

Optimal Site Selection of an Electrical Power Station in Iran Using Heuristical Computational Algorithms

Davoud Gholamiangonabadi

Industrial engineering and management system Department
Amirkabir University of Technology
Tehran, Iran

Dgholamian91@aut.ac.ir

Afshin Mohammadi

Electrical Engineering Department
Amirkabir University of Technology
Tehran, Iran

Afshin.mohammadi.gojani@aut.ac.ir

Mohammad Alimoradi

Industrial engineering and management system Department
Amirkabir University of Technology
Tehran, Iran

Alimoradi@aut.ac.ir

Jamal Shahrabi

Assistant Professor in Industrial Engineering
Amirkabir University of Technology
Tehran, Iran

Jamalshahrabi@aut.ac.ir

Abstract—One of the main challenge of new life is replacing traditional fuel energy by renewable energy sources. Renewable energies are those are naturally replenished such as sunlight, wind, rain, tides, waves and geothermal heat. The famous renewable energy is biomass. Biomass is biological material derived from living, or recently living organisms. Electrical power station based on biomass are one the issues in the field of renewable power generation. The big challenge to use this technology is locating power station with respect to the sources of this generation method. This paper intends to find the optimal location of power station using heuristically computation and real statistics concerned the provinces of Iran.

Keywords- Electrical Power Station; Heuristical Computational Algorithms

I. INTRODUCTION

Renewable energy replaces conventional fuels in four distinct areas: electricity generation, hot water space heating, motor fuels, and rural (off-grid) energy services. About 16% of global final energy consumption presently comes from renewable resources, with 10% of all energy from traditional biomass, mainly used for heating, and 3.4% from hydroelectricity. New renewables (small hydro, modern biomass, wind, solar, geothermal, and biofuels) account for another 3% and are growing rapidly. Biomass is an important part of a global clean power generation solution and is already the fourth-largest energy resource in the world after oil, coal and gas. Carbon emissions from the biomass electricity life

cycle (planting, harvesting, processing and transportation) are lower than burning conventional fossil fuels.

As an energy source, biomass can either be used directly via combustion to produce heat, or indirectly after converting it to various forms of biofuel. Conversion of biomass to biofuel can be achieved by different methods which are broadly classified into: thermal, chemical, and biochemical methods.

Wood remains the largest biomass energy source today. In a woody biomass power station, the location decision is a big challenge concerned significantly to transportation cost and nature of biomass source in a typical area.

In this paper, at first, the optimal locations are selected with respect to the distance to the fossil power stations, population census, city distribution and potentiality of biomass resources. Second, using the heuristically computations the best location to construct a power station is decided considering local characteristics. Note all of this algorithms are implemented using GIS-based information's like distribution of population, plants, corps and the capacity of producing manures.

Critical to find financial success in a biomass power generation is specifying the optimal location for the facility or in the other hand The ability of replacing traditional energy generation is dependent on finding the best location to construct the power station with respect to the sources. Considering rural in the center of Iran this generation method can reduce the cost of power generation by elimination of power transfer lines. This