THE CHALLENGE OF INTRODUCING AN EXERGY INDICATOR IN A LOCAL LAW ON ENERGY

D.Favrat[1], F.Marechal
Industrial Energy Systems Laboratory, Ecole Polytechnique Fédérale de Lausanne (EPFL)
O. Epelly
Cantonal Energy Service (ScanE), Etat de Genève

ABSTRACT
Extending the idea of exergy to practitioners and policy makers is still a major challenge. Recently the "Canton of Geneva" in Switzerland introduced a new law governing the procedures of attribution of building permits for new or retrofitted city areas. Authorities were asked to define a procedure including the calculation of an exergy indicator to be quantified in each file submitted for acceptance of large projects. This paper summarizes the problem definition, a clarification of the limits expected from the exergy indicator as well as the excel tool and the tables used to facilitate this quantification both for heating and air conditioning. For simplification the overwhole system was divided into a superstructure formed by four subsystems including the room convector, the plant of the building, a possible district heating and cooling plant and an external power plant. Three temperature ranges were considered for the building distribution networks both in heating and cooling. In a first approach it was accepted that the exergy efficiency would not be indicative of the relative use of renewable versus non renewable. Ten different technology combinations were considered ranking from the lowest heating exergy efficiency with nuclear electricity and joule heating to the best efficiency with hydroelectricity and District heating electric heat pumps using lake water. For nuclear plants the exergy efficiency was assimilated to be the standard electrical First Law efficiency, which we know is misleading (Haldi, Favrat Ecos2004) but it was strategically not the place to generate controversy on that issue. For most technology combinations the net exergy efficiency is the product of the exergy efficiency of the subsystems to be considered. Although the effectiveness of this introduction is not yet fully assessed the major benefit so far has been the renewed awareness of the interest of having low heating and high cooling temperatures of the building networks

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[1] Corresponding Author: tel: +41 21 6932511; fax: +41 21 6933502; e-mail: daniel.favrat@epfl.ch