**Syllabus subtopic:**

- Infrastructure: Energy, Ports, Roads, Airports, Railways etc.
- Science and Technology: developments and their applications and effects in everyday life Achievements of Indians in science & technology; indigenization of technology and developing new technology.

**Prelims and Mains focus:** about the rise in imports of solar equipments and the reasons for govt. failure to curb it; about solar power scenario in India; about PV cell

**News:** Five years of a concerted solar power push, a key policy thrust area for the NDA government, has come at a cost — the value of solar photovoltaic (PV) cells and modules imported since FY’14 adds up to $12.93 billion, or Rs 90,000 crore.

**Import cost too high?**

- An estimated 85 per cent of this equipment has been imported from three countries — primarily China, alongside Vietnam and Malaysia — with a surge coinciding with the rollout of the Centre’s ‘Make-in-India’ programme.

- The amount spent on imports of PV cells and modules in the last five years works out to nearly three times the cumulative Foreign Direct Investment (FDI) of $4.83 billion that flowed into the entire renewable energy sector. It is also well over six times the budgetary allocation made by the Centre to the renewable energy sector in the five years since FY’14.

- The high import levels came despite safeguard duties being slapped by the government in the last 24 months, alongside multiple red flags being raised on the quality of solar equipment and material reaching the country.

**Reasons for lack of domestic production of PV panels & modules**
India has an installed manufacturing capacity of around 3 GW (giga watts, or 3000 mega watts) for fabricating solar PV cells and around 10 GW for modules. But it does not have any commercial production for upstream stages of solar PV manufacturing, such as wafers, ingots and polysilicon. The official reason is the energy and capital intensive nature of the process.

- The lack of an integrated set-up and the economies of scale — despite the government having allowed 100 per cent FDI in the renewable energy sector through the automatic route — translates into higher cost of domestic production.

- This is despite the government extending a raft of sops for the production of solar PV cells and modules. This includes support through the Modified Special Incentive Package Scheme (M-SIPS) of Ministry of Electronics & Information Technology that offers a 20-25 per cent subsidy for investments in capital expenditure for setting up a manufacturing facility.

- Riding on equipment imports, the solar generation sector cornered the bulk of FDI inflows in the power sector in the last five years, also accounting for the bulk of capacity addition during this period. At the same time, thermal capacity addition recorded a progressive downward trend.

- The problem pertaining to the quality of material used in solar projects is another fallout of the excessive import dependency by project developers.

- There is a trend wherein developers taking up solar projects import use sub-standard equipment to set it up, with the result that capacity starts to report a decline in output after about a year.

- Most of these developers then end up selling the project to a buyer, generally after around a year. It generally takes about three years to ascertain the actual solar efficiencies of a project.

Measures taken by the govt.

- Following a number of such cases coming to light, the Ministry of New and
Renewable Energy changed rules to ensure that developers will not be allowed to dispose of a project before three years, as against a one-year stipulation earlier.

- This condition has now been put to ensure quality standard, alongside the stipulation of a minimum efficiency of 21 per cent.

- There have been some trade interventions to stymie equipment imports, but they have largely been ineffectual and had resulted in protests from developers.

- Based on the findings of Directorate General of Trade Remedies (DGTR), following investigations concerning safeguard duty on imports of solar cells and modules, the government had slapped duties on imports of solar cells (on assembled modules or panels) of between 15 per cent and 25 per cent since July 2018.

- Industry players, however, maintain that the duties have failed to stem the tide, with the Indian Solar Manufacturers Association contending that Chinese manufacturers have, in turn, reduced their prices.

India’s solar power ambition

The government has a target of 175 GW of installed clean energy capacity by March 2022, of which 100 GW is expected to be solar. Over the last five years, solar power has seen its installed capacity grow around 12 times to over 31 GW, according to Central Electricity Authority data.

About Photovoltaic (PV) cell

A photovoltaic (PV) cell, commonly called a solar cell, is a non-mechanical device that converts sunlight directly into electricity. Some PV cells can convert
artificial light into electricity.

Solar photovoltaic cells are grouped in panels (modules), and panels can be grouped into arrays of different sizes to produce small to large amounts of electricity, such as for powering water pumps for livestock water, for providing electricity for homes, or for utility-scale electricity generation.

**Applications of photovoltaic systems**

The smallest photovoltaic systems power calculators and wristwatches. Larger systems can provide electricity to pump water, to power communications equipment, to supply electricity for a single home or business, or to form large arrays that supply electricity to thousands of electricity consumers.

**Some advantages of PV systems are:**

- PV systems can supply electricity in locations where electricity distribution systems (power lines) do not exist, and they can also supply electricity to an electric power grid.
- PV arrays can be installed quickly and can be any size.
- The environmental effects of PV systems located on buildings is minimal.