IMPROVED HYDRO-THERMAL SCHEDULING WITH INTEGRATED RENEWABLE ENERGY AND ELECTRIC VEHICLES USING UPGRADED WHALE OPTIMIZATION VARIANTS: A REVIEW

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ABSTRACT

The shift to sustainable energy has expedited the adoption of renewables and electric vehicles into electricity systems. This paper summarizes hydro thermal scheduling by using advanced whale optimization variants OWOA and CQOWOA. These algorithms efficiently solve complex multi objective problems considering real world conditions like load variability valve point effects and transmission losses. Results indicate significant cost and emission savings with improved performance compared to traditional methods affirming their potential for sustainable and reliable power system planning.

Keywords: *Hydro–thermal scheduling (HTS), Renewable energy integration, Electric vehicles*

1. INTRODUCTION

Improved Hydro-Thermal Scheduling with Integrated Renewable Energy and Electric Vehicles Using Upgraded Whale Optimization Variants: A Review Siyu et al [1] introduce a multi objective scheduling model including hydro solar wind batteries and thermal reserves to mitigate power shortages through better cost emission and reliability. Wang et al [2] employ V2G with dynamic programming and wavelet decomposition to stabilize wind dispatch using EVs. Hua et al [3] create an NSGA II based dispatch model improving grid security and EV charging. Yang et al [4] discuss optimization and meta heuristic techniques for stable EV integration into the grid. Zhang et al [5] describe a hydro thermal wind EV model based on enhanced PSO to reduce cost and emissions. Xiao et al [6] propose an EMS based on stochastic for commercial buildings utilizing PVs EVs and old batteries with 83.3 percent cost saving. Wang et al [7] introduce a CVaR based MILP approach to hybrid systems to enhance profitability of hydrogen and electricity markets. Yuan et al [8] introduce a chance constrained hydro PV coordination model with over 90 percent reliability in power balancing. Zifa et al [9] create a long term dry season strategy for regional grids with renewables to improve water use and efficiency. Hannan et al [10] survey V2G systems describing benefits, challenges and future directions of research.