



PLUTUS ACADEMY

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1.China's entry in Nuclear power sector

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About Hualong One

According to the China National Nuclear Corporation, Unit 5 of Fuqing Nuclear Power Plant located in Fujian province was connected to the grid for the first time. Unit 5 is the first nuclear power reactor in the world to adopt Hualong One technology. It can generate 10 billion kilowatt hour electricity every year. This will help China cut its carbon emission by 8.16 million tonnes.

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The construction of Hualong one began in 2015 with more than 10,000 technicians working on it. Till now there are 6 units under construction in China and other parts of the world based on the Hualong One technology.

Nuclear Power in China

As of 2019, nuclear energy accounted for only less than 5% of annual electricity of China. This is expected to grow as China is trying to become carbon neutral by 2060. China has 47 nuclear power plants. They together generate 48.75 million kilo watts of power. With this, China has the third highest nuclear power in the world after United States and France.

Other nuclear projects of China

China is also constructing two other demonstration Hualong One units in Guangxi Autonomous Region. These units are to begin their operation in 2020. The China National Nuclear Corporation has also begun the construction of two other Hualong units at Zhangzhou plant.

China has planned five Hualong One Nuclear reactors for Pakistan. Four are planned at Karachi Nuclear Power plant and one at Chashma Nuclear Power plant. Of these, two units are under construction. The construction began in 2015 and the units are to enter into commercial operation by 2021 and 2022.

2.Sahakar Pragya Programme: Key Facts

The Ministry of Agriculture and Farmers Welfare recently launched the Sahakar Pragya. The initiative will train the primary cooperative societies in the country. It holds 45 new training modules of National Cooperative Development Corporation (NCDC). It will enhance the training capacity of NCDC through a network of eighteen regional training centres.

About Sahakar Pragya

Under the Sahakar Pragya initiative, the 45 training modules are to be delivered at LINAC. LINAC is Laxman rao Inamdar National Academy for Cooperative Research and Development operating under NCDC.

These 45 training modules are to be supported by the following

- NCDC Schemes
- **10,000 Farmer Producer Organizations**
- **Agri Infra Fund Scheme**
- **PM-FME Scheme**
- **Dairy Infra Dev Fund Scheme**
- **Fisheries Infra Dev Fund Scheme**
- **PM Matsya Sampada Yojana**
- Schemes of Ministry of Rural Development

NCDC

The NCDC was created to plan and promote programmes for processing, production, marketing, storage, import and export of agricultural produce. Apart from agricultural produce, NCDC also focuses on livestock, foodstuffs, industrial goods and services like healthcare, hospitals and education. The NCDC also provides financial assistance to Cooperative at all three tiers, primary, district and multi-state. The NCDC had earlier launched the Sahakar Coop Tube to involve youth in the Cooperative movement.

NCDC Schemes

The schemes implemented by NCDC are as follows

Ayushman Sahakar

It was launched to provide financial assistance to the cooperatives in the field of education, healthcare and hospitals. It will assist the promotion of AYUSH facilities launched by cooperative societies. It will also work to fulfil the objectives of National Health Policy. It will help the co-operative societies to participate in the National Digital Health Mission. The activities included under the scheme are creation, expansion, modernisation, repair, renovation of hospital, education and healthcare infrastructure.

Sahakar Mitra Scheme

Under the scheme, the NCDC will provide short term internship to young professionals in the areas of functioning of NCDC. With this, the manpower of NCDC will be boosted.

Yuva Sahakar

The scheme will encourage newly formed cooperative societies to come up with new innovative ideas. It mainly focuses on programmes such as Stand up India and Startup India. Basically, it will provide financial assistance to those cooperative societies that are coming up with innovative ideas.

Why are Cooperative Societies important?

The Cooperative societies act as a shield against exploitation of farmers by the traders. They minimize the risks in agriculture. There are more than 8.5 lakh cooperative sector in India supporting 290 million members in the country. 94% of farmers in the country are members of any one of the cooperative societies.

Background

There are 2.53 lakh Gram Panchayats in the country. Through these Gram Panchayat, the Government of India is ensuring that every household has access to basic amenities such as electricity, toilets, water, cooking gas, etc.

There are 86% small farmers in India. These farmers cannot invest in farming on their own. Therefore, the Government of India is developing facilities such as irrigation, high yielding variety seeds, and cold storage at village level for these farmers. This will help to prevent farmers from selling their produce at low prices.

3.Mission COVID Suraksha launched

The Government of India recently launched Mission COVID Suraksha to accelerate development of vaccines in the country. It will ensure that the vaccines being developed are brought closer to the market. The mission was introduced by Finance Minister Nirmala Sitharaman on November 12, 2020 as a part of 12 announcements made under Atma Nirbhar Bharat Abhiyan 3.0.

The Finance Minister had allocated Rs 2.65 lakh crores under the fourth economic package. Of this, Rs 900 crores has been allocated to Department of Biotechnology to accelerate development of COVID-19 vaccine. This fund is to be used to implement Phase I of Mission COVID Suraksha which is to run for 12 months. The funds allocated are to be used for the development of vaccines and licensure of vaccines that are in clinical stage or ready to enter clinical stage. The Department is currently supporting development of ten vaccines.

What is Mission COVID Suraksha?

The mission will envisage COVID-19 vaccine development from pre-clinical to manufacturing and regulatory facilitation. The other important roles of the mission are as follows

- To establish clinical trial sites
- To strengthen existing immunoassay laboratories
- To strengthen suitable facilities for animal studies
- To establish clinical sites
- To support data management systems, trainings, regulatory submissions, accreditations, external quality management and support development of common harmonized protocol.
- The mission will support cell line development. Cell Line is a cell culture developed from a single cell.
- It will also support manufacturing of good manufacturing practice batches for animal toxicology studies.

What are the supports offered to Mission COVID Suraksha?

The mission will be supported by India Coalition for Epidemic Preparedness Innovations (Ind-CEPI) and National Bio Pharma Mission

What is Ind-CEPI?

The mission was launched in March 2019 at a cost of Rs 312 crores. The main aim of the programme is to strengthen the development of vaccines for epidemics in India.

Objectives

The mission will support development of at least two to three vaccines until phase 2 of their testing. It will strengthen the infrastructure support of vaccine development through industry-academia interface. The mission will work to strengthen internal inter-ministerial coordination to speed up the vaccine development. It will strengthen surveillance, development framework and logistics for the use of new vaccines.

What is CEPI?

CEPI is Coalition for Epidemic preparedness Innovations. It is a foundation that was established in 2017 by the World Economic forum, India, Norway, Bill and Melinda Gates Foundation. It was founded at Davos, Switzerland. The headquarters of CEPI is

located in Oslo, Norway. CEPI finances independent research projects developing vaccines by taking donations from public, private and philanthropic organisations.

How has CEPI helped the programme?

CEPI has so far conducted prioritisation exercises for Nipah virus, Lassa, Chikungunya, MERS and RFV in India.

What is the National Bio Pharma Mission?

The National Biopharma Mission is being implemented by the Biotechnology Industry Research Assistance Council (BIRAC). It is implemented through industry-academia collaboration. The mission accelerates biopharmaceutical development in the country. The mission was launched in 2017 at a cost of 1500 crore rupees. 50% of the mission is funded by the World bank.

What is the I3 programme under the mission?

The Innovate in India, I3 programme was launched under the mission. It enables an ecosystem to promote indigenous manufacturing in bio Pharma sector.

What are the four verticals under the mission?

The four verticals under the mission are development of product leads for vaccine, upgradation of shared infrastructure facilities, development of human capital and developing technology transfer.

4.PRAGATI

The Prime Minister Narendra Modi recently chaired the 33rd PRAGATI interaction. During the meeting, projects worth of Rs 1.41 lakh crores were reviewed. These projects were taken up by DPIIT, Ministry of Railways, Power Minister and Ministry of Road, Transport and Highways.

What is PRAGATI?

PRAGATI is Pro-Active Governance and Timely Implementation. It aims to provide pro-active governance and timely implementation of projects. It was launched in 2015. It is a multi-modal and multi-purpose platform that aims to address the grievances of a common man. It also monitors and reviews projects of Government of India and also projects flagged by the State Governments.

What are the technologies used by PRAGATI?

The PRAGATI platform bundles three latest technologies namely video conferencing, Digital data management and Geo-spatial technology.

How does PRAGATI promote Cooperative Federalism?

PRAGATI offers the combination of the above three technologies in the direction of cooperative federalism. Using these three technologies the PRAGATI platform brings the Secretaries of Government of India and the Chief Secretaries of the State on one

stage. Thus, it binds the state and Centre together and thereby promotes Cooperative Federalism.

What are the Key Features of PRAGATI?

PRAGATI is a three-tier system that includes the Prime Minister Office, GoI secretaries and Chief Secretaries of the state. Under PRAGATI, the Prime Minister will hold a monthly programme in which he will interact with the secretaries through video conferencing.

The programme is held once in every month, which is on fourth Wednesday. This day is called "PRAGATI Day". On this day based on the database from public grievances, pending projects and ongoing programmes, the issues are flagged before the Prime Minister. The data bases are collected from Project monitoring groups and Ministry of Statistics and Programme Implementation.

Who designed the PRAGATI platform?

The PRAGATI platform was designed by the Prime Minister Office in collaboration with the National Informatics Centre.

What are the objectives of PRAGATI?

The three main objectives of PRAGATI are grievance redressal, project monitoring and project implementation.

Pros and Cons of PRAGATI

PRAGATI is a robust system. It brings e-accountability and e-transparency.

On the other hand, the direct interaction between the Prime Minister and the state secretaries undermines the state political executive as it does not involve the political executive of the states. Also, the platform is being criticized that it is leading to concentration of power with that of the Prime Minister Office

Progress of PRAGATI

So far, the Prime Minister has chaired 32 meetings reviewing 275 projects that were worth Rs 12.5 lakh crores. It included 47 schemes and programmes across seventeen sectors.

5.India-US extend MoU for Cooperation on Nuclear Energy

India and the United States have extended the Indo-US Civil Nuclear Energy agreement for another ten years. The agreement is also called the 123 agreement. India buys the nuclear material from the United States based on this agreement. The extension of the agreement was signed at the Global Centre for Nuclear Energy Partnership (GCNEP).

India-US Civil Nuclear Agreement

The U.S.-India deal took more than 3 years as it had to go through several complex stages, including amendment of U.S laws. This was mainly because India is not a signatory of the Non-Proliferation Treaty (NPT). It is mandatory for the countries to sign the NPT to become a member of Nuclear Suppliers Group (NSG). In spite of this, the NSG granted the waiver to India (allowed India to sign the agreement with the US), allowing the access to civilian nuclear technology and fuel from others.

Why did India sign the agreement?

India signed the agreement because India believed that it was the best in nuclear weapon technology and also India wanted to keep its credentials in the technology. Also, India was in need of nuclear materials to run its nuclear power plants as well.

Non-Proliferation Treaty

The main objective of the Non-Proliferation Treaty was to prevent the spread of nuclear weapons and weapons technology, to create cooperation in the uses of nuclear energy and to achieve the goal of nuclear disarmament. India is not a signatory of the Non-Proliferation Treaty. This made it difficult for the country to obtain nuclear weapons, nuclear technology and nuclear raw materials from the rest of the countries holding nuclear reserves.

Nuclear Power in India

There are 22 nuclear power reactors in India. Currently, 3.22% of electricity in India is generated through nuclear power.

Nuclear Fuel Reserves in India

India has limited Uranium reserves in the world. It approximately holds 54,636 tonnes of assured nuclear resources. According to the Nuclear Power Corporation of India, the nuclear resources of India are only sufficient to generate 10 GW of power for about 40 years. Therefore, it is important for India to import nuclear materials from foreign countries.

What is GCNEP?

It is the first world nuclear energy partnership centre. It was established in Kheri Jasaur village of Bahadurgarh tehsil.

6.Hayabusa2 Spacecraft of Japan: Key Facts

The Hayabusa2 spacecraft of Japan is nearing the earth after a yearlong journey from asteroid Ryugu. The asteroid is located at a distance of about 300 million kilometres from the Earth. The spacecraft is to reach the earth in Southern Australia on December 6, 2020 carrying precious samples from the asteroid .

The entire operation is being held by JAXA, Japanese Aerospace exploration agency. According to the agency the capsule that is protected by a heat shield will turn into a fireball at its 200 kilometre from the earth surface. The parachute of the capsule will open at about 10 kilometres.

In February 2019, the spacecraft collected surface dust samples from the asteroid Ryugu. Later in July 2019, the spacecraft collected underground samples from the asteroid. This is the first time in the history of world space underground samples are collected from an asteroid.

The spacecraft took three and half years to reach the asteroid to go. However, the return journey was much shorter due to its location relative to the earth.

Hayabusa2

This mission follows the Hayabusa mission that returned asteroid samples in 2010. Hayabusa2 was launched in 2014. It surveyed the asteroid Ryugu for a year and half. Later it collected the samples from the asteroid and left to the earth in November 2019. The mission is expected to provide knowledge about the evolution of inner planets especially in the origin of water and organic compounds on the earth.

Ryugu

It is a carbonaceous near-Earth asteroid. The carbonaceous asteroids hold the most Pristine materials in the solar system.

Carbonaceous asteroid

The carbonaceous asteroids form around 75% of the known asteroids. As their composition includes a large amount of carbon, they are distinguished by a very low albedo. Albedo is the measure of reflection of solar radiation. The value of albedo is between 0 and 1. The carbonaceous asteroid occurs mostly at the outer edge of the Asteroid belt.

Rovers of Hayabusa2

Hayabusa2 carried four small Rovers. These Rovers were deployed at different dates. The first two Rovers were called HIBOU and OWL. The third Rover was called MASCOT. The fourth Rover called MINERVA failed before it was released from the Orbiter.

MASCOT

MASCOT is a Mobile Asteroid Surface Scout. It was developed by the joint cooperation of French Space Agency CNES and German Aerospace centre. It is the only object of the mission developed by a foreign Space Centre. The rest of the components were developed within Japan and JAXA.

6. Giant Metrewave Radio Telescope (GMRT) granted 'Milestone' status by IEEE – Key Facts

The Giant Metrewave Radio Telescope observatory located in Pune has been provided with the prestigious IEEE milestone status. The status was provided to honour its significant technical achievement, services, its excellence as unique product, patent and seminal papers that aim to benefit humanity.

This is the third IEEE milestone recognition being offered to India according to the National Centre for Radio Astrophysics. The previous two IEEE milestone recognition were awarded to JC Bose in 1895 and CV Raman in 1928. JC Bose is regarded as the Father of Wireless Communication.

Giant Metrewave Radio Telescope

It is an array of thirty fully steerable parabolic radio telescopes. Each radio telescope is of 45 metre diameter and is operated by the National Centre for Radio Astrophysics. It is a part of the Tata Institute of Fundamental Research located in Mumbai.

The telescope was built under the direction of lead professor Govind Swarup between 1984 and 1996. One of the major objectives of the telescope was to search for highly redshift 21-line radiation. These radiations are emitted from the primordial neutral hydrogen clouds. The determination of these radiations will help determine the epoch of galaxy formation in the universe.

In February 2020 the telescope helped in observing the biggest explosion in the history of the Universe called the Ophiuchus Supercluster Explosion.

What are Hydrogen Clouds?

The hydrogen clouds are the interstellar matter where hydrogen occurs in its neutral state rather than its molecular or ionised states. The Hydrogen clouds are detectable at radio wavelengths as they emit characteristic energy at a wavelength of 21 cm.

What is the Redshifted 21cm Hydrogen Line?

It is an electromagnetic radiation spectral line. It is created due to the change in energy state of neutral hydrogen atoms. These electromagnetic radiations fall in the wavelength of microwaves and are usually observed in radio astronomy. This is because these radio waves can penetrate large clouds of cosmic dust that are opaque to visible light.

Ophiuchus Supercluster Explosion

The extremely powerful eruption occurred in the Ophiuchus supercluster. It is located at about 390 million light years from the Earth.

The eruption occurred due to a supermassive black hole. The observation was a result of several other earth-based and space-based observatory such as Chandra x-ray observatory, Hubble Space Telescope, XMM Newton Extra Space observatory of

European Space Agency, Murchison Widefield array of Australia and the Giant Metrewave Radio Telescope of India.

Ophiuchus Supercluster

It is one of the nearby Galaxy superclusters of the earth. It is located in the Ophiuchus constellation. Supercluster is a group of galaxies. For instance, the milky way is a part of the Local Group Galaxy group. The Local Group in turn is a part of the Virgo supercluster. The Virgo supercluster in turn is a part of Laniakea Supercluster. There are more than 10 million superclusters observed in the universe so far.

The superclusters indicate that the galaxies in the universe are not distributed uniformly.

What are the nearby superclusters?

The nearby superclusters are Perseus-Pisces Supercluster, Coma Supercluster, Sculptor Supercluster, Leo Supercluster, Shapley Supercluster and Ophiuchus supercluster.

IEEE Milestone status

The Programme was established in 1983 to honour significant achievements of electrical and electronics engineering.

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