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Electro-Kinetic Streaming to Tap Energy from Water

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Why in News

The **Indian Institute of Technology-Guwahati (IIT-G)** researchers have developed materials that can **produce energy from flowing or stagnant water in households**.

The decentralised energy model involves a large number of small generation devices which can generate energy in every household and the excess energy can be transferred to energy-deficient areas nearby.

Key Points

- The generation of energy from water in various forms like river flow, ocean tides, stagnant water and even raindrops is now known as "**Blue Energy**".
 - These are the traditional form of blue energy and there have been efforts to harness the power of water in other ways. One such out-of-the-box blue source is electrokinetic energy.
- Two different methods have been employed to harvest energy from the flowing water and the stagnant waters.
- **Electro-Kinetic Streaming Potential:**
 - By this method, energy can be harvested from flowing tap water.
 - When fluids stream through tiny channels that are charged, they can generate an electrical voltage, which may be harnessed through miniaturised generators.
 - Although the exploration of such electrokinetic phenomena and their possible use for energy conversion have been known for over half a century, they have not been harnessed because of low efficiency arising from the unsuitability of channels for the fluid stream.

- **Contrasting Inter-Facial Activities:**

- These entail different types of semiconducting materials to generate power from stagnant water.
- Devices were fabricated with doped graphene flakes for generating power by dipping in a bucket of water in the stagnant water source to “complementary charge transfer activities”.
 - Graphene is the sheet produced by oxidation followed by reduction of natural graphite flakes.
 - Graphene was modified to manipulate its electron density so that even stagnant water in contact with this form of graphene can produce energy.

Streaming Potential

It is the potential difference at zero current produced by the convective flow of charge due to a pressure gradient (flow of liquid) through a charged capillary, membrane, plug, or diaphragm.

Source: TH