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TOPIC A: Energy transition to renewable energy sources in developing countries.

The transition to renewable energy sources in developing countries is an increasingly vital topic in the context of climate change and global sustainability efforts. As nations strive to reduce their reliance on fossil fuels, renewable energy—such as solar, wind, and hydroelectric power—provides a promising alternative to help mitigate greenhouse gas emissions.

However, developing countries often encounter unique challenges in this transition. Limited access to financial resources is a significant barrier; according to the International Renewable Energy Agency (IRENA), these countries will require an estimated \$1 trillion annually until 2030 to transition to sustainable energy systems. Many governments lack the budgetary flexibility to make substantial investments in renewable technologies. Additionally, deficiencies in existing energy infrastructure complicate efforts to integrate renewable systems. The World Bank estimates that over 770 million people globally lack access to electricity, predominantly in sub-Saharan Africa and South Asia, highlighting the urgent need for improved infrastructure.

Moreover, a shortage of skilled labor and technical expertise hampers the development and maintenance of renewable energy systems. In countries like Afghanistan and Haiti, the need for trained personnel in renewable technologies is critical to ensuring sustainable energy solutions. Regulatory frameworks also pose challenges; many developing nations have environments that are not conducive to renewable energy investments. Unclear policies or bureaucratic obstacles can deter foreign investment and slow down the implementation of renewable projects. Lastly, heavy reliance on fossil fuels can create political and economic resistance to transitioning to renewables. For instance, in Nigeria, the oil industry significantly influences the economy, complicating the shift toward renewable energy.

Despite these challenges, developing countries possess substantial potential for renewable energy. Regions with high solar irradiance can capitalize on solar power; for example, Kenya's investments in solar mini-grids have provided energy access to over 2 million people, with the government aiming to generate 100% of its electricity from renewable sources by 2030. Similarly, South Africa has made significant strides in harnessing wind energy through its Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), attracting over \$14 billion in investments and adding 6,422 MW of renewable capacity.

Countries with abundant water resources can leverage hydropower effectively. Ethiopia's Grand Ethiopian Renaissance Dam, once completed, is expected to produce over 6,000 MW of electricity, significantly boosting the country's power supply and exports.

Transitioning to renewable energy in developing countries is crucial not only for climate objectives but also for socioeconomic development. Increasing renewable energy access can dramatically improve living conditions. For instance, the



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deployment of solar home systems in rural Bangladesh has helped over 4 million households gain access to electricity, enhancing quality of life and economic opportunities. The renewable energy sector is also labor-intensive and can create numerous jobs; according to IRENA, the renewable energy sector employed 12 million people globally by 2020, with developing countries accounting for a significant portion of this workforce.

Moreover, the shift to cleaner energy sources can lead to public health improvements by reducing air pollution linked to respiratory diseases. A study in India found that transitioning to renewable energy could prevent approximately 1.1 million deaths annually by reducing air pollution from fossil fuel combustion.

1. What financing models can be developed to support renewable energy projects in developing countries?
2. How can developed countries help transfer renewable energy technologies to developing countries?
3. How can local communities be better involved in planning and developing renewable energy projects?
4. How can better policies be better at promoting renewable energy sources in developing countries?

<https://www.worldbank.org/en/news/feature/2023/05/16/breaking-down-barriers-to-clean-energy-transition>

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<https://iap.unido.org/articles/promoting-global-sustainability-investing-energy-transition-on-developing-countries>

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