Proceedings of the 1st Annual World Conference
of the Society for Industrial and Systems Engineering,
Washington, D.C, USA
September 16-18, 2012

Unit Commitment with CO_2 Emissions Limits: A Multi-objective Approach

Galo Nina

National Energy Control Center Corporation Ecuador

Corresponding authors Email: gnina@cenace.org.ec

Authors Note: Galo Nina: Electric Engineer for the ESPOL, Industrial Engineer from the FHTE Esslingen, Germany, Master of Science in Systems Engineering (Optimization) from the COPPE/UFRJ Brazil; From 1981 unti1 1998, he served in INECEL in Operation Planning and Management Control. As of 1999 he has held the position as Head of Control and Analysis in the National Energy Control Center Corporation – CENACE.

Abstract: Ecuador as a country has started to become concerned about quantifying CO_2 emissions, and it has been verified that this factor has increased over the years, depending in part on the hydrology observed in the Ecuadorian Electricity System. Incidentally, the execution of hydroelectric projects that are in need of a significant investment of capital could be promoted with carbon credits, by taking these emissions into consideration. It is therefore important to begin bearing these environmental factors in mind for the system's operation. This paper deals with the problem of committing units when emissions limits are taken into consideration. A multi-objective model is suggested which deals with both economic factors and CO_2 emissions limitations. An example is presented in order to make comparisons between the traditional unit commitment model and the proposed method, and to observe the feasibility of applying this methodology.

Keywords: Unit Commitment, Multi-Objective Programming, CO_2 Emissions, Goal Programming.