



FUNDACION DE
I NVESTIGACIONES
ECONOMICAS
LATINOAMERICANAS

Energía y Cambio Estructural

Fernando Navajas

52 Reunión Anual AAEP

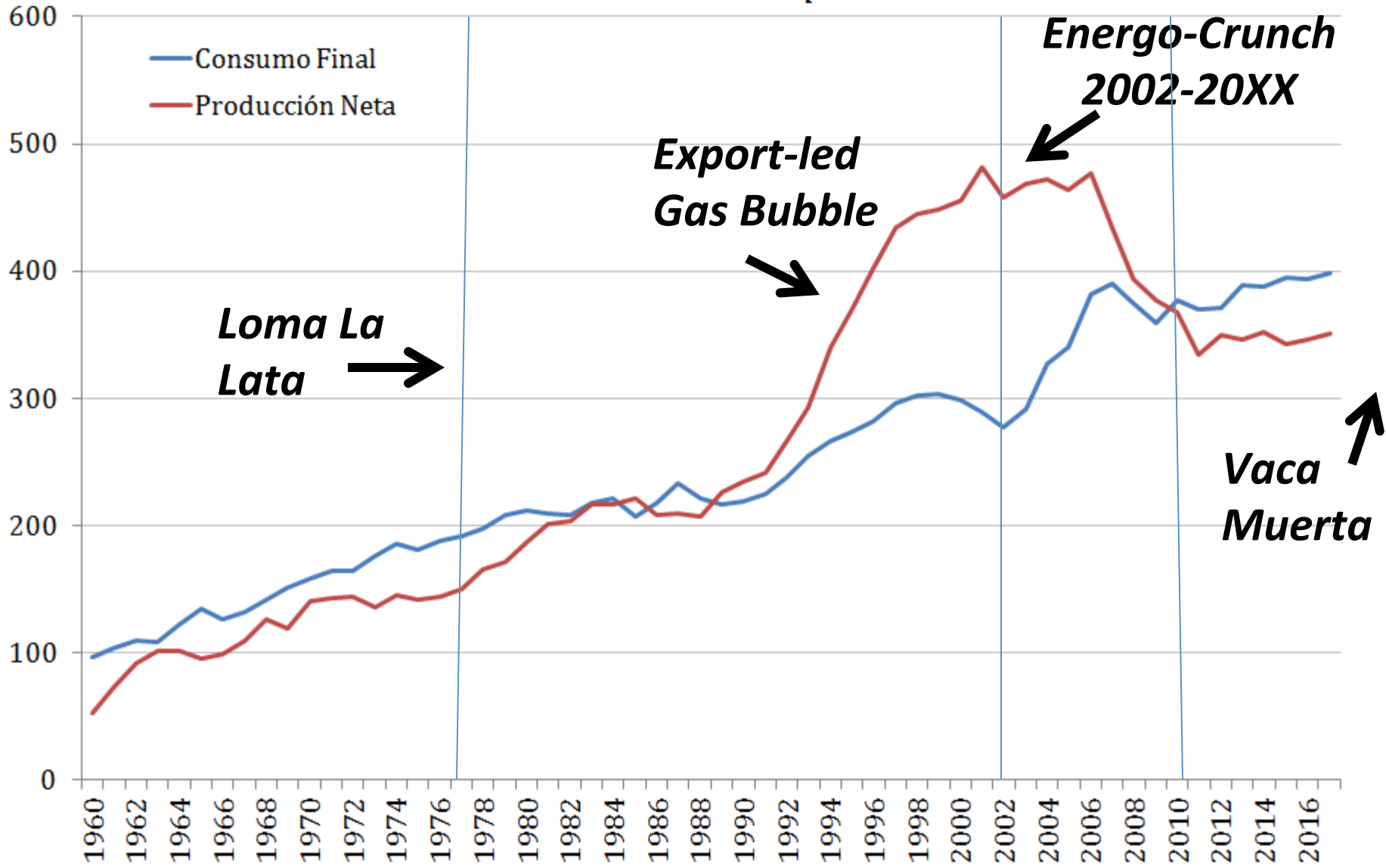
Sede Andina UNRN, S.C. de Bariloche, Noviembre 17, 2017

Narrativa

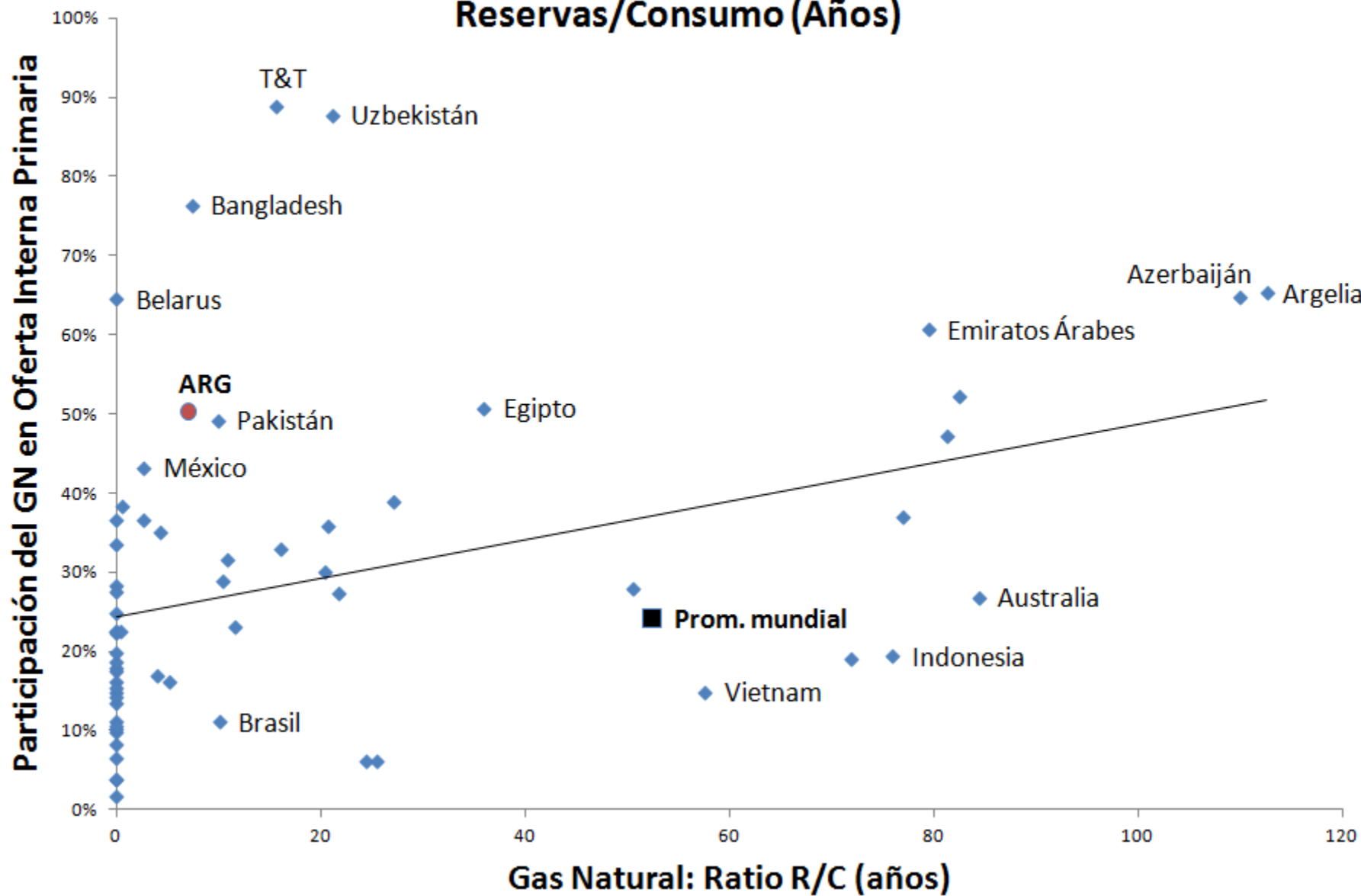
1. La energía atraviesa un **gran cambio estructural en el mundo**. Los 2 paradigmas emergentes nos impactan de lleno.
2. ¿De dónde venimos? **Estamos “Off-side”** en el ratio **Consumo/Reservas** de hidrocarburos (GN).
3. Se “resuelve” por el **Numerador (Renovables)** y/o por el **Denominador (Vaca Muerta)**
4. Dos cosas que ya son **“política de estado”** desde hace rato y tienen distinta geopolítica global
5. Dos cosas también distintas para nuestra macro y para nuestros futuros mercados energéticos

Producción Neta de Energía y Consumo Final

en millones de bep

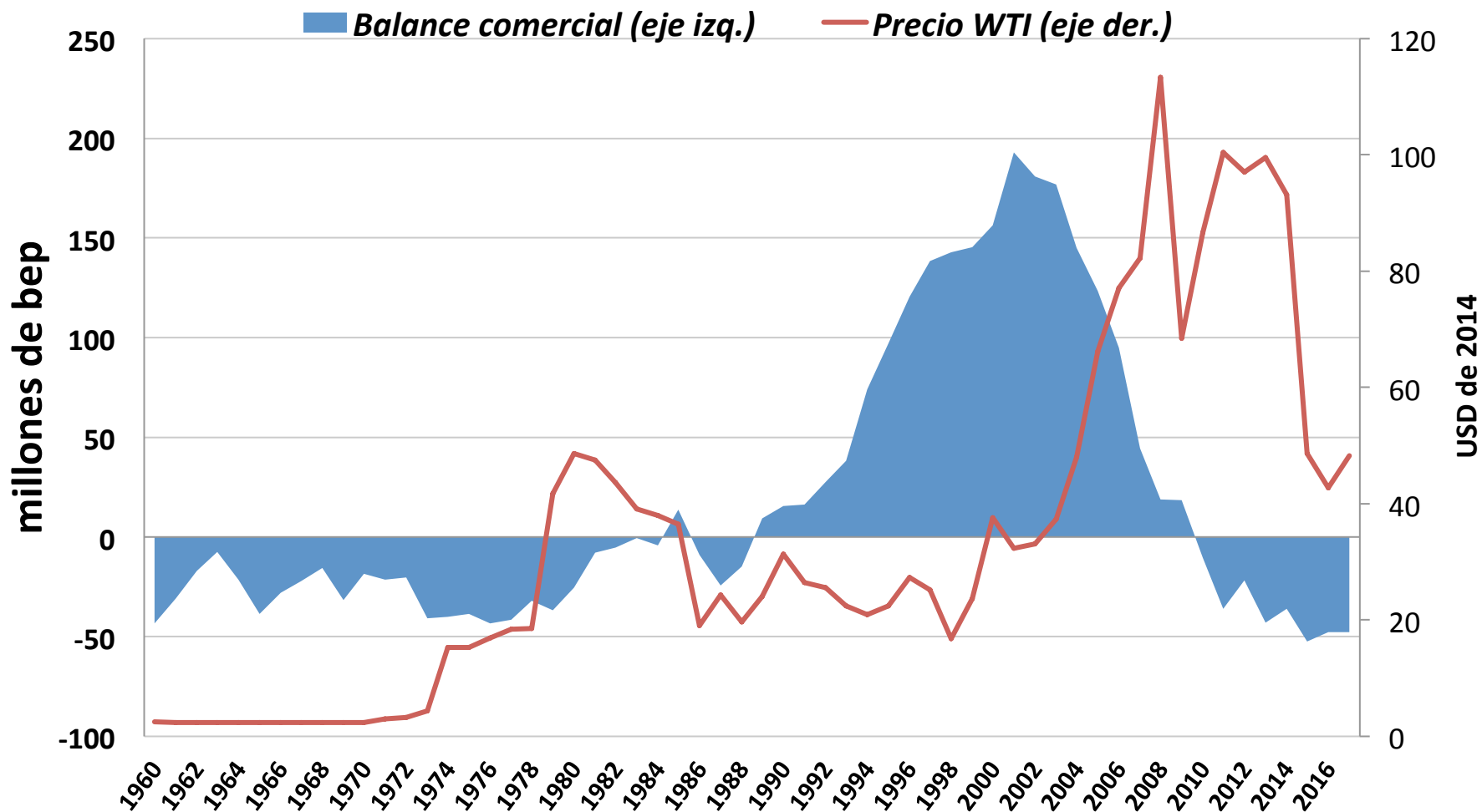


Gas Natural: Penetración en la Oferta Interna y Ratio Reservas/Consumo (Años)



Balance comercial energético de Argentina, 1960-2017

Energía Primaria y Secundaria

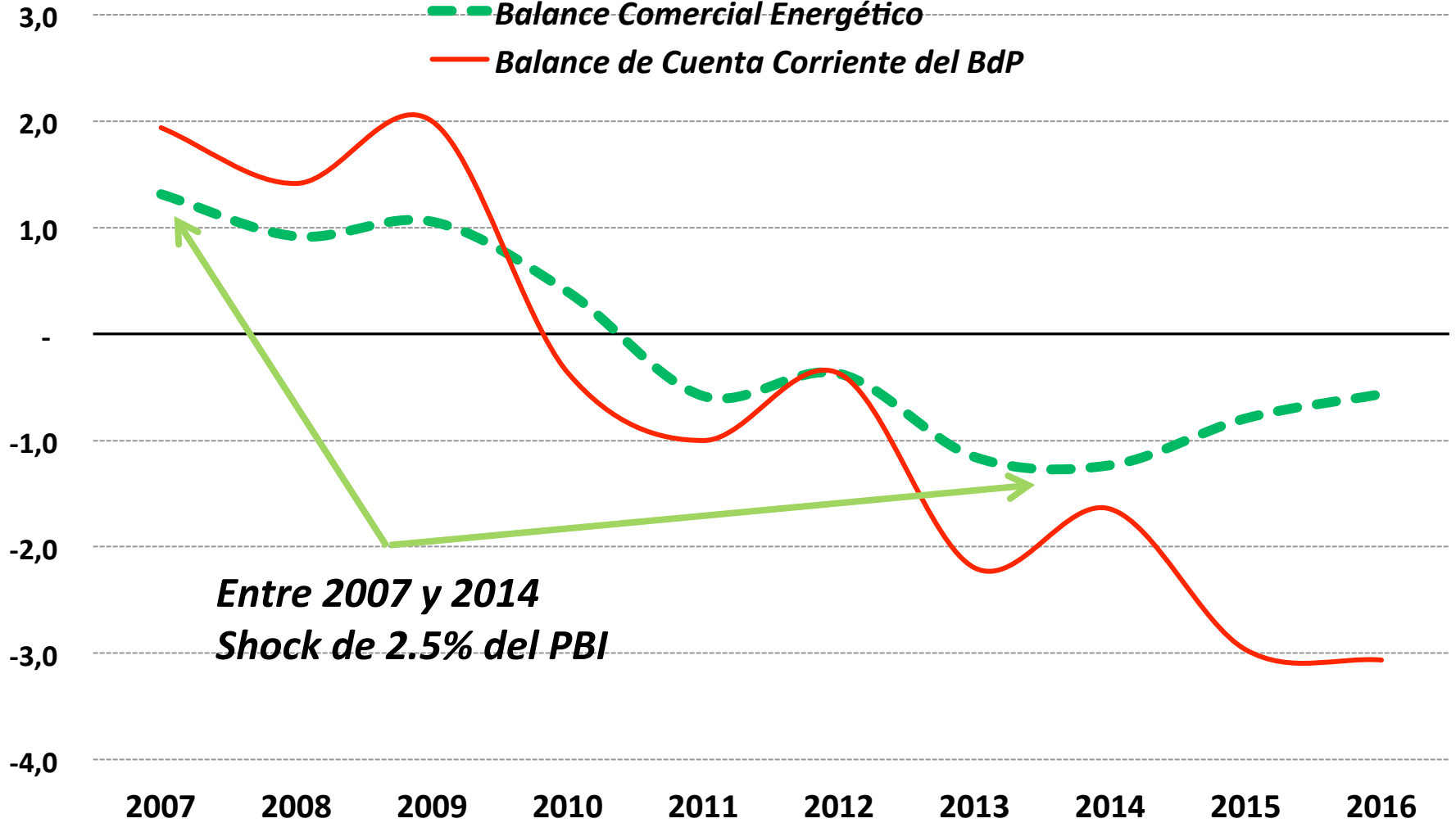


Fuente: elaboración propia en base a INDEC, Balance Energético Nacional y Tablas Dinámicas (Secretaría de Energía).
2016 y 2017 estimado

Déficit Externo y Energía

Porcentaje del PBI (%)

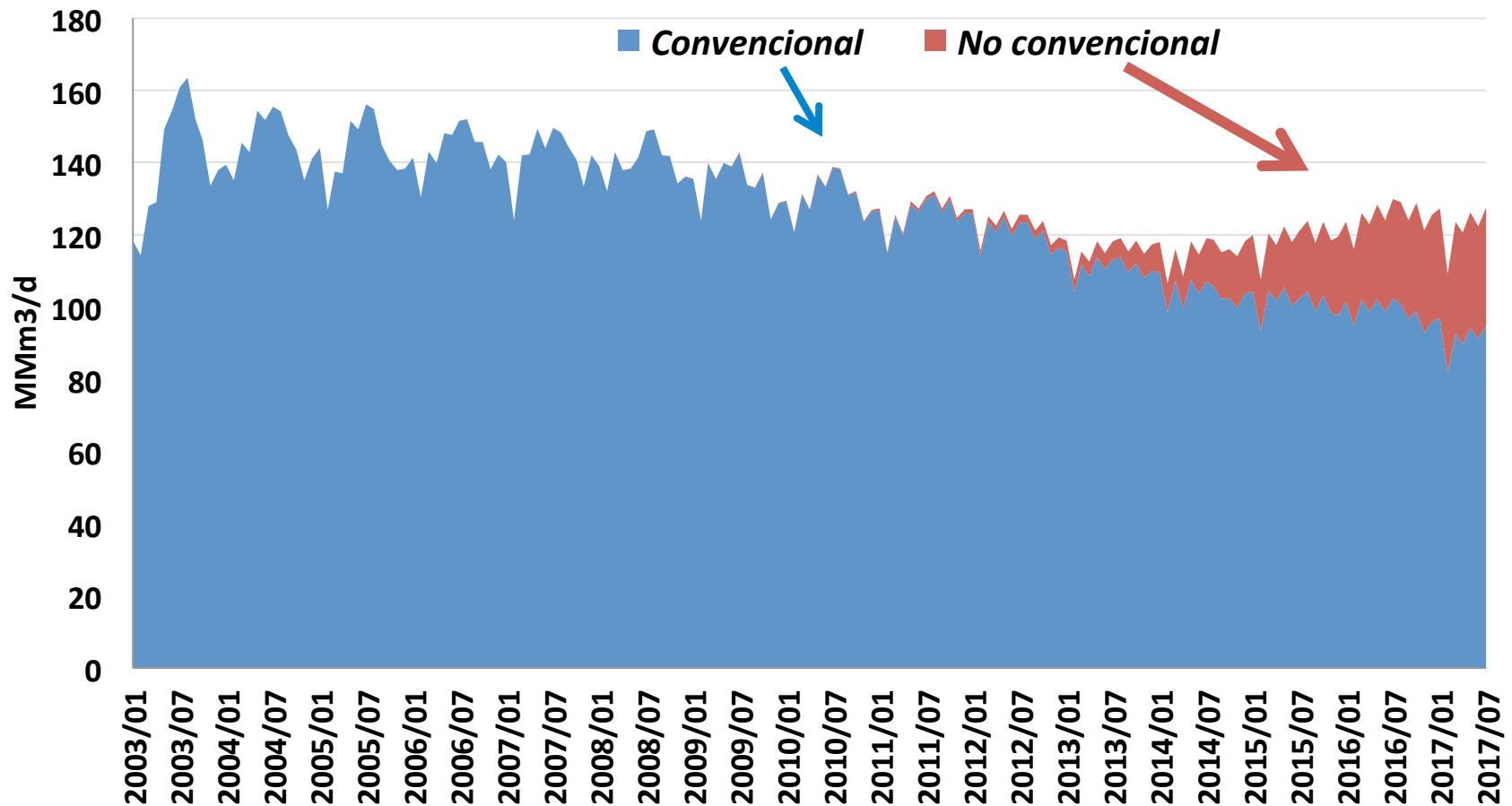
Balance Comercial Energético
Balance de Cuenta Corriente del BdP



Entre 2007 y 2014
Shock de 2.5% del PBI

El cambio de paradigma hasta ahora sostiene la producción

Evolución de la producción de gas natural 2003-2017



¿Tiene elasticidad-precio cero la oferta convencional?

- La microeconomía de la expansión de la oferta de gas y del proceso de inversión.
 - La venimos discutiendo desde 2001 o aún antes. La tenemos que volver a discutir.
- ¿Qué causó la dinámica de la oferta de gas en la Argentina post crisis 2002? (Nota: mucho antes del shale o el tight)
 - A. No fueron los precios. Fue la mala-praxis empresaria (Repsol) en un contexto de falta de inversiones
 - B. Sí fueron los precios, en un contexto de reservas maduras. Con mejores precios la oferta se sostenía (implica que la oferta convencional tiene elasticidad precio positiva en vez de nula !!)
- Barril y Navajas, *Energy Journal*, Dic 2015) testean a favor de la hipótesis “B”: no fueron las empresas fueron los precios. Porque había elasticidad-precio >0 para el gas convencional
- Pero la racionalización del argumento dice que ahora la oferta convencional tiene elasticidad-precio cero (antes no).

Natural Gas Supply Behavior under Interventionism: The Case of Argentina

Diego Barril* and Fernando Navajas**

ABSTRACT

We address the causes behind the significant drop in natural gas production in the 2000s in Argentina, starting from a basic supply model that depends on economic incentives, and adding control variables related to different potential explanations such as firm specific (or area specific) behavior and the role of contractual renegotiation of concessions extensions. Results from a panel data of production areas between 2003 and 2013 show that once a basic supply-past production (or reserve) relationship is modeled, other often mentioned effects become non-significant. Chiefly among them are firm specific effects that were used as a central argument for the nationalization of YPF in 2012. Rather, the evidence shows that the observed downcycle conforms to the prediction of a simple model of depressed economic incentives acting upon mature conventional natural gas fields and hindering investment in reserve additions or new technologies. The results are robust to the nationalization of YPF, after which aggregate production continued a downward trend for two years, although are insufficient to capture an ongoing reconfiguration of incentives and risks in the forthcoming transition to shale gas production.

Keywords: Natural gas, Production, Exhaustible resources, Argentina

<http://dx.doi.org/10.5547/01956574.36.4.dbar>

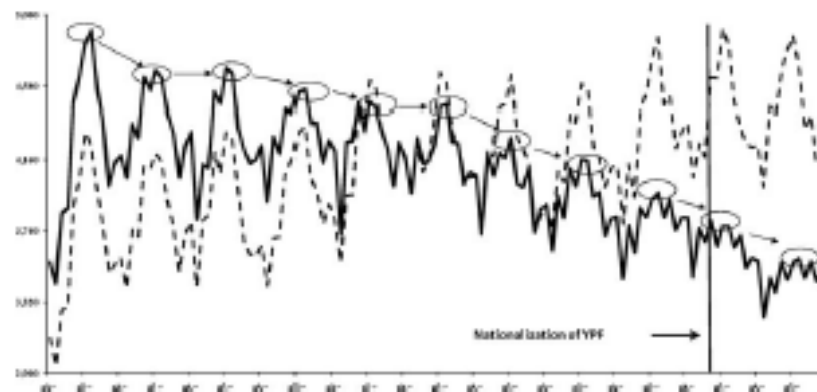
1. INTRODUCTION

Argentina became, in the last quarter of the past century, an important producer of natural gas after some important discoveries of conventional resources in Patagonia. The country followed a rapid and economy-wide substitution in residential and commercial segments, the industrial sector, electricity generation and even transport. Indeed, it has been recognized as part of the group of countries used to illustrate a fast and deep penetration process of natural gas (see Hansen and Percebois, 2010, chapter 4). At the beginning of the 2000s natural gas had a share well above 50% in the primary energy mix and several exports projects mainly to neighbor countries (mainly Chile) were set to take up to 20% of domestic production. More than two decades ago, an evaluation mission by the World Bank (1990) commended the important substitution to natural gas performed by the country, but alerted that unless supply could evolve rapidly too, there could be problems in attending all segments of demand (including exports). The report even conjectured that if the status quo they were observing extended into the future, the country could hit a critical reserve-production ratio in 2002. This prediction actually happened, but with the unfortunate coincidence of a large

* University of La Plata, Argentina.

** Corresponding author. University of Buenos Aires, University of La Plata, and Fundación de Investigaciones Económicas Latinoamericanas (FIEL), Argentina. E-mail: navajas@fiel.org.ar.

Figure 1: Argentina: Natural Gas Production and Consumption 2003–2013



Note: In million m³, production (solid line), consumption (dotted line)
Source: IAPIG and Energas

macroeconomic crisis, an extensive contractual default and the introduction of long-government intervention in energy markets (see e.g. Pollitt, 2008; Cont et al. 2011). In less than two years, the country faced an energy-crunch in the natural gas market which led to mandatory export cuts to Chile, broken contracts (Navajas, 2008) and a command-and-control management of imbalances, while electricity and natural gas prices were kept frozen for main demand segments.¹

Earlier quantitative decompositions of the energy imbalances attributed a central role to demand (see e.g. Cont and Navajas, 2004), but after peaking in 2004 natural gas production has been falling consistently. Figure 1 represents the monthly evolution of aggregate natural gas production and domestic consumption from 2003 to 2013. The Figure shows that the fall in production has been matched by a corresponding increase in net imports in order to satisfy domestic demand. Thus, supply and demand behaved in an unrelated manner during the sample period, both contributing at different stages to the widening gap covered by a drastic switch in the net export position. Demand did not show, on this basic accounting, an effect upon supply dynamics, except for demand shocks years with harsh winters or due a very short and mild recession in 2009. Furthermore, the nationalization of the leading firm in the gas market (YPF) in early 2012 did not change the observed underlying dynamics.

Different arguments put forward by academic studies or policy debates have attempted to explain this phenomenon, depending on the role attributed to firm behavior on the one hand and the policy or regulatory environment on the other. The government or official view attached the culprit of the fall in production to the lack of investment efforts by large firms and in particular YPF (controlled by Repsol since 1999), which ended-up in an expropriation announcement in April 2012.² Other views regarded the drop in production as the expected evolution of conventional

1. Price controls were asymmetric in the sense of being too strong in electricity and natural gas and less restrictive or relatively soft in other segments. In the case of LPG (the main substitute for natural gas for households—about 33%—without access to natural gas) higher prices led to very different and testable behavior of demand (e.g., Navajas, 2009).

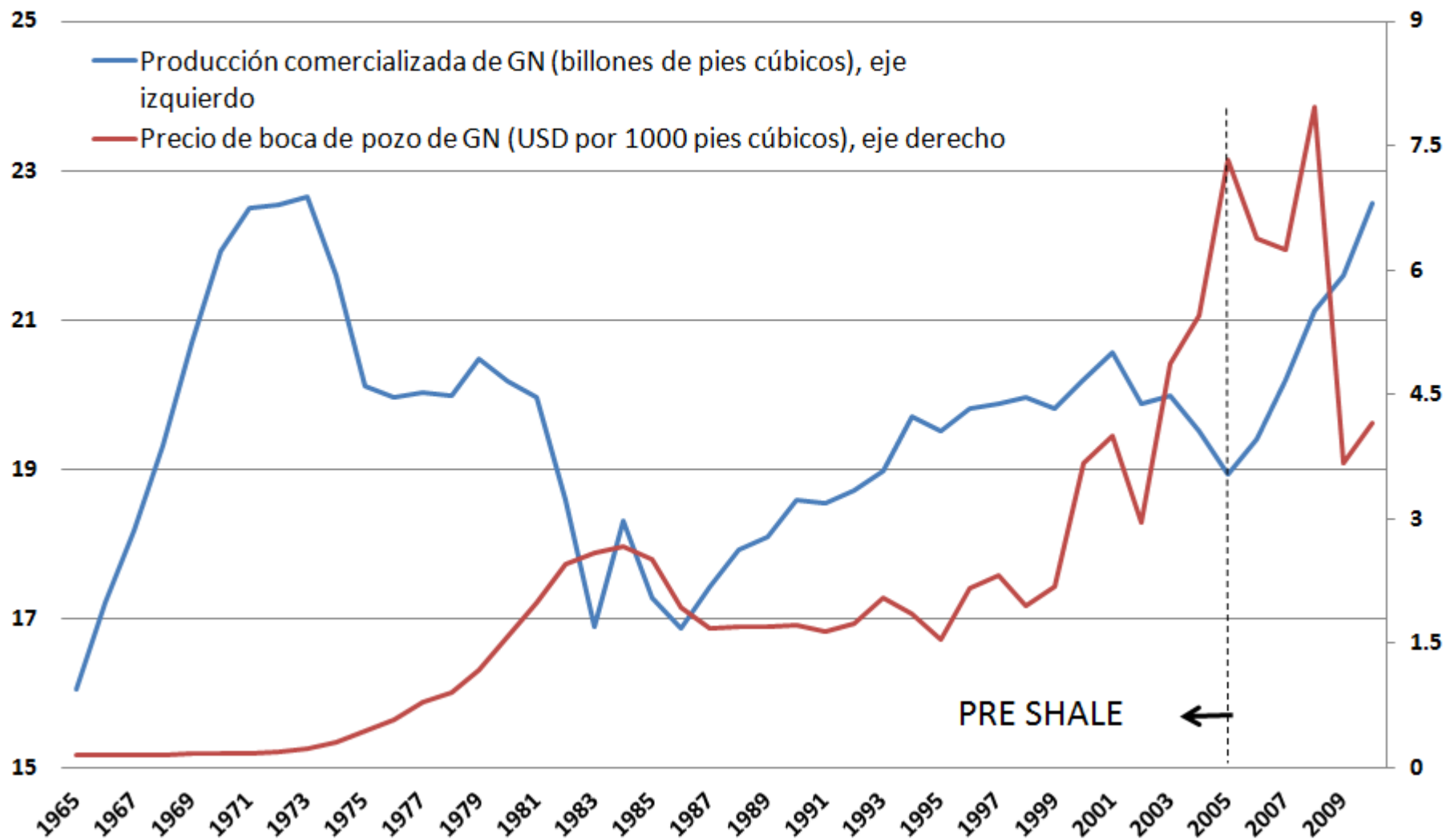
2. This view was officially stated in a government report that justified the expropriation of Repsol (De Vido and Kicilloff, 2012) but had been voiced much earlier. It was also stated in a Federal Agreement on Hydrocarbons signed in February 2012 by the Federal Government and the oil producing Provinces (which, by the 1994 Constitution own hydrocarbon

¿Qué caso muestra baja elasticidad de oferta convencional?

- EEUU 1960-2005, antes del shale es un caso interesante.
- Una regulación de tasa de retorno por pozo (a la De Vido-Kiciloff) llevo a un derrumbre de la producción, con precios bajos.
- La desregulación de comienzos de los 80 eleva el precio y las cantidades, pero es tenue, la elasticidad es muy baja.
 - Cross-plot de precios y cantidades da una “L” inverida
- Cuando los precios suben más, entonces se “activa” una tecnología latente (el shale) que hace volar a la oferta.
- Los valores de transición de precios son muy parecidos a los que estamos discutiendo ahora.
- Pero son de mercado, no fijados. Cuando los precios bajan la oferta se consolida y los consumidores ganan. Un mecanismo de precio fijo no detenía el boom de shale, pero los consumidores no ganaban.

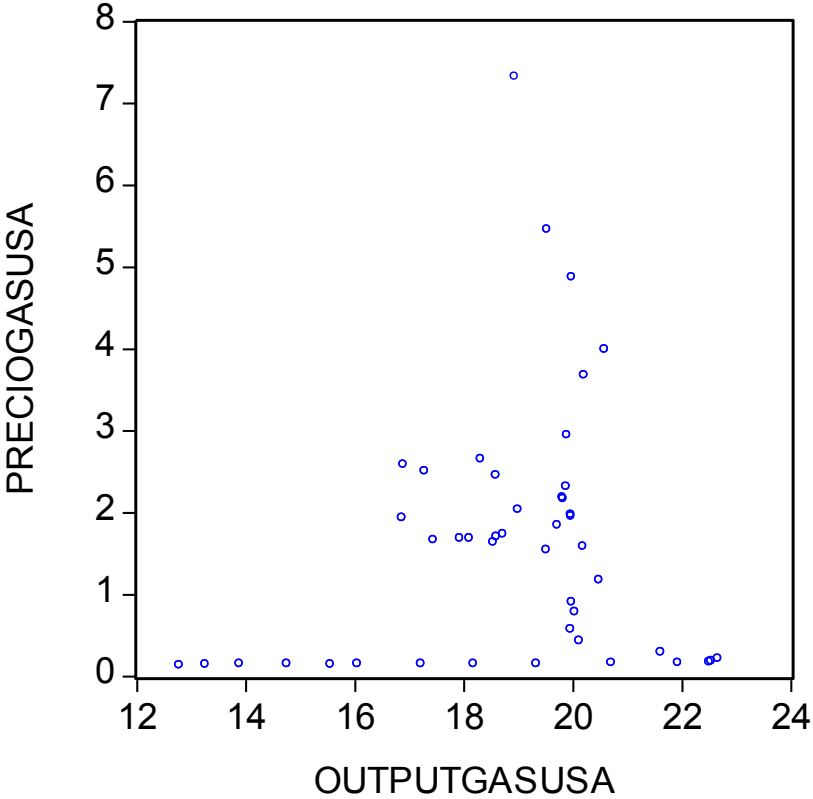
Producción de gas natural y precio promedio en los Estados Unidos 1965-2010

(Fuente: EIA)



Relación precio-output “pre-shale” en EEUU muestra una “L” invertida

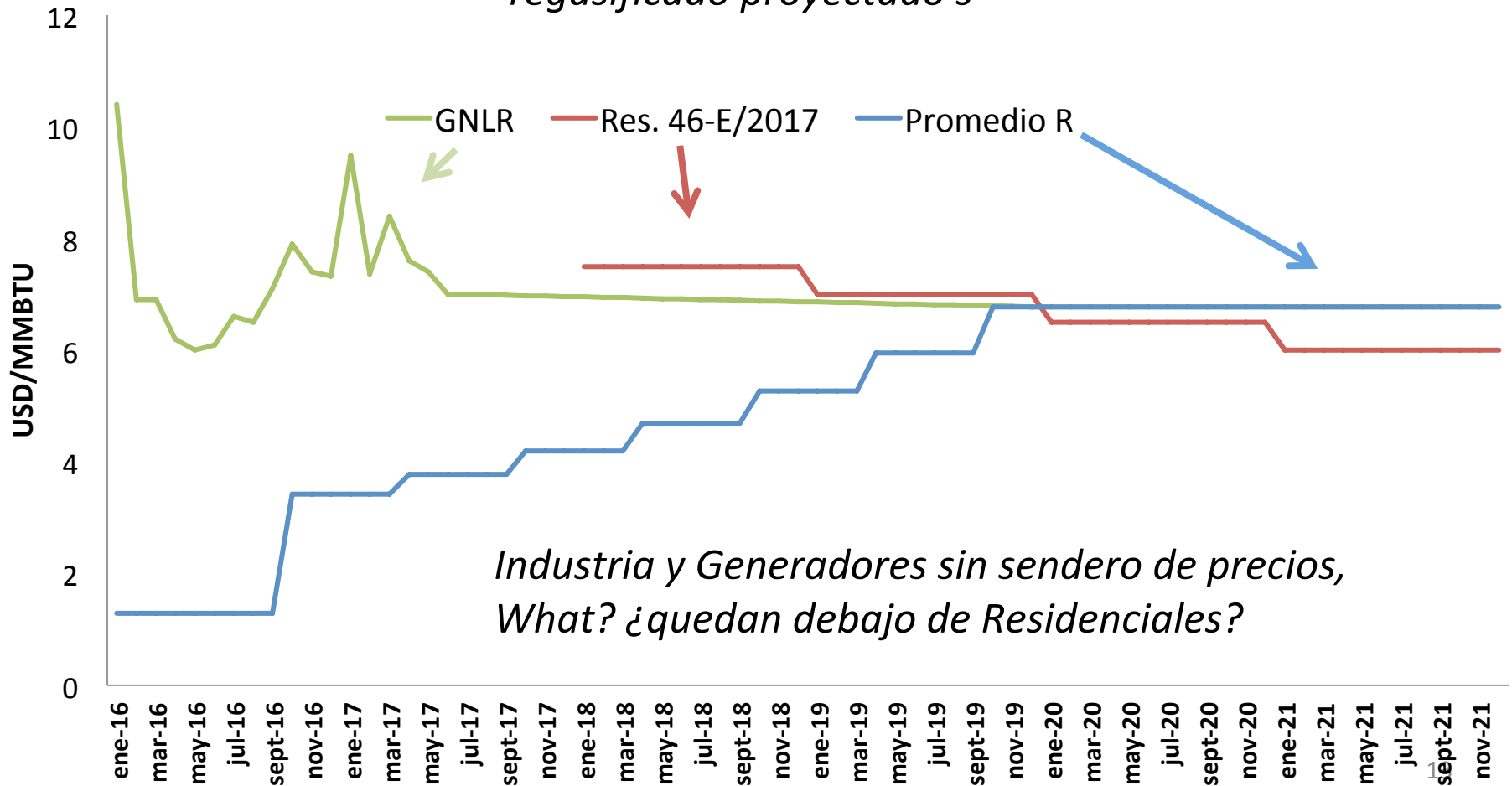
RELACION PRECIO-OUTPUT DEL GAS NATURAL EN EEUU 1960-2005



Mientras tanto: falta completar las reglas de precios...y de mercados

Senderos de Precios del Gas Natural

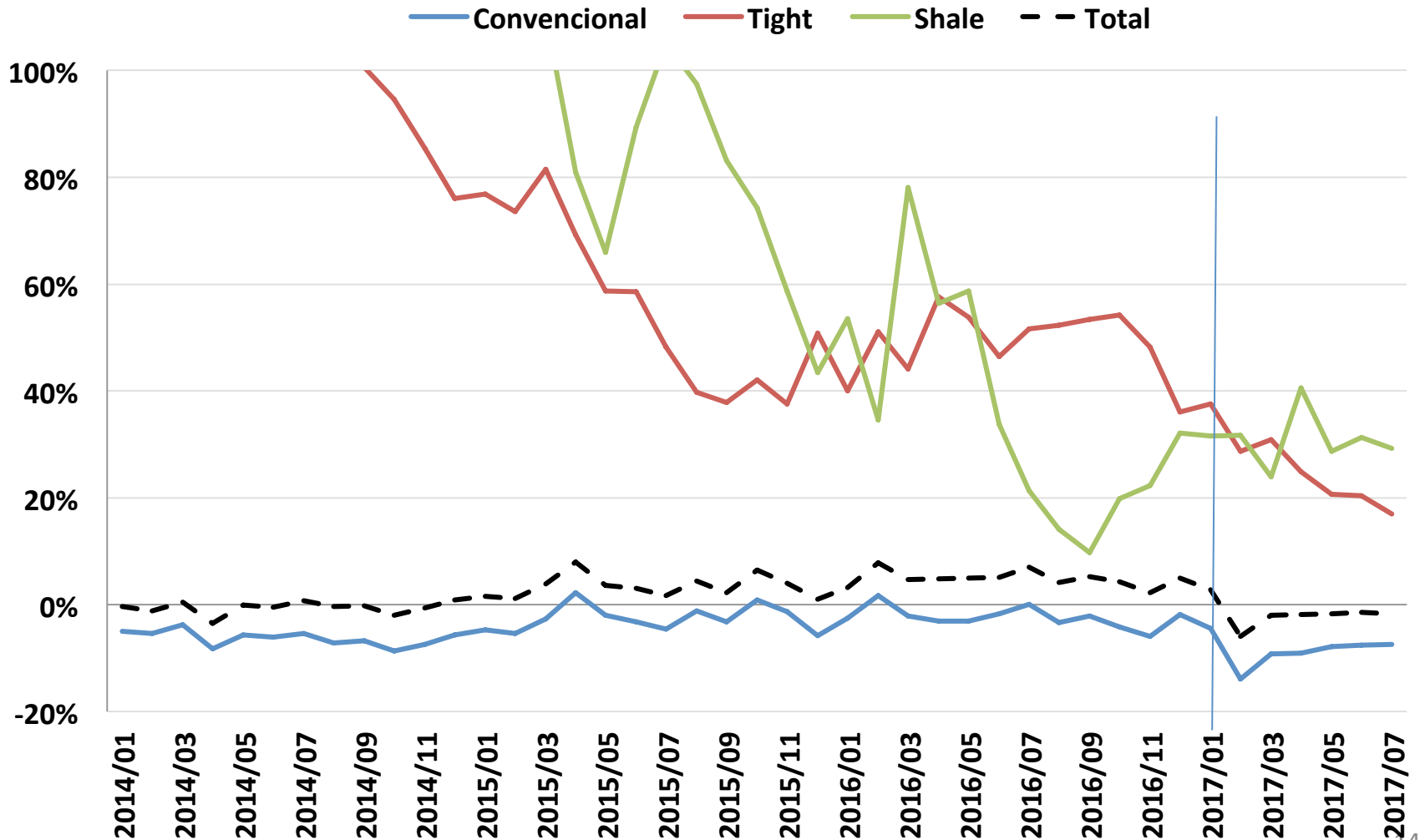
Precio para residenciales, Estímulo Res. MINEM 46-E/2017 y GNL regasificado proyectado s



*Industria y Generadores sin sendero de precios,
What? ¿quedan debajo de Residenciales?*

Cambio de reglas Res 46 y 419 y “el pozo de aire” de 2017: es respuesta racional a inconsistencia?

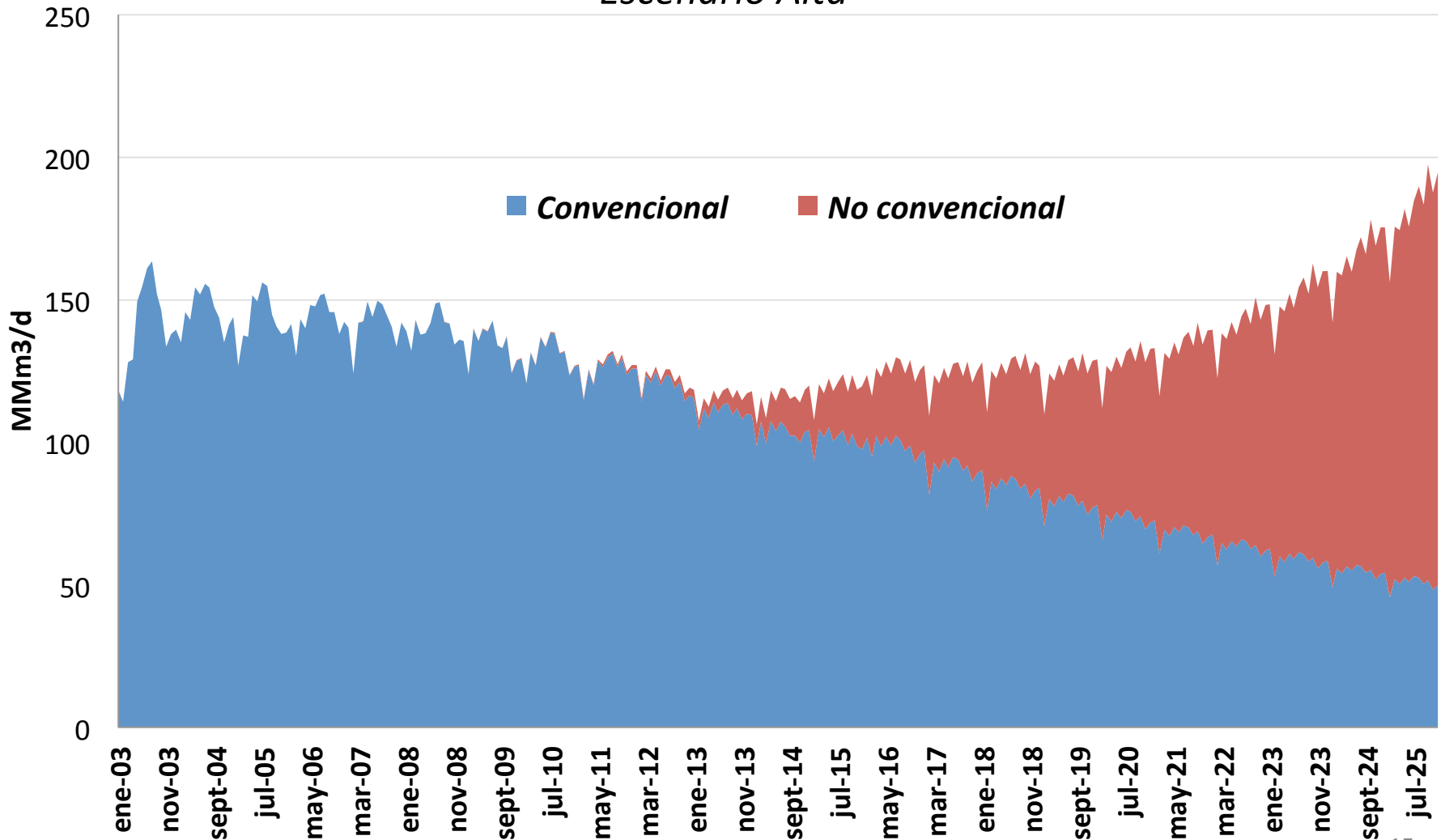
Evolución de la producción de gas natural por tipo de recurso
Variación interanual



¿Si la hacemos bien?

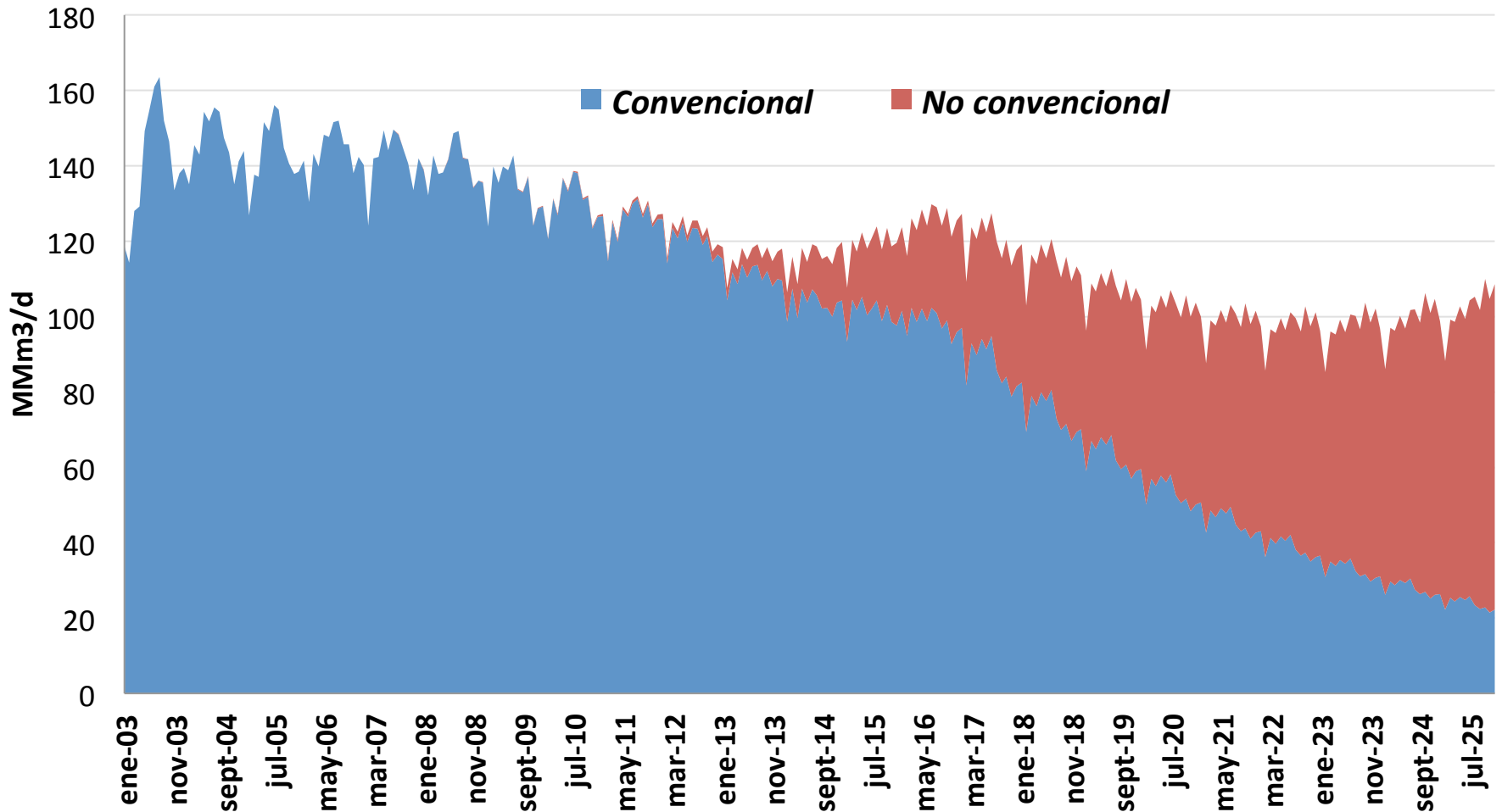
Evolución de la producción de gas natural por tipo de recurso

Escenario Alta



¿Y si la hacemos mal?

Evolución de la producción de gas natural por tipo de recurso
Escenario Baja



Agenda

1. La energía y el modelo de crecimiento de la Argentina
2. Precios o subsidios versus “reglas de precios o de subsidios”
3. ¿Qué mercados energéticos vamos a tener en gas y en electricidad?
4. Coordinación de Paradigmas: Vaca Muerta y Renovables
5. Acotar la inconsistencia temporal de políticas para que la inversión vuele