GIS-BIM Based Virtual Facility Energy Assessment (VFEA) – Framework Development and Use Case of California State University, Fresno

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ABSTRACT

Assembly Bill 758 (AB758) of California Energy Commission (CEC) incentivizes radical improvement of energy performance in existing buildings. Execution of AB758 relies heavily on building performance data and energy assessment. Traditionally, building performance data are not available for public consumption, while energy assessment is complex and time-consuming to conduct. Thus, a Virtual Facility Energy Assessment (VFEA) strategic planning tool is proposed built upon the robust integration of Geographic Information Systems (GIS) and Building Information Modeling (BIM) with a cloud infrastructure. For owners with large portfolios of facilities, such as the California State University (CSU) system, VFEA can leverage location-based building information, dynamic simulation capacity of BIM and wireless sensor network (WSN) for real-time building energy performance detection, visualization, analysis and optimization across campuses. It provides stakeholders a dynamic and holistic virtual assessment for energy performance of buildings that are geographically dispersed. VFEA offers conceptual yet informative suggestions in the decision-making process directed to meet the AB758 requirements. This paper conducted the feasibility analysis, established the system framework of VFEA, and discussed the use case of CSU, Fresno campus for VFEA implementation.