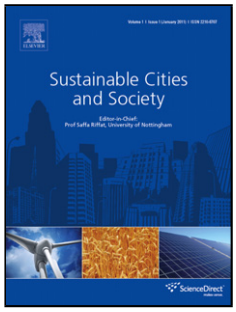

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Seeker Optimization Approach to Dynamic PI based Virtual Impedance Drooping for Economic Load Sharing between PV and SOFC in an Islanded Microgrid

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Highlights for review:

The major contributions of this paper are:

I. Hybrid micro sources are considered to increase the energy supply reliability.

II. Seeker optimized fuzzy tuned DPI controlled MP&O technique is proposed to assure the true and oscillation-free MPPto availthe maximum energy cost efficiency.

III. Seeker optimized fuzzy tuned DPI controlled modified Virtual Impedance Drooping is proposed to establishthe communication less power sharing between two micro sources such that the energy cost efficiency remains at its peak.

IV. A detailed comparison is performed for the proposed technique Seeker optimized fuzzy tuned DPI based MP&O and Seeker optimized fuzzy tuned DPI based VID with respect to the conventional MP&O and conventional VID.

V. THD calculation through FFT analysis of the load voltage and the load current are performed and the values are found to be well within the IEEE prescribed limits.

***Abstract*— Nowadays Load Sharing has been an emerging trend, necessary for the integration of multiple distributed generators (DGs) into the microgrid system through sophisticated power electronics converters. Proper sharing of load ascertains the utilities with increased energy cost efficiency, reliability, stability and protects the system from being overloaded. This work puts forth a novel control technique for proportional load sharing among parallel VSCs connected to an islanded microgrid in a distributed generating system consisting of Photovoltaic (PV) and Solid Oxide Fuel Cell (SOFC) as two micro sources. For tracking maximum solar energy a Mamdani Fuzzy Logic Controller (MFLC) based self-tuned Dynamic PI Controller (DPIC) is implemented for the Modified Perturb and Observe MPPT method. Also for the optimum cost management of the microgrid system, DPIC based communication less Virtual Impedance Drooping (VID) technique is implemented for suitable load sharing between the two hybrid micro sources. In order to further enhance the performance of the DPIC, the Membership function parameters are optimized using a heuristic computational algorithm named Seeker Optimization Approach (SOA). SOA computes the optimum value of the Membership function parameters for the MFLC and thus avoids the use of constant input valued parameters. The dynamic response and stability of the system with proposed method is compared and contrasted with DPIC during load**