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Incentives for early adoption of carbon capture technology: Further considerations from a European perspective

HIGHLIGHTS

- We extend the policy proposal in Comello and Reichelstein (2014).
- We examine a second scenario in which no new CCS is adopted internationally.
- We prove that the original policy can lead to multiple Nash Equilibria (NE).
- We propose a revised policy to make generalized adoption the unique NE.
- Our results show that higher but still reasonable subsidies would be necessary to incentivize early adoption.

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ABSTRACT

This note details two comments on a recent policy proposal in Comello and Reichelstein (2014) aimed at favoring the early adoption of Carbon Capture (CC) technology in the next generation of thermal-based power plants to be installed in the United States. First, we examine the implications of a worst-case scenario in which no new CC is adopted internationally beyond what is in place in 2014. Second, we show the potential, under the original proposed subsidy, for the emergence of coordination failures capable of hampering the desired early CC deployment. We propose and evaluate modified schedules of tax-credits sufficient to overcome these concerns. These additions strengthen the argument in the original article: namely, though higher incentive levels are necessary, our findings confirm that the cost of the proposed policy is not out of reach.

Introduction

The prohibitively high cost of Carbon Capture (CC) technology for first-of-a-kind plants is recurrently cited as a major barrier to its large-scale deployment. To overcome this problem, Comello and Reichelstein (2014) recently articulate an innovative policy proposal to enable substantial cost reductions by leveraging the sizeable deployment of thermal-based power generation projected in the U. S. during the period 2017–2027. The proposal combines two ingredients: a binding and inflexible emission standard; and the "*Accelerated Carbon Capture Deployment*" (ACCD) – a preannounced schedule of Investment Tax Credits (ITC) and Production Tax Credits (PTC) – aimed at providing an incentive for newly built power plants in the U.S. to adopt CC immediately.

This note extends the analysis by considering two issues. In a first section, we apply the framework detailed in the original article[1] to generate a schedule of tax-credits that is robust to alternative scenarios for CC deployments outside the U.S. In a second section, we reflect on the possible emergence of a coordination game capable of hampering the desired early deployment of that technology and propose a modified schedule of tax-credits that is sufficient to overcome that problem.

1. The role of early CC deployments outside the U.S.

Using a list of proposed but still undecided projects (GCCSI, 2013), the authors assume the installation of nearly 3 GW of foreign CC capabilities between 2014 and 2020. However, in Europe, the funding of large CC projects has recently proven to be difficult, causing delays and several project cancelations (Lupion and Herzog, 2013). As early foreign projects are posited to engender international spillovers, one may wonder whether these withdrawals could undermine the proposal's success.

To render the proposal robust to the vicissitudes impacting foreign projects, we consider a 'worst-case' scenario whereby foreign deployments are restricted to the unique Canadian 130 MW power plant finalized in 2014. To compensate for the absence of foreign early investments, augmented ITC and PTC

[1] The two authors must be praised for having made their data and spreadsheet model readily available to readers.

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0301-4215/

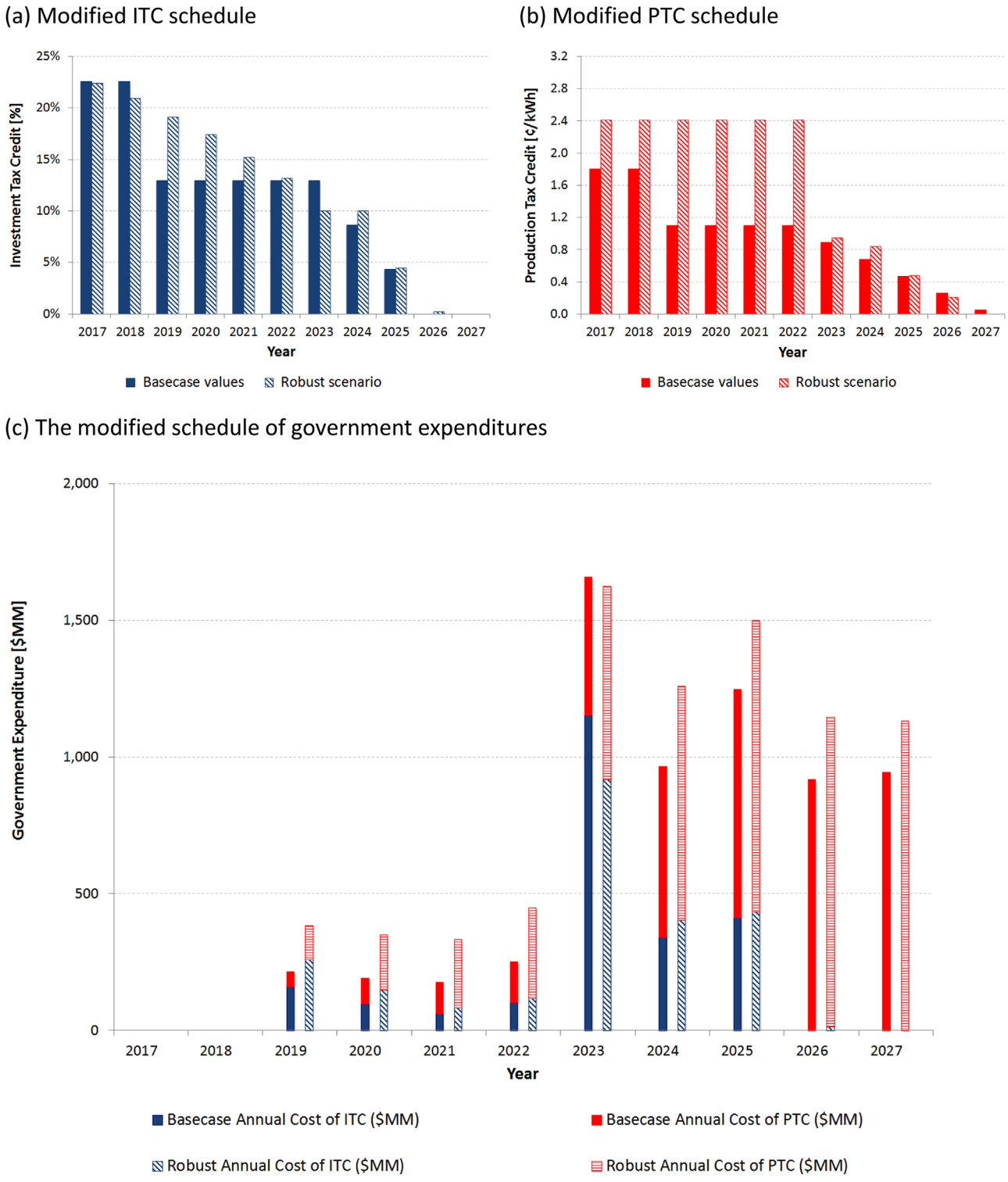

Fig. 1. The modified ACCD tax credits schedule under a robust scenario.

schedules are needed (cf., Fig. 1) but this robust version is almost as attractive as the initial version (cf. Table 1).[2]

2. Strategic interactions among CC adopters

Recent European literature on CC and storage has highlighted the interactions that exist among CC adopters connected to a common infrastructure system (Mendelevitch, 2014; Massol, et al., 2015). In the present paper, infrastructure issues are neglected but the use of an experience curve *de facto* generates some

[2] For the sake of brevity, this note solely summarizes our main conclusions. Further details on the methods used to generate the results are provided in a Supporting Document to be disseminated as a companion file to this paper.