Two-stage modeling approach for microgrids

Can a two-stage robust stochastic programming model be used to schedule microgrids?
In this article, a two-stage robust stochastic programming model for the optimal scheduling of commercial microgrids equipped with 100% RERs to handle the existing uncertainties is presented.

What is stochastic optimization model of multi-energy microgrid based on random fluctuation stabilization?
On this basis,a two-stagestochastic optimization model of multi-energy microgrid based on random fluctuation stabilization is established to formulate the operation of equipment. The main contributions of this study are as follows.

Do microgrids participate in the energy exchange process based on transactive energy architecture?
Simulation results on the IEEE 33-bus standard system integrated with microgrids verify that the proposed model could provide satisfactory profits for microgrids participated in the energy exchanging process based on the transactive energy architecture.

Do uncertainty factors affect the efficient operation of multi-energy microgrids?
With the increase in renewable energy penetration,the impact of uncertain factors on the efficient operation of multi-energy microgrids (MEMGs) is becoming more and more prominent. Considering the source-load uncertainties of MEMGs,a two-stage stochastic optimization approach based on scenario analysis is proposed in this paper.

What is a stochastic model for the management of MMG systems?
In Section 2, a stochastic model is developed for the daily prediction of the renewable energy sources. The 2SSP approach for the management of MMG systems is presented in Sections 3 Problem formulation as a two-stage stochastic program, 4 Illustrative examples.

What are the uncertainties associated with interconnections of microgrids (MGS)?
The model aims to minimize the total costs while benefiting from interconnections of Microgrids (MGs),considering uncertainties associated with electricity demand and Renewable Energy Sources(RESs). The associated uncertainties are analyzed using Geometric Brownian Motion (GBM) and probability distribution functions (pdfs).

In this paper, a two-stage energy auction model based on blockchain and smart contracts to solve the problem of lack of trust and transaction default, and to increase flexibility in energy transactions among microgrids is proposed.

According to the historical data about energy supply of each microgrid, an aggregator aims to maximize each microgrid"s profit while minimizing the risk of overbidding for renewable energy resources trading based

microgrids. A novel two-stage stochastic game model with Cournot Nash pricing mechanism and the conditional value-at-risk criterion ...

The two-stage stochastic approach considers the smart grid base-load as a (discrete) random variable and assigns a probability to each possible realization. Therefore ...

In this paper, to support the hydrogen-based networked microgrids planning subject to multiple uncertainties (e.g., RES generation, electric loads, and the refueling demands of hydrogen vehicles ...

In this day-ahead planning study, the short planning interval allows for the modeling of load-induced uncertainties using the normal distribution function [58]: (47) F N (D) = 1 2 p s. e - (D - m 2) / 2 s 2 where D, m and s represent the demand, average and standard deviation of the load.the values of these parameters are obtained by statistical data and ...

With the increasing impact of renewable energy sources in distribution power systems, the short-term scheduling of microgrids is facing many uncertainties. The supply of microgrids" consumers, on the one hand, and the optimal participation of microgrids in the market the next day, on the other hand, are faced with many challenges for microgrid operators. ...

The proposed model consists of an investment master problem on the first stage and a multi-objective operation planning subproblem on the second stage. Benders decomposition is implemented for solving the two-stage stochastic model, and Lexicographic Goal Programming is applied to the subproblem to deal with multiple objectives.

In order to solve the shortcomings of current droop control approaches for distributed energy storage systems (DESSs) in islanded DC microgrids, this research provides an innovative state-of-charge (SOC) balancing control mechanism. Line resistance between the converter and the DC bus is assessed based on local information by means of synchronous ...

This article presents a novel linear programming (LP) based two-stage stochastic approach for microgrids (MGs) under uncertainties. In this regard, the day-ahead programming ...

Load models can be classified into two broad categories: static and dynamic models, while there are two types of approaches to identify model parameters: measurement-based and component-based.

However, combined with the research of multi-microgrids" dispatch and the energy storage system, we further notice that 1) whether the variables of each device can participate in rescheduling based on the system structure is ignored; 2) little literature considers hybrid energy storage system to participate in two-stage scheduling; 3) although SOC is an ...

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most researchers hav e proposed two-stage Stackelberg models between microgrids and dispatch problems (ISO, DSO, TSO) considering uncertainty in ISO or DSO ...

In this paper, a new multi-objective two-stage robust-stochastic (MOTSRS) optimization approach for assessing microgrids and distribution system resilience is proposed. A novel approach based on deep learning is presented to model social behavior, specifically Social Reactions to Disasters (SRDs), in assessing microgrid and distribution system resilience.

A two-stage optimal scheduling model is proposed in (Daneshvar et al., 2020) and (Liu et al., 2019) to improve the profits of commercial microgrids equipped with 100% RERs and determine the most ...

In the second stage, the microgrids try to minimize their energy cost by optimally purchasing power from the main grid and the other migrogrids, and by selling back their stored energy.

A two-stage stochastic programming approach for planning of SVCs in PV microgrids under load and PV uncertainty considering PV inverters reactive power using Honey Badger algorithm ... this study utilizes EVaR as a stochastic modeling approach. The EVaR is a novel coherent risk measure incorporated to enhance risk management practices and ...

A novel two-stage hybrid approach based on the combination of the Hilbert-Huang transform, genetic algorithm and artificial neural network is proposed for day-ahead wind power forecasting, which achieves significant forecasting accuracy improvement compared with three other artificial intelligence-based forecasting approaches and a benchmark model using ...

practices and two-stage stochastic modeling approaches by identifying an open-source modeling framework which is then applied to real local data. As reference case-study, we consider a microgrid built in 2015 in Bolivia. Overall, the optimal system results from a compromise between the Net Present Cost, the peak capacity installed and the ...

Networked microgrids aggregate distributed energy resources (DERs) and flexible loads to reach the minimum capacity for market participation and provide reserve ...

With the increase in renewable energy penetration, the impact of uncertain factors on the efficient operation of multi-energy microgrids (MEMGs) is becoming more and more prominent. Considering the source-load uncertainties of MEMGs, a two-stage stochastic optimization approach based on scenario analysis is proposed

in this paper.

To address the question of how to best achieve a tradeoff, this work proposes the use of a two-stage stochastic decision-making approach for designing and operating an MMG ...

A two-stage stochastic programming model that minimizes the overall cost of the coupled system is formulated to determine the optimal capacity of the system under uncertain ...

Recent challenges in isolated microgrids modeling 2.1. Parametric uncertainty The first challenges are related to long-term demand and renewables projections. ... A MILP dispatch model is used for each scenario. A multi-objective two-stage stochastic approach is presented by Gou et al. [25]. The goals are to minimize the net present cost (NPC ...

Received: 13 June 2023-Revised: 22 December 2023-Accepted: 8 January 2024-IET Energ y Systems Integration DOI: 10.1049/esi2.12135 ORIGINAL RESEARCH A two-stage, four-layer robust optimisation model for distributed cooperation in multi-microgrids Haobo Rong1 | Jianhui Wang2 | Honghai Kuang3 1Department of Electrical and Control Engineering, Nanjing ...