

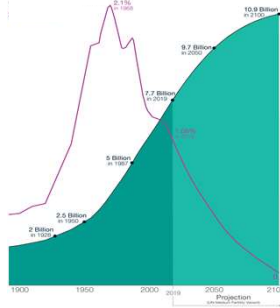
# TREX

Daniel May<sup>1</sup>, Steven Zhang<sup>1</sup>, Petr Musilek<sup>1</sup>

## Sustainability vs Growth



We must scale energy production for growth.

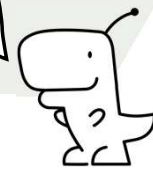


Sustainability efforts and innovation challenge the power system.

This is a complex, multidisciplinary problem...

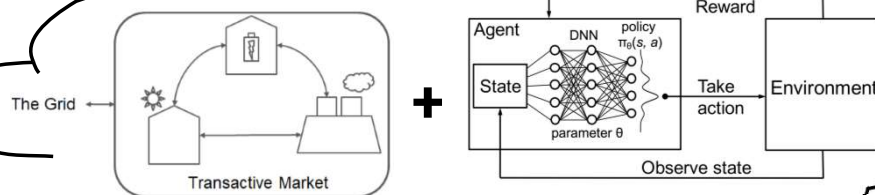
## Meet TREX

Energy should be traded and coordinated peer-to-peer, securely, in real-time. This way we can address system and policy issues and decrease strain on power system infrastructure!



Short for Transactive Renewable Energy eXchange, TREX is an Artificial Intelligence (AI) enabled flexibility platform for community energy systems. Our visionary, scalable, adaptable and cost-efficient attempt to start solving this challenge.

## The Solution



### Auction-based, Transactive Energy Market

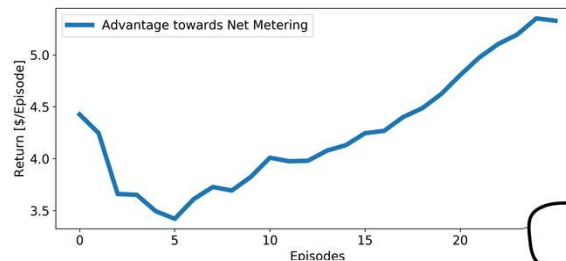
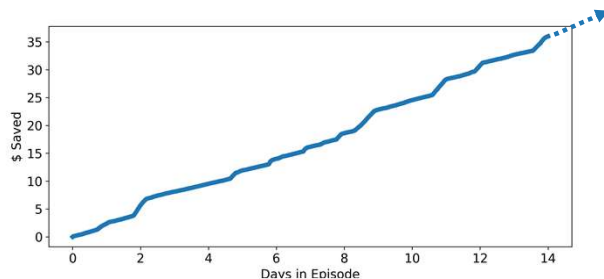
By placing a community behind a virtual meter, we establish a clear market range, allowing for exact determination of transaction prices.

### Deep Reinforcement Learning Based AI Agents

Per participating unit, an AI agent manages the real-time market interactions, learning how to compete and coordinate on real data.

TREX can improve participant's financials as well as decreased voltage variance within the community.

This leads to individual as well as systematic benefits while at the same time allowing business cases for renewable energy assisting technologies to naturally form.



<sup>1</sup>Department of Electrical and Computer Engineering, University of Alberta, Edmonton, Alberta, Canada T6G 1H9



UNIVERSITY OF ALBERTA  
FUTURE ENERGY SYSTEMS



This research has been undertaken thanks in part to funding from the Canada First Research Excellence Fund.