

# Accepted Manuscript

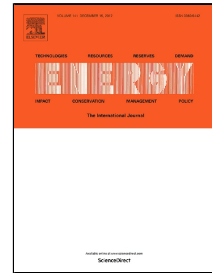
A Flexible Active Distribution System Expansion Planning Model: A Risk-Based Approach

M. Moradijoz, M. Parsa Moghaddam, M.R. Haghifam

PII: S0360-5442(17)32203-X  
DOI: 10.1016/j.energy.2017.12.160  
Reference: EGY 12109  
To appear in: *Energy*  
Received Date: 05 August 2017  
Revised Date: 26 December 2017  
Accepted Date: 30 December 2017

Please cite this article as: M. Moradijoz, M. Parsa Moghaddam, M.R. Haghifam, A Flexible Active Distribution System Expansion Planning Model: A Risk-Based Approach, *Energy* (2017), doi: 10.1016/j.energy.2017.12.160

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# A Flexible Active Distribution System Expansion Planning Model: A Risk-Based Approach

M. Moradijoz, M. Parsa Moghaddam\*, M.R Haghifam

Faculty of Electrical and Computer Engineering, Tarbiat Modares University, Tehran, Iran

**Abstract:** This paper presents an active distribution network expansion planning framework, which concurrently uses the renewable distributed generations and energy storage systems as capacity expansion options. In order to enhance the network reliability, the model takes into account the island mode operation of the renewable resources and energy storage systems. The proposed planning framework, which is modeled as a probabilistic bi-level optimization problem quantifies and controls the economic risk level associated with the stochastic nature of these resources. The master level is devoted to the here-and-now decisions in the planning phase, whereas the slave level, which is formulated as a two-stage model, is related to the wait-and-see decisions in the operational phase. At the first stage of the slave level, the network operational behaviour is determined by performing an optimal power flow modeled as a mixed-integer linear programming problem. At the second stage of the slave problem, the network reliability is optimized considering island mode operation and taking into account energy-limited nature of storage systems. The effectiveness of the proposed active distribution network planning model is demonstrated through several case studies. Simulation results demonstrate that the proposed approach can result in a flexible low-risk plan for the expansion of the network.

**Keywords:** Active distribution network planning; Bi- level optimization problem; Energy storage; Reliability; Risk.

## 1. Introduction

Emerging distributed generations (DGs) in distribution networks, referred to as active distribution networks (ADNs), enables distribution system companies (DISCOs) to deal with the new challenges

---

\* Corresponding author. Tel.:+982182883369; fax:+9821 82884325  
E-mail address: [parsa@modares.ac.ir](mailto:parsa@modares.ac.ir), P. O. Box: 14115-143

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات