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Fuel Cell Technology for Disaster Management

- International Advanced Research for Powder Metallurgy & New Materials (ARCI), Hyderabad, has developed Polymer Electrolyte Membrane fuel cells (PEMFC).
- ARCI an autonomous R&D Centre of Department of Science and Technology (DST) under Ministry of Science and Technology.
- PEMFC, in its entireness, have an advantage of operational capability at low-temperatures with applications in decentralized power generation systems.
- ARCI at its Centre for Fuel Cell Technology, has developed in-house PEMFC systems in the power range of 1 to 20 kiloWatt (kW) and demonstrated the same in stationary (1-20 kW) and transport applications (1,3,5 kW).
- Emergency Operation Centers (EOC) backed with 10 kW system along with fuel cell stack (providing sustainable electricity using hydrogen gas without the need of grid power), air moving sub systems, power control devices and control and monitoring system is being planned as a natural disaster management measure.
- The latest concept in disaster management all over the World is about conversion of Control Rooms to Emergency Operation Centres (EOC).
- EOCs respond immediately during an emergency situation with State-of-the-Art communication systems.
- This helps in providing immediate support during the Golden Hour of the disaster.

Fuel Cell System

- A fuel cell is an electrochemical cell that converts the chemical energy of a fuel (often hydrogen) and an oxidizing agent (often oxygen) into electricity through a pair of redox reactions.
- Fuel cells are different from most batteries in requiring a continuous source of fuel and oxygen (usually from air) to sustain the chemical reaction, whereas in a battery the chemical energy usually comes from metals and their ions or oxides that are commonly already present in the

battery, except in flow batteries.

- Fuel cells can produce electricity continuously for as long as fuel and oxygen are supplied.
- Fuel cells are used for primary and backup power for commercial, industrial and residential buildings and in remote or inaccessible areas.
- They are also used to power fuel cell vehicles, including forklifts, automobiles, buses, boats, motorcycles and submarines.
- There are many types of fuel cells, but they all consist of an anode, a cathode, and an electrolyte that allows ions, often positively charged hydrogen ions (protons), to move between the two sides of the fuel cell.
- The ions move from the anode to the cathode through the electrolyte.
- At the same time, electrons flow from the anode to the cathode through an external circuit, producing direct current electricity.
- At the cathode, another catalyst causes ions, electrons, and oxygen to react, forming water and possibly other products.
- Fuel cells are classified by the type of electrolyte they use and by the difference in startup time ranging from 1 second for proton exchange membrane fuel cells (PEM fuel cells, or PEMFC) to 10 minutes for solid oxide fuel cells (SOFC).
- Fuel cell systems offer a potential benefit in terms of providing sustainable electricity using hydrogen gas without the need of grid power as required by conventional battery backup systems.

Delimitation Commission

- Recently a 'delimitation commission' has been set up by the Ministry of Law and Justice.
- The commission will headed by a former Supreme Court judge Ranjana Prakash Desai.
- The commission has been set up for the Union Territory of Jammu & Kashmir and the north-eastern states of Assam, Arunachal Pradesh, Manipur and Nagaland.
- The Election Comissioner (Sushil Chandra) will be the ex-officio member of the commission.
- The Election Commissioners of the concerned states and UT will also be its members.
- The Commission will delimit the constituencies of Jammu and Kashmir in accordance with the provisions of the Jammu and Kashmir Reorganization Act, and of Assam, Arunachal Pradesh, Manipur and Nagaland in accordance with the provisions of the Delimitation Act, 2002.

Delimitation Act, 2002

- Delimitation is the act of redrawing boundaries of Lok Sabha and Assembly seats to represent changes in population and is done on the basis of the last Census.
- Articles 82 and 170 of the Constitution of India provide for readjustment and the division of each State into territorial constituencies (Parliamentary constituencies and Assembly constituencies) on the basis of the 2001 census.
- Articles 330 and 332 of the Constitution of India provide for refaxing the number of seats reserved for the Scheduled Castes and the Scheduled Tribes in the House of the People and Legislative Assemblies of the States on the basis of the 2001 census.
- The Delimitation Act, 2002, was enacted to set up a Delimitation Commission for the purpose of effecting delimitation on the basis of the 2001 census so as to correct the aforesaid distortion in the sizes of electoral constituencies.
- The recent delimitation of Assembly constituencies would be carried out on the basis of the 2011 Census.

J&K Delimitation of Lok Sabha Constituencies

- The number of seats in the Legislative Assembly of Union Territory of Jammu and Kashmir shall be increased from 107 to 114, and delimitation of the constituencies may be determined by the Election Commission in the manner hereinafter provided.
- Notably, 24 of the total seats in J&K remain perennially vacant as they are allotted to Pakistan-occupied Kashmir.
- The reorganization Act also says Lok Sabha will have five seats from the Union Territory of J&K and Ladakh will have one seat.

Rajkumari Amrit Kaur

- Rajkumari Amrit Kaur was born into the Kapurthala royal family, she was educated in Oxford and returned to India in 1918, and began to be drawn towards the work and teachings of MK Gandhi.
- Apart from joining the nationalist freedom struggle, Kaur also began work on a number of other social and political issues such as the purdah system, child marriage and the Devadasi system.
- When the civil disobedience movement took off in the 1930s, Kaur dedicated her life to it.
- Kaur was jailed after the Quit India movement and carried to the jail a

spinning wheel, the Bhagwat Gita and the Bible.

- Amrit Kaur was the first woman in independent India who joined the Cabinet as the Health Minister and remained in that position for 10 years.
- Before taking up the position of a Health Minister, Kaur was Mahatma Gandhi's secretary.
- During these 10 years, she founded the Indian Council for Child Welfare.
- She also laid the foundation of the All India Institute of Medical Sciences (AIIMS) and Lady Irwin College in Delhi in the following years.
- While Kaur advocated for equality, she was not in favour of reservations for women and believed that universal adult franchise would open the doors for women to enter into the legislative and administrative institutions of the country.
- In light of this, she believed that there was no place left for reservation of seats.

Freedom in the World 2020 report

- Freedom in the World report is released by Freedom House, a US-based watchdog.
- The report derives its methodology from the Universal Declaration of Human Rights, adopted by the United Nations General Assembly in 1948.
- It covers 195 countries, awarding scores based on political rights indicators such as the electoral process, political pluralism and participation and government functioning, as well as civil liberties indicators related to freedom of expression and belief associational and organizational rights, the rule of law and personal autonomy and individual rights.
- According to the report Finland, Norway, Sweden, the Netherlands and Luxembourg are the top five countries in the free category.
- The report has placed India at 83rd position along with Timor-Leste and Senegal among the bottom five of "free democracies".
- India witnessed the worst score decline among the world's 25 largest democracies.
- India's overall score declined from 75 in 2019 to 71 in 2020, with civil liberties taking the biggest hit.
- The annulment of autonomy and the subsequent shutdown of Kashmir, the National Register of Citizens and the Citizenship (Amendment) Act, as well as the crackdown on mass protests have been listed as the main signs of declining freedom in the report.
- These three actions have shaken the rule of law in India and threatened

the secular and inclusive nature of its political system.

Central Pollution Control Board (CPCB)

- The Central Pollution Control Board (CPCB) of India is a statutory organization under the Ministry of Environment, Forest and Climate Change (MoEFC).
- It was established in 1974 under the Water (Prevention and Control of pollution) Act, 1974.
- The CPCB is also entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981.
- It serves as a field formation and also provides technical services to the Ministry of Environment and Forests under the provisions of the Environment (Protection) Act, 1986.
- It Co-ordinates the activities of the State Pollution Control Boards by providing technical assistance and guidance and also resolves disputes among them.
- It is the apex organization in country in the field of pollution control, as a technical wing of MoEFC.
- The board is led by its Chairperson, who is generally a career civil servant from the Indian Administrative Service appointed by the Appointments Committee of the Cabinet of the Government of India.
- CPCB has its head office in New Delhi, with seven zonal offices and 5 laboratories.
- The board conducts environmental assessments and research.
- It is responsible for maintaining national standards under a variety of environmental laws, in consultation with zonal offices, tribal, and local governments.
- It has responsibilities to conduct monitoring of water and air quality, and maintains monitoring data.
- The agency also works with industries and all levels of government in a wide variety of voluntary pollution prevention programs and energy conservation efforts.
- It advises the central government to prevent and control water and air pollution.

Hazardous Contamination

- According to recent update of Central Pollution Control Board (CPCB), there are 128 sites in India contaminated by toxic and hazardous substances.

- West Bengal led the list with 27 sites followed by Odisha at 23.
- Including those, there are 324 sites that may be contaminated, with 196 still awaiting an investigation and confirmation.
- Twenty sites in 6 States have seen agencies prepare a detailed project reports, or a plan of action, to clean up sites.
- Such action follows orders by the National Green Tribunal (NGT).
- There are four such sites in Kerala (Eloor-Edayar), Odisha (Ganjam, Orichem) Tamil Nadu (Ranipet), Uttar Pradesh (Rania, IPL and Deva Road), West Bengal (Nibra village), Madhya Pradesh (Ratlam).
- Types of contamination are as follows

1. **Oil contamination -** These incidents include oil contamination due to leakage of underground oil pipelines of Bharat Petroleum Corporation Limited in Tamil Nadu,
2. **Pesticide and heavy metal contamination in creeks** at Eloor, Kerala.
3. **Chromium contamination** at Rania, due to improperly disposed electronic waste lying on the banks of river Ramganga, Moradabad.
4. **Mercury contamination** of the soil at Kodaikanal, Tamil Nadu, and Ganjam, Odisha.

Kyasanur Forest Disease (KFD)

- Kyasanur forest disease (KFD) is a tick-borne viral haemorrhagic fever endemic to South India.
- The disease is caused by a virus belonging to the family Flaviviridae, which also includes yellow fever and dengue fever, which are transmitted by monkeys.
- A variety of animals are thought to be reservoir hosts for the disease, including porcupines, rats, squirrels, mice, and shrews.
- The vector for disease transmission is Haemaphysalis spinigera, a forest tick, humans gets the disease with the contact with ticks.
- The symptoms of the disease include a high fever with frontal headaches, followed by haemorrhagic symptoms, such as bleeding from the nasal cavity, throat, and gums, as well as gastrointestinal bleeding.
- Other symptoms include vomiting, muscle stiffness, tremors, absent reflexes, and mental disturbances.
- An affected person may recover in two weeks' time, but the convalescent period is typically very long, lasting for several months.
- Muscle aches and weakness also occur during this period and the affected person is unable to engage in physical activities.

Source: Times of India, The Hindu, PIB, Indian Express

