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RESEARCH QUESTION

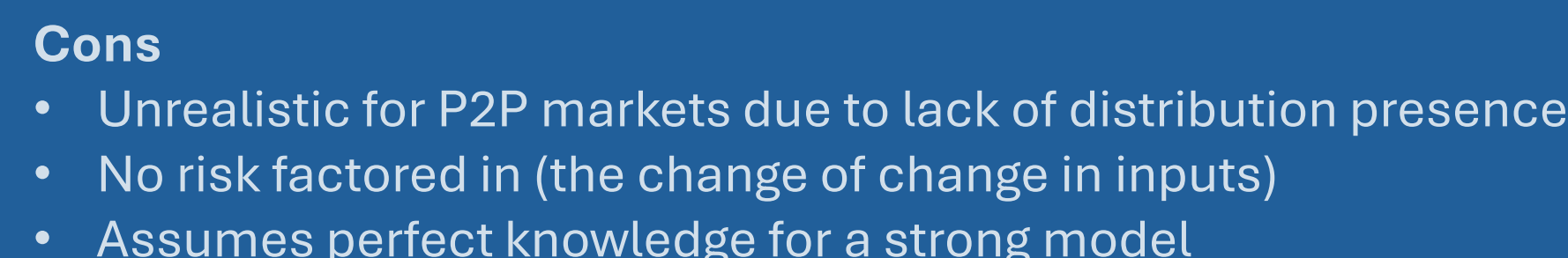
This review is structured around three core research questions:

- In what ways does AI optimization function within peer-to-peer energy markets?
- Which industry trends have developed in this field over the last five years?
- How has real-world data been applied in comparable analyses?

STEP 3

UNCERTAINTY

STOCHASTIC



2025 TRENDS

Multi-Level Optimization Advanced Trilevel models and Reverse Stackelberg games perfectly balance economic incentives and physical grid limits across network operators, microgrids, and prosumers

- **Rising Adoption:** P2P networks are gaining significant attention for their potential to empower local communities.
- **Energy Efficiency:** Localized trading drastically reduces transmission losses and saves energy.
- **The AI Imperative:** Advanced AI optimization is critical to balance economic incentives with grid security, enabling the full potential of transactive energy.

Man, Z., Babiker, K., & Birge, R. (2016). Aggregating data-based energy resources (Windferry and watercat) power. *Manufacturing Service Operations Management*, 36(5), 430-445. <https://doi.org/10.1016/j.sbspro.2016.06.001>

Sapich, J., Bruckner, L., & Le Cadre, H. (2020). A PowerStacking method for demand-response in local energy markets. *European Journal of Operational Research*, 277(3), 382-396. <https://doi.org/10.1016/j.ejor.2019.05.023>

Hahbi, G., El-Ferik, G., Guizar, H. M., Choudhary, T. T., Ahmad, E. H., & Almansoori, N. (2016). A distributed hierarchical optimization framework for smart homes, microgrids, and distribution networks with hydrogen integration via distributed-GMRES approach. *Applied Energy*, 168, 126-177. <https://doi.org/10.1016/j.apenergy.2016.05.050>