

Government Policies to Accelerate 100% Renewable Energy Transition

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Received: 30/05/2026 Accepted: 30/06/2026 Published: 30/07/2026

Abstract:

Switching to renewable energy is necessary for long-term sustainability and climate change mitigation. Even though solar, wind, and hydropower are more efficient and cost-effective, governments worldwide must collaborate to move to renewable energy. Government policies can accelerate this transformation by setting laws, incentives, and structures to promote renewable energy systems. the role of feed-in tariffs, subsidies, tax incentives, and renewable energy legislation in easing the switch to renewable electricity. importance of including renewable energy targets in energy plans, stimulating commercial investment, and addressing energy storage, grid integration, and infrastructure challenges. The article emphasizes policy alignment and international cooperation to meet global renewable energy targets. This report analyzes case studies from nations that have made significant progress toward 100% renewable energy to identify the main policy drivers that can accelerate the global transition to a sustainable, renewable-powered future. Strong, consistent, and future-oriented government policies are needed to reach 100% renewable energy and build a sustainable, low-carbon energy system.

Keywords: Government Policies, 100% Renewable Energy, Climate Change Mitigation, Renewable Energy Transition

Introduction:

Using only renewable energy is one of the best ways to fight climate change. Due to rising temperatures, environmental deterioration, and fossil fuel depletion, conventional, carbon-intensive energy sources must be replaced immediately. Renewable energy—derived from water, wind, and sunlight—is clean, sustainable, and practically inexhaustible. A complete switch to renewable energy requires more than financial and technological expenditures. Countries must collaborate to create the laws, regulations, and structures that will promote renewable energy. Government legislation is crucial to utilize entirely renewable energy. Their regulations can boost or hinder renewable energy growth. Subsidies, tax cuts, and feed-in tariffs lower project costs and increase clean electricity availability. Governments must also set transparent renewable energy standards, include energy storage alternatives, solve infrastructure issues, and stimulate system modernization to efficiently create, store, and distribute renewable energy. The intermittent nature of renewable sources, the need for massive infrastructure projects, and the advancements in renewable energy technology make it difficult to fully integrate renewable energy into our energy systems. Government intervention is needed to solve these issues. For a renewable energy future to succeed, regulations must foster

innovation, long-term planning, and private sector investment. Renewable energy accounts for 100% of the world's energy consumption, hence international cooperation is essential. Government policies are crucial to accelerating the switch to renewable energy. This paper will evaluate current policy frameworks, successful case studies, and their prospects and challenges to accelerate the transition to a sustainable, low-carbon energy future.

Policies to Support Renewable Energy

Government policies can accelerate the transition to renewable energy by improving market conditions, decreasing financial risks, and tackling technological and infrastructure issues. Regulatory frameworks and financial incentives can promote renewable energy technology development, competitiveness, and long-term viability. This section discusses some of the most important policy instruments governments may employ to promote renewable energy.

1. Subsidies and Tax Incentives

Subsidies, tax credits, and refunds are strong renewable energy development tools. These methods reduce initial capital expenditures, making renewable energy systems more affordable for consumers and businesses.

- **Investment Tax Credits (ITC):** Renewable energy developers can use these credits to reduce their federal tax liability for a portion of the cost of renewable energy system installation. In order to attract investment and lower the initial cost of solar installations, the ITC has been extensively utilised by the solar energy sector.
- **Production Tax Credits (PTC):** Power from renewable sources can earn you a credit at a rate of one penny per kilowatt-hour under the PTC. This approach promotes the functioning and profitability of renewable energy facilities over the long term, which is particularly helpful for wind power projects because it directly rewards electricity generation instead of installation.
- **Subsidies for Renewable Energy Technologies:** Renewable energy technologies, including solar panels, wind farms, and energy storage, can be directly subsidised by governments. By providing financial incentives, we can scale up the deployment of renewable technology while simultaneously reducing their adoption costs.

2. Feed-in Tariffs and PPAs

Market mechanisms like feed-in tariffs (FITs) and power purchase agreements help renewable energy providers win long-term contracts.

- **Feed-in Tariffs (FITs):** FITs provide a set amount for every kilowatt-hour of renewable energy produced, usually spread out over fifteen to twenty years. Investments in renewable energy projects are made more appealing by this system, which ensures a steady and predictable income for renewable energy producers. By providing pricing consistency over the long term, regardless of market fluctuations, FITs can promote broad adoption.
- **Power Purchase Agreements (PPAs):** Power purchase agreements (PPAs) spell out the terms and conditions for the sale of renewable energy from generators to consumers, which are typically large corporations or utilities. PPAs aid in the acquisition of funding

for renewable energy projects while also providing a reliable source of income for those projects. With this technique, renewable energy may be more easily integrated into the grid, and it works especially well for large-scale projects.

3. Mandates for Renewable Energy

Renewable energy standards (RES) or renewable portfolio requirements require an electric utility to use a specific amount of renewable power by a certain date. These laws, frequently backed by fines or penalties for non-compliance, are essential for include renewable energy projects in the country's energy mix.

- **Renewable Energy Standards (RES):** A country's energy generation must meet a certain percentage from renewable sources according to these rules. Utilities are incentivised to invest in renewable technology by governments that establish objectives for renewable energy generation. This is because utilities are aware that they will be compelled to reach these requirements.
- **Renewable Energy Certificates (RECs):** Utilities and energy providers in RES-enforced markets must buy renewable energy certificates in order to verify compliance. One way to encourage the production of renewable energy is through the sale of certificates that indicate certain amounts of generated energy.

4. Net Metering, Feed-in Premiums

Net metering and feed-in premiums provide financial incentives for renewable energy producers.

- **Net Metering:** Power users who generate their own renewable energy (for instance, from solar panels on their roofs) can now receive utility bill credits for the amount of energy they return to the grid. Net metering is a widely supported policy in many locations since it promotes the generation of renewable energy by individuals and communities while helping to cover the initial expenses of installation.
- **Feed-in Premiums:** Producers of renewable energy who are already earning market pricing for their energy can receive additional money in the form of feed-in premiums. Renewable energy is now more competitive with traditional energy sources because to this approach, which helps renewable energy providers by adding a premium to the market price.

5. Government grants, research funding

R&D and demonstration projects are the only way to advance and lower the cost of renewable energy. Government subsidies and public-private collaborations are vital to R&D.

- **Research and Development (R&D) Grants:** The creation or improvement of renewable energy technology might receive financial backing from governments. To cut costs and increase efficiency of renewable energy systems, funds could be devoted towards research on energy storage, offshore wind turbines, or next-generation solar cells.
- **Public-Private Partnerships (PPPs):** Through public-private partnerships (PPPs), governments and businesses can work together to build renewable energy projects on a

grand scale or to help bring novel energy technologies to market. Effective development and deployment of new technologies can be achieved by the pooling of resources and the sharing of risks through such collaborations.

6. Carbon Pricing and Emissions Trading Systems

Carbon pricing, which can take the form of carbon taxes or cap-and-trade systems, is a policy tool for lowering emissions of carbon dioxide.

- **Carbon Taxes:** To encourage companies and individuals to switch to greener energy sources, a carbon tax places a price on the amount of carbon in fossil fuels. A growing number of people will choose to use renewable energy sources since carbon taxes raise the price of fossil fuels, which makes them less affordable.
- **Cap-and-Trade Systems:** Governments implement cap-and-trade systems when they limit overall emissions and enable businesses to trade emissions permits. Businesses will have an economic incentive to invest in low-carbon technology and renewable energy sources in order to lower their emissions.

7. Climate Agreements and International Plans

The Paris Agreement and other climate accords accelerate the global transition to renewable energy. Setting objectives to reduce greenhouse gas emissions and enhance renewable energy in national energy mixes holds governments worldwide to their sustainable energy promises.

International Climate Agreements: Multilateral agreements may support renewable energy uptake politically and economically. International treaties set mandated emission reduction targets and encourage government collaboration on renewable energy.

Many policies can accelerate the switch to renewable energy, but government policies are crucial. Lowering barriers to renewable energy adoption and instituting feed-in tariffs, subsidies, tax incentives, renewable energy regulations, and research and development funding can help clean energy technology flourish quickly. These policies boost the energy sector and reduce renewable energy's financial risks. Governments must tweak and improve these policy tools to make the changeover to renewable energy and overcome new challenges.

Conclusion:

Government policies are crucial to the renewable energy transition. Carbon pricing, feed-in tariffs, renewable energy requirements, and subsidies can help governments promote renewable energy. These steps reduce financial barriers and ensure that renewable energy will meet our energy needs long-term. Even with high initial investment costs and grid connectivity, the right policy environment can encourage investment, innovation, and market expansion. Supporting policy adoption boosts private sector involvement, public-private collaborations, and technical progress. Successful case studies illustrate that governments with substantial and long-term renewable energy projects reduce emissions, improve energy security, and create sustainable energy systems. Governments must improve policies, encourage innovation, and remove barriers to renewable energy's scalability to assure a renewable future. Finally, moving to renewable energy sources altogether entails technology, policy, and governance issues.

Strong, consistent, and forward-looking government policies are needed to advance this transition and create a sustainable, low-carbon future.

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