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International support for feed-in tariffs in developing countries—A review and analysis of proposed mechanisms

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ABSTRACT

Government support in the form of so-called feed-in tariff policies (FITs), which combine long-term, fixed-price electricity purchase agreements and guaranteed grid-access, has attracted large private-sector investments in sustainable electricity generation in the industrialized world. In an effort to replicate these experiences globally, a number of international organizations, NGOs, banks and donor countries are proposing mechanisms to cover part of the cost of FITs in developing countries. This paper reviews these proposals for supported FITs and then uses a case study of Thailand's Alternative Energy Development Plan 2013–2021 to investigate the opportunities and challenges of supporting FITs at a global scale. The review highlights that these proposed mechanisms foresee different roles for national governments and supporting entities, particularly in terms of who is responsible to balance fixed FIT payments with uncertain revenues and savings from carbon markets, donors and avoided fuel consumption. The case study results then show that the uncertainty about the actual cost of supported FITs is so significant that the responsibility to balance the FIT budget has to be considered carefully in the design of any mechanism that is to be employed at scale. To a considerable extent, the uncertainty is driven by the counterfactual analysis, i.e., by assumptions about the future savings from avoided fossil fuel consumption: for example, depending on the fossil fuel price scenario the FIT may result in a cost of USD 17bn or savings of 23bn. Unlike uncertainty about the necessary level of FIT payments, uncertainty about the avoided fossil fuel cost materializes only over the course of the policy's lifetime, making it politically challenging. This suggests that an international support mechanism that differentiates the allocation of responsibility depending on the income-level of the recipient country is more suitable for global-scale support than a one-size-fits-all approach.

Contents

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1. Introduction

Avoiding dangerous climate change will require a rapid upscaling and redirection of electricity infrastructure investments. The Intergovernmental Panel on Climate Change projects that the average annual investment in conventional fossil-fuelled electricity generation over the next 15 years will need to decrease by 20% compared to 2010 levels, while annual investment in low-carbon electricity supply will need to rise to around USD 300bn over the same period, about twice the current level [1]. Trends in overall emission growth indicate that an increasing share of these investments will need to flow into infrastructure in developing countries [2]. How the industrialized world can best support developing countries in attracting these investments is therefore keenly debated among researchers and policymakers [3–10].

Much of the global investment in renewable energy in the last decade has been incentivized by so-called feed-in tariff policies (FITs), which combine long-term, fixed-price electricity purchase agreements and guaranteed grid-access. FITs have been especially successful in attracting private-sector investments in new renewable energy technologies, supporting 64% of global wind and 87% of global PV capacity [8]. The United Nations Development Program estimates that by 2012, 66 countries had some form of FIT in place, up from only two countries in 1990, as shown in Fig. 1 [11]. More than half of these tariffs have been enacted in the developing world, where renewable energy investments reached USD 112bn in 2012, representing some 46% of the world total [12].

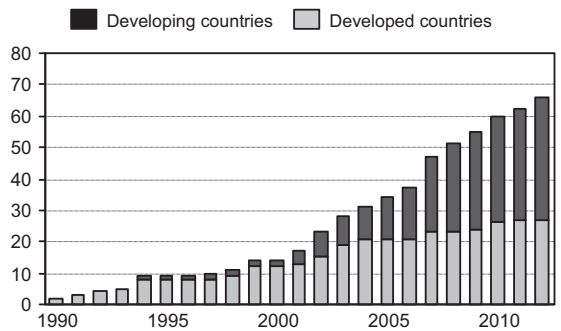

Fig. 1. Number of countries with some form of FIT legislation worldwide, 1990–2012 [11].

The finance flows necessary to alter the trajectory of electricity sector investments in developing countries are significant. The United Nations Department of Economic and Social Affairs (UN DESA) estimates that a large-scale rollout of FITs in developing countries would cost about USD 250–270bn per year [13]. Smaller countries in particular often lack the resources to provide sufficiently stable support to attract private sector investments at a large scale. Most of the current investment in renewable energy in developing countries is thus heavily concentrated, in major markets such as China and India [14]. In an effort to replicate and expand the effects of FITs globally, a number of international organizations, NGOs, banks and donor countries have proposed mechanisms that the international community covers a share of the *incremental cost*,[1] i.e., the cost gap between conventional electricity generation and the FITs in low- and middle-income countries [9,13,15–20].

This paper presents a review and a case study to investigate how FITs in developing countries can be supported internationally. The proposals for "supported FITs" all aim to provide some form of direct international financial transfer to fund FITs in developing countries, but they span a wide range of policy designs, with different administrative forms, responsibilities and tariff structures. Given the size of required commitments, and the long-term nature of payments under FITs, the institutional mechanisms used to allocate and channel international support need to be very well understood before they can be applied on a global scale. However, since most proposals have been formulated in the last four to five years, there has been limited systematic research on supported FITs and how they compare to other forms of international support. For the same reason, there has been little comparative work on the different proposals. To address this gap, this paper first reviews the proposed supported FIT mechanisms, highlighting the ways in which the proposals differ in terms of the roles they assign to the international donors and the national government. In a second step, the paper presents a quantitative case study of a hypothetical internationally supported FIT to finance Thailand's renewable energy targets for 2021 [21]. The case study illustrates the cost and cost determinants of supported FITs, and

[1] In this paper "incremental cost" refers to the difference between conventional and renewable electricity in USD/kWh and is used interchangeably with "cost gap" and "additional cost".