Policies for Aquifer Thermal Energy Storage (ATES)

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Aquifer thermal energy storage (ATES) is a promising technology for sustainable and climate-friendly space heating and cooling. Compared to conventional heating and cooling techniques, ATES-based systems offer several benefits such as lower greenhouse gas emissions and reduced primary energy consumption. Despite these benefits and the availability of suitable aquifers in many places around the world, ATES has yet to see a widespread global utilization. Currently the vast majority of installed systems is located in the Netherlands, Belgium, Sweden and Denmark. Besides technical and hydrogeological feasibility, appropriate national policies driving ATES deployment are therefore of high importance. Hence, this study provides an international comparison of ATES policies, highlighting best practice examples and revealing where appropriate policy measures are missing. To this end, multi-disciplinary views from experts in geothermal energy and ATES from academia, companies, government authorities, national geological surveys and industrial associations in 30 countries were obtained through an online survey. Subsequent semi-structured interviews with a smaller selection of experts revealed further insights. The online survey results show significant differences regarding the existence and the strength of supporting policy elements between countries of different ATES market maturity. Going beyond these descriptive findings, the interviews provided more country-specific details on how favorable conditions came into effect and what obstacles have still to be overcome for an increased ATES deployment. Based on the lessons learned from the online survey and the expert interviews, recommendations for sophisticated ATES policies are derived which address the following areas: legislative and regulatory issues, raising awareness and expertise, the role of ATES in local energy transitions, and social engagement. This work aims at steering energy policy towards a wider international ATES deployment and better harnessing the potential of ATES to decarbonize buildings.