

 **5th lesson: energy security****1. Development of the concept “energy security”:**

In the first half of the 20th century, and particularly during the second World War, the concept of energy security was strictly related to securing supplies of fuel for the army. In the post-war period, the importance of supplies to the army, especially oil supplies, did not decrease. In addition, oil has become the primary energy carrier in many sectors of the economy in developed countries. Industrialized countries did not produce enough oil to meet their own needs. Hence, oil was imported mainly from developing countries.

For that reason, energy security focused on securing oil supplies for a long time. In this regard, energy security was conceptualized by political analysts within a single strategy that merged peaceful diplomacy and war into a complementary whole. Over time, the security of the oil supply became an important focus of interest for China, India, and other fast-growing economies, leading to increased competition for resources.

Such a perception of energy security in the second half of the 20th century was influenced by the significant dependence of the global economy (especially transport) on oil and its limited resources. In addition, the increase in demand from rapidly developing countries, especially China and India, can lead to increased price volatility and, as a result, long-term price increases. An additional risk factor in oil supplies is the concentration of most of the known resources in a small number of countries, mainly in the Middle East and in the countries of the former Soviet Union.

In the 21st century, concerns over energy supply, in addition to oil, have grown for the supply of natural gas. This problem mainly affects the Eurasian market. Concerns about the stability of supplies must be taken into account not only by consumers, but also exporters of energy raw materials. The economies of countries exporting energy raw materials are exposed to price fluctuations which destabilize their export revenues. Since the traditional challenges connected with ensuring a sufficient supply of energy carriers, especially oil and gas, did not change fundamentally, they remained at the heart of energy security programs in an unchanged form for the majority of the 20th century. Energy security is one of the fundamental conditions for economic development. As energy demand is growing much faster at the present stage of society's development than in the past, energy security has become an indispensable component of national security. Owing to its key significance, energy security is an importance factor in shaping international relations.

2. Defining energy security:

No concrete definition of energy security has emerged from the literature, but definitions have evolved over time. Several papers trace the origins of interest in energy security back to the oil shocks of the 1970s, and cite this as a reason for much of the energy security debate being focused on security of supply, and specifically the security of the oil supply (and more recently, gas).

The definition of energy security has expanded beyond the initial focus on security of supply to include a wider range of factors, often referred to as the “four As” of energy security –availability, affordability, accessibility and acceptability.

- Availability ensures that energy supplies are available in sufficient amounts.
- Affordability aims to have these resources available at sufficiently-low prices.
- Accessibility focuses on ensuring all citizens have access to energy, which is to some extent about ensuring that reliable infrastructure is in place to ensure a robust supply for the end user, but this is generally interpreted in practice as ensuring that energy prices are kept low and fuel poverty is minimised.
- Acceptability is concerned with the negative impacts of energy, such as pollution and environmental damage, and ensuring that these impacts are minimised in order to make the energy acceptable to the customer.

Mitchell et al. define energy security as a property of energy systems, which are vulnerable to a range of risks that shift with time and location, requiring a range of strategies for the resilience of the energy system as a whole. They identify four key aspects: stability (the ability to cope with internal shocks, e.g. infrastructure failure), resilience (the ability to deal with external shocks, e.g. supply disruptions), durability (the ability to cope with long-term internal stresses, e.g. increased demand) and robustness (the ability to cope with long-term external stresses, e.g. resource depletion).

The IEA defines energy security as the uninterrupted availability of energy sources at an affordable price. Energy security has many aspects: long-term energy security mainly deals with timely investments to supply energy in line with economic developments and environmental needs. On the other hand, short-term energy security focuses on the ability of the energy system to react promptly to sudden changes in the supply-demand balance.

One reason for the diversity of definitions is that stakeholders have different perspectives on energy security. It has different meanings in different markets; for example, energy security means different things for the gas market than it does for the electricity market, and more generally means different things to producers, consumers, countries, companies, policymakers and other stakeholders.

3. Threats to a nation's energy security:

Threats to a nation's **energy security** include:

- Political/Domestic instability of major energy-producing countries.
- Reliance on foreign countries for oil.
- Manipulation of energy supplies (e.g. mega-corporation or state-backed racketeering).
- Competition over energy sources (e.g. biofuel (biodiesel, bioethanol) vs oil(crude, distilled fuel) vs coal vs natural gas vs nuclear vs wind vs solar vs hydro(dam, pumped)).

- Unreliable energy stores (e.g. long time to spin a turbine to create power, or Li-ion battery grid explosion, or pumped hydro dam becoming clogged).
- Attacks on supply infrastructure (e.g. hackers stopping flow pumps inside a pipeline).
- Accidents (e.g. shoddy weld causing debris buildup in a pipeline).
- Natural disasters (e.g. wind turbine collapsing from a major earthquake).

4. Measures to increase energy security:

Long-term measures to increase energy security centre on reducing dependence on any one source of imported energy, increasing the number of suppliers, exploiting native fossil fuel or renewable energy resources, and reducing overall demand through energy conservation measures. It can also involve entering into international agreements to underpin international energy trading relationships.

There are several key strategies governments and policymakers can pursue to enhance a country's energy security:

- **Diversify energy sources:**
 - Develop a mix of energy sources, including fossil fuels, nuclear power, and renewable energy (solar, wind, hydroelectric, geothermal, etc.).
 - Reduce reliance on any single source or supplier to mitigate supply disruption risks.
- **Improve energy efficiency:**
 - Implement policies and programs to encourage energy efficiency in homes, buildings, industries, and transportation.
 - Invest in technologies and infrastructure that reduce energy waste and consumption.
- **Invest in energy infrastructure:**
 - Upgrade and maintain electricity grids, pipelines, refineries, and other energy distribution networks.
 - Develop storage facilities for energy resources like natural gas and oil.
 - Expand renewable energy generation and transmission capabilities.
- **Enhance domestic production:**
 - Develop and utilize domestic energy resources, such as oil, natural gas, and renewable sources.
 - Reduce reliance on energy imports by increasing self-sufficiency.
- **Diversify energy supply routes and trading partners:**
 - Establish multiple supply channels and trading partners to reduce vulnerability to disruptions.
 - Develop strategic reserves of energy resources.
- **Promote research and innovation:**
 - Invest in research and development of new energy technologies, such as advanced renewable energy, energy storage, and carbon capture and sequestration.

- Support the development of a skilled workforce in the energy sector.
- **Implement energy security policies and regulations:**
- Establish policies, laws, and regulations to ensure the reliable, affordable, and sustainable supply of energy.
- Coordinate energy security strategies across different government agencies and stakeholders.
- **Enhance international cooperation:**
- Collaborate with other countries on energy security issues, such as joint infrastructure projects and energy trade agreements.
- Participate in international organizations and initiatives focused on energy security.

By pursuing a combination of these strategies, countries can work towards enhancing their energy security and reducing their vulnerability to energy supply disruptions and price volatility.

5. The difference between energy geopolitics and energy security:

The main difference between energy geopolitics and energy security is:

- **Energy Geopolitics:**
- Focuses on the strategic and political aspects of energy resources and supply.
- Looks at how countries and regions use their energy resources as a source of power, influence, and leverage in international relations and global politics.
- Examines things like resource nationalism, energy trade disputes, and the use of energy as a tool of foreign policy.
- Considers how the global distribution and control of energy resources shapes the balance of power between nations.
- **Energy Security:**
- Focuses on ensuring a reliable, affordable, and sustainable supply of energy for a country or region.
- Looks at issues like fuel diversification, supply chain resilience, infrastructure protection, and managing energy demand.
- Aims to minimize disruptions, price volatility, and the vulnerability of a country's energy systems.
- Considers both short-term risks (e.g. supply shocks) and long-term challenges (e.g. energy transition).

In summary, energy geopolitics is more about the strategic use of energy for international influence, while energy security is more about ensuring a stable and reliable energy supply.