Abstract:
In the context of increasing greenhouse gas emission and global demographic change with the simultaneous trend to urbanization, it is a big challenge for cities around the world to perform modifications in energy supply chain and building characteristics resulting in reduced energy consumption and carbon dioxide mitigation. Sound knowledge of energy resource demand and supply including its spatial distribution within urban areas is of great importance for planning strategies addressing greater energy efficiency. The understanding of the city as a complex energy system affects several areas of the urban living, e.g., energy supply, urban texture, human lifestyle, and climate protection. With the growing availability of 3D city models around the world based on the standard language and format CityGML, energy system modelling, analysis and simulation can be incorporated into these models. Both domains will profit from that interaction by bringing together official and accurate building models including building geometries, semantics and locations forming a realistic image of the urban structure with systemic energy simulation models. A holistic view on the impacts of
energy planning scenarios can be modelled and analyzed including side effects on urban texture and human lifestyle. This paper focuses on the identification, classification, and integration of energy-related key indicators of buildings and neighbourhoods within 3D building models. Consequent application of 3D city models conforming to CityGML serves the purpose of deriving indicators for this topic. These will be set into the context of urban energy planning within the Energy Atlas Berlin. The generation of indicator objects covering the indicator values and related processing information will be presented on the sample scenario estimation of heating energy consumption in buildings and neighbourhoods. In their entirety the key indicators will form an adequate image of the local energy situation for decision making. An approach for extending the CityGML standard for the explicit storage of these indicators in relation to the according city object will be given by using the concept of CityGML Application Domain Extension (ADE). The aim of this approach is to initiate a discussion process for the specification of a standardized data model extension concerning energy assessment into 3D CityGML models, which facilitates the application of the Energy Atlas decision support concepts within other city models conforming to this standard.

Stichworte: CityGML; Energetic City Planning; Energetic Key Indicators; Energy Assessment; Energy Atlas Berlin; Urban Energy System; Urban Information Model; 3D City Models; LOCenter; LOCTop_Urban_Information_Modeling_Virtual_3D_City_Model; LOCTop_Semantic_modeling; GISPro_EnergyAtlas; GISPro_Ndemo; GIStop_Energy; GIStop_CityModeling; GIStop_CitySystemModeling

Kongress- / Buchtitel: Proceedings of the ISPRS Congress 2012 in Melbourne
Band / Teilband: XXXIX-B2
Verlag / Institution: ISPRS
Jahr: 2012
Monat: Jul
Seiten: 145--150
Serientitel: ISPRS International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences
Serien-ISSN: 1682-1777
Occurences: · Einrichtungen > Fakultäten > Ingenieurfakultät Bau Geo Umwelt > Lehrstühle > Leonhard Obermeyer Center > Lehrstuhl für Geoinformatik (Prof. Kolbe) > 2012

entries: