

DOCKETED	
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Description:	2C. Dimitri Saad, Stanford University
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Stanford
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School of
Sustainability

The Potential of Enhanced Geothermal Systems in Decarbonizing the Electric Power and Industrial Sectors

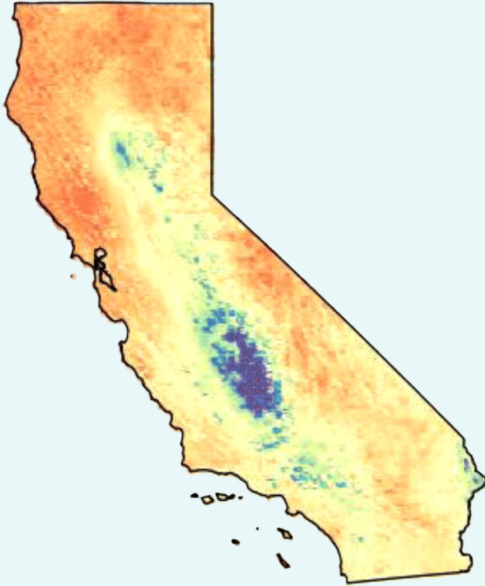
Mohammad “Jabs” Aljubran, **Dimitri Saad**, Mo Sodwatana, Adam Brandt, & Roland Horne
Department of Energy Science & Engineering, Stanford University
IEPR Workshop on Geothermal Resources

June 19th, 2026

Geothermal energy can play a role in multiple economic sectors

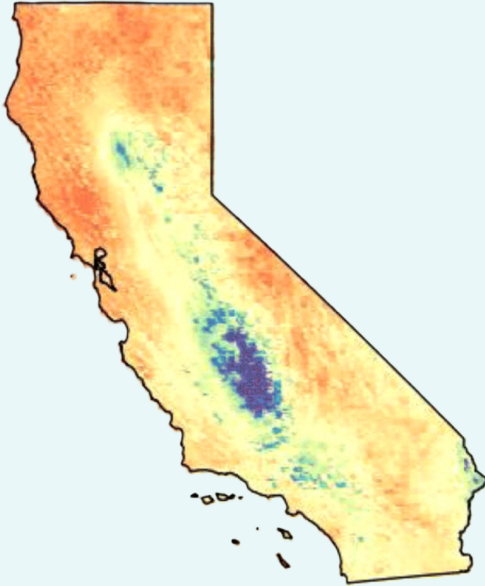
Geothermal energy can play a role in multiple economic sectors

Electric Power Sector

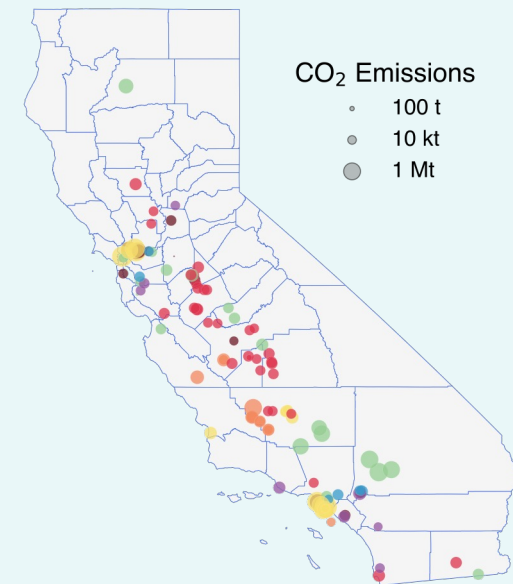


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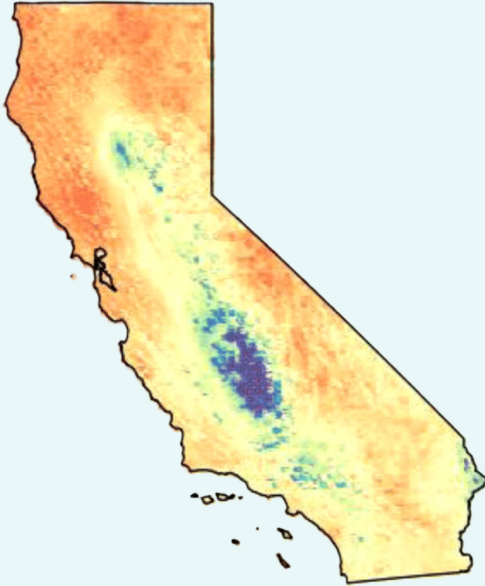


Industrial Sector

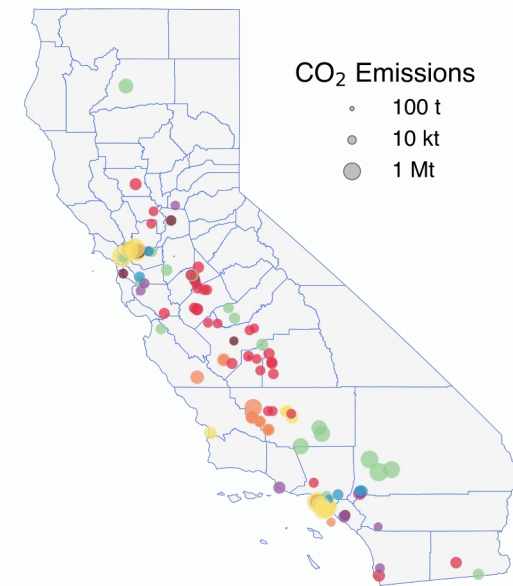


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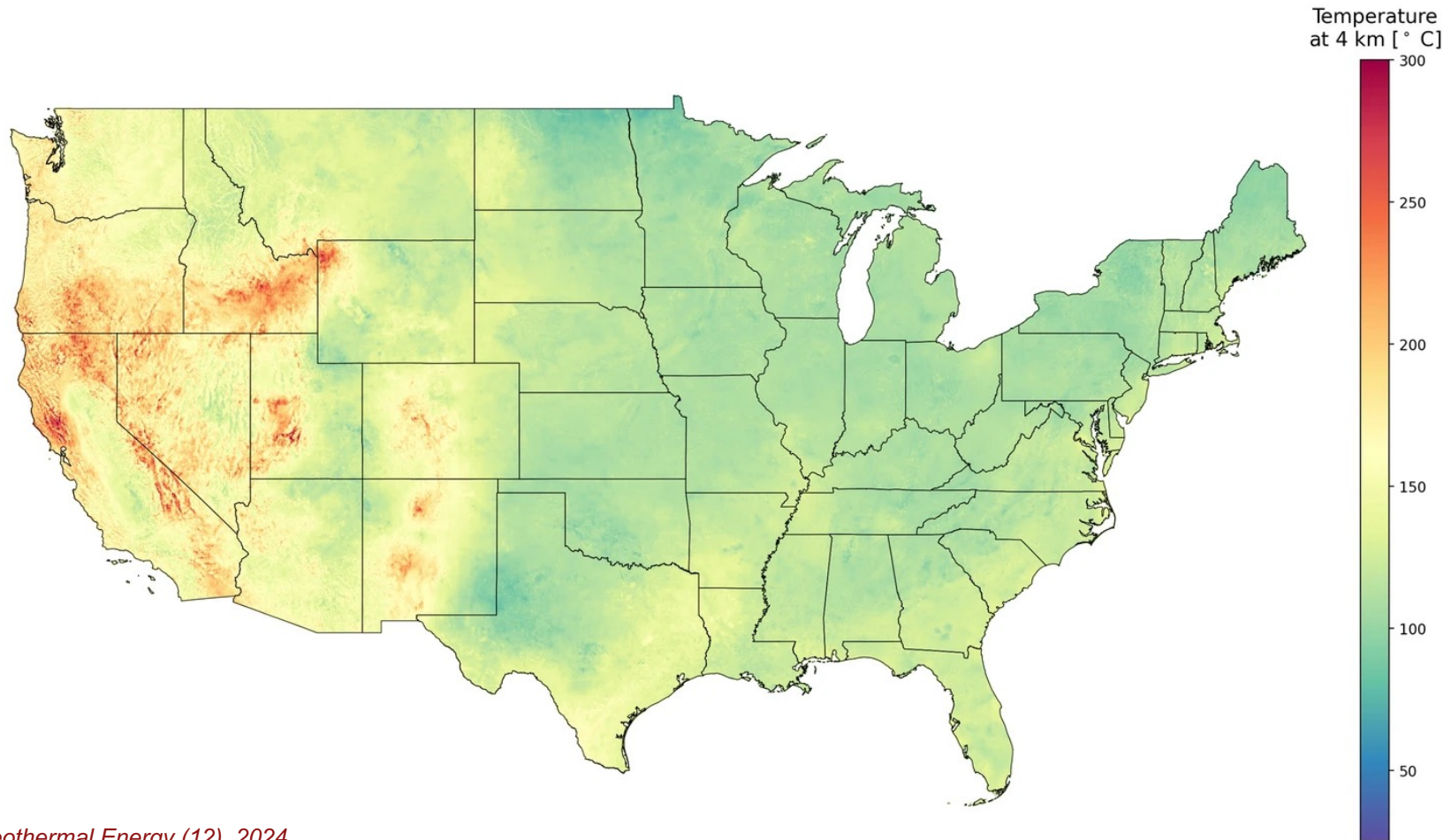


Industrial Sector



California is home to extensive geothermal resources

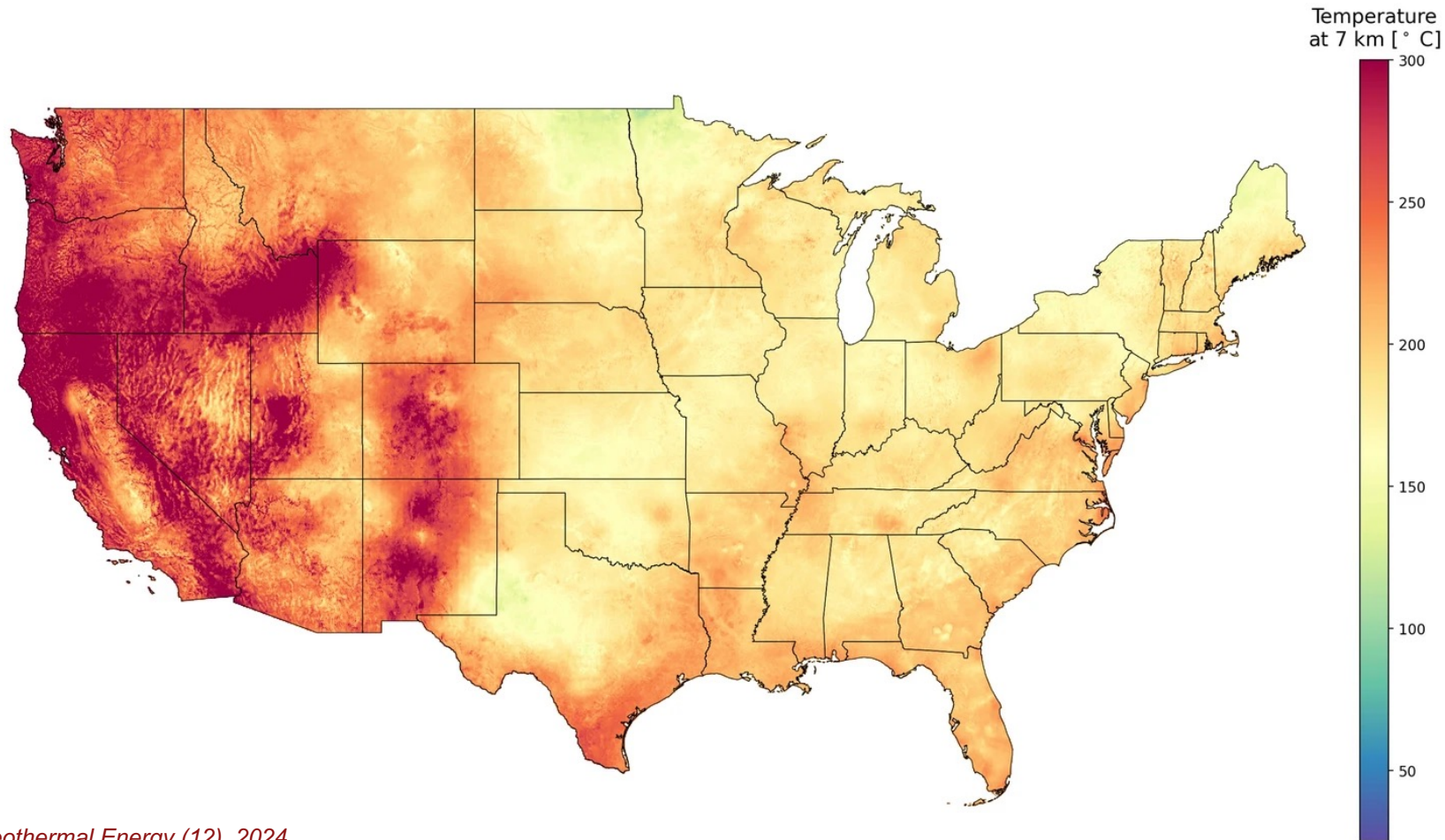
At 4 km of drilling depths



¹ M.J. Aljubran & R.N. Horne; *Geothermal Energy* (12), 2024

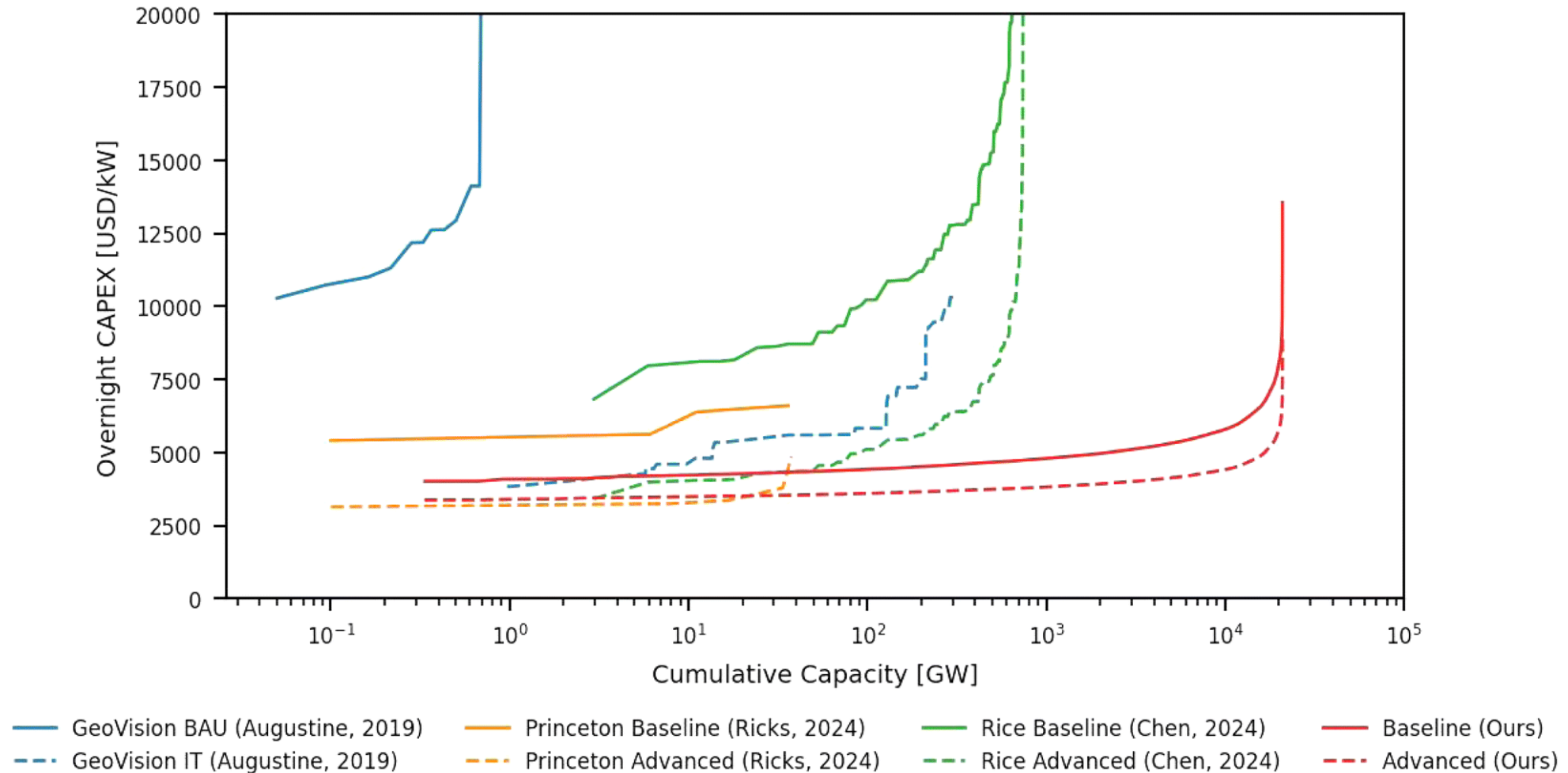
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At 7 km of drilling depths



¹ M.J. Aljubran & R.N. Horne; *Geothermal Energy* (12), 2024

Data developments show lower geothermal costs in California



¹ M.J. Aljubran, D.M. Saad, M. Sodwatana, A.R. Brandt, R.N. Horne; *Sustainable Energy & Fuels* (9), 2025

Designing a pathway to a net-zero California

Designing a pathway to a net-zero California

Goal:

Build & operate the least-cost gas-electricity energy system
using the BRIDGES energy systems model

¹ G. Von Wald, K. Sundar, E. Sherwin, A. Zlotnik, A. Brandt; *Advances in Applied Energy* (6), 2022

² D.M. Saad, M. Sodwatana, E.D. Sherwin, A.R. Brandt; *Applied Energy* (385), 2025

³ M.J. Aljubran, D.M. Saad, M. Sodwatana, A.R. Brandt, R.N. Horne; *Sustainable Energy & Fuels* (9), 2025

⁴ M. Sodwatana, D.M. Saad, M. Ahumada-Paras, A.R. Brandt; *Applied Energy* (390), 2025

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While also:

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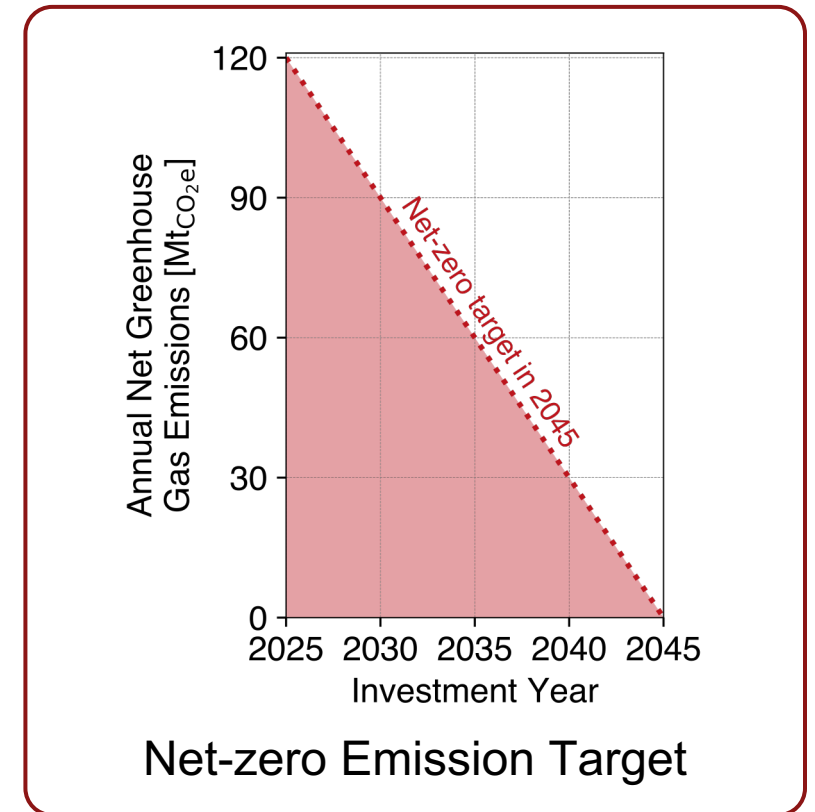
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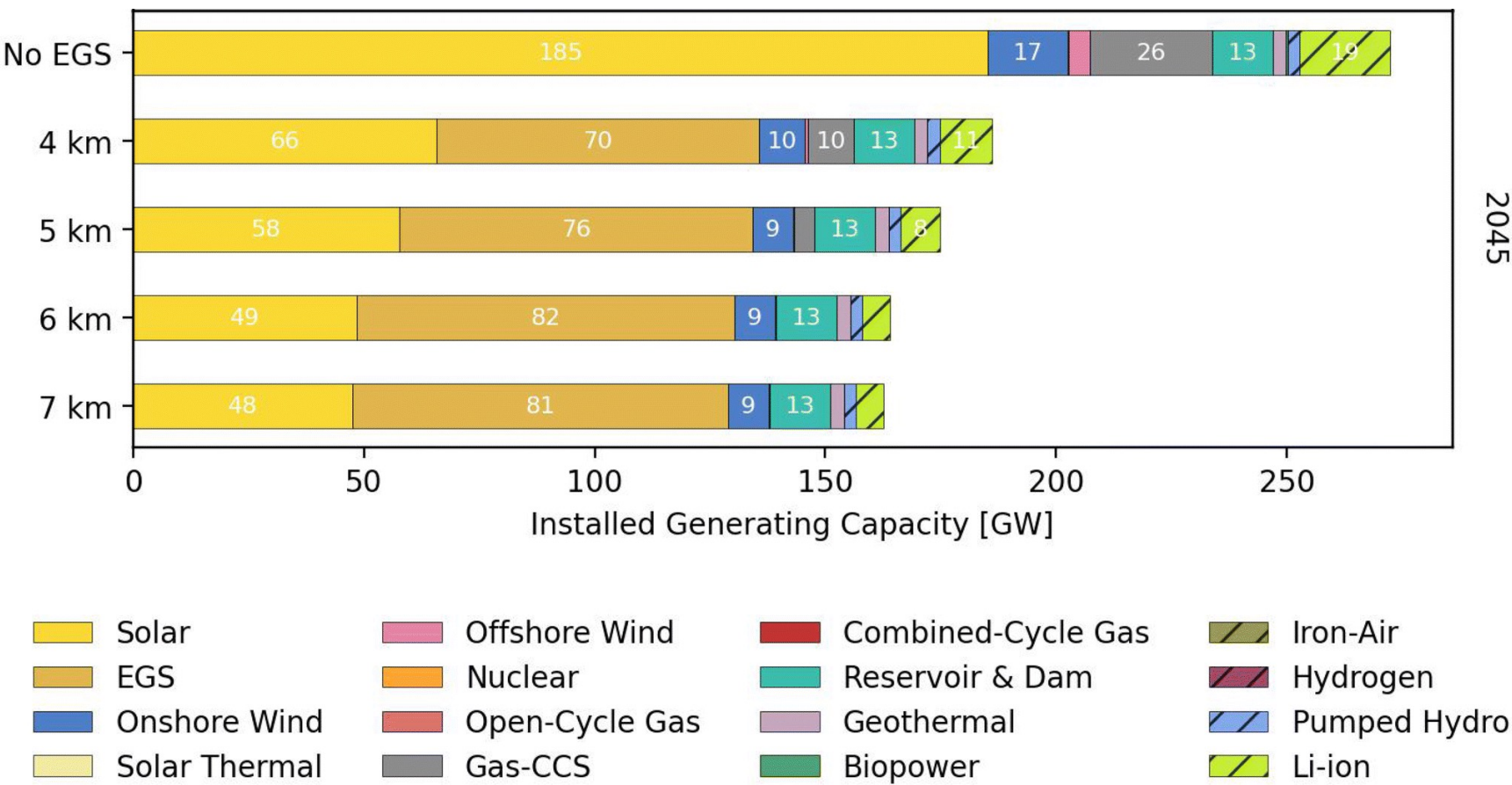
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⁵ Executive Department, State of California. "Executive Order B-55-18 to achieve carbon neutrality", 2018

We find that EGS reduces the system size of the grid

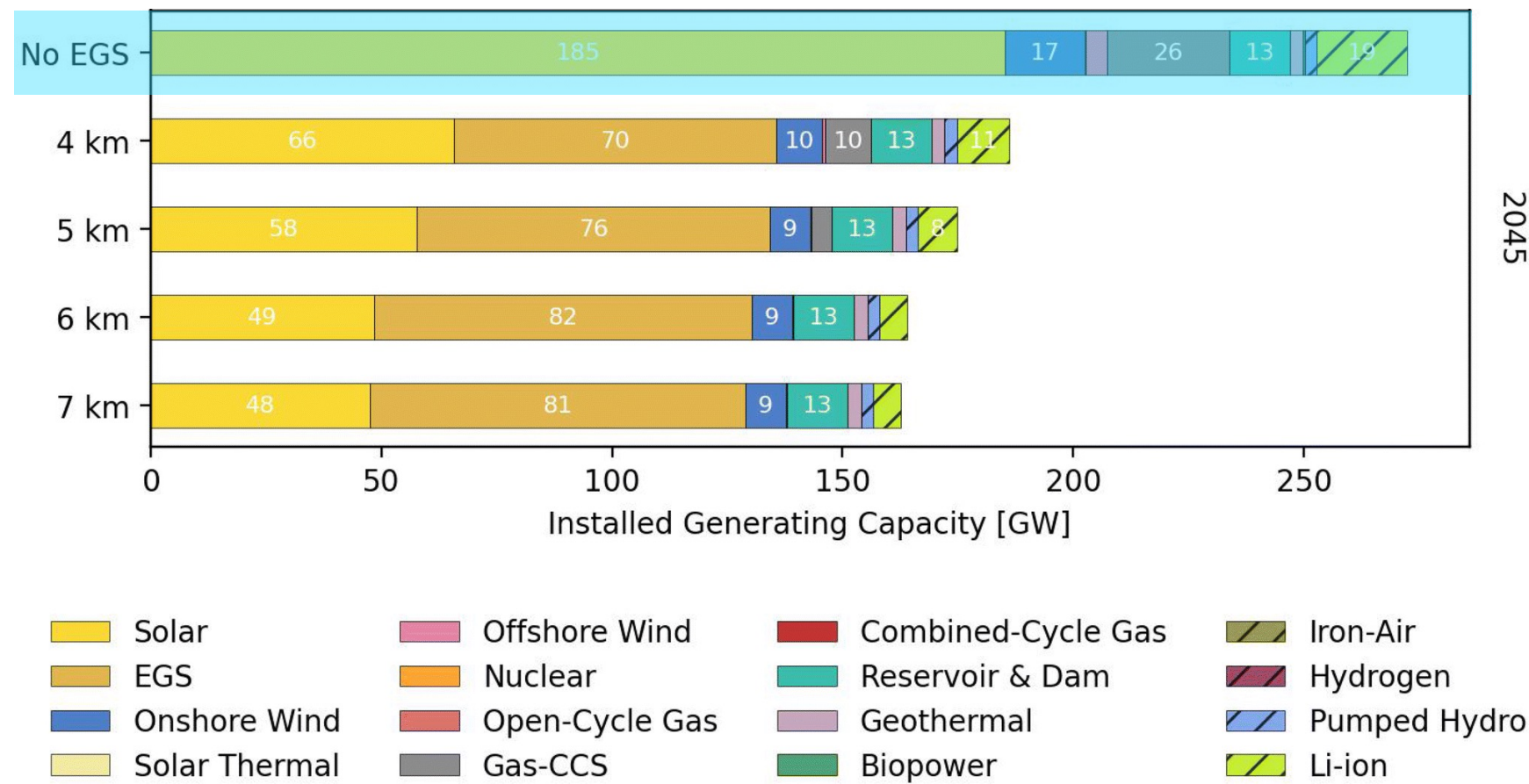
Least-cost electricity generation capacities in 2045



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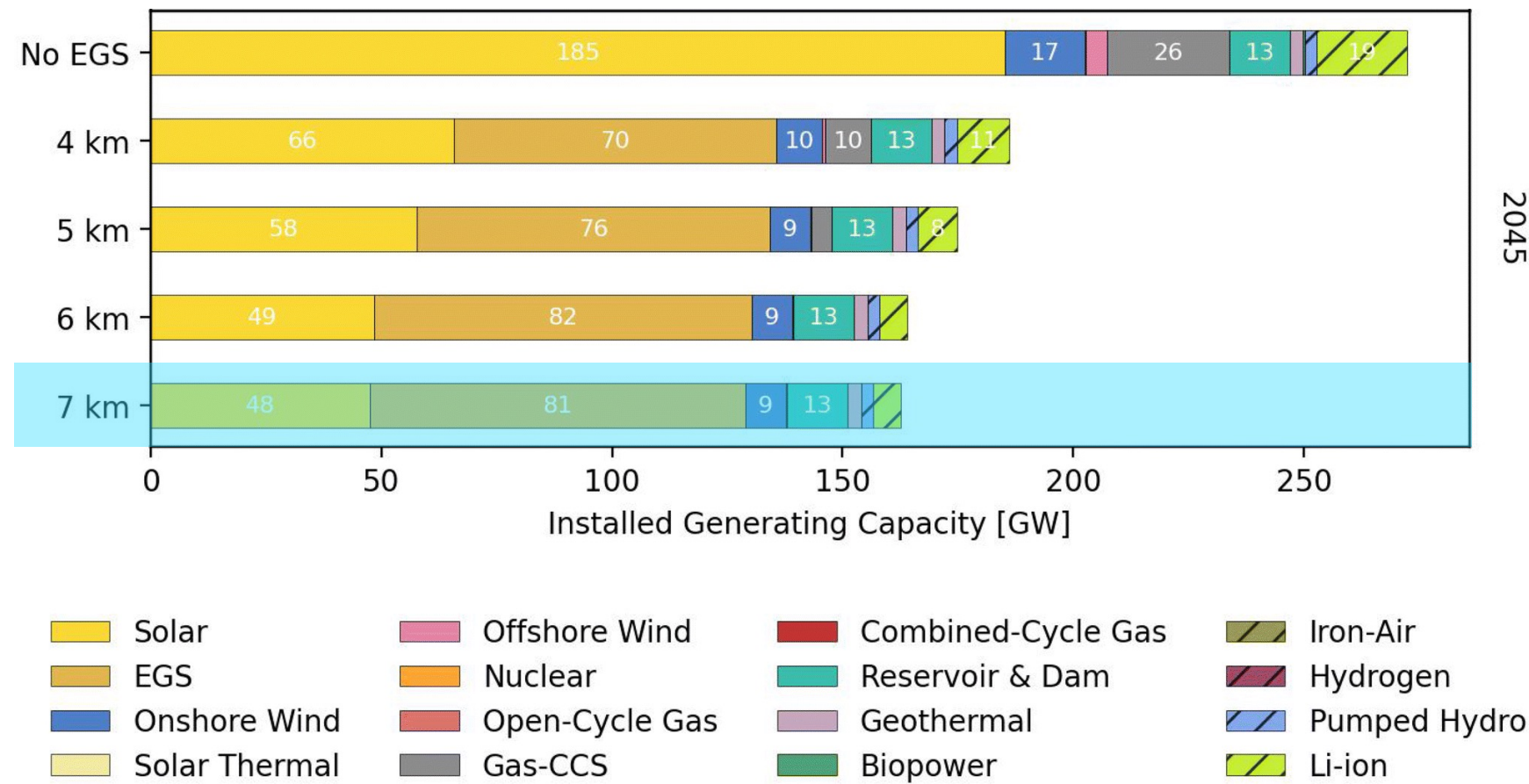
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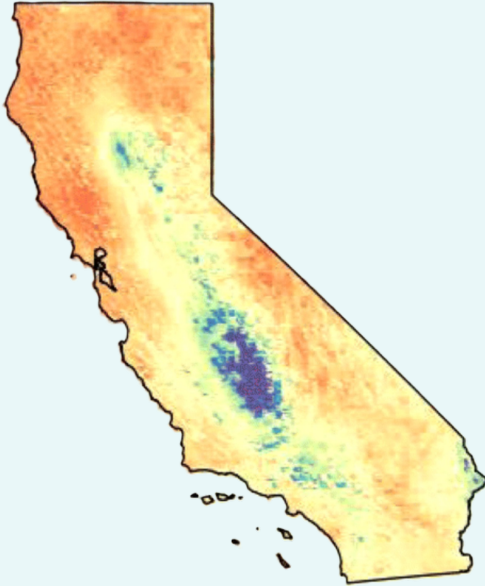
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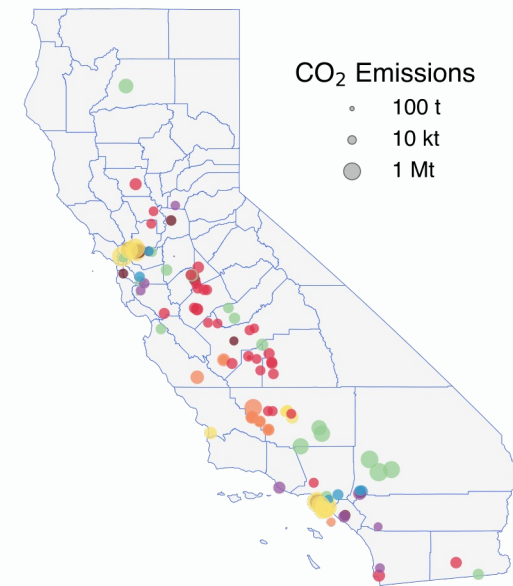
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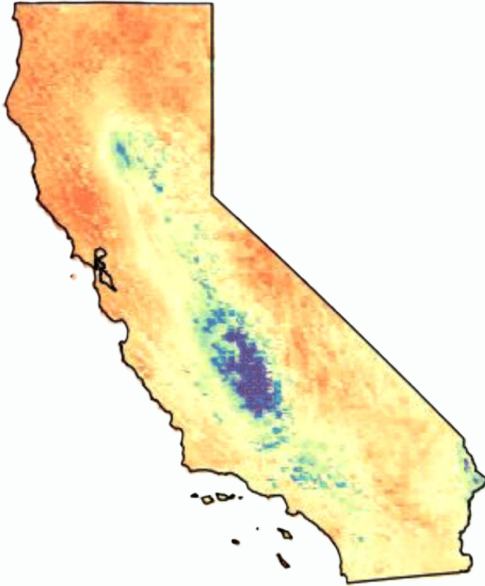


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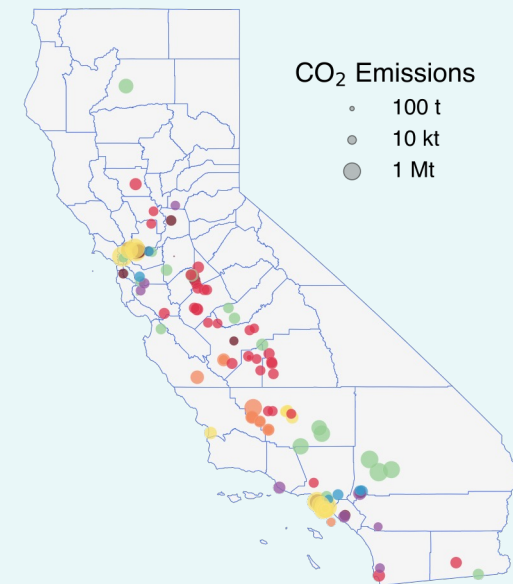


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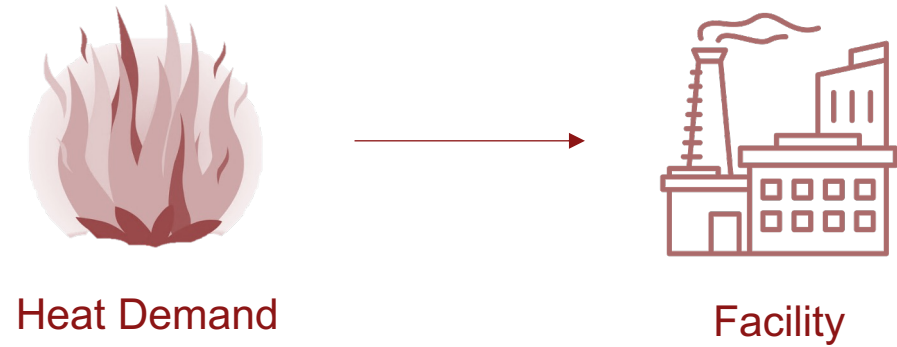
Can EGS reduce emissions from industrial process heat?

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Facility

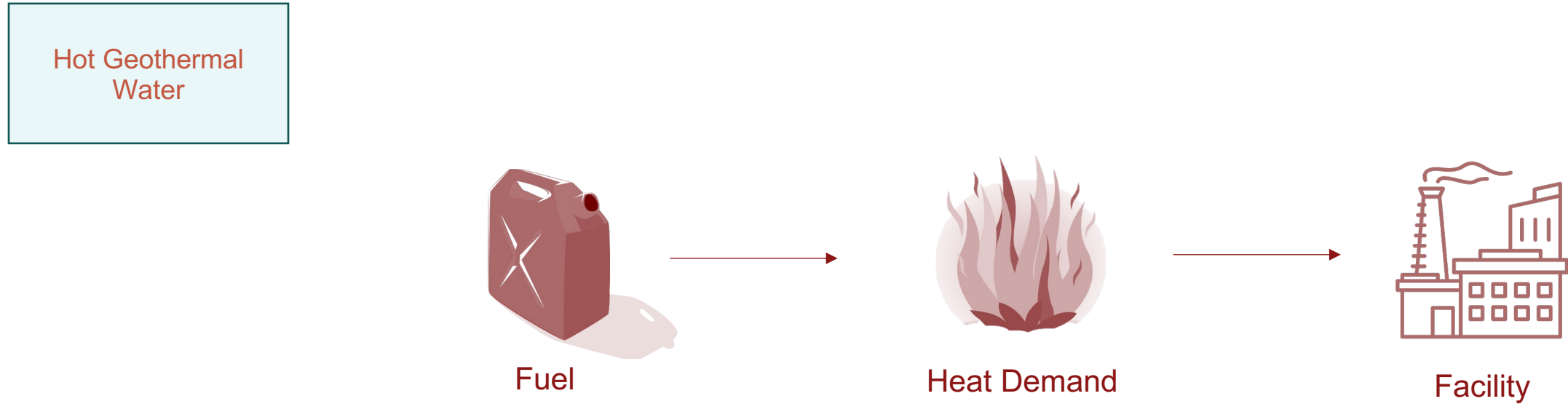
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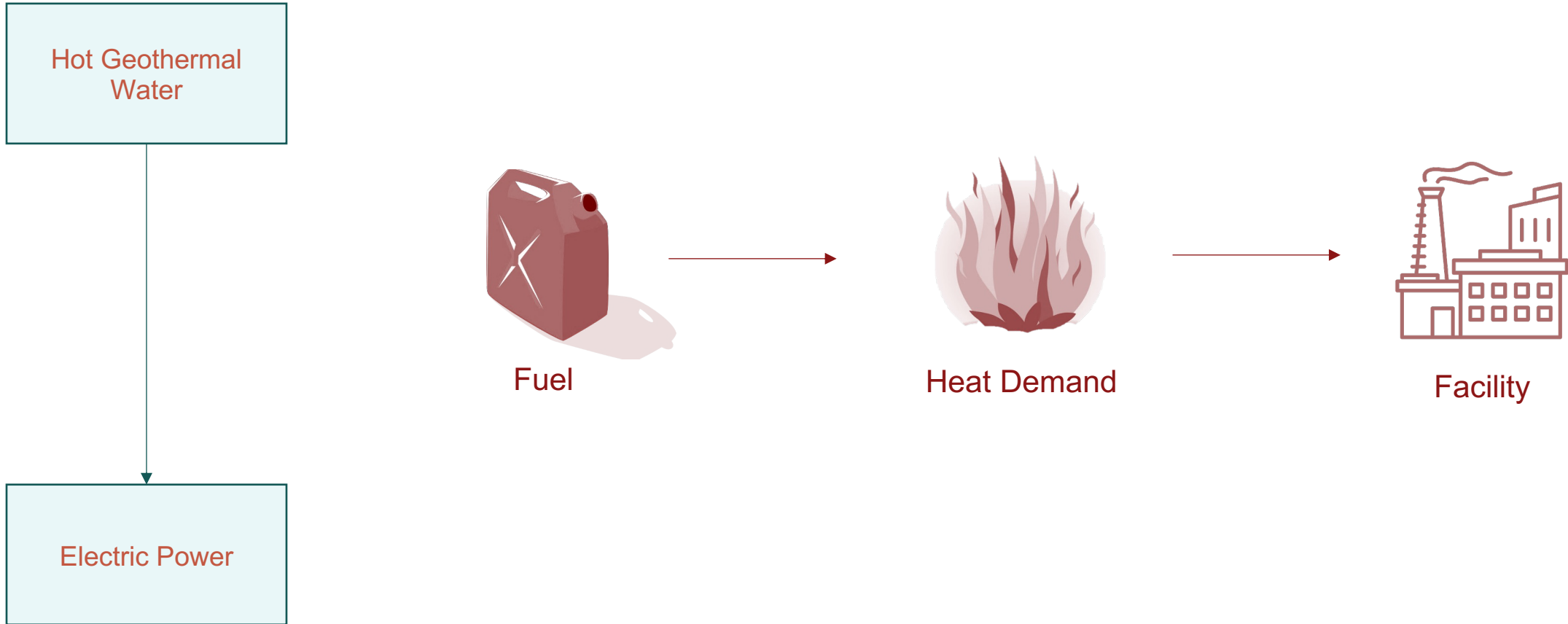
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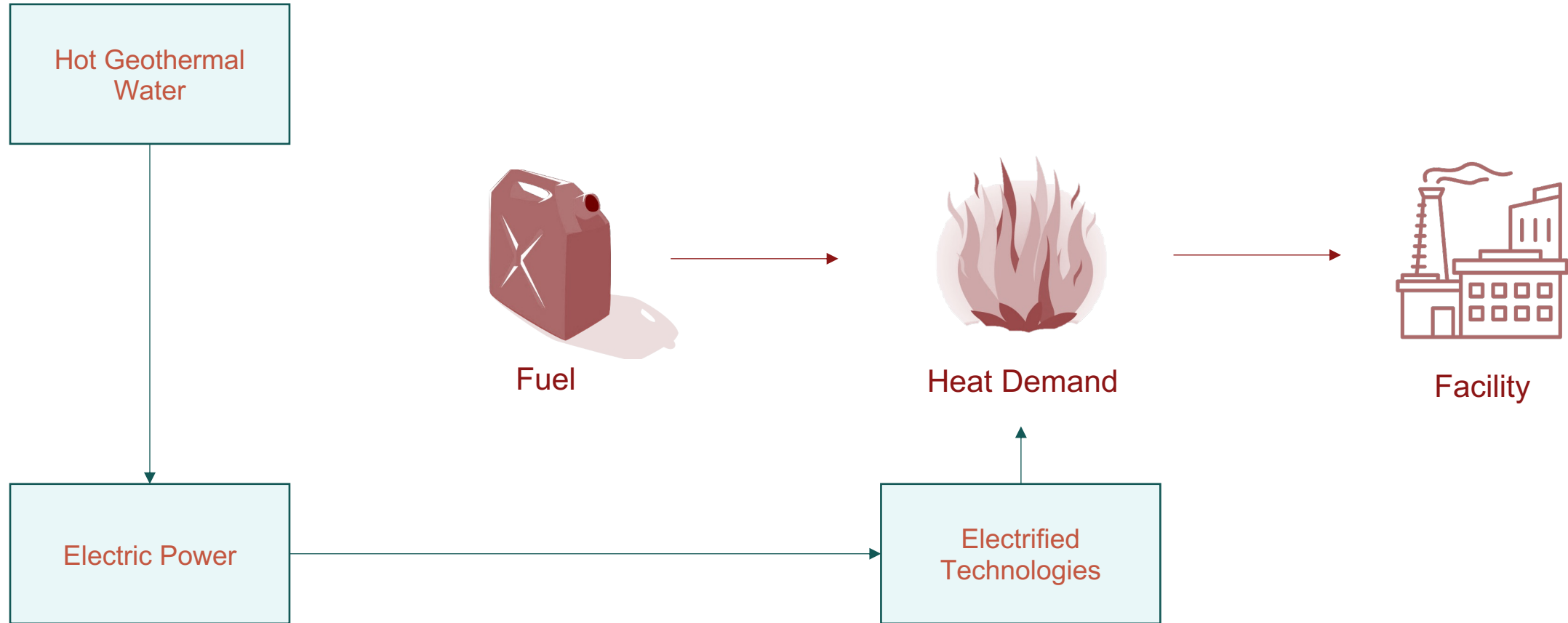
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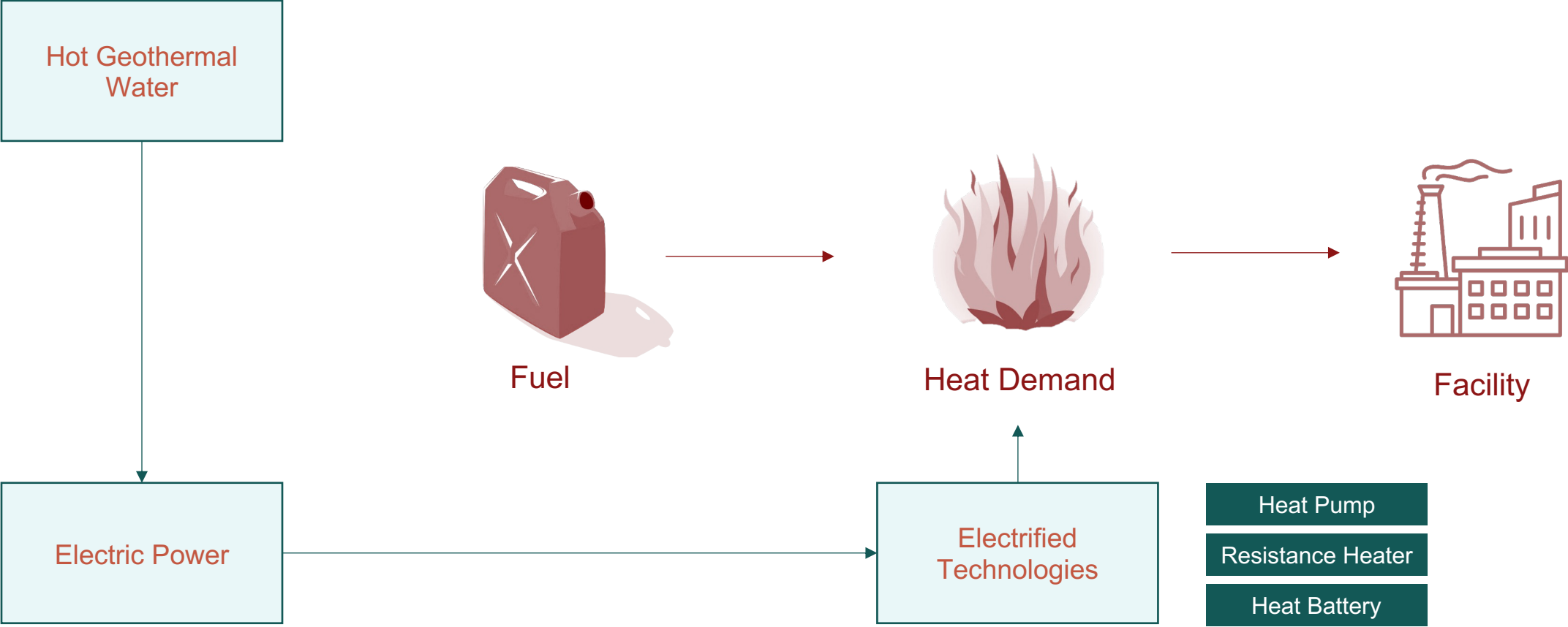
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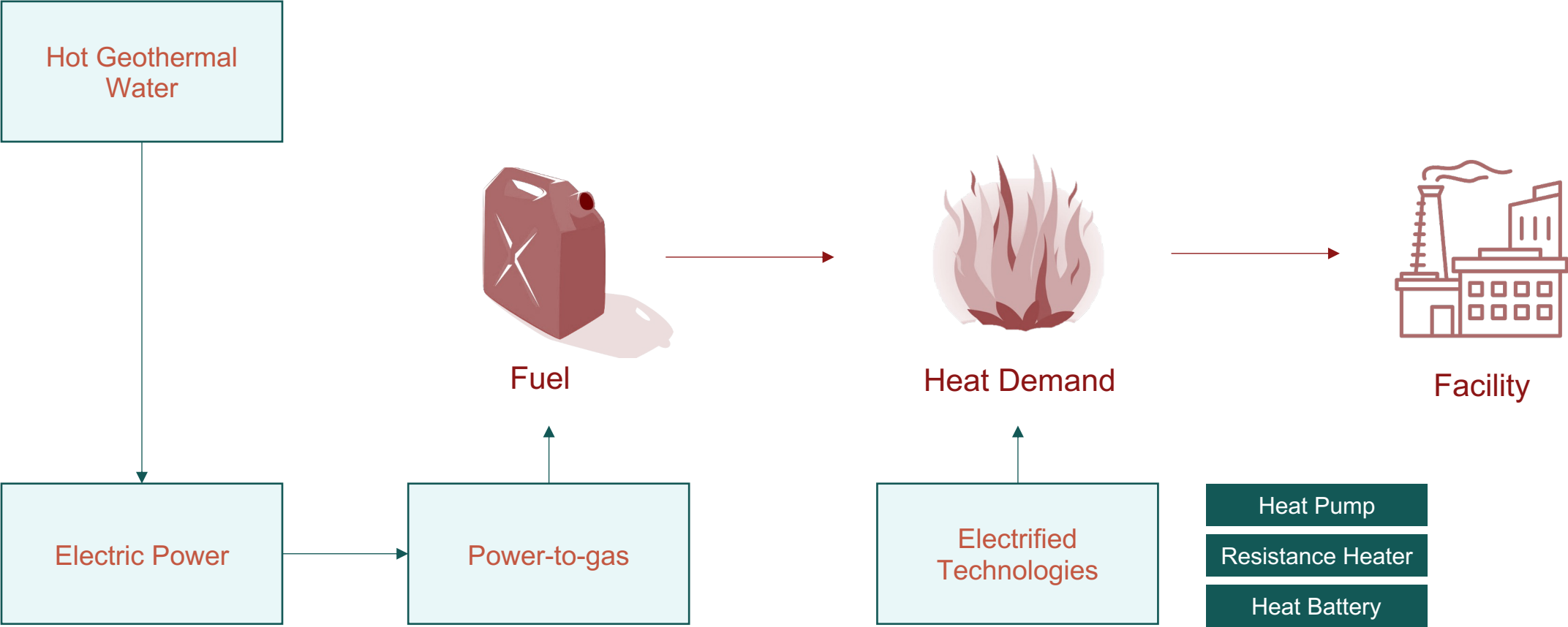
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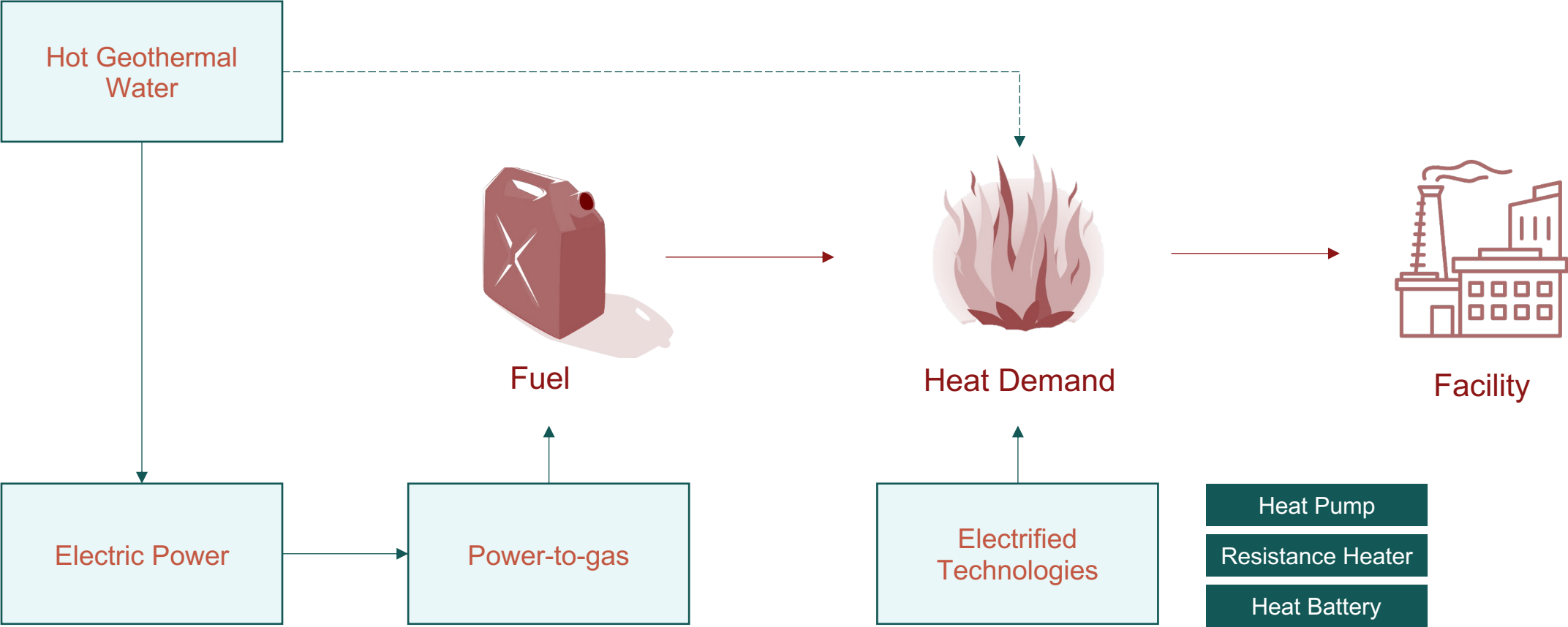
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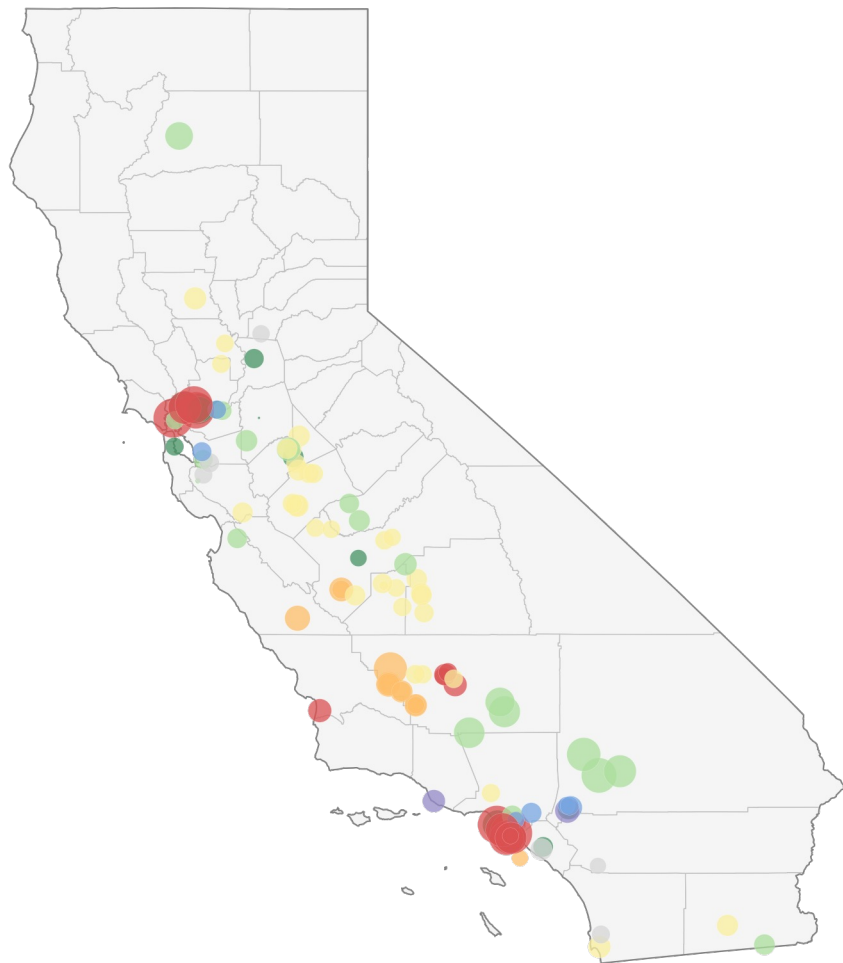


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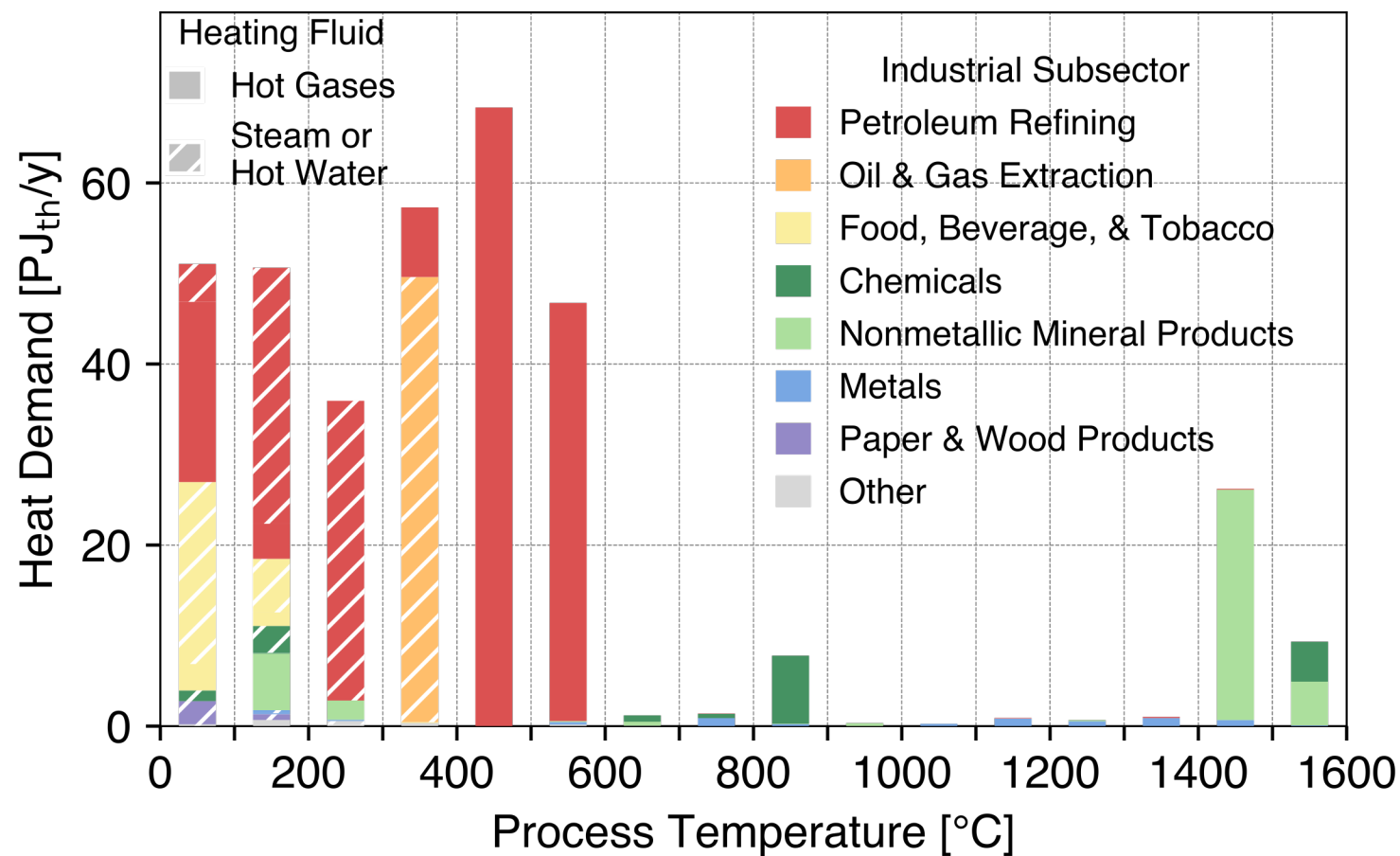
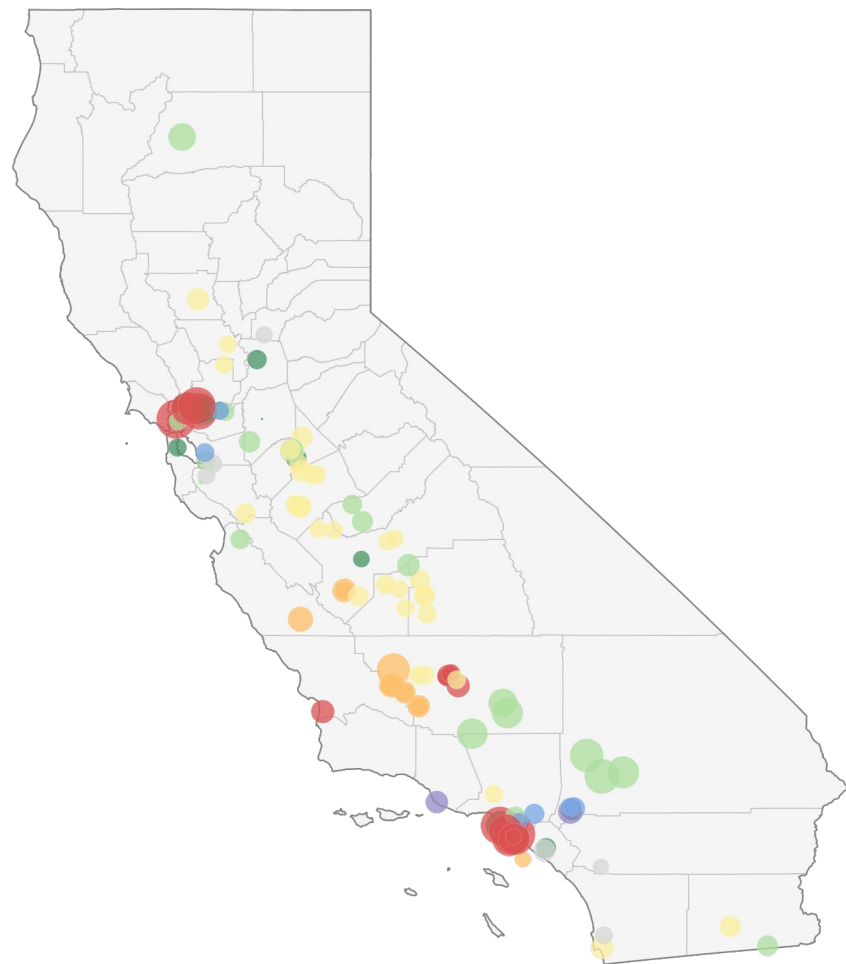
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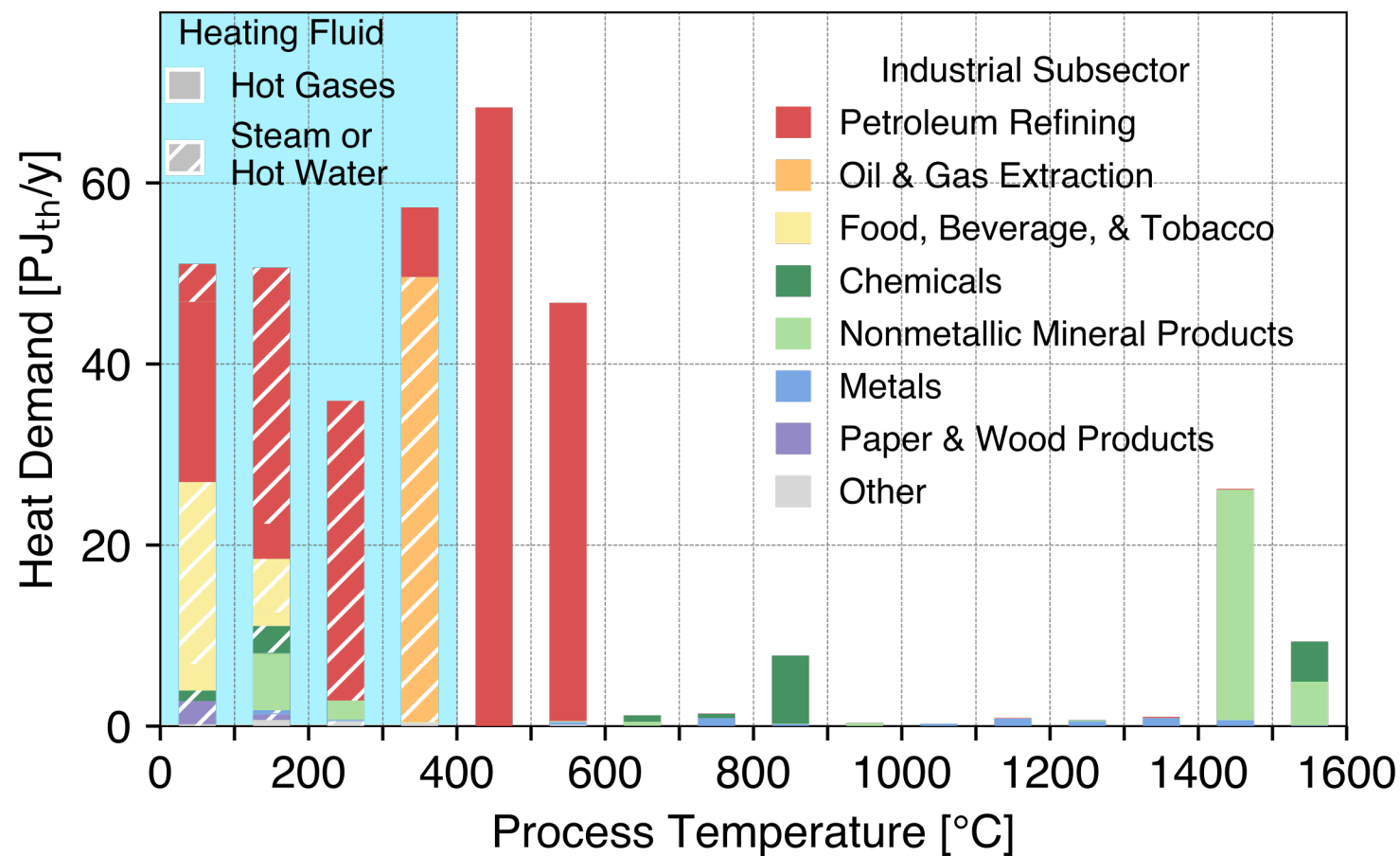
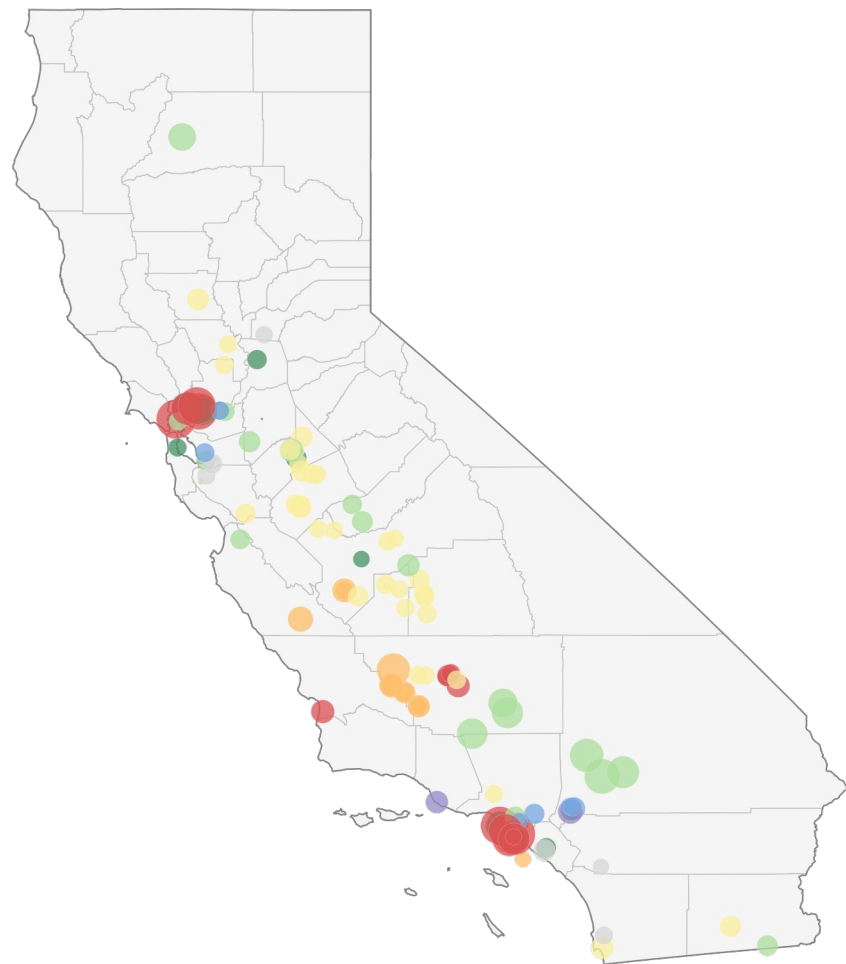
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Key findings and policy recommendations

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Geothermal system deployment can reduce the total cost and size of the electric power sector, as well as increase system reliability

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Current physics-based models show high promise in geothermal resources → state supported exploration and testing can confirm the potential and accelerate geothermal deployment

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Geothermal systems may help decarbonize low-temperature process heat in industrial clusters