Allocating Suddenly Reduced Natural Gas and Energy Supplies

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Challenges.

1. When there is a sharp drop in natural gas supply, **standard market** resource allocations are **not socially desirable**. This is the case for the allocation across households, across industries and also within industries.

   The reason for this misallocation of resources is that the willingness and ability to pay cash are poorly correlated with social value (Dworczak et al., 2021), especially in the short term. For the same reason, standard auctions (Milgrom, 2004) would fail to attain socially desirable outcomes.

   Competitive industries may have important economic functions and yet make little profit: think public transport vs. mining crypto.

2. At the same time, simply allowing the government to allocate the resources is suboptimal because it is **difficult for the government to truthfully elicit** how much does each industry or firm (within an industry) really needs it. For example, it is difficult to determine which gas oven for various glass manufacturers to switch off. Which firm or industry needs the limited natural gas supply, which users are essential? How much does each user really need?

Criteria for a good solution.

3. The ideal allocation of natural gas should reflect several desirata: First, gas should be **efficiently allocated** to those units which need it the most. Second, the mechanism should **prevent stockpiling and speculation**. Third, the allocation should be **robust and fault-tolerant**. That is, a slight mistake or miscalibration should not throw off the allocation mechanism. Fourth, the mechanism should that **fair to less sophisticated** and more sophisticated users (Pathak and Sönmez, 2008, Budish et al., 2017). Nobody should be taken advantage of. Finally, it should dynamically **reflect changing conditions.**

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Policy Proposal: Pro-social Cap and Trade System. A pro-social market solution can overcome both challenges (in 1. and 2.) and satisfy most of the desired criteria outlined above.

4. The key is to start with an allocation that reflects reasonable social objectives. That is, the government (Bundesnetzagentur) assigns the initial "gas purchase permits" using a sensible fixed rule to avoid rent seeking and lobbying. For example, every user could receive a purchase permits proportional to its recent use[1] (say in 2019 before Covid). Permits would be short-term permits, reissued monthly, allowing adjustments to changing conditions.

   This starting point anchors the outcome and ensures that the final allocation is not driven by financial strength and profit margins alone. For instance it guarantees that industries with high a social value, like hospitals or public transport, get a fair share of the final allocation compared to cash-rich industries.

5. Starting from the socially acceptable allocation, users are allowed trade these permits to optimize at the margin (based on their needs and adjustment capabilities, which is typically unknown to the government). This provides firms with incentives to substitute into other energy sources as best as they can, and reallocate production to the most efficient facilities.

6. Importantly, the cap-and-trade mechanism has to be designed to avoid speculation and stockpiling, while also allowing firms to plan reasonable future consumption.

   Restricting trading to short-term permits only (e.g. gas consumption for the next month) would limit speculation and stockpiling. However, short-term contracts do not allow firms to guarantee stable prices. This creates costly uncertainty for users. For example, a glass manufacturer might worry that sudden price increases will prevent keeping ovens running. Allowing the trading of medium-term contracts would allow this manufacturer to guarantee price stability, but may also allow speculation.

   One could resolve this tension with several design elements:

   a. Restrict user ability to purchase more that X-factor initial permit allocation (e.g. 2).
   b. Allow users to reclaim pledged futures at some cost (e.g. 20%) for own consumption alone.
   c. Restrict ability to pledge full medium term/long term future rights to sophisticated players. Only allow partial ability to sell purchase-permits to retail/unsophisticated users.

[1] or the use of similar users.

d. Restrict intermediaries from holding permits within short window (e.g. 1 week) of delivery to avoid waste.

7. System already familiar to energy players because of emission trading systems in EU and US. Policy know-how readily available (Environmental Protection Agency, 2003, Marcu et al., 2017, Environmental Defense Fund, 2018). Energy markets already sophisticated (Reguant, 2014).

Further considerations.

8. To reflect complex, multidimensional objectives it may be desirable to assign different shares of resources using different mechanisms (Pathak et al., 2021, Bandiera et al., 2022): for instance, 80% based on cap and trade; 10% using an English auction; and 10% based on government discretion.

   The shares allocated to each mechanism could grow or decrease over time depending on evolving circumstances.

9. To overcome a "trading inertia effect" (related to endowment effects or excessive rent seeking) one could apply a small (e.g. 1%) tax on value of permits (Segal and Whinston, 2013, 2016).

Other proposals to be developed in further memos.

10. European governments should coordinate on purchases and exert monopsony power along the line set by the European Coal and Steel Community, (Monnet, 1978). This would also require a cap-and-trade scheme. The exercise of monopsony power by governments representing consumer welfare is not a source of deadweight loss.[2] Except for production incentives, there is no reason gas exporting countries should get a large windfall. European governments can internalize this objective.

11. Feedback-based methods used to reduce electricity consumption could be used to get retail users to voluntary curb their consumption (Allcott and Mullainathan, 2010, Allcott, 2011, Brülisauer et al., 2020).

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[2]Another example is the use of buying power to reduce the cost of pharmaceuticals (Chown et al., 2019).

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