gas
Strategic Management of Geology, Mining and Mineral Processing
Water Supply
Risk Management and Disaster Response
Communications for Development, Democracy and Inclusion
Decent Housing
Sanitation
Urban Mobility and Traffic.

Productive and Environmental Development Policies

Productive Development
Science, Technology and Innovation
Nuclear Policy
Space Policy
Micro and Small Enterprises
Trade and Services
Foreign Trade
Sustainable Agriculture, Supply and Marketing
Innovations for Agriculture
Irrigated Agriculture
Fisheries and Aquaculture
Agricultural Protection
Tourism
Biodiversity
Climate Change
Forests, Prevention and Control of Deforestation and Fires
Licensing and Environmental Quality
Conservation and Water Resources Management.

Special Policies and Topics

Democracy and Public Management Improvement
Management of Economic Policy and Financial System Stability

South American Integration

Foreign Policy

Sea, Coastal and Antarctic

National Defence

Regional Development, Sustainable Territorial and Economic Solidarity.

2 NATIONAL DEVELOPMENT PRIORITIES AND ACTIVITIES RELEVANT TO THE AGENCY'S TECHNICAL COOPERATION PROGRAMME

14. The development and application of nuclear energy for peaceful purposes is a fundamental principle in Brazilian policy, which is enshrined in its Constitution. Brazil is well aware of the benefits of international technical cooperation and the synergies fostered by it, for which the Agency's Technical Cooperation Programme (IAEA-TCP) is of strategic importance.

15. Concerning the IAEA-TCP, Brazil has a double role, as beneficiary of international technical cooperation and contributor to other Member States' development goals. These roles are harmonized under the national and Regional Cooperative Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) programmes. Regarding Brazil's national programme, this CPF identifies the areas in which the IAEA technical cooperation could contribute strategically to successfully achieve the national goals. Also, the ARCAL programme allows Brazil to contribute to foster regional development through the application of nuclear sciences and technology.

16. The peaceful applications of nuclear energy represent a significant contribution to the national economy and social welfare in various sectors. These sectors are outlined below, including a comprehensive description.

2.1 HUMAN HEALTH

17. Over 600 hospitals and medical clinics use nuclear techniques for *in vivo* and *in vitro* procedures and more than 200 clinical facilities apply radiopharmaceutical products in over 2.5 million procedures every year. A total of 1,300 radioactive facilities in medicine are in operation in the country with an overall of 25,000 sources. Nowadays, Positron Emission Tomography and Computer Tomography (PET/CT) are one of the fastest growing nuclear applications in the health sector, and the production of short lived radioisotopes through cyclotron is booming. The recent worldwide crises in primary radioisotopes supply led Brazil to take the political decision of building up its own high flux multi-purpose reactor to be self-sufficient on primary radioisotope production.

18. Radiotherapy for cancer treatment is another major application of nuclear techniques in health. It is important to note that, as population ages, cancer is a major cause of morbidity and mortality. Under the Ministry of Health, the PPA seeks to guarantee population's access to medications and strategic inputs, and to promote the qualification and permanent education in health-related new technologies, such as Image Guided radiotherapy (IGRT), Volumetric Modulated Arc Therapy (VMAT), and in that sense, corresponding training programmes are being implemented. An issue still relevant to Brazil is the dissemination of tissue bank technology using nuclear applications.

2.2 ENERGY

19. Brazil operates two nuclear power plants (NPP) with an output of 2,000 MWe which represent roughly 2% of the national generating capacity. A third NPP is under construction and will add 1,300 MWe to the grid with initial operation planned in 2015. The National Energy Plan 2030 envisages an additional 4,000 MWe of nuclear origin to be added to the

grid. However, projects related to new nuclear power generation plants are subject to social, economic and technical analysis related to the consequences of the Fukushima Daiichi accident.

2.3 FUEL CYCLE

20. The Brazilian nuclear energy production programme is characterized, since its beginning, by self-reliance on fuel supply from uranium mining and milling to fuel assembly production. The completion of the conversion facility is the last step necessary to master the fuel cycle technology. Brazil has one uranium mining and milling facility in production and another being decommissioned. International best practices for both activities are sought.

2.4 INDUSTRY

21. Nearly 1,400 industrial facilities are applying ionizing radiation in the production process including four industrial ⁶⁰Co irradiators, more than 10 Electron Beam accelerators and 30,000 radioactive sources. During the last 6 years there were increases of around 100 facilities annually. Hence, Research and Development (R&D) on new applications, continuous training of existing staff and formation of new ones to cope with the increasing demand is a major challenge.

2.5 FOOD AND AGRICULTURE

22. This is an area of nuclear applications in which Brazil is well developed and has achieved international recognition. In this field, Brazil has increasingly a donor rather than a recipient of international technical cooperation. However, there are some fields of concern, mainly those related to environment. In this areas (i.e. harmful residue in foodstuff or standardization of maximum acceptable levels), regardless of the development circumstances, international cooperation is still indispensable.

2.6 NUCLEAR SAFETY AND RADIATION PROTECTION

23. As the Fukushima accident unfolds the development of new safety standards, design basis accident requirements are expected to be developed and should be incorporated to any new project and licensed accordingly. The Ministerial Conference on Nuclear Safety meeting at IAEA headquarters in June 2011 was the landmark for the beginning of a new nuclear safety approach. Increasingly, new applications using ionizing radiation are being marketed exposing workers, public and patients to additional sources, raising the need for additional resources for licensing and control. Stochastic effects of low doses are a permanent concern leading to non-stop improvement on measurement technology and discussion of the dose limits.

2.7 RADIOISOTOPE AND RADIOPHARMACEUTICAL PRODUCTION

24. This is a service that CNEN provides to the Brazilian society. It holds the Federal monopoly of primary radioisotope production, except for short lived ones produced by cyclotron where clinics and hospitals are beginning to enter into the market. The actual

portfolio of products are numbered in 44: Technetium Generator (1); Primary radioisotopes (12); marked substances with Iodine-131, Chromium-51, Fluorine-18, Samarium-153, Indium-111 and Lutetium-177 (12); marked Technetium-99m reagent (14); Iridium-192 wire for brachytherapy (1); Iodine-125 seed for brachytherapy (2) and ultra-pure Iodine-123 (2); Sodium Iodide (NaI23I) and Metaiodobenzylguanidine (MIBG). The total output of CNEN in 2010 was 16,861,639 mCi. This is a dynamic area with growing demand and R&D of new products and applications is a permanent challenge..

2.8 WASTE MANAGEMENT

25. Inevitably, nuclear technology generates radioactive waste that needs to be collected, treated, conditioned and disposed. It is acknowledged that for low and intermediate level waste the major challenge is the social acceptance of disposal facilities by the host communities. Brazil can clearly benefit from international experience in this field, given its project to build up the national repository for low and intermediate waste.

2.9 ENVIRONMENT

26. Brazil borders with 10 countries and shares vast natural resources with its neighbours. The rational and sustainable use of these resources can only be achieved in partnership. Some resources shared by several countries, like the Amazon ecosystem and the Guarani aquifer, require concerted effort among the neighbouring countries to undertake the technical studies necessary for proper policy making. The sustainability of the vast natural resources within its land and sea territory is of continuous concern. International cooperation and multilateral organizations' involvement are key aspects to bringing on board Non-Governmental Organizations (NGOs), communities, and Governmental partners.

BRAZIL AND THE MILLENNIUM DEVELOPMENT GOALS (MDGs)

27. In the context of the United Nations (UN) system, the MDG's are the guiding principles for all cooperation for development. Consequently, the IAEA supports the achievement of the MDG's through its TCP.

28. Brazil acknowledges that the national development plan 2012-2015 (PPA) and the United Nations Development Assistance Framework (UNDAF) are complementary in order to achieve the MDGs; although their planning and implementation actions can be different. Within this context it is considered that IAEA-TCP contributes to the PPA and MDGs through know-how transfer.

29. The implementation of the MDGs by Brazil can be summarized as follows³:

30. **Goal 1:** Eradicate extreme poverty and hunger

Brazil has surpassed the objective of reduction by half the people living in extreme poverty until 2015: from 25.6% of population in 1990, to 4.8% in 2008. This last number represents 8.9 million Brazilians living with less than 1.25 dollars per day in 2008.

³ Sources: www.pnud.org.br/odm/ and www.mdgmonitor.org/country_progress.cfm?c=BRA&cd=76#

IAEA contribution: Brazil was beneficiary of 19 projects at the field of activity 5 (food and agriculture) since 1976 from food safety and productivity that indirectly contributed to increase rural income and diminish hunger.

31. **Goal 2:** Achieve universal primary education

According to the national 2008 MDG report, 94.9% of children and youngsters between 7 and 14 years old were enrolled in school. In the urban areas the percentage was 95.1%.

32. **Goal 3:** Promote gender equality and empower women

In Brazil, women achieve higher education than men, however have less employment opportunities and earn less than men working at the same job and occupy lower positions. In 1998 52.8% of women were considered economically active compared with 82% of men. In 2008 the proportion was 57.6% to 80.5%.

33. **Goal 4:** Reduce child mortality rates

Brazil reduced infant mortality (children with less than one year old) from 47.1 per thousand born in 1990 to 19 per thousand in 2008. For 2015 the target is 17.9 per thousand.

IAEA contribution: Nuclear techniques on breast feeding.

34. **Goal 5:** Improve maternal health

According to the 4th National Follow Up report, Brazil registered a reduction of almost 50% since 1990. The maternal mortality rate in 1990 was 140 per 100 thousand born. By 2007 the rate was 75 per 100 thousand.

35. **Goal 6:** Combat HIV/AIDS, malaria, and other diseases (Achieved)

Brazil was the first developing country that provided free and universal treatment to HIV through its public health system. Almost 200 thousand persons benefit from antiretroviral treatment from Governmental programmes. The prevalence of HIV is 0.5% of the population or roughly 600 thousand persons.

IAEA contribution: One IAEA project supported Brazil on communicable disease diagnostic.

36. **Goal 7:** Ensure environmental sustainability

The country reduced the rate of deforestation, the consumption of gases that damage the ozone layer and increased energy efficiency through renewable sources. It is expected that access to potable water will be universalized but the goal of providing basic sanitation to the households is still pending subject to additional investment.

IAEA contribution: Brazil implemented 18 projects since 1976 in the field of activity 8 (isotope hydrology and industry) on the issues of isotope hydrology and industrial cleaner production that indirectly contributed to this goal.

37. **Goal 8:** Develop a global partnership for development

Brazil was the main promoter of the creation of the G-20 during the Doha round at OMC. It also has a leading role in the effort of universalization of HIV/AIDS drugs. The country is active and innovative in the promotion of global partnership and south-south cooperation.

IAEA contribution: Brazil is active in sharing its expertise and hosting trainings in support of IAEA technical cooperation recipient countries, particularly Portuguese speaking and Latin American countries.

3 OTHER RELEVANT INTERNATIONAL TECHNICAL ASSISTANCE

38. International technical cooperation is an important tool for development, helping countries to promote structural changes in their production systems as a way to overcome constraints that hinder their sustainable growth. The programmes implemented under its aegis allow the transfer of knowledge, experience, expertise, and sophisticated equipment, thus supporting recipient countries in the training and development of human resources and strengthening institutions.

Brazil and International Technical Cooperation

39. Brazil has been working in partnership with other countries and international organizations for nearly four decades. Technical cooperation projects are producing benefits in key sectors such as transport, energy, mining, environment, agriculture, education and health, which allowed building stronger institutions, able to perform their duties at a higher level of excellence.

40. The concept of "partnership for development", followed by Brazil, reinforces the idea that the relationship of cooperation contributes to all parties, sharing efforts and benefits. The proposed initiatives are assessed in light of the impact and scope of the recipient communities. This procedure involves improving mechanisms for negotiation, evaluation and management of projects in order to fit them to national priorities.

41. International technical cooperation arouses great interest in a large segment of society, including government agencies, NGOs and the general public by enabling faster access to technologies, knowledge, information and training. The Brazilian Cooperation Agency (ABC) is responsible for coordinating programmes and projects, as well as the role of official representative of the Government in technical cooperation activities.

Types of International Technical Cooperation

42. Technical cooperation in Brazil is developed in two dimensions: a) South-South cooperation and b) cooperation received from abroad.

43. South-South cooperation refers to the technical cooperation implemented by Brazil and other developing countries, through which it promotes the deepening of their relations and strengthening their political and economic ties.

44. The cooperation received from abroad covers bilateral and multilateral technical cooperation, and searches the internalization of expertise provided by international agencies (multilateral cooperation) and more developed countries (bilateral cooperation) within the optical acceleration of national development.

3.1 SOUTH-SOUTH COOPERATION

45. The strategy of technical cooperation in Brazil is focused on institutional strengthening of its partners, as a crucial condition for the transfer and absorption of knowledge to be effective. Non-profit and disconnected from commercial interests, technical cooperation plans to share successes and best practices in areas demanded by partner countries. In addition, the ABC has been in contact more frequently with civil society organizations, with the intention to broaden the range of opportunities for horizontal cooperation in Brazil.

46. Brazil maintains technical cooperation relations with Latin America, the Caribbean and Africa, with occasional performances in Asia (Timor-Leste, Afghanistan and Uzbekistan), Middle East (Lebanon and the Palestinian territories) and Oceania. According to the last national report Brazil approved and coordinated the implementation of 236 projects and activities, the South-South technical cooperation, benefiting 58 developing countries. The South-South technical cooperation is concentrated in agriculture (including agricultural production and food security), vocational training, education, justice, sports, health, environment, and information technology, prevention of occupational accidents, urban development, biofuel, air transport and tourism. Other areas such as culture, trade and human rights are addressed in projects and activities of more recent design.

47. The technical cooperation projects prove to be efficient promoters of social development, and represent the efforts of many professionals; demonstrating that with political will, valuable social and economic activities can be performed.⁴

3.2 INTERNATIONAL COOPERATION

Table 1. Other Multilateral and Bilateral Cooperation in Brazil by Field-Relevance to the IAEA's Technical Cooperation Programme

FIELD / SECTOR	MULTILATERAL ORGANIZATION / COUNTRY
Environment	IADB, OAS, World Meteorological Organization (Hydrology), UNDP, European Union Germany, Canada, Spain, France, Italy, Japan, United Kingdom, Netherlands
Human Health	PAHO/WHO Canada, Japan, United Kingdom
Agricultural Development and Food Security	FAO, IICA Germany, Spain, France, Italy, Japan
Industry	UNIDO Germany, Japan
Energy	Japan
Science and Technology	OAS, OEI, UNESCO
Security	UNODC United States
Social and Economic Development	IADB, ECLAC, OAS, UNDP United States, Italy
Urban Development	IADB

⁴ Brazilian Cooperation Agency (ABC). www.abc.gov.br

The Nuclear Sector in Brazil

48. The Government of Brazil or the CNEN have subscribed bilateral Nuclear Cooperation Agreements with the following countries:

Argentina	Belgium	Canada	Chile
China	European Union	France	Germany
Republic of Korea	Russian Federation	United States.	

The United Nations System in Brazil

49. The United Nations Development Assistance Framework (UNDAF) is developed by the United Nations Country Team (UNCT) in Brazil, by way of a thorough consultation process with all relevant sectors within the government and civil society, taking into consideration the countries' development needs and the national development and sectorial development priorities.

50. The latest UNDAF for Brazil covered 2007-2011, and the new UNDAF is being drafted. The UN framework will be taken into consideration for the activities derived from this IAEA framework, in support of relevant MDGs.

51. Brazil and the IAEA will actively pursue future partnerships with the UNCT for all relevant development activities.

4 OVERVIEW OF PAST AND PRESENT AGENCY TECHNICAL COOPERATION ACTIVITIES IN THE COUNTRY

52. Brazil is one of the founding Members of the Agency and has been an increasingly active Member State of the IAEA since 1957, participating as a member of the Board of Governors for every period since that year.

53. To have a clear perspective of the past programme, this data will focus on the TCP during the period **2000-2011**. During that time, Brazil has participated in 45 national projects and 86 regional and interregional technical cooperation projects, including the Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL).⁵

54. Brazil joined ARCAL in 1999 and ratified it in 2006, and strongly supports its aim to promote, foster, coordinate and implement cooperation activities for training, research, development and applications of nuclear science and technology in the region.

55. This CPF identifies Brazil's national programmes where the IAEA technical cooperation programme could make a strategic contribution within the wide scope of nuclear technology and nuclear applications existing in the country. The ARCAL programme allows Brazil to contribute to foster regional development in Latin America through the application of nuclear science and technology.

56. The amount disbursed for the national projects during that period, including the Technical Cooperation Fund (TCF), is of around 11.5 million US dollars.⁶

57. For the IAEA-TCP Cycle **2012-2013**, Brazil is implementing 6 new national projects with a TCF total budget of €1.38 million, of which Brazil paid in January 2012 the full 5% of its National Participation Costs (NPC). Brazil participates in 39 Regional and Interregional projects, including ARCAL projects.⁷

58. Brazil's priorities for the current cycle are in the fields of: Human Resource Development, Radiation Protection, Human Health and Nuclear Energy.

59. A full list of current National, Regional and Interregional projects can be found in Annex 5 of this CPF.

Table 2: List of National and Regional projects by field of application

IAEA-TCP PROJECTS IN BRAZIL DURING 2000-2011		
FIELDS OF APPLICATION	NATIONAL	REGIONAL
General development of atomic energy	4	14
Atomic and nuclear physics	1	1
Nuclear chemistry and radiochemistry	5	4
Nuclear fuel cycle	3	4

⁵ IAEA TC Profile.

⁶ IAEA TC Country Profile.

⁷ IAEA TC Profile.

IAEA-TCP PROJECTS IN BRAZIL DURING 2000-2011		
FIELDS OF APPLICATION	NATIONAL	REGIONAL
Nuclear engineering and technology	10	8
Use of isotopes and radiation in food and agriculture	2	8
Radiation in medicine and health	9	21
Isotopes and radiation in biology and environmental studies	1	4
Isotope hydrology and applications of radiation in industry	4	7
Nuclear and radiation safety	6	15
TOTAL	45	86
Note: Includes ARCAL and interregional projects.		

4.1 ACHIEVEMENTS

60. Supported by the IAEA-TCP, Brazil has already achieved:

61. **Self-generated income at CNEN.** Most of the capabilities that produce income at CNEN have been leveraged by contributions from the Agency's TC (CNEN had incomes in 2011 of around 32 million Euro).

62. **Self-reliance.** The IAEA projects act as an external validation, which enhances the recipient to receive additional support, build external partnership, and create positive spin-offs and by-products.

63. **Technology accessibility.** Under the IAEA-TC umbrella it is possible to access equipment and training that would be more difficult to access otherwise.

5 ENVISIONED COUNTRY PROGRAMME OUTLINE

Overview

64. The IAEA-TCP plays an important role in complementing the national efforts in the development of the Brazilian Nuclear Programme. All the projects submitted to the TCP are linked to the already on-going Brazilian activities in the nuclear field.

65. There are potential contributions of nuclear applications and technology to the PPA goals. In the Brazilian nuclear sector, CNEN has the unique role of being the central organization in policy making as well as in science, technology and innovation. Its field of interest covers most aspects of applications from safety, security and radiation protection through basic research and innovation in nuclear energy and applications, providing services to the society such as production of primary radioisotopes and radiopharmaceuticals, services using nuclear analytical techniques and irradiation of materials. Additionally, CNEN, through its institutes, has extensive academic and training programmes.

66. In the Latin American region, Brazil is committed to transfer know how and leverage regional development through nuclear applications by the means of the IAEA regional technical cooperation programme and the support with experts and training to other countries' national projects.

67. An essential document for the identification of the regional challenges is the Regional Strategic Profile (PER)⁸. Brazil is fully engaged in contributing to the formulation and implementation of the objectives outlined in the document for the fulfilment of the identified necessities.

68. As contribution to TCP, the Brazilian nuclear institutions and expertise have been made available to the IAEA's TC recipient Member States, in support of the implementation of the respective programmes, national and regional alike, particularly the Latin America and Portuguese speaking countries.

69. The Brazilian technical cooperation is directed to areas of: 1) environment, 2) food and agriculture, 3) human health, 4) industry, 5) nuclear energy for electricity generation, 6) radiation protection, 7) regulatory issues, and 8) national capacity building. A careful selection process is adopted to choose the most adequate proposals to be presented as project proposals for TC programmes for future projects. However, considering the wide range of nuclear activities in Brazil, a specific project with focus on human resources preparation is necessary.

70. Some areas were covered in the last cycles, such as PET and Radiotherapy applications, and after the next cycle will receive less attention. Other areas will have rising priority, such as: a) *production of radiopharmaceuticals*, b) *construction of repository for medium and low level of radioactive waste*, c) *interim storage of burned fuel*, d) *underground uranium mining*, e) *decommissioning and environmental recovering of exhausted uranium mines*, f) *agro-business* and g) *industrial applications* will be of interest considering the importance of these areas to the development of the country.

⁸ PER is the ARCAL planning document for the region and defines the regional needs and priorities for cooperation with IAEA, including south-south cooperation.

71. The creation of a Brazilian Nuclear Regulatory Agency is a priority of the Brazilian Government and will adopt the best international practices, adapting them to the national conditions and needs.

72. The envisaged future programme is outlined below by field of activity, and in alphabetical order:

5.1 ENVIRONMENT

73. **Objective:** To assure the adequate management of nuclear activities regarding environmental issues and to promote the use of nuclear techniques as a tool for environmental preservation and conservation aiming at a sustainable development.

74. Brazil must use its natural resources to reach adequate quality of life for the population, while under sustainability principles, environmental issues must be taken into consideration. The use of nuclear energy must be done with the best practices regarding the environment as a key principle. Nuclear acceptance is also linked to this aspect.

75. **Cooperation Topic 1:** Decommissioning of nuclear facilities, environmental management of uranium mines and management of exploitation of minerals associated to uranium and thorium.

76. As in other countries, former enterprises carried out in the nuclear areas left the need for environment recovering and remediation. Technical cooperation can provide important exchange of knowledge that more advanced countries have developed in those areas. One of the objectives of the Brazilian programme is the decommissioning of the exhausted uranium mines in the coming years.

77. For the current TC cycle a national project was approved aimed at a better management of water in an area of uranium mining.

78. Besides uranium mining, the exploitation of mineral ore with associated radionuclides has generated considerable amount of NORM (Naturally Occurring Radioactive Material) that demands adequate solutions. The TC participation in the search of technological solutions for the proper management of NORM in these sites will be an important contribution to the adequate environmental protection in nuclear and associated activities.

79. Counterpart institutions that can participate and benefit from future TC activities are: the CNEN, the Ministry of Energy, the Ministry of Environment and the Brazilian Nuclear Industry.

80. **Cooperation Topic 2:** Use of nuclear techniques for environmental sustainability.

81. Nuclear techniques using radioisotopes, stable isotopes, radiotracers, nucleonic instrumentation and radiation technology are very important tools in the environmental studies of water management, pollutants control, decontamination of pesticide containers, and more. These studies are carried out in research institutes and universities and they can help with the adequate management of natural resources in the country.

82. Other global concerns are greenhouse effects and global warming. Nuclear techniques are also useful to obtain and analyse parameters related to climate change and weather conditions.

83. Counterpart institutions that can participate and benefit from future TC activities are: the CNEN, the Centre of Nuclear Energy in Agriculture (CENA), the Ministry of Agriculture, Ministry of Environment and the Biological Institute of the State of Sao Paulo.

5.2 FOOD AND AGRICULTURE

84. **Objective:** Use of nuclear techniques to improve quantity and quality of food production in the country.

85. The past efforts made by the country in the area of agriculture research have created a strong infrastructure. The Brazilian Company for Agricultural Research (EMBRAPA) has a net of more than 30 specialized research centres dedicated to specific products and regions. EMBRAPA is one of the main users of nuclear techniques in research and development. Nuclear techniques have been performing an important role as tools in the improvement of agricultural practices. The Centre for Nuclear Energy in Agriculture (CENA), created in 1966 with strong support of the IAEA, was responsible for spreading those techniques to other similar centres in the country and in the region. Areas in the agricultural and agro-business that have been of great attention are: 1) sterile insect technique, 2) food irradiation, 3) control of chemical agents (pesticides, hormones) in food production and 4) induced mutation breeding.

86. **Cooperation Topic 1:** Food irradiation and Sterile Insect Technique (SIT).

87. In August of 2011 a Normative Instruction of the Ministry of Agriculture was issued, recognizing irradiation as a valid technique for food disinfestations and conservation. This field of interest could be object of projects under the TC programme considering that the country is one of the main food commodities producer and exporter.

88. In 2002, Moscamed Brazil was created as an organization linked to the Ministry of Agriculture for the introduction of the SIT in the country. A TC project was important to aid the development of Moscamed providing technical assistance and equipment. Although Moscamed is well established and working with the SIT to control insects that affect the fruit production in the region, there are new challenges; for example, the use of the technique to avoid the proliferation of *Aedes Aegypti*, the mosquito that is the main vector of dengue disease propagation.

89. Other counterpart institutions that can participate and benefit from future TC activities are: the CNEN and the CENA.

90. **Cooperation Topic 2:** Food security

91. The main areas for cooperation include post-harvest application of irradiations for food safety and quarantine purposes; and development of analytical capacities for food traceability and contaminant control system.

92. Other counterpart institutions that can participate and benefit from future TC activities are: the CNEN, the Biological Institute, LANAGRO, Ministry of Agriculture and the CENA.

5.3 HUMAN HEALTH

93. **Objective:** To allow population access to advanced radiotherapy and technology for diagnosis of using nuclear techniques.

94. Brazil is improving the national capacities to provide proper health assistance to the population. The main objective in this area is to achieve advances on medical knowledge and equipment. In the last three TC cycles (2005-2006; 2007-2008; 2009-2011) projects were conducted on the implementation of Positron Emission Tomography (PET) techniques, as well as on the introduction of Image Guided Radiotherapy (IGRT) in public hospitals and clinics.

95. **Cooperation topic 1:** Creation of centres of excellence for staff training and the introduction of new techniques in the Public Health System (SUS).

96. In the area of radiotherapy, projects in the last cycles have introduced Advanced Radiotherapy Techniques such as the Intensity Modulated Radiation Therapy (IMRT) in public hospitals. Brazilian Federal and State Governments have been strongly investing in new equipment and in hospitals. It is important to create a critical mass of professionals linked to public institutions that are able to get the best use of the infrastructure built in the last years. The aim for the next cycles is to give continuity to the introduction of advanced techniques for radiotherapy to the professionals who work for public institutions.

97. Other counterpart institutions that can participate and benefit from future TC activities are: the CNEN, the National Cancer Institute (INCA), the Clinics Hospital of Sao Paulo University, Sirio Libanes Hospital, the Universities' Medicine School and the Ministry of Health.

98. **Cooperation Topic 2:** Knowledge transfer and training staff for the introduction of new radiopharmaceuticals in the Brazilian health institutions.

99. Due to the introduction of new radiopharmaceuticals in the country, the qualification of professionals to the improvement of diagnostic and therapeutic processes in Nuclear Medicine becomes necessary. A current TC cycle project seeks the implementation of image processing techniques for new radiopharmaceuticals being introduced in the Brazilian medical assistance sector. However this is a very dynamic sector and new radiopharmaceuticals are continuously being developed, hence, technical cooperation could be required.

100. Counterpart institutions that can participate and benefit from future TC activities are: the CNEN, the National Cancer Institute (INCA), the Clinics Hospital of Sao Paulo University, and the Ministry of Health (Network of public Hospitals).

5.4 INDUSTRY

101. **Objective:** Use of nuclear techniques with application of radioisotopes and radiation technology for the development of new and advanced materials, products and processes for health care, food safety, as well as cleaner and safer industrial processes and practices, for sustainable industrial growth.

102. **Cooperation Topic:** The development of industrial processes in the field of human health is a programme with great impact in Brazil. The development of new materials to be used in the sterilization process with radiation technology, the processes of sterilization of human tissues, allograft and blood to avoid contamination diseases in transplants and in medical procedures are always being improved to provide safe and efficient medical procedures. The studies in the development of new materials to be used in food packaging are receiving support from CNEN and others national agencies. In the field of agro-business,

Brazil is developing a process using radiation processing technology to increase bio-ethanol production from sugarcane and using radiation processing technology for soil (turf) decontamination to increase the soy bean production. In the field of environment the use of radiation technology and radiotracers are contributing to tackling pollution arising from industrial and agricultural activities. In industrial processes the development of digital industrial radiography (DIR) techniques, protocols and procedures in Non-Destructive Techniques (NDT) are contributing to improve the methodologies for various products and processes.

103. Counterpart institutions that can participate and benefit from future TC activities are: The CNEN, the Ministry of Environment, the Ministry of Industry and Trade, the Brazilian Association for NDT, Companies in bio fuel production, Wastewater Treatment Plants, Industries in general.

5.5 NUCLEAR ENERGY FOR ELECTRICITY GENERATION

104. **Objective 1:** To provide complementary electrical energy supply to the national energy matrix.

105. **Objective 2:** To assure that the country achieves full technological control of the nuclear fuel cycle.

106. Besides the specific projects, the Brazilian Nuclear Programme is dealing with a wide area of activities. Areas where technical cooperation can play an important role are: 1) construction of the third nuclear power plant, 2) underground mining, 3) radioactive waste repository, 4) environmental applications, and 5) human resource preparation. The IAEA-TCP can offer the opportunity to look for good practices and developed technologies that can be adapted to benefit the Brazilian institutions.

107. **Cooperation Topic 1:** Ageing of nuclear power plants and infrastructure directed to the new Nuclear Power Plant (NPP).

108. Brazil has now two NPPs in operation, Angra I and Angra II. The third one, Angra III, is currently under construction and scheduled to be ready in 2015. Regarding Angra I and even Angra II, ageing matters and operational experience are issues of interest for nuclear operators and regulators. The country has included nuclear energy as a complementary source of electric generation in the national energy matrix for the next twenty years. At this moment a new laboratory for seismic assessment is being implemented.

109. **Cooperation Topic 2:** Environmental assessment of the uranium mining sites.

110. Brazil ranks sixth in uranium ore reserves in the world. Constitutionally, these reserves are considered among the country's strategic asset. At present there is one mine in operation, one being decommissioned and a second mining site is under consideration. The goal is to achieve 100% of nationalization of all NPP fuel cycle.

111. Counterpart institutions that can participate and benefit from future TC activities are: The CNEN, the Brazilian Nuclear Industry (INB) and the Ministry of Environment.

5.6 RADIATION PROTECTION

112. **Objective:** To assure protection against ionizing radiation for population, workers, patients and the environment.

113. Brazil has a good structured system in the area of ionizing radiation protection. The introduction of new techniques and equipment using ionizing radiation can profit from the experiences of good practices adopted in other countries.

114. **Cooperation topic 1:** Good practices related to radiation protection in all activities involving ionizing radiation in the country.

115. In the current cycle 2012-2013, there is a national project on interventionist radiology. This area is of great concern and it is important to collect information and develop and implement protocols to decrease the unnecessary exposure to ionizing radiation. This project is being carried out with the participation of interventionist cardiology medical associations and the regulatory body for X-ray diagnosis, named National Agency for Sanitary Vigilance (ANVISA).

116. Counterpart institutions that can participate and benefit from future TC activities are: The Ministry of Health, the Ministry of Environment, the Ministry of Energy and Mines, the Ministry of Industry and Trade, and the Ministry of Education.

117. **Cooperation Topic 2:** Emergency preparedness and response

118. Cooperation for enhancing national capability arrangements for preparedness and response to nuclear and radiological incidents and emergencies will be a priority for the period considering the organization of such large events as the Football World Cup and the Olympic Games in the country.

119. Counterpart institutions that can participate and benefit from future TC activities are: The CNEN, Civil Defence and the National System for Nuclear Protection (SIPRON).

5.7 REGULATORY ISSUES

120. **Objective:** To assure the proper application of safety and security standards in the use of ionizing radiation.

121. Brazil has a well-developed system for licensing and control of facilities and activities that use ionizing radiation or are involved with nuclear activities. The regulatory body related to nuclear issues is the Directorate of Radiation Protection and Nuclear Safety (DRS) which is part of the structure of the Brazilian Nuclear Energy Commission (CNEN). The DRS has autonomy and independence about decisions regarding regulatory issues. In past years the number of cyclotrons for radiopharmaceutical production increased from the original number of 3 to 14. The nuclear power plant Angra III is under construction and a phosphate-mine with associated uranium ore will be exploited. With the increasing complexity of nuclear activities, the Brazilian Government defined as a *priority the creation of a nuclear regulatory body in the next years*. A proposal for the nuclear regulatory agency is now under discussion at all the government levels.

122. Counterpart institutions that can participate and benefit from future TC activities are: Electronuclear, the Brazilian Nuclear Industry (INB).

123. **Cooperation Topic:** Creation of the Brazilian Nuclear Authority and Human Resource strengthening.

124. Concerning the creation of the Regulatory Agency, IAEA expert missions were involved in the discussions regarding the proposal for the creation of its organizational structure and legal framework. During the final discussions and for its implementation, Brazil might look at the experience of other countries. The average age of qualified technical personnel is also a point of concern of the Brazilian Authorities. Training and qualification of technical staff for the regulatory body can profit from the IAEA programmes. The demand for training will be addressed in the project for improving and strengthening of human resources for the next cycle.

125. Counterpart institutions that can participate and benefit from future TC activities are: the CNEN.

THE NUCLEAR SAFETY ACTION PLAN

126. After the nuclear accident at TEPCO's Fukushima Nuclear Power Stations on 11 March 2011, the IAEA Director General convened a *Ministerial Conference on Nuclear Safety* in Vienna in June 2011. The *Ministerial Conference* adopted a *Ministerial Declaration* that, inter alia, requested the Director General to develop a draft *Action Plan on Nuclear Safety*. Developed in intensive consultation with Member States, the *Action Plan on Nuclear Safety* was adopted by the IAEA's Board of Governors and subsequently unanimously endorsed by the *IAEA General Conference* in September 2011. The implementation of the *Action Plan* started immediately after its adoption through a wide range of activities.

Key Work Areas

127. The full implementation of the *Nuclear Safety Action Plan* makes a major contribution towards enhancing nuclear power production safety. The activities undertaken to implement the *Action Plan* focus on reviewing, improving and strengthening IAEA peer reviews; emergency preparedness and response; the effectiveness of national regulatory bodies and operating organizations; IAEA Safety Standards and their implementation; the international legal framework's effectiveness; capacity building; the effectiveness of communication, information dissemination and transparency; as well as nuclear safety research and development.

128. Currently Brazil is considering the next steps to take derived from the Nuclear Safety Action Plan.

5.8 NATIONAL CAPACITY BUILDING

129. **Objective:** To strengthen academic and specialized training for advanced research and technological development for the nuclear sector.

130. Science and Technology are based on people, as well as on adequate infrastructure and resources. The Brazilian education system, complemented with scholarships abroad, is able to provide academic training to the professionals and technicians needed for the nuclear programme. The Research and Development (R&D) institutes and University centres can also provide on-the-job training on most of the technical areas of the nuclear sector.

131. Nonetheless, R&D is a cooperative work and exchange of technical visits and training, participation on international events and scholarships are fundamental activities. Brazil still lacks resources and information that enable participation in all the opportunities abroad required by the nuclear sector. The information channelled by the Agency and the resources it allocates for this activity are fundamental for Brazil to keep track of international advancement in nuclear technology and applications.

132. It is worth to note that the technologies that Brazil was able to tropicalize and develop through the mechanisms of the IAEA-TCP, are being shared within the region and other TC recipient member States as a training and expertise resource centre.

133. **Cooperation Topic:** all areas of nuclear sciences and application

134. The main counterpart institutions are listed in Annex 1.

5.9 SUPPORT ACTIVITIES

Legal Framework

135. Support of the IAEA might be required in order to assist Brazil in strengthening and updating its legal framework to make it consistent with the relevant international legal instruments including treaties, standards and technical guidelines. Strengthening the legal framework will provide the appropriate context for the promotion, development and regulation of peaceful uses of nuclear energy, as well as for the institutional framework including the establishment of an independent regulatory body as indicated in section 5.7 above and clear rules for all actors involved in the use of ionizing radiation. In this context, Brazil will participate in the regional project for legislative assistance.

136. IAEA legislative assistance will help also to strengthen the status of Brazil vis-à-vis the relevant international instruments and, in particular, with regard to the Amendment to the Convention on Physical Protection of Nuclear Material and to the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage.

Security

137. Cooperation will also be focused on improving the security of nuclear and other radioactive material in the use, storage and transport, as well as the security of associated facilities and for detecting and responding to lost, missing or stolen radioactive material that may be used for criminal acts or unauthorized acts with nuclear security implications.

ANNEX 1

LIST OF RESOURCE INSTITUTIONS

Associação Brasileira de Ensaios Não Destrutivos e Inspeção (ABENDI)

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Vila Clementino
CEP: 04041-054 - São Paulo - SP
Phone: (11) 5586-3199
Fax: (11) 5581-1164
Email: abendi@abendi.org.br
Site: <http://www.abende.org.br/>

Centro de Desenvolvimento da Tecnologia Nuclear (CDTN)

Av. Presidente Antônio Carlos, 6627 - Campus UFMG - Pampulha
Belo Horizonte - MG - Brasil
CEP 31270-901
Phone: (31) 3069-3241
Fax.: (31) 3069-3321
<http://www.cdtm.br>

Centro de Energia Nuclear na Agricultura (CENA)

Av. Centenário, 303
CEP: 13400-970
Piracicaba, São Paulo - SP
Email: diretoria@cena.usp.br
Phone: 0055 19 3429 4600
<http://www.cena.usp.br/labs/labfertsol.htm>
Email: osny@cena.usp.br
Phone: 0055 19 3429 4713

Comissão Nacional de Energia Nuclear (CNEN)

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Comissão Nacional de Energia Nuclear Laboratório de Poços de Caldas - LAPOC

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Poços de Caldas - MG - Brasil
CEP 37701-970
Phone: (35) 2107-3500
Fax: (35) 3722-3622
Web: <http://www.cnen.gov.br/lapoc>

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Fax: (51)3322-2455

Centro Regional de Ciências Nucleares do Centro-Oeste - CRCN-CO

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Fax: (81) 3797-8072

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Companhia de Tecnologia de Saneamento Ambiental (CETESB)

Avenida Professor Frederico Hermann Júnior, 345
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Phone: 0055 11 3133 3000
Web: <http://www.cetesb.sp.gov.br/>

ELETRONUCLEAR - Eletrobrás Termonuclear S.A.

Rua da Candelária 65
CEP: 20091-906 RIO DE JANEIRO
Fax: 0055 21 2588-7200
Phone: 0055 21 2588-7000
Web: <http://www.eletronuclear.gov.br/>

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Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA)

EMBRAPA Sede

Parque Estação Biológica – PqEB s/nº
Brasília, DF – Brasil – CEP 70770-901
Phone: (61) 3448-4433 – Fax: (61) 3347-1041

EMBRAPA (CNPAB) Agrobiologia

Rodovia BR-465 (Antiga Rodovia Rio-São Paulo),
km 7
Caixa Postal 74.505, 23890-000 - Seropédica, RJ
Phone: (21) 2682-1500 - Fax: (21) 2682-1230
Web: <http://www.cnpab.embrapa.br>

Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA)

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Centro Nacional de Pesquisas de Gado de Corte
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Fundação Pio XII

Hospital do Câncer de Barretos

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(61) 3245-2102

PET-CT e Tomografia

SHLS 716 conj. L, Centro Clínico Sul Praça da Saúde sala W162
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Instituto Nacional do Câncer (INCA)

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Microbióticos Laboratório

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13084-471 CAMPINAS, S.P.
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Fax: 0055 19 3289 9380
Phone: 0055 19 3289 9690
Web: <http://www.microbioticos.com>

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Petrobrás

Av. República do Chile, 65 - Centro
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Web: www.petrobras.com.br/

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ANNEX 2
RESOURCE ESTIMATES AND FORECASTS

CPF Brazil 2012-2017

Date originated: March 2012

Date updated:

		EURO
1.	Historical reference figure for approved national programme (average of e.g.; 2007-2008, 2009-2011), as an indicative planning figure ⁹ for the period of coverage.	4,500,000
	Estimated government cash contribution ¹⁰ for the planning period	225,000
	Estimated government in-kind contribution ¹¹ for the planning period	
	Total estimated costs	4,725,000
2.	Preliminary estimates for the agreed programme/projects reflected in the CPF	
	Title	
	i) Environment	
	ii) Food and agriculture	
	iii) Human health	
	iv) Industry	
	v) Nuclear energy	
	vi) Radiation safety	
	Total estimated costs	4,725,000
3.	Total estimated resource (1) less total estimated costs (2)	0
4.	Estimated resource requirements	4,725,000

⁹ The country indicative planning figure does not obligate the Agency to provide such funding, nor does it suggest the expectation of continued levels of Agency funding. The sole purpose is to assist planning and prioritization of the country framework.

¹⁰ The indicative government cash contribution does not commit the government to the stated amount, but indicates the intent and likelihood of such support.

¹¹ In-kind contributions represent the value assigned to non-cash contributions such as providing experts, training courses, and infrastructure. Planning for in-kind contribution can also include bilateral trade and intergovernmental cooperation agreements in the respective programme area.

ANNEX 3
PLAN OF ACTION (period 2012-2017)

CPF Referenced Planning Opportunities	Proposed Action	Time Frame (From-To)	Resource Requirements in Euro	Project Concept Number
Human Resources	Implementing Strategies to Improve and Strengthen Human Resources in Nuclear Science Competences	2012-2013	191,726	BRA0020
	Strengthen Human Resources in Nuclear Science Competences	2014-2015	250,000	New
Environment	Sustainable Water Resources Management in an Uranium Production Site	2012-2013	201,070	BRA7010
	Sustainable Water Resources Management in an Uranium Production Site (Phase II)	2014-2015	200,000	New
Human Health	Supporting the Qualification of Human Resources in Advanced Radiotherapy Techniques	2012-2013	332,399	BRA6023
	Supporting Human Resource Qualification and Diffusion of Quantitative Emission Tomography to Improve	2012-2013	328,107	BRA6024
	Application of PET/CT	2014-2016	600,000	New
Industry	QA of radioactive sources production for cancer treatment	2014-2017	440,000	New
Nuclear Energy	Establishing Methods and Facilities for Seismic Qualification of Nuclear Components	2012-2013	126,000	BRA2018
Radiation Safety	Supporting National Assessment of Quality Control and Radiation Protection in Interventional Cardiology Departments	2012-2013	204,665	BRA9056
	Supporting the licensing process of nuclear fuel cycle facilities	2014-2015	300,000	New
	Radioactive waste management	2014-2015	200,000	New

Notes:

- This plan of action does not include the cooperation under the regional or ARCAL programme framework.
- Specific action plan for 2016-2017 will be defined considering priorities and results of the two first cycles

ANNEX 4
COMPILATION OF TREATIES UNDER THE AUSPICES OF THE
INTERNATIONAL ATOMIC ENERGY AGENCY SIGNED BY BRAZIL

IAEA Membership:	29-Jul-57	
Number of accession:	28	
Multilateral Agreements		
Title	In Force	Status
Agreement on the Privileges and Immunities of the IAEA	1966-06-13	Acceptance: 1966-06-13
Convention on the Physical Protection of Nuclear Material	1987-02-08	Signature: 1981-05-15 Ratification: 1985-10-17
Vienna Convention on Civil Liability for Nuclear Damage	1993-06-26	Accession: 1993-03-26
Convention on Early Notification of a Nuclear Accident	1991-01-04	Signature: 1986-09-26 Ratification: 1990-12-04
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	1991-01-04	Signature: 1986-09-26 Ratification: 1990-12-04
Convention on Nuclear Safety	1997-06-02	Signature: 1994-09-20 Ratification: 1997-03-04
Optional Protocol Concerning the Compulsory Settlement of Disputes		Non-Party
Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention		Non-Party
Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2006-05-18	Signature: 1997-10-31 Ratification: 2006-02-17
Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage		Non-Party
Convention on Supplementary Compensation for Nuclear Damage		Non-Party
Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL)	2006-03-27	Signature: 1999-08-04 Ratification: 2006-03-27
Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA (RSA)	1991-02-27	Signature: 1991-02-27
Third Agreement to Extend the 1987 Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (RCA)		Non-Party
Amendment to the Convention on the Physical Protection of Nuclear Material		Non-Party
Safeguards Agreements		
Title	In Force	Status
Agreement between the Republic of Argentina and the Federal Republic of Brazil, the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials and the IAEA for the Application of Safeguards	1994-30-04	Signature: 1991-12-13
Exchange of letters in connection with the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean	1997-06-10	Signature: 1997-05-22
Exchange of letters in connection with NPT and Tlatelolco Treaty	1999-09-20	Signature: 1999-07-30
Last updated on 2011-04-11 by the Office of Legal Affairs (OLA).		

ANNEX 5
ACTIVE NATIONAL AND REGIONAL PROJECTS

Project Number	Project Title	1st Year of Approval
BRA0020	Implementing Strategies to Improve and Strengthen Human Resources in Nuclear Science Competences	2012
BRA2018	Establishing Methods and Facilities for Seismic Qualification of Nuclear Components	2012
BRA6023	Supporting the Qualification of Human Resources in Advanced Radiotherapy Techniques	2012
BRA6024	Supporting Human Resource Qualification and Diffusion of Quantitative Emission Tomography to Improve Management of Patients	2012
BRA7010	Sustainable Water Resources Management in an Uranium Production Site	2012
BRA9056	Supporting National Assessment of Quality Control and Radiation Protection in Interventional Cardiology Departments	2012
INT2015	Supporting Uranium Exploration, Resource Augmentation and Production Using Advanced Techniques	2012
INT5151	Sharing Knowledge on the Use of the Sterile Insect and Related Techniques for Integrated Area-Wide Management of Insect Pests	2012
RLA0037	Supporting a Sustainable Increase in the Use of Research Reactors in the Latin American and Caribbean Region through Networking, Exchange of Experiences, Knowledge Preservation and Training of Human Resources (ARCAL CXIX)	2009
RLA0045	Supporting the Regional Agreement to Strengthen the Latin American Regional Programme (ARCAL CXXX)	2012
RLA0046	Strengthening Communication and Partnerships in ARCAL countries to Enhance Nuclear Applications and Sustainability (ARCAL CXXXI)	2012
RLA0048	Networking for Nuclear Education, Training, Outreach and Knowledge Sharing	2012
RLA1011	Supporting Automated Systems and Processes in Nuclear Installations (ARCAL CXXIII)	2012
RLA5059	Harmonizing Official Control Laboratories to Analyse Chemical Contaminants in Food and Feedstuffs (ARCAL CXXII)	2012
RLA5060	Harmonizing and Validating Analytical Methods to Monitor the Risk of Chemical Residues and Contaminants in Foods to Human Health (ARCAL CXXVIII)	2012
RLA5061	Supporting Quality Management for the	2012

Project Number	Project Title	1st Year of Approval
	Assessment and Mitigation of Impacts of Contaminants on Agricultural Products and in the Environment (ARCAL CXXIV)	
RLA5063	Supporting Genetic Improvement of Underutilized and Other Important Crops for Sustainable Agricultural Development in Rural Communities (ARCAL CXXVI)	2012
RLA6069	Strengthening Clinical Applications of Hybrid Modalities: SPECT/CT and PET/CT PET in Latin American (RLA) Member States.	2012
RLA6070	Harmonizing Nuclear Cardiology Techniques to Manage Patients Affected by Congestive Heart Failure, with an Emphasis on Chagas' Cardiomyopathy	2012
RLA6071	Evaluating Breast Milk Intake and Body Composition of Infants and Mothers, measured by deuterium dilution, as Indicators of Good Feeding Practices and Nutritional Status	2012
RLA7016	Using Isotopes for Hydrogeological Assessment of Intensively Exploited Aquifers in Latin America (ARCAL CXXVII)	2012
RLA9066	Strengthening and Updating Technical Capabilities for the Protection of Health and Safety of Workers Occupationally Exposed to Ionizing Radiation (TSA2)	2009
RLA9067	Ensuring Radiological Protection of Patients during Medical Exposures (TSA3)	2009
RLA9068	Strengthening the National Infrastructure and Regulatory Framework for the Protection of Public and the Environment for Safe Management of Radioactive Waste	2012
RLA9070	Strengthening the Education and Training Infrastructure and Building Competence in Radiation Safety	2012
RLA9072	Supporting a Database of Values of Radioactivity in Typical Latin American Food (ARCAL CXXIX)	2012
RLA9073	Supporting Human Resource Development in Nuclear Security	2012
RLA9074	Strengthening and Harmonizing National Capabilities for Response to Nuclear and Radiological Emergencies	2012

ANNEX 6
GUIDING PRINCIPLES IN SUPPORT
OF THE ENVISIONED COUNTRY PROGRAMME

The wide range of PPA goals, when subject to international cooperation, should comply with the national guidelines given by the Brazilian Cooperation Agency:

- Emphasize programmes linked to the national development priorities.
- Emphasize programmes with national, regional and local impact, in this order.
- Concentrate efforts on projects that have multiplying effects, sustainable outcomes, avoiding pulverization and dispersion of efforts.
- Emphasize projects that allow capacity building of national institutions through transfer of know-how and facilitate future innovation and development.
- Emphasize projects that integrate the main components of international technical cooperation such as expert mission, training and acquisition of equipment necessary to its development.
- Priority to projects with clear funding scheme.
- Priority to projects that strengthen the international relations with perspective on political, commercial and economic cooperation between Brazil, developing and developed countries. For multilateral cooperation, projects must be approved considering the concepts of multilateralism, universality and neutrality.

On the other hand the IAEA-TCP should comply with its guiding principles according to the document INFCIRC 267:

(a) The primary objective of technical assistance is to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity in Member States by facilitating their free access to the peaceful uses of atomic energy, the transfer of nuclear technology, the development of research, the application and utilization of atomic energy for peaceful purposes in Member States and the promotion of co-operation between them for that purpose;

(b) The provision of technical assistance constitutes a major, high-priority function of the Agency, and responsibility for its success devolves on all Departments of the Secretariat;

(c) The technical assistance activities of the Agency shall be carried out with due observance of the sovereign rights of States, the provisions of the Agency's Statute and the terms of agreements concluded between the Agency and the State or group of States requesting technical assistance. The Agency shall not make technical assistance subject to any political, economic, military or other conditions incompatible with the provisions of the Agency's Statute;

(d) The Agency's resources for technical assistance shall be allocated primarily to meet the needs of developing countries;

(e) Technical assistance shall be designed to meet needs of research on, and development and practical application of, atomic energy for peaceful purposes, including the production of electric power, as determined by the requesting State or group of States, and to foster the exchange of scientific and technical information on peaceful uses of atomic energy and to facilitate access to nuclear technologies, equipment and materials for peaceful purposes;

(f) The nature, extent and scope of technical assistance to be provided to the requesting State or group of States shall be defined by the Government or Governments concerned, and the assistance actually provided shall be in conformity with the Government's request and shall be

given only to or through Governments. This definition shall be as precise as possible. If requested, the Agency shall help the Government or Governments concerned in defining the nature, extent and scope of the technical assistance being sought;

(g) The State or group of States requesting technical assistance shall define, in advance, the subject, purpose and programme for which the technical assistance is requested and shall carry out all necessary preparatory work to ensure that the technical assistance achieves its objective;

(h) The Agency's Safety Standards and Measures shall be applied, where relevant, to operations making use of technical assistance provided;

(i) Technical assistance shall be provided only for peaceful uses of atomic energy. For the purposes of the technical assistance programme, peaceful uses of atomic energy shall exclude nuclear weapons manufacture, the furtherance of any military purpose and uses which could contribute to the proliferation of nuclear weapons, such as research on, development of, testing of or manufacture of a nuclear explosive device. To this end and to the extent required by the Board of Governors, Agency safeguards shall be applied to all forms of technical assistance in all sensitive technological areas in accordance with the provisions established by the Board of Governors as set forth in the Annex or as subsequently amended by the Board;

(j) To the extent relevant, the Agency's recommendations regarding physical protection shall be applied to nuclear facilities, equipment and materials relating directly to the technical assistance programme.

The cooperation included in this CPF document complies with both principles.