Accepted Manuscript

Title: Changing climate: The effects on energy demand and

human comfort

Author: Kelly Kalvelage Ulrike Passe Shannon Rabideau

Eugene S. Takle

PII: S0378-7788(14)00228-X

DOI: http://dx.doi.org/doi:10.1016/j.enbuild.2014.03.009

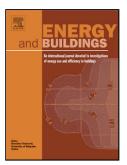
Reference: ENB 4901

To appear in: *ENB*

Received date: 28-10-2013 Revised date: 6-3-2014 Accepted date: 7-3-2014

Please cite this article as: K. Kalvelage, U. Passe, S. Rabideau, E.S. Takle, Changing climate: The effects on energy demand and human comfort, *Energy and Buildings* (2014), http://dx.doi.org/10.1016/j.enbuild.2014.03.009

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Changing climate: The effects on energy demand and human comfort

Kelly Kalvelagea*, Ulrike Passea, Shannon Rabideaub, Eugene S. Takleb

a Department of Architecture, Center for Building Energy Research, College of Design, Iowa State

University, Ames, Iowa 50011, United States, kellyk@iastate.edu, cber@iastate.edu

^b Atmospheric Science Program, Department of Geological and Atmospheric Sciences, Center for

Building Energy Research, Iowa State University, Ames, Iowa 50011

*Corresponding author: Tel.: 1 515 720 9636

Abstract

Typical climate conditions for the 20th century do not adequately describe the potential extreme conditions that will be encountered over the lifetime of buildings constructed today. We develop future typical meteorological year datasets that describe ambient environmental conditions that we utilize in the design and modifications of buildings to maintain human thermal comfort. Our use of multiple climate model scenarios provides uncertainty of the calculations of future energy demand. Going beyond previous studies, our results show that future energy demand by current buildings in the U.S. will decline for heating, and will increase for cooling. The increased air temperature poses a new challenge of increased humidity that will cause uncomfortable interior conditions for occupants. We identify the

building features required for maintaining current thermal comfort understanding in future U. S. climates.

Download English Version:

https://daneshyari.com/en/article/6733807

Download Persian Version:

https://daneshyari.com/article/6733807

<u>Daneshyari.com</u>