

THE ECONOMICS OF CONNECTING OF SMALL BUILDINGS TO GEOTHERMAL DISTRICT HEATING SYSTEMS

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ABSTRACT

Many of the communities co-located with geothermal resources are very small and as a result the buildings they contain tend to be small as well. Generally, small buildings (10,000 ft²) use heating systems which are not hot water based. Since geothermal district heating systems deliver hot water, the costs associated with the conversion of small building heating systems to use hot water for heating is an issue of great influence in terms of the potential development of such systems. This paper examines the typical retrofit costs associated with conversion of small buildings and the level of savings necessary to attract the interest of owners. In general, the prospects for connection of such buildings based only on energy savings is not positive.

INTRODUCTION

Recently renewed interest has been expressed in district heating¹ as a potential application for low temperature geothermal fluids. To some extent this has been driven by a publication (Boyd, 1996) in which 271 communities were identified as being co-located with geothermal resources. Beyond that, the availability of a software tool (WSU, undated) which can be used for evaluating the economics of distribution systems for district heating, has made the process of feasibility study more convenient.

Evaluations of geothermal district heating (GDH) systems often focus heavily on the resource, central mechanical facilities and distribution piping. While it is true that these components do constitute the bulk of the capital costs for the system and without careful design of these components a system cannot be brought to fruition, it is equally true that a system cannot be successfully developed without customers. In the world of simulation, virtual customers can be expected to connect to any system the modeler creates. Real customers however require a reasonable economic incentive to connect. In the small building size range typically found at most of the co-located sites, the economics associated with connecting to a geothermal district heating system may include some substantial economic hurdles for building owners.

1. The term “district energy” is often used in describing these systems. It is a useful term for marketing purposes and to describe systems in which both heating and cooling (and electricity in some cases) are delivered to the customer. Low temperature geothermal resources are capable of supporting only district heating and this is the term that will be used in this paper.