INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study	:	Ph.D.

Thesis Title: The Solar Assisted Smart Public Transportation System and its Coordination with the Grid

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Thesis Submitted to the Department/ Center	:	Electronics and Electrical Engineering
Date of completion of Thesis Viva-Voce Exam	:	12-12-2017
Key words for description of Thesis Work	:	***Capa-bus, Electric bus, Electric vehicle, fuzzy logic controller, High capacity Energy storage device, transportation network, solar plant and supercapacitor.***

SHORT ABSTRACT

This thesis proposes the solar assisted smart public transportation system (SPTS) and it's interaction with the grid. SPTS consists of a specified number of electric bus stops that are present through the ring road of the Guwahati city, Assam, India. Every bus stop consists of a high capacity energy storage device (ESD) and these ESDs are responsible to communicate SPTS with the grid. ESDs receive energy from the grid during off-peak period and send its stored energy back to the grid during peak period. The charging and discharging performance of ESD mitigates the peak power demand of the grid (normally the grid remains under energy deficit condition during peak period). Also, ESD supplies energy to the electric buses (supercapacitor based energy storage system is used) for 24 h and performs the isolated operation of electric buses with the grid. The electric buses have been used to perform the mass transportation through the ring road of the Guwahati city. SPTS dependence on the grid has been reduced by providing a solar plant at every bus stop. The main contributions of the thesis are given as follows:

- The favorable energy has been utilized from both, the grid and the solar plant to reduce the SPTS dependence on the grid.
- The optimal numbers of electric buses have been determined in SPTS and also, verified its self-sustainability for the different failures that exist in the SPTS.
- The smart public transportation network expansion has been carried out and also, verified its response: for all the seasons of a year and for the uncertain situations that exist in the system.