1163-91-629 **Maxim Bichuch*** (mbichuch@jhu.edu), **Benjamin Hobbs** (bhobbs@jhu.edu) and **Xinyue Song** (xsong11@jhu.edu). *Optimal Electricity Distribution Pricing under Risk and High Photovoltaics Penetration.*

We model a hierarchical Stackelberg game in a competitive power market under high behind-the-meter Photovoltaics (PV) penetration and demand-side uncertainty, with emphasis on the feedback loop between distributed generation via PV and power prices. The Stackelberg leader, who is the government regulator, attempts to define a set of network tariffs that results in maximal overall system net benefits with consideration of consumer utility, cost recovery and renewable energy promotion. The Stackelberg followers, who are rational consumers of electricity, choose their individual PV investments in order to maximize their personal utilities. With the consumers' demand evolution described by a discretized Ornstein–Uhlenbeck process, we find a closed form approximation to consumer's utility, and existence of a game equilibrium between all the consumers and the regulator. Numerical results are calibrated to PJM power market data, and illustrate the market participants' coupled decisions. Results suggest that consumers tend to rely more on PV when the market demand is more volatile, with potential risks of the utility death spiral where the high electricity retail price resulting from increased distributed generation incentivizes further PV investment. (Received September 10, 2020)