Unveiling France's Energy Conservation Policy :
Insights from the 2022-2023 Energy Crisis

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Overview

The winter of 2022-2023 saw a signi cant shift in energy consumption patterns across Europe, with France experiencing a notable reduction in natural gas demand in the context of a broader energy crisis. This reduction in demand was likely in uenced by di erent factors, including the introduction of France's large-scale *Plan de Sobriete*, a signi cant rise in energy prices and mild winter temperatures.[1] The crisis, triggered by a sharp decline in natural gas supplies due to geopolitical disruptions, prompted governments across Europe to implement stringent policies aimed at reducing energy consumption, targeting both the residential and tertiary sectors. This study examines the speci c factors that in uenced the change in natural gas consumption in France during this period. It focuses on the interaction between economic and behavioural responses to both policy interventions and price signals. In particular, the extent to which the demand reduction can be attributed to conservation policies is assessed.

Economic and behavioural responses to energy shocks

Recent literature has examined the economic (Alessandir, 2023; Buquet and Stalla-Bourdillon, 2024; Guntner et al., 2024) and behavioural repercussions of supply shocks in energy markets, particularly following the gas supply shortages of 2022. Studies by Doumeche et al. (2023) and Ruhnau et al. (2023) underscore the adaptability of consumers and industries. Doumeche et al. (2023) demonstrated signi cant shifts in energy demand linked to altered work patterns in France, while Ruhnau et al. (2023) identi ed a broad reduction in gas consumption across sectors in Germany, suggesting a willingness among consumers to adjust usage in response to scarcity. These ndings support the concept that crisis-driven demand shocks can result in marked, though possibly temporary, shifts in consumption behaviour.

Energy savings : e ciency and conservation

The concept of energy savings is grounded in two primary frameworks: energy e ciency and energy conservation. Energy e ciency refers to the adoption of technologies that reduce energy consumption while maintaining service levels. This is typically measured as a ratio of energy consumed to services delivered, with an emphasis on technological improvements. Energy conservation, alternatively, involves behavioral adjustments in energy use patterns, often motivated by external factors like price signals or policy interventions. Conservation is particularly relevant in the context of curtailment behavior, where users consciously reduce their energy use as a response to supply constraints or incentives (Gardner and Stern, 1996). While energy e ciency provides substantial potential for reducing overall consumption, it is often constrained by two phenomena: the energy paradox and rebound e ects. The energy paradox describes a discrepancy between the apparent economic bene ts of energy-e cient technology and its adoption rate, often due to informational barriers, short-sighted investment decisions, and heterogeneity in consumption patterns (Ja e and Stavins, 1994). Rebound e ects, on the other hand, occur when energy savings achieved through e ciency lead to increased energy usage elsewhere, thereby mitigating net savings (Penasco and Anadon, 2023; Sorrell et al., 2007). Energy conservation, in contrast, is driven by external factors and can circumvent some of these issues. Evidence suggests that conservation behaviors, particularly those in uenced by non-monetary incentives, can achieve lasting reductions in energy use without the risk of rebound e ects. Bolderdijk et al. (2013) and Ferraro and Price (2013) demonstrate that informational campaigns and social comparisons can sometimes yield more sustained reductions than nancial incentives. Blasco and Gangl (2023) further notes that behavioral interventions are particularly e ective during crises, as they lower informational barriers and encourage immediate action among consumers.

Empirical methodology

Based on Buquet and Stalla-Bourdillon (2024) and Guntner et al. (2024), the French market for natural gas is modeled using a ve-variable SVAR:

$$A_0 y_t = \quad + \sum_{i=1}^{p} A_1 y_{t\ i} + \sum_{j=0}^{p\ 1} {}_j x_{t\ j} + {}_t; \quad \text{with} \quad {}_t \sim \mathcal{N}(0; \ {}^2_t) \tag{1}$$

where the n $\times$ 1 vector of seasonally adjusted endogenous variables y_t contains log of the sum of net natural gas imports and a (small) amount of domestic gas production, an indicator of real economic

[1] See Table 1 in Appendix for the main steps of the *Plan de Sobriété* policy.