To avoid corrosion, the dissolved oxygen has to be removed. This can by done by boiling or adding chemicals, which react with the oxygen. Addition of sodium sulphite to the water is widely used. Dissolved oxygen and hydrogen sulphide cannot exist together in solution (or only to a certain extent). Sulphide is therefore a good natural eliminator of dissolve oxygen if it enters the system from the atmosphere for example in storage tanks (Figure 5). The empirical results from Reykjavik Energy show that 1.6 ppm of hydrogen sulphide is needed to remove 1 ppm of dissolved oxygen. This indicates that the reaction is not only sulphate production as shown in the reaction $S^{--} + 2O_2 = SO_4^{--}$ where 0.5 ppm of sulphide is needed for each 1 ppm of dissolved oxygen

BENEFITS OF GEOTHERMAL DISTRICT HEATING IN REYKJAVIK

Clean air in one of the main benefits of utilizing geothermal energy for space heating, and it has also influence the health of the inhabitants. Clean air and reduction of coal-soot and other particles are undoubtedly the main reason. Other benefits of the use of geothermal energy for district heating is that the energy is in all cases domestic, and fossil fuels do not have to be transported. Geothermal water for house heating is very compatible in price compared to other alternatives (figure 6), especially if environmental issues are taken into account. Space heating using geothermal water also allows cascading uses such as for swimming pools, green-houses, heated garden conservatories and snow melting.

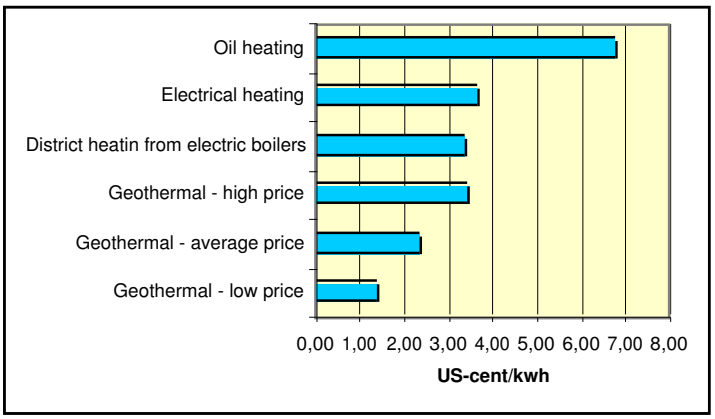

Figure 6: Comparison of prices of different heating sources for house heating in Iceland

FUTURE OF DISTRICT HEATING IN REYKJAVIK

Almost all houses in Reykjavik and surrounding communities are heated with water from geothermal fields (99.9%). The increase of inhabitants in this area is around 3-4 % per year. The low-temperature geothermal fields in Reykjavik are now fully utilized. Therefore the future energy for heating will come from the high-temperature fields in the Hengill area. Orkuveita Reykjavíkur is now developing the Hellisheidi geothermal field on the southern site of the Hengill complex. Deep research drilling was started in 2001 by drilling two wells, followed by the drilling of three wells in 2002 and two wells during the summer of 2003. Production drilling has started as well as construction of a 120 MW electrical and 400 MW thermal plant.

REFERENCES

Gunnlaugsson, E. and Gíslason, G. (2003). District heating in Reykjavík and electrical production using geothermal energy. Paper submitted to: *International Geothermal Conference on Multiple Integrated Use of Geothermal Energy*, Reykjavík 14-17, September 2003.

Gunnlaugsson, E., Gíslason, G., Ívarsson, G., Kjaran, S.P., (2000). Low–temperature geothermal fields utilized for district heating in Reykjavík. *Proceedings of the World Geothermal Congress 2000*, Japan. pp 831-835.

Samorka home page – www.samorka.is