

## POWER-TO-X IN THE GERMAN EXPERIENCE: ANOTHER IN THE LIST OF GROWING ENERGY TRANSITION STRATEGIES\*

A number of options exist to balance demand and supply. More power can be traded between regions. A second option is storage. Battery use is on the rise, but still very limited. Enter "power-to-X".

Power-to-X uses electricity to produce hydrogen, synthetic methane, or liquid fuels such as ammonia or methanol. Although power-to-X is not new, its stature has grown in recent years, and it presents distinct possibilities to store excess renewable power generated in times of relatively low demand which can improve the economic value of renewable generation by facilitating a classic storage arbitrage. Moreover, as renewable deployment continues to expand, power-to-X also has potential to help decarbonize other sectors of the economy, such as industry and transport, that have long vexed carbon mitigation specialists.

Power-to-X for hydrogen production creates some interesting opportunities. When hydrogen is produced close to power generation sources, it avoids electricity grid capacity constraints. Power-to-X for synthetic methane allows the use of existing natural gas distribution and storage infrastructure, as the gas can be stored in natural gas pipeline systems or underground for long periods of time, which can address seasonal variability constraints. Finally, power-to-X for the production of gaseous or liquid energy carriers facilitates sector coupling. For example, it can help in sector coupling in cases where electricity is not applicable or convenient, such as in aviation, iron and steel making, or chemical and petrochemical feedstocks.

