



Analysis on energy–water nexus by Sankey diagram: the case of Beijing

Guangping Hu^a, Xunmin Ou^{a,*}, Qian Zhang^a, Valerie J. Karplus^b

^a*Institute of Energy, Environment and Economy, Tsinghua University, Beijing 100084, China*

Email: ouxm@mail.tsinghua.edu.cn

^b*MIT Joint Program on the Science and Policy of Global Change Cambridge, MA 02139-4307, USA*

Received 1 February 2012; Accepted 8 June 2012

ABSTRACT

We visualize water utilization in Beijing from source to service and onwards to destination using Sankey diagram to analyze the energy–water nexus at the city level. First, we describe the methodology, definition, and data and apply the Sankey diagram approach. Beijing faces highly constrained water resources and relies heavily on water that is energy-intensive to supply (such as underground water or water that must be conveyed over long distances). We find that the electricity required for water supply, treatment, utilization, and post-use utilization comprised about 5–7% of total electricity consumption in Beijing in 2009. We further find that water used in the energy-related sub-sectors accounted for about one-fourth of the water used in the whole industrial sector and about of 3% of the total fresh water used in Beijing in 2009. Among the energy related sub-sectors, the electricity sub-sector was found to be the largest contributor.

Keywords: Beijing; Water; Energy; Electricity; Sankey

*Corresponding author.

The Sixth Dubrovnik Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES 2011), 25–29 September 2011, Dubrovnik, Croatia