**Driven Geothermal Energy Pile Foundation for Heating/Cooling Buildings**

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Geothermal energy piles also known as thermal piles or energy foundations or energy piles are a direct adoption of vertical borehole closed loop ground source heat pump (GSHP) technology into concrete pile foundations where closed heat exchanging loops are installed within the pile. Energy piles have great potential of improving energy efficiency of a new building resting on pile foundation by using ground as heat source/sink to provide building space heating/cooling. Energy pile foundations of a building are being used as heat source during the winter to keep the building warm and heat sink during the summer to keep the building cool. Recently, the use of thermal piles especially in European countries such as Austria, Switzerland, Germany and UK, has increased significantly as European Union is committed to reduce greenhouse gas emission to 50% below 1990 levels by 2030 as set out in the Glasgow Agreement. We have developed a novel and innovative driven energy pile solution (patent pending) that can covert concrete pile foundations into thermal battery. The talk is going to explain this emerging technology and innovative solution for heating/cooling buildings.

**Biography:** Rao Martand Singh is a Professor of Geotechnical Engineering at the Department of Civil and Environmental Engineering, NTNU, Norway. He is mainly carrying out his research in the field of Energy and Environmental Geotechnics doing physical and numerical modelling of heat, moisture and gas transport in porous media. Currently, he is leading a project related to Geothermal Driven Energy Pile investigating potential of Energy Piles for heating buildings in Norwegian conditions. He has received funding from EPSRC, UK; NFR, Norway and EU in the field of Geothermal Energy for Heating/Cooling. He is leading working groups in two EU Cost Action projects viz. Geothermal DHC and FOLIAGE. Previously he worked in various academic roles at the University of Surrey, UK, Monash University, Australia and Cardiff University, UK. Prof Singh has got 15 years of international experience in the area of geothermal energy pile foundations, energy tunnels, energy walls, soil-structure interaction, and thermo-hydro-mechanical (THM) behaviour of unsaturated clays and geosynthetics. His research has been awarded in the form of best paper awards in 2013, 2016 and 2017 from prestigious international journals including ICE.