Will Mexico's Energy Reforms succeed in reversing its oil production decline? A market and multi-Hubbert analysis of future prospects

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***Abstract*— Mexico's ongoing constitutional reforms have ended the monopoly by the state and by monopoly by Petroleos Mexicanos (Pemex) over hydrocarbon production and ownership, and lifted the ban on Pemex's partnering with foreign firms (Mexico 2014). Recently passed secondary laws will regulate the opening of the country's oil and natural gas sector to international companies. If implemented effectively, these reforms could pave the way for exploration of new resources, particularly offshore deepwater fields in the Gulf of Mexico and unconventional shale oil and gas deposits onshore that could reverse the significant decline in Mexico's oil production. The oil industry has received this well, but many challenges remain. The US Energy Information Agency has changed its forecast for Mexican production from declining steadily in its IEO 2013 to an increasing output in the 2014 version. However, the deepwater and unconventional resources considered as the expansion frontier of Mexican production are expensive to develop and require massive investments and technological expertise. Therefore, the right conditions will have to prevail to attract the right players. This paper analyzes the reforms from both a financial and political perspective, and estimate Mexico's future production using a multi-Hubbert modelling approach. Results show the new laws may succeed in attracting the needed investments and expertise to reverse Mexico's declining production, and that Mexico's reserves are sizeable enough to produce lasting revenues.**

***Keywords*—Mexico, constitutional reform, Pemex, oil and gas, Hubbert**

I. INTRODUCTION

On December 20, 2013 Mexico's president Enrique Peña Nieto signed into law constitutional reforms that ended state monopoly over hydrocarbon production and ownership, which had been nationalized in 1938 [1]. The reforms also ended the monopoly by Petroleos Mexicanos (PEMEX) and lifted the ban on its partnering with foreign firms. PEMEX was created in 1938 to exploit the nationalized oil and gas resources and will continue to be a state owned company, at least in the short term. The firm faces serious challenges, is heavily in debt and would need to be recapitalized before any attempts to open it to private investors. But, more importantly, production has been declining since 2005 [2] and it has lacked the investments required to explore and develop new resources [3], so it is hoped the reforms will bring in the cash.

The reforms, however, will not guarantee an inflow of much needed investments. Recently passed secondary laws will regulate the opening of the country's oil and natural gas sector to international companies. These laws have been well received by the industry, but many challenges remain, in particular: delivering competitive oil and gas exploration terms; building a new set of effective regulators quickly; truly reducing control of and dependence on PEMEX, while its revenues remain indispensable to government income; and ensuring that new local content requirements are not onerous [4]. However, if implemented effectively, these reforms could pave the way for exploration of new resources, particularly offshore deepwater fields in the Gulf of Mexico and unconventional shale oil and gas deposits onshore [2], [5]–[8].

The prognosis for growth is mixed. Mexico's oil production peaked in 2004 and has been declining since due mainly to lack of investment, but vast undiscovered resources may lie in the deepwaters of the Gulf of Mexico and onshore unconventional resources in northern Mexico are also deemed significant [5]. On the one hand, there is much

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