



Working Paper 2026.1.4.2

- Vol. 1, No. 4

**TRIỂN KHAI CƠ CHẾ BIỂU GIÁ ĐIỆN HỖ TRỢ VÀ CÁC CHÍNH SÁCH VỀ
GIÁ NHẪM THỨC ĐẨY PHÁT TRIỂN NĂNG LƯỢNG MẶT TRỜI: TRƯỜNG
HỢP TRUNG QUỐC VÀ BÀI HỌC CHO VIỆT NAM**

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Tóm tắt

Quá trình chuyển dịch năng lượng toàn cầu, dưới tác động của tình trạng bất an ninh năng lượng gia tăng và biến đổi khí hậu, đã khiến năng lượng tái tạo trở thành yếu tố trung tâm trong việc đạt được mục tiêu phát thải ròng bằng 0 (Net Zero). Trong số các công cụ chính sách, chính sách biểu giá điện hỗ trợ (Feed-in Tariff – FiT) đã đặc biệt có ảnh hưởng tại các nền kinh tế mới nổi như Trung Quốc và Việt Nam. Nghiên cứu này đánh giá hiệu quả của FiT trong việc thúc đẩy phát triển năng lượng mặt trời, sử dụng Trung Quốc như một trường hợp so sánh nhằm rút ra bài học cho Việt Nam. Dựa trên các tài liệu chính sách, báo cáo quốc tế và các nghiên cứu học thuật gần đây, phân tích cho thấy FiT đã thúc đẩy mạnh

mẽ việc triển khai điện mặt trời trong giai đoạn đầu, nhưng đồng thời cũng tạo ra một số thách thức như quá tải lưới điện, tổn động trợ cấp và hiệu quả cận biên suy giảm. Việc Trung Quốc chuyển từ cơ chế FiT sang các cơ chế định hướng thị trường hơn, bao gồm Phụ phí giá điện (Feed-in Premiums), đấu thầu cạnh tranh, và Hợp đồng chênh lệch giá (Contracts for Difference), mang lại những bài học quan trọng cho Việt Nam. Từ đó, ghiên cứu cho rằng trong giai đoạn chính sách tiếp theo, Việt Nam nên áp dụng cơ chế định giá minh bạch, đầu tư nâng cấp lưới điện, và đảm bảo các chương trình hỗ trợ có tính bền vững về tài khóa nhằm xây dựng một thị trường điện mặt trời cạnh tranh và có khả năng chống chịu cao.

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IMPLEMENTING FEED-IN TARIFF (FIT) AND PRICING POLICIES TO PROMOTE SOLAR ENERGY DEVELOPMENT: THE CASE OF CHINA AND LESSONS FOR VIETNAM

Abstract

The global energy transition, shaped by rising energy insecurity and climate change, has made renewable energy central to achieving Net Zero. Among policy tools, the Feed-in Tariff (FiT) has been especially influential in emerging economies like China and Vietnam. This paper assesses the effectiveness of FiT in promoting solar energy, using China as a comparative case to derive lessons for Vietnam. Based on policy documents, international reports, and recent academic studies, the analysis shows that FiT accelerated early solar deployment but also created challenges such as grid congestion, subsidy backlogs, and declining marginal efficiency. China's shift from FiT to more market-oriented mechanisms, including Feed-in Premiums, competitive auctions, and Contracts for Difference, provides important insights for Vietnam. The paper argues that Vietnam's next policy phase should adopt transparent pricing, invest in grid upgrades, and ensure fiscally sustainable support schemes to build a resilient and competitive solar energy market.

Keywords: Feed-in Tariff, solar power, China, Vietnam, renewable energy

1. Introduction

The global energy crisis, coupled with the escalating impacts of climate change, has underscored the urgent need to transition toward a clean, secure, and sustainable energy system. To achieve net-zero emissions and limit global warming to below 1.5°C, the international community recognizes renewable energy as the cornerstone of decarbonization pathways. In particular, solar and wind power have emerged as central pillars in these transitions due to their scalability, rapid deployment potential, and sharp cost reductions over the past decade (IEA, 2021a; IPCC, 2021).

In this context, many countries, particularly across Asia, have implemented Feed-in Tariff (FiT) schemes as a primary policy tool to accelerate renewable energy deployment. The FiT mechanism guarantees renewable power producers a fixed long-term purchase price for each kilowatt-hour (kWh) supplied to the grid, thereby reducing revenue uncertainty and encouraging investment (Mendonça, 2007; IEA, 2021a). Countries such as China and Vietnam adopted FiT

mechanisms to attract private investment and promote rapid expansion of solar and wind energy during the early stages of market development (Government of Vietnam, 2017)

However, an essential policy question arises: **to what extent has the FiT mechanism proven effective in practice?** And, crucially, what lessons can Vietnam, having already implemented FiT for solar power, learn from China and other leading countries to design more market-oriented mechanisms such as Feed-in Premiums (FiP), competitive auctions, or Contracts for Difference (CfDs)? The effectiveness of FiT depends not only on the level of tariff levels but also on institutional capacity, grid infrastructure, and the ability to balance investment incentives with fiscal sustainability (IRENA, 2018; Couture et al., 2010).

This study focuses specifically on solar energy, which has become a priority sector due to its technological maturity, rapidly falling costs, and vital role in meeting Net Zero commitments (IEA, 2021b). By examining the design, implementation, and outcomes of FiT in China and Vietnam, the paper aims to identify key success factors, structural weaknesses, and actionable policy lessons for Vietnam's upcoming transition toward competitive and sustainable renewable energy markets.

2. Theoretical Analysis Framework

2.1 Definition of Feed-in Tariff (FiT)

A Feed-in Tariff (FiT) is a policy mechanism designed to encourage the development of renewable energy by guaranteeing renewable power producers a fixed, long-term, and preferential purchase price for the electricity they supply to the national grid. According to Mendonça (2007), FiT is one of the most effective policy instruments for stimulating investment in clean energy technologies, as it reduces investors' financial risk and ensures capital recovery. Similarly, the International Energy Agency (IEA, 2021c) defines FiT as “a policy that requires utilities or system operators to purchase electricity from renewable energy sources at a fixed government-determined price, usually over a period of 15 – 20 years.” This mechanism not only increases the installed capacity of renewable energy but also helps diversify the energy mix and promote technological innovation (IRENA, 2019). In many countries, FiT policies have played a critical role in the early stages of energy transition by accelerating renewable capacity deployment and attracting private investment.

2.2 Competitive Bidding (Auction) Mechanism

The competitive auction (or tender) is another market-based policy tool for renewable energy development. Under this mechanism, government authorities announce a target capacity or generation volume to be developed, and investors compete by offering the lowest bid price or the most favorable technical–financial terms. The goal is to select cost-effective projects, reduce fiscal burdens, and promote fair market competition (Ngadiron & Radzi, 2016; IRENA, 2015). According to Ngadiron & Radzi (2016), auctions help governments avoid investment booms, a common outcome of fixed FiT schemes, while revealing the true cost of renewable technologies.

Auctions are inherently market-based mechanisms, as support prices depend on investors' bids rather than government-set tariffs. Regulators typically determine the capacity cap and select winners based on the lowest bids or specific technical criteria (IRENA, 2015). Successful bidders then sign Power Purchase Agreements (PPAs) at their bid price (pay-as-bid) or a uniform clearing price (uniform-price model). For example, early auction rounds in several Chinese provinces demonstrated substantial price reductions compared with previous benchmark tariffs, highlighting the role of auctions in lowering renewable electricity costs.

The primary advantage of auctions lies in price discovery, which reveals the true market cost of renewable technologies and reduces the need for subsidies. According to IRENA (2020a), auctions have enabled record-low renewable electricity prices globally. Moreover, the mechanism allows governments to control capacity growth and reduce fiscal burdens (OECD, 2021). However, a key drawback is underbidding, where investors offer excessively low prices to win contracts but later fail to implement projects due to insufficient profitability. This issue has been observed in several renewable energy markets, including China, where experts warned that overly low bids might affect project quality and timelines (IENE, 2025). Furthermore, auctions require high transparency and strong administrative capacity to ensure fairness and effective implementation (The Asset, 2025).

In summary, while FiT policies provide stable and predictable prices that reduce investment risks and accelerate early renewable expansion, they may also generate fiscal burdens when capacity growth outpaces grid development (OECD, 2019). In contrast, auction mechanisms offer greater cost efficiency and better reflect market conditions.

2.3 Socio-Economic Context Theory

Socio-Economic Context Theory emphasizes that policymaking processes are embedded within specific social and economic contexts, which significantly shape policy design and outcomes

(Blomquist, 2015). Socio-economic conditions influence how policy problems are defined, the resources available to policymakers, and the range of feasible policy instruments. To analyze these influences systematically, contextual factors can be organized into three analytical levels:

First, at the macro level, relatively stable parameters represent foundational conditions that change slowly and shape the long-term policy environment. These include institutional structures, legal systems, cultural values, and the distribution of natural resources (Sabatier & Weible, 2007).

Second, at the meso level, external system events and conditions may trigger policy change in the medium term. These include shifts in economic growth, public opinion, technological progress, or changes in governing coalitions (Howlett et al., 2012).

Third, at the micro level, the policy subsystem represents the immediate arena where actors interact and compete to influence policy outcomes. This level includes policy networks, interest groups, and institutional rules governing decision-making processes (Ostrom, 2007; Sabatier & Weible, 2007).

This analytical framework helps explain how differences in socio-economic contexts influence the design and effectiveness of renewable energy policies across countries.

2.4 The Theory of Latecomers

The Theory of Latecomers suggests that late-developing countries can accelerate their development by learning from the experiences of early industrializers and adopting advanced technologies without undergoing the same intermediate stages (Gerschenkron, 1962). This concept, often described as the “advantage of backwardness,” argues that latecomers can benefit from accumulated technological and institutional knowledge. However, Gerschenkron emphasized that technological catch-up requires more than simply importing machinery. Technology is often embedded in tacit knowledge, organizational practices, and production capabilities. Therefore, effective technology transfer requires learning-by-doing and gradual capability building. Building on this idea, Amsden (2001) argued that late-industrializing economies often require active state intervention to support emerging industries. Policies such as subsidies, preferential credit, or guaranteed prices can create space for domestic firms to learn and build capabilities.

In the renewable energy sector, FiT policies illustrate this strategy by guaranteeing above-market prices to reduce investment risks, attract capital, and encourage technological learning. From this perspective, Vietnam’s renewable energy policy development can be understood as a process

of learning from China's experience, allowing Vietnam to design more efficient policy instruments while avoiding earlier policy mistakes.

2.5 Polity – Politics – Policy

The Polity–Politics–Policy framework provides a comprehensive perspective for analyzing policymaking processes. It enables a comprehensive analysis of how institutional structures, political dynamics, and policy instruments interact in shaping renewable energy policy development. In comparative policy studies, similar institutional approaches have been widely used to explain cross-country policy differences. For example, Steinmo et al. (1992) demonstrate how institutional arrangements shape political behavior and influence policy outcomes across different political systems. Likewise, Howlett et al. (2014) emphasize that understanding public policy requires examining the interaction between institutional contexts, political actors, and policy instruments.

Polity refers to the institutional structures and legal frameworks that shape policymaking environments (Steinmo, 2008). Institutional arrangements influence how policy instruments such as FiT or auctions are adopted and implemented.

Politics refers to the dynamic processes of negotiation, competition, and coalition-building among policy actors. According to the Advocacy Coalition Framework, policymaking involves competition among coalitions with different beliefs and interests (Sabatier & Jenkins-Smith, 1988).

Policy represents the concrete outcomes of political processes. Policies combine specific goals with policy instruments designed to achieve them (Howlett et al., 2014).

The main advantage of the this framework is that it provides a structured lens for comparative analysis by linking institutions, political processes, and policy outcomes. However, its limitation is that it functions primarily as an analytical classification rather than a causal model, which may make it less precise in identifying specific mechanisms of policy change. In both China and Vietnam, FiT policies initially functioned as market-creation instruments that stimulated rapid growth in solar energy deployment. However, declining renewable technology costs and increasing fiscal pressures have led governments to gradually transition toward more competitive mechanisms such as auctions.

3. Comparative analysis with the case of China and the case of Vietnam

3.1 Overview of the case of China

The Feed-in Tariff (FiT) policy in China was established in the context of the country accelerating its energy transition and carbon emission reduction to meet international climate commitments. The institutional framework managing the FiT policy was coordinated by the National Development and Reform Commission (NDRC) and the National Energy Administration (NEA), in cooperation with local governments and electricity sector enterprises. Over more than a decade of implementation, China's FiT policy evolved through two major stages.

The first period (2006–2011) was the initial stage following the enactment of the Renewable Energy Law, during which several pilot solar projects received fixed purchase prices. Although there was no unified national tariff framework, this period established the legal and institutional foundations for the future FiT system (Ye et al., 2017).

The second period (2011–2018) marked the official nationwide implementation of FiT. According to the IEA (2021c), the NDRC introduced the first national FiT rate in July 2011 at 1.15 CNY/kWh for projects approved before July 1, 2011 and operational before December 31, 2011. The tariff was later adjusted by solar resource zones (0.9–1.0 CNY/kWh) to reflect regional differences in solar potential. This period saw rapid expansion of solar projects, strong participation of domestic enterprises, and the development of a national PV supply chain, enabling China to become the global leader in installed solar capacity.

From 2019 onward, China gradually shifted toward market-oriented pricing mechanisms, particularly competitive bidding, to improve efficiency and reduce fiscal pressure (World Bank, 2020). Subsidy-free solar projects were piloted, while FiT rates were reduced and project capacity increasingly allocated through auctions (NDRC, 2019a). Projects achieving grid parity were exempt from capacity limits, helping reduce pressure on the Renewable Energy Development Fund as solar costs declined. In parallel, China introduced a Renewable Portfolio Standard (RPS) with mandatory provincial renewable consumption targets, strengthening demand-side incentives in an increasingly competitive electricity market (NDRC, 2019b; World Bank, 2020).

These reforms reflect China's transition from FiT-based subsidies toward market-oriented mechanisms, supported by declining solar generation costs and fiscal constraints (IEA, 2025). Initially, FiT functioned as a market-creation instrument offering high guaranteed prices to attract investment. Since 2019, however, the policy has been gradually restructured through lower tariffs and competitive allocation mechanisms (NDRC, 2019a). As a result, FiT has evolved from a direct

subsidy scheme into a transitional policy tool guiding the renewable sector toward a competitive and subsidy-free market (IEA, 2021d).

3.2 Overview of the Case of Vietnam

Vietnam is among the countries with the highest solar energy potential in Southeast Asia, supported by favorable natural conditions and rapidly growing electricity demand, as rising energy consumption in the country associated with industrialization and urbanization has increased concerns about energy security and dependence on fossil fuel imports (World Bank, 2025; IRENA, 2023).

Solar power development accelerated significantly in 2017, when Vietnam introduced a FiT under Decision No. 11/2017/QD-TTg, which set a purchase price of 9.35 US cents/kWh for 20 years. This policy reduced investment risk and rapidly increased installed solar capacity to approximately 5 GW by 2019, far exceeding initial planning targets (Sanseverino et al., 2020; IRENA, 2021). The subsequent policy Decision No. 13/2020/QD-TTg introduced differentiated FiT levels by project type, sustaining market growth and increasing installed solar capacity to over 18 GW by the end of 2023, making Vietnam the largest solar market in Southeast Asia (Vietnam Briefing, 2024).

However, the nationwide application of relatively uniform FiT rates, combined with limited coordination between pricing policy and grid planning, led to spatial concentration of projects and grid congestion, causing significant curtailment after 2019 (World Bank, 2021). After 2020, Vietnam began exploring more market-based pricing mechanisms, but the transition has been slow and characterized by legal uncertainty. Many projects have struggled to secure long-term Power Purchase Agreements (PPAs), weakening investor confidence (Reuters, 2025a; Reuters, 2025b).

Overall, Vietnam's solar development reflects a typical latecomer pattern: rapid expansion driven by FiT policies followed by challenges in grid integration and policy adjustment. While FiT effectively stimulated early market growth, limited regional differentiation and an unclear transition strategy have constrained its long-term effectiveness. These characteristics provide an important basis for comparison with China's more gradual and coordinated FiT reform process.

3.3 Comparison of FiT Implementation and the Policy Transition Process: The Case of China and Vietnam

3.3.1 Polity: Institutional Structure, Long-term National Orientation, and the Structure of the Electricity Sector

a. Institutional structure

From a political–institutional perspective, China and Vietnam both follow a developmental state model, where energy policy is closely linked to national economic development and energy security objectives. However, their institutional arrangements differ significantly.

In China, FiT policies are embedded within a strong legal framework, particularly the Renewable Energy Law (2006), which reduced policy uncertainty and enabled the rapid development of a national solar market (EU–China Energy Cooperation Platform, 2020). The central government, mainly through the NDRC, coordinated planning and implemented regionally differentiated FiT rates to reflect variations in solar resources and project costs across provinces. Tariffs were periodically adjusted, creating a relatively predictable investment environment (IEA–PVPS, 2019). From 2019 onward, China gradually transitioned toward market-based pricing mechanisms to reduce subsidy burdens (TaiyangNews, 2019).

In contrast, Vietnam’s renewable energy governance involves multiple actors, including the Ministry of Industry and Trade (MOIT), the Electricity Regulatory Authority of Vietnam (ERAV), Vietnam Electricity (EVN), and provincial governments, resulting in weaker policy coordination. Vietnam’s FiT scheme was introduced through administrative decisions, notably Decision No. 11/2017/QD-TTg and Decision No. 13/2020/QD-TTg, offering relatively generous and largely uniform tariffs to stimulate investment. However, the nationwide tariff structure created challenges related to grid capacity and project concentration in specific provinces (Sanseverino et al., 2020).

Overall, China’s centralized institutional structure enabled more effective policy coordination and smoother transition toward competitive mechanisms, whereas Vietnam’s fragmented institutional environment has reduced policy consistency.

b. Long-term national orientation

Long-term policy orientation plays a crucial role in providing investment stability for renewable energy development.

China has implemented Renewable Portfolio Standards (RPS) requiring grid companies and electricity retailers to meet annual renewable energy consumption targets (Dong et al., 2019). In addition, solar development is integrated into national Five-Year Plans, which establish clear capacity targets. The 13th Five-Year Plan (2016–2020) aimed to increase solar PV capacity to approximately 110 GW, emphasizing both distributed and utility-scale projects (IEA, 2016). The 14th Five-Year Plan (2021–2025) further strengthened China’s climate commitments, targeting

carbon neutrality before 2060 and more than 1.2 TW of combined wind and solar capacity by 2030 (NDRC, 2021).

In Vietnam, renewable energy development is guided by the Renewable Energy Development Strategy (REDS) approved under Decision No. 2068/QD-TTg (Government of Vietnam, 2015). While the strategy highlights the role of solar energy, Vietnam lacks a dedicated national solar development plan. Solar deployment planning has largely occurred at the provincial level, often focusing on large grid-connected projects rather than distributed systems. This fragmented planning approach may undermine long-term policy coherence (Sanseverino et al., 2020).

Thus, a clear and consistent long-term renewable energy strategy has enabled China to maintain policy credibility during both FiT implementation and the transition toward competitive mechanisms, whereas Vietnam's weaker long-term vision for solar energy has increased policy uncertainty and investor risk.

c. Structure of the electricity sector

China and Vietnam also differ in the structure of their electricity sectors.

China's power sector has undergone major reforms since 2002, when the State Council dismantled the State Power Corporation and established two grid companies – State Grid Corporation of China and China Southern Power Grid – while separating generation into five major generation groups (Oxford Institute of Energy Studies, 2025). Further reforms were introduced in 2015 (Document No. 9) to deepen market competition by reforming grid revenue models and gradually expanding electricity market access (China Energy Portal, 2015). While ownership structures remained largely unchanged, the document redefined system operation by reforming grid revenue models, gradually expanding market access for large consumers, and promoting competition in segments where competition was feasible. This approach aligned with the principles articulated at the Third Plenum of the 18th Communist Party Congress, which emphasized the role of market mechanisms in resource allocation within a framework of strong state coordination (Central Government of the People's Republic of China, 2013; Oxford Institute of Energy Studies, 2025).

By contrast, Vietnam's electricity sector remains largely vertically integrated, with EVN occupying a dominant position across most segments. Prior to 1995, the power sector was entirely state-owned, with three regional power companies managed by the Ministry of Energy. In 1995,

these entities were merged into EVN, separating state management from production and commercial operations. Since 2008, EVN has further consolidated its central role through the establishment of the Electricity Power Trading Company as a single buyer and the operation of the national power system via the National Load Dispatch Center. This structure was reinforced by the creation of five regional power corporations in 2010 and three generation corporations in 2012, although generation entities are intended to be separated from EVN in the long term. Current reforms are guided by Power Development Plan VII (2011), which envisions a fully competitive wholesale and retail electricity market (Asian Development Bank, 2015).

Overall, China's functionally unbundled electricity sector provides greater flexibility for integrating both large-scale and distributed solar PV, whereas Vietnam's vertically integrated structure and single-buyer model may constrain the efficient integration of solar energy into the national power system.

3.3.2 Politics: The market of solar energy, government interventions, and interactions between the government and stakeholders

Overall, politics plays a central and decisive role in shaping the development of the solar PV market in China. In this context, the state acts not only as a regulator but also as a market creator, proactively employing policy instruments to adjust supply–demand relations, shape firm behavior, and mitigate external strategic risks. Prior to 2011, China's solar PV industry was heavily influenced by international markets – particularly Europe – not only in terms of technology and manufacturing capacity but also with respect to product demand. Although China had become the world's leading producer of PV cells by 2007, its domestic market remained underdeveloped, with total installed capacity of only around 140 MW. This imbalance generated significant political–economic pressure on the Chinese government, as high dependence on external markets increased strategic vulnerability for the domestic PV industry.

In response, the Chinese government intervened forcefully through a combination of supportive and regulatory policies aimed at stimulating domestic demand, attracting investment in solar power generation, and building project development capabilities for domestic firms and technical personnel (Le et al., 2022). These state–market interactions laid the foundation for a shift in power from international to domestic markets, contributing to China's emergence as a dominant actor in the global PV supply chain.

By contrast, in Vietnam, the state has primarily played a short-term market-activating role through administrative policy instruments – most notably feed-in tariffs (FiTs) – rather than implementing a coherent and long-term political strategy specifically tailored to the solar PV sector. Vietnam’s solar PV industry has developed much more slowly than those of other countries with comparable solar resource potential. The solar market remains highly dependent on foreign organizations for technology, engineering expertise, and project development capabilities (Sanseverino et al., 2020). Although the Vietnamese government has introduced policy adjustments to promote solar energy, these measures have largely taken the form of short-term political interventions, lacking long-term stability and consistency. As a result, large-scale solar projects tend to respond rapidly to changes in support policies, highlighting the strong influence of government policy signals on market behavior (Le et al., 2022).

Following adjustments to the FiT mechanism, the number of new solar power plant (SPP) projects in 2020 declined sharply compared with 2019, reflecting the market’s high sensitivity to policy risk. Under conditions of policy uncertainty, investors have increasingly shifted toward small-scale rooftop solar (RTS) systems in order to reduce political risk and preserve capital (Le et al., 2022). This pattern reveals an asymmetric relationship between the state and market actors, in which investment decisions are largely reactive to administrative decisions, thereby reinforcing the “policy-driven market” characteristic of Vietnam’s solar PV sector.

Overall, the divergence between China and Vietnam is particularly evident in state–stakeholder interactions. In China, government–enterprise relations are strategic and bidirectional: domestic firms are simultaneously regulated and supported by the state to scale up operations, accumulate capabilities, and integrate deeply into global value chains. In Vietnam, by contrast, interactions between the state and market actors are predominantly asymmetric, with the state exerting strong control over policy design and adjustments, while firms largely remain in a passive, adaptive position vis-à-vis administrative decisions. This dynamic reinforces Vietnam’s characterization as a policy-driven solar PV market, in contrast to China’s model of a state-created market underpinned by industrial capability development.

3.3.3 Policy: The effectiveness of the policy in each context, and future paths for each country’s transitioning process

- a. The effectiveness of the policy in each context

The effectiveness of FiTs in China is clearly demonstrated by their ability to stimulate remarkable growth in solar power deployment despite relatively high production costs. FiTs created a stable and attractive long-term investment environment, enabling China to become one of the world's largest solar energy markets (Ye et al., 2017; World Bank, 2021). Specifically, the FiT policy strongly promoted the development of the national value chain. It helped form a stable domestic market, encouraging domestic enterprises to invest in R&D and expand production of photovoltaic (PV) components (Bai et al., 2024). Additionally, the FiT contributed to creating a stable investment environment and reducing risks for the private sector (Song, 2023) and played an important role in reducing CO₂ emissions and promoting the goal of carbon neutrality by 2060 (RMI, 2024).

However, the rapid growth of the PV industry has also led to several serious problems, including financial burden and subsidy arrears in the renewable energy development fund (Zhu, 2018; (Dong et al., 2021); the phenomenon of power curtailment (Dong et al., 2021;), Sun et al., 2014) and regional disparities in policy effectiveness (Zhang & He, 2013; Baziar & Parsa, 2024).

In Vietnam, FiTs have likewise been recognized as an effective policy tool in triggering the initial boom in solar energy, particularly before a fully developed market mechanism was in place. Numerous studies highlight the pivotal role of FiTs in driving solar capacity growth, attracting investment, and accelerating clean energy project deployment (Do et al., 2021; Le et al., 2022; Nguyen et al., 2023). Nevertheless, policy shortcomings emerged once FiTs expired or were adjusted, including policy uncertainty, financial risks faced by EVN, and disputes related to fixed-price PPAs, undermining investor confidence and market stability, as reports indicate that some investors have even expressed concern over potential retroactive policy changes, which could jeopardize billions of USD in investments and further increase long-term investment risk (Reuters, 2025a; Reuters, 2025b).

b. Future paths for each country's transitioning process

Regarding transition pathways, China has pursued a gradual and sequential shift from FiTs to competitive bidding, with full implementation for solar energy commencing in 2025 (TaiyangNews, 2025). As FiTs imposed significant fiscal pressure on the Renewable Energy Development Fund and reduced resource allocation efficiency (World Bank, 2021), China entered a renewable pricing reform phase beginning in 2019. Through the NDRC and NEA, the central government mandated competitive bidding for solar projects to determine support prices, while

promoting subsidy-free projects in regions that had achieved or approached grid parity. According to the IEA (2021d), this transition was facilitated by rapid technological cost reductions, allowing the state to gradually withdraw from direct price support and replace it with market-based competition, thereby enhancing economic efficiency and market discipline.

Alongside pricing reforms, China introduced demand-side policy instruments to secure solar power offtake during market liberalization. Specifically, Renewable Portfolio Standards (RPS) were established at regional levels, shifting policy emphasis from supply stimulation to consumption assurance. Both the IEA (2021d) and the World Bank (2021) emphasize that the combination of competitive bidding and consumption obligations has enabled China to sustain renewable expansion while controlling fiscal and system operation risks.

Vietnam, meanwhile, is entering a transition phase with similar strategic orientation but distinct institutional conditions and market maturity. The FiT period (2017–2020) played a critical role in jump-starting the solar market but also exposed limitations related to system costs, grid congestion, and policy uncertainty following FiT expiration. Recognizing these challenges, the Vietnamese government and international organizations have identified competitive bidding as the central post-FiT policy instrument to reduce generation costs and improve allocation transparency (World Bank, 2019)

Beyond auctions, Vietnam has begun developing Direct Power Purchase Agreements (DPPA) to expand market participation and reduce reliance on the single-buyer model dominated by EVN (World Bank, 2019; World Bank, 2023; Government of Vietnam, 2024a). DPPA represents a crucial demand-creation mechanism, allowing large consumers to contract directly with generators, improving risk allocation and enhancing long-term investment attractiveness. In parallel, policies related to energy storage, system flexibility, and grid investment have gained increasing prominence. Notably, PDP8 (Decision No. 500/QĐ-TTg) and its implementation plan (Decision No. 262/QĐ-TTg, 1 April 2024) mark a shift from price-based to system-based policy, prioritizing coordinated generation–grid development and curtailment mitigation (Government of Vietnam, 2024b). PDP8 was subsequently revised by Decision No. 768/QĐ-TTg (15 April 2025), setting battery energy storage capacity targets of 10,000–16,300 MW by 2030 and positioning storage as a core component of renewable integration (Government of Vietnam, 2025; EVN, 2025). Furthermore, the 2024 Electricity Law, effective from February 1, 2025, expands the legal

framework for competitive electricity markets, system operation governance, and infrastructure-linked renewable development (National Assembly of Vietnam, 2024).

Overall, policy transitions in China and Vietnam reflect distinct reform trajectories shaped by institutional conditions, market maturity, and energy transition stages. While China emphasizes price adjustment and consumption discipline, Vietnam's transition centers on system planning, grid investment, energy storage, and expanded trading mechanisms such as DPPA. These differences underscore that policy instruments such as FiTs, auctions, or DPPA cannot be divorced from national institutional contexts; policy lessons for Vietnam therefore require selective adaptation rather than mechanical replication of international models.

4. Lessons for Vietnam

4.1 Institutional Recommendations

From an institutional perspective, the stability of the legal and regulatory environment plays a decisive role in shaping investor confidence. According to latecomer development theory, one major constraint faced by late-developing countries is the tendency toward inconsistent and discontinuous policymaking, which creates regulatory gaps and leads to market stagnation. In Vietnam, delays in institutional transition and legal uncertainty following the expiration of the FiT mechanism prevented many projects from securing long-term power purchase agreements (PPAs), thereby imposing significant financial pressure on investors (Le et al., 2022). More critically, concerns over abrupt policy adjustments may undermine the confidence of international capital flows.

Therefore, Vietnam should consider drawing lessons from China's experience in maintaining policy continuity through long-term planning. As discussed earlier, the Chinese government has designed and implemented successive Five-Year Plans (e.g., the 13th and 14th Plans) that set quantitative targets and pre-announce subsidy reduction schedules, allowing market participants sufficient time to adapt (IEA, 2021d; NDRC, 2021). More specifically, Vietnam should codify commitments related to output, installed capacity, and transition roadmaps into the Electricity Law or subordinate legal documents, rather than relying primarily on short-term administrative decisions. This would help ensure policy continuity during the transition from FIT to competitive auction mechanisms.

Furthermore, China's experience with the implementation of FIT and its subsequent transition to auctions represents a typical case of institutional governance failure caused by

inadequate coordination between spatial planning and infrastructure development, namely the mismatch between power generation expansion and grid capacity. A similar issue has occurred in Vietnam, where the application of a uniform FIT without sufficient consideration of technical constraints led to an excessive concentration of projects in high-irradiation areas such as Ninh Thuan and Binh Thuan, despite later regional adjustments in support levels (EREA & DEA, 2022). As a result, severe grid congestion emerged, forcing curtailment rates of up to 30–40% at certain times. To address this issue, Vietnam needs to establish a more rigorous planning framework under the auction regime, whereby project licensing is conditional on verified grid absorption capacity. Referring to the Chinese model, where the National Development and Reform Commission (NDRC) tightly coordinated generation targets with regional grid capabilities (Ye et al., 2017), it is evident that even under strong government intervention, risks such as uneven distribution of FIT revenues and suboptimal utilization of solar potential may still arise. This underscores the increasing complexity of policy design and institutional governance, which demands deeper and more systematic analysis from policymakers.

4.2 Political Recommendations

According to latecomer state theory, government intervention is necessary to provide an initial push for industrial development, but it must be accompanied by “reciprocal control mechanisms” and a gradual withdrawal of subsidies. This approach emphasizes that the long-term viability of sectors, including electricity and energy should ultimately depend on market forces rather than persistent government intervention (Amsden, 2001). In Vietnam, the single-buyer model dominated by Vietnam Electricity (EVN) offers certain advantages, such as preventing private monopolies and enabling electricity price subsidies. However, as the market expands, this model also generates financial burdens and payment risks for investors (Le et al., 2022).

Accordingly, Vietnam may consider transforming EVN’s role from that of a monopolistic buyer and distributor toward a more regulatory and system-management function, thereby fostering greater competition in the electricity market. Such a shift would help alleviate fiscal pressure and reduce the costs associated with policy instruments such as FITs and auctions by eliminating intermediary purchasing and redistribution processes. At the same time, it would create a more conducive environment for private firms to compete and grow in a less monopolized market. In this respect, Vietnam could even move ahead of China, which continues to maintain strong state-owned conglomerate dominance in its power sector. Concretely, Vietnam could pilot the Direct Power

Purchase Agreement (DPPA) mechanism, allowing generators to contract directly with large consumers. This would help disperse financial risks away from EVN and generate genuine market incentives, rather than relying primarily on administrative directives.

4.3 Recommendations on Renewable Energy Promotion Policies

One of the most important lessons from the adoption and subsequent phase-out of FIT schemes in both Vietnam and China lies in the poorly differentiated FIT levels across regions (Wang et al., 2021; Le et al., 2022). Pricing instruments function not only as mechanisms for electricity procurement but also as critical investment signals. A major policy shortcoming in Vietnam's earlier phase was the nationwide application of a uniform FIT (with only minor later adjustments), which resulted in regional supply–demand imbalances and localized grid congestion.

As Vietnam has now begun transitioning toward competitive auctions, it is essential to design project capacity allocations and procurement prices based on geographical considerations. More specifically, Vietnam should conduct more frequent and detailed assessments of the levelized cost of electricity (LCOE) for renewable energy, not only by region but also by sub-regions with distinct natural conditions. In addition, policymakers should consider setting differentiated price caps for each major region. Offering higher prices in the Northern region, where solar potential is relatively lower would encourage greater investment there, reduce transmission losses, limit excessive dependence on a small number of high-resource areas, and enhance energy security more effectively than a uniform pricing mechanism.

Conclusion

This study examines the implementation of feed-in tariff (FiT) policies and the transition toward competitive auction mechanisms in the development of solar energy through a comparative analysis of China and Vietnam, with the Polity–Politics–Policy framework serving as the central theoretical lens. It shows how institutional structures, political dynamics, and policy instrument choices interact to shape renewable energy pricing reform in both countries.

The analysis demonstrates that FiT has been a particularly effective instrument during the market-formation phase, when solar technologies were still immature and investment risks were high. However, as the cost of solar power declined rapidly and market scale expanded, FiT policies gradually revealed several limitations, notably fiscal pressure, curtailment, and uneven implementation outcomes. The Chinese case indicates that the shift from FiT to competitive auctions is not merely a change in policy instruments, but rather a broader process of coordinated adjustment

among long-term institutional foundations, the distribution of interests among market actors, and the redesign of electricity pricing mechanisms toward managed marketization.

In comparison with China, Vietnam achieved a relatively rapid expansion of solar capacity under FiT policies; however, the transition toward post-FiT mechanisms has been slow and characterized by limited predictability. This reflects underlying constraints in institutional coordination and in the management of political incentives among the state, investors, and the single buyer. In this context, China's experience suggests that Vietnam's transition to competitive auction mechanisms should be embedded within a stable institutional framework, guided by a clear and credible transition roadmap, and accompanied by political instruments aimed at sustaining investor confidence and mitigating systemic risks.

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