Editorial

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1 Introduction

The new millennium belongs to renewable energy sources as the world is increasingly looking for green and sustainable energy sources. Small hydropower energy is the most rapidly growing technology for renewable power generation. It is estimated that by 2020, at least 20% of the world's energy requirement is likely to be fulfilled by renewable energy out of which a considerable portion will come from hydro energy. Thus, it is an honour and pleasure to present this special issue on '*Small hydro power systems*'.
This special issue consists of nine papers from reputed researchers from different parts of the world. In these papers, different technical, energetic, economic and environmental aspects of small hydropower systems have been discussed.

2 Scanning the issue

The paper by Risa Morimoto and Munasinghe reviews the potential impacts of energy production and consumption on sustainable development in Sri Lanka. A case study of Sri Lanka is presented based on the application of sustainomics principles, including multi-criteria analysis to assess the role of small hydroelectric power projects. This type of analysis helps policy-makers to compare and rank project alternatives easily and effectively.

The paper by Aidan Foss et al. applies low-cost micro-controllers, data communications and personal computing to small hydro automation. Innovative low-cost simulation tools facilitate reduction in cost. The successful application of these technologies to the control and protection of a 2 MVA hydro generating unit is described.

The paper by Himani Goyal, T.S. Bhatti and D.P. Kothari proposes a new scheme for the speed control of small hydropower plant. A new model is proposed for controlling the flow by controlling the rotary motion of the spear valve or linear motion of the sluice gate by using the servomotor and the principle of servomechanism. An analogy of the conventional system is given with the proposed system using the principle of Type 0 Servomechanism. This scheme will provide complete control of the generation and thereby maintain the frequency of the system at the desired level.

The paper by Ramos and Almeida describes an analysis based on the hydrodynamic behaviour of the system through computer simulations and experimental tests. Special protection devices different from the classic one were selected to control overpressures induced by runaway conditions in small hydropower system. A spectral analysis is used here in order to identify the influence of each type of disturbance in the system response.

The paper by Nouni, Mullick and Kandpal presents the result of a techno-economic feasibility evaluation of some micro hydropower (MHP) plants being planned and implemented for remote village power supply in the state of Uttaranchal in India.

The paper by Kashem addresses islanding and anti-islanding issues of hydropower distributed generation and developed design criteria and solution for effective operation and control. In this paper, a current control scheme based on microprocessor-based line-tracking system is proposed for HPDG operation with grid system. A technique is developed to use islanding detection and anti-islanding protection of HPDG. The paper has also proposed guidelines for islanding operation of HPDG to improve quality and reliability of power supply. Control of over- and under-generated islanded systems with hydropower DG have been explored and criteria for islanding operation and resynchronisation when mains return are discussed.

The paper by Bansal et al. presents reactive power control of isolated wind-diesel-micro-hydro hybrid power system for realistic load disturbance using MATLAB/SIMULINK. The mathematical model of the system based on MATLAB/SIMULINK is developed.

The paper by Nigim discusses simulated control cases of the wound rotor self-excited induction generator WRSEIG. The generator external controller is designed to regulate the output voltage and frequency for constant or variable speed operation of the prime mover.

The paper by Taekil and Peter investigates the characteristics of single-phase induction generators. Many different winding and excitation capacitor configurations are investigated. This paper also includes laboratory test and simulation results.

Acknowledgements

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I am grateful to all the authors for contributing such precious and informative papers for this special issue of *IJGEI*. Thanks are also due to the reviewers who have spared their valuable time in reviewing different papers and thus enhancing their quality. I firmly believe that this issue will provide professionally relevant information and guidelines to all the stakeholders in the field of Small hydropower systems. I am extremely grateful to members of the editorial team headed by Professor Dorgham, Editor-in-Chief, *IJGEI*, for their immense contribution at every stage of preparation of this special issue. I acknowledge my deep appreciation for their efforts but for which this special issue would not have acquired its present shape.

Last but not the least, I would like to place on record my sincere thanks and appreciation of the immense and untiring efforts put in by my research scholar Ms. Himani Goyal in helping me at every stage of this project.