



Geothermal Energy is on the Brink of a Boom: And it's because society's energy transition needs it

Will Pettitt, PhD
Executive Director

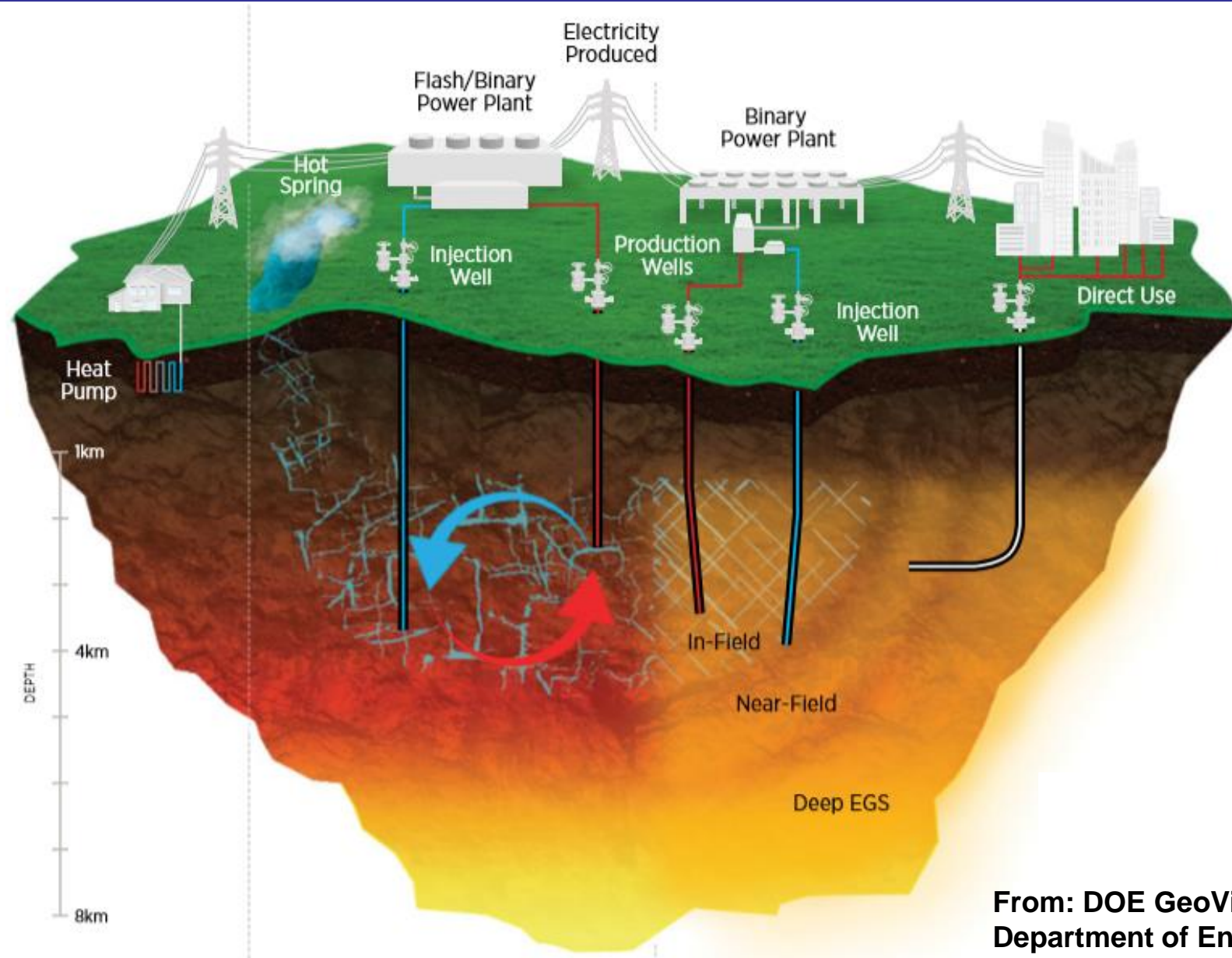
**USEA, 16th Annual State of the Energy Industry Forum
Washington DC, 23rd January 2020**



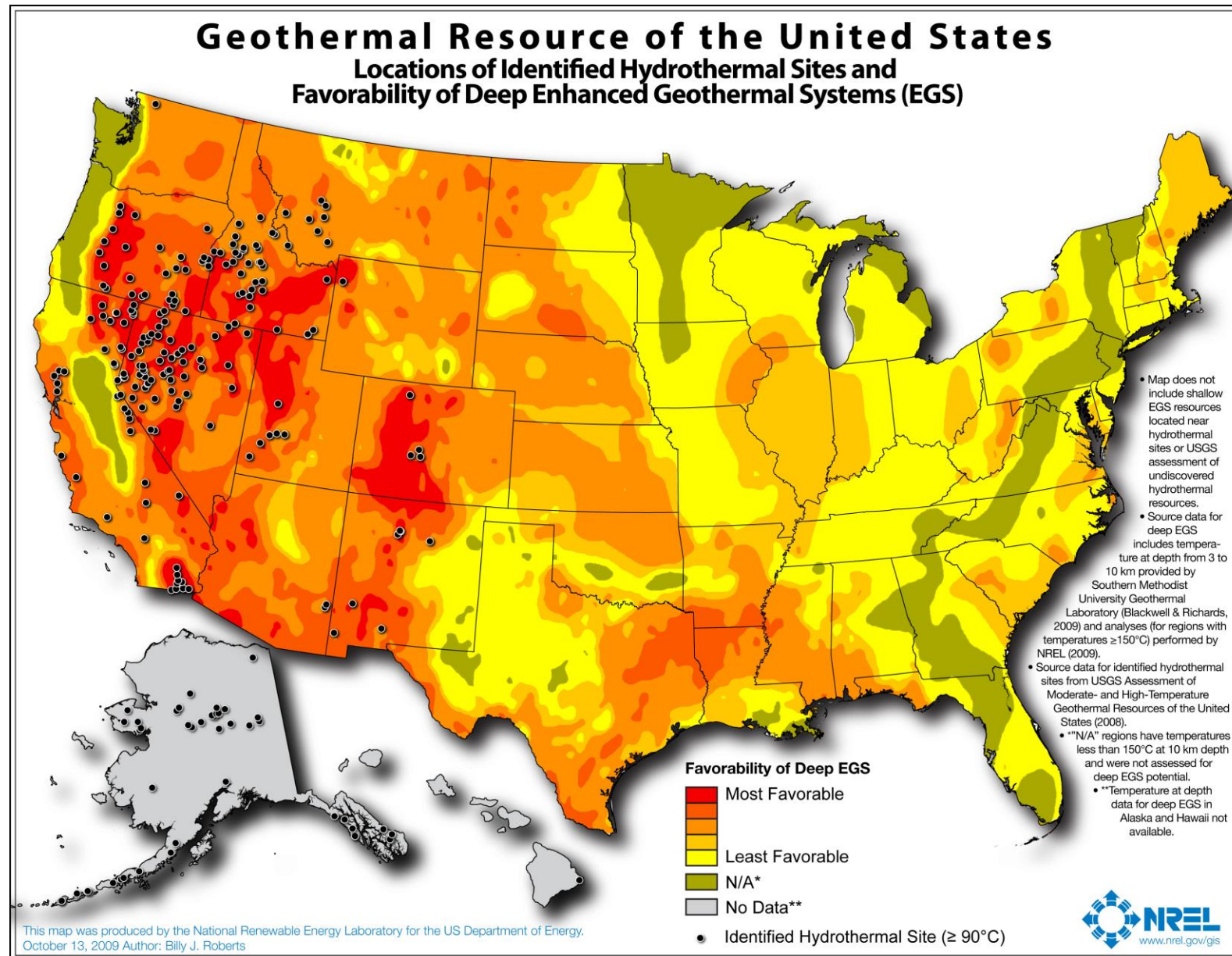


Geothermal Industries

1. Power Generation
2. Direct Use
3. Heat Pumps
4. EGS

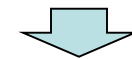


From: DOE GeoVision Report,
Department of Energy, 2019



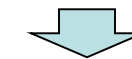
Installed conventional
geothermal

3.8 GWe‡



Conventional
geothermal under
development

1.0 GWe*



Geothermal by 2050

60+ GWe**



Viable EGS potential
>>100 GWe***

‡ After: EIA, 2019

* After: GEA 2016

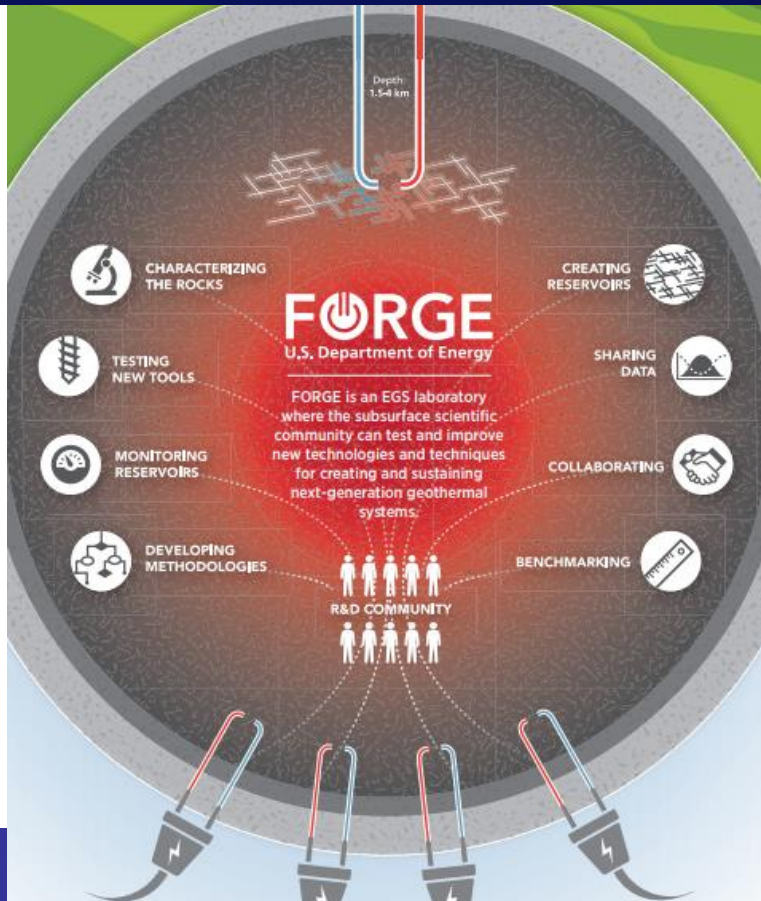
** From: DOE GeoVision, 2019

*** From: Ziagos et al., 2013

The **Frontier Observatory for Research in Geothermal Energy (FORGE)** is a dedicated site where the scientific community will be able to develop, test, and accelerate breakthroughs in EGS technologies and techniques.

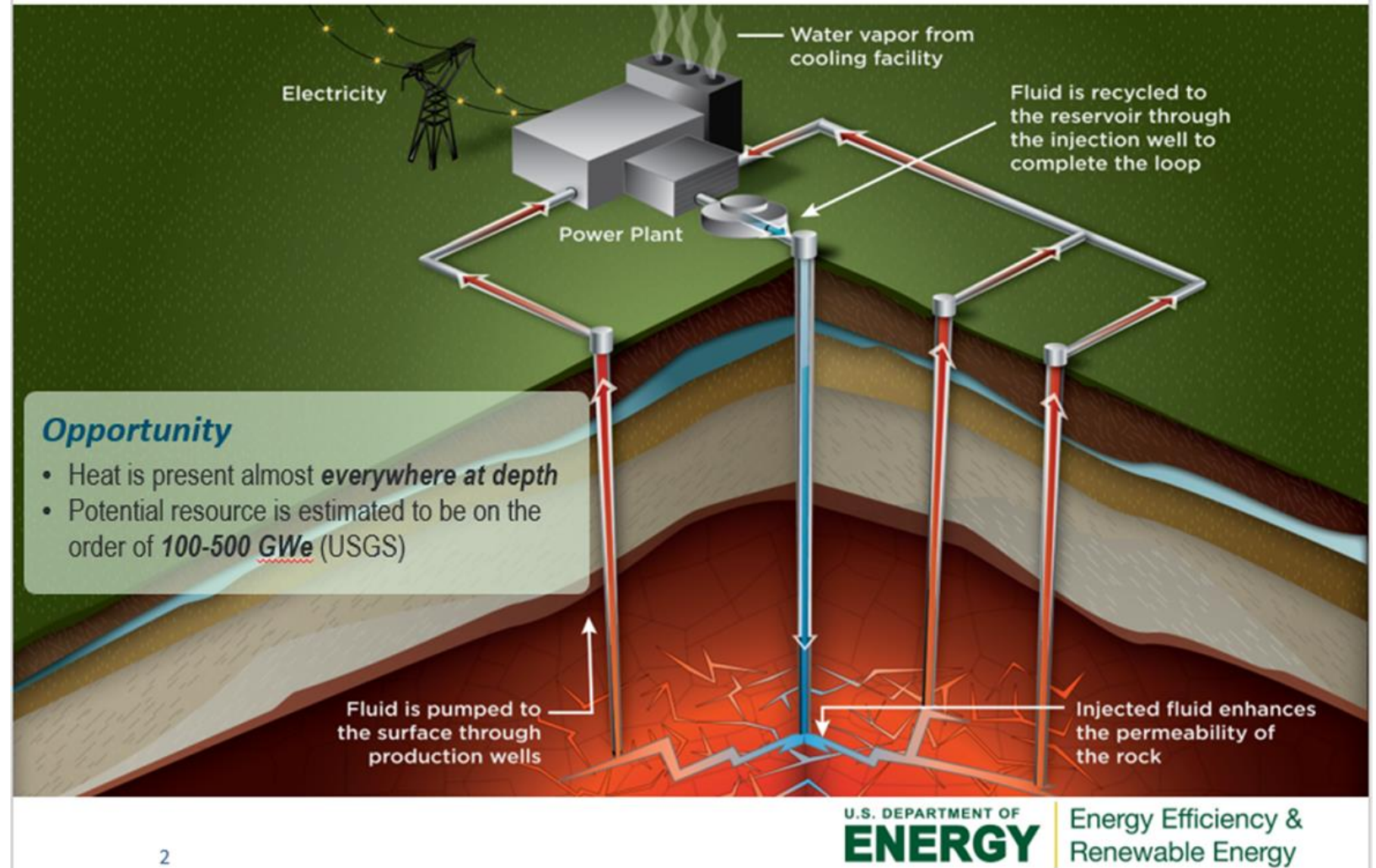
FORGE aims to:
U.S. Department of Energy

- advance**
our basic knowledge of the subsurface
- develop**
sustainable, clean energy resources
- maintain**
global leadership in EGS development & deployment



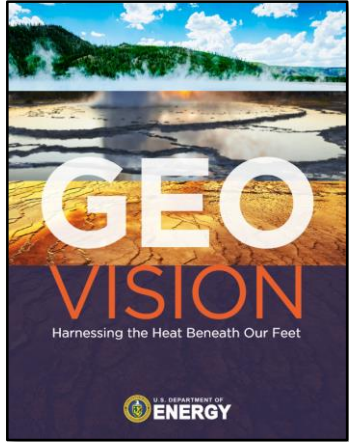
Supporting the Geothermal Community

The Future: Enhanced Geothermal Systems



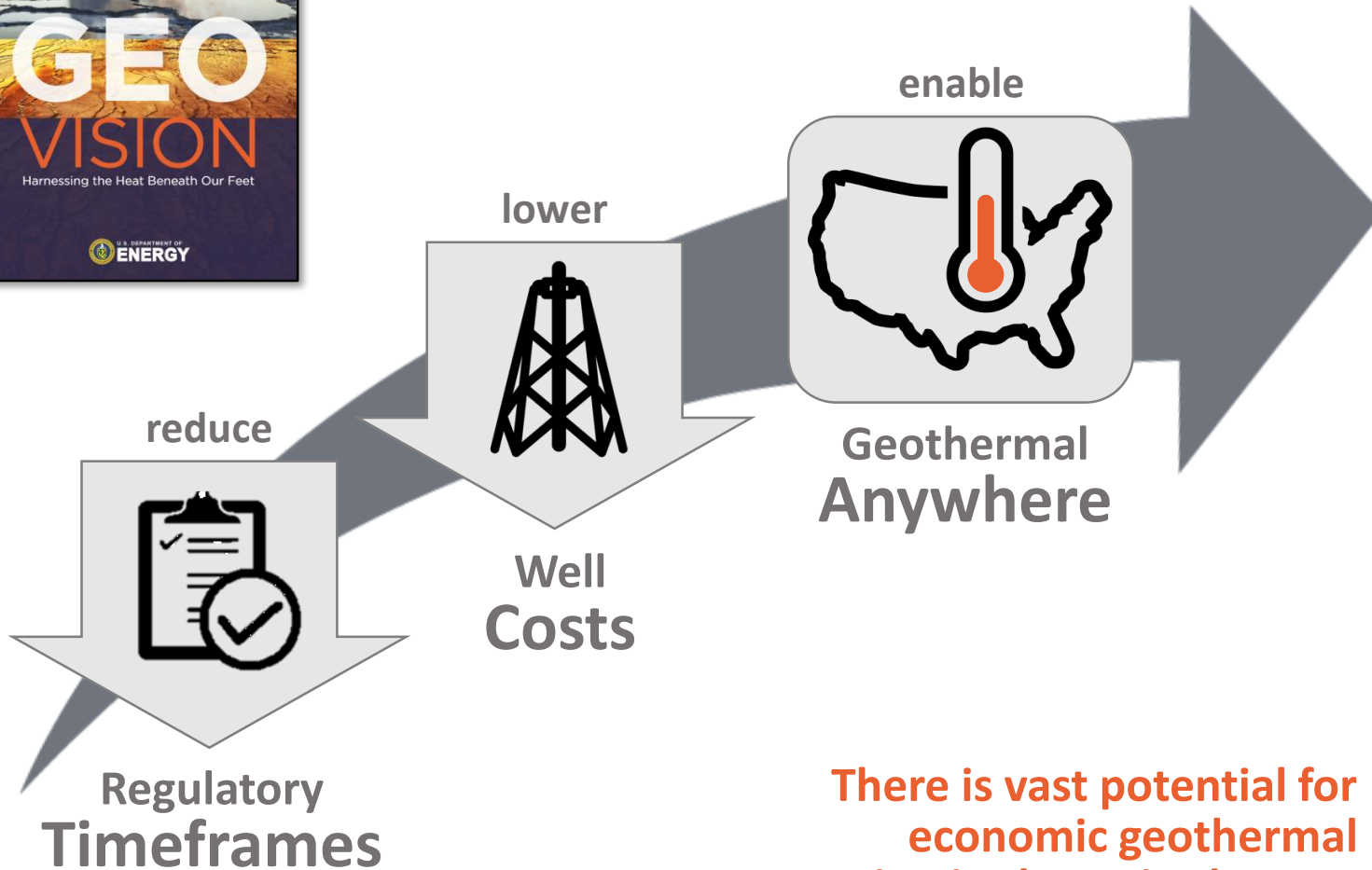
GeoVision

Harnessing the Heat Beneath Our Feet



www.energy.gov/geovision

Slide courtesy of NREL

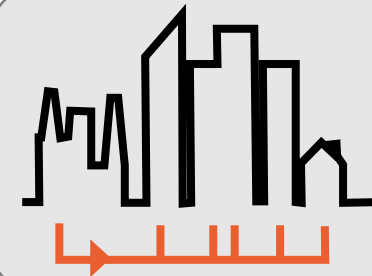


There is vast potential for economic geothermal expansion in the United States

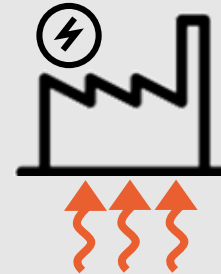
By 2050



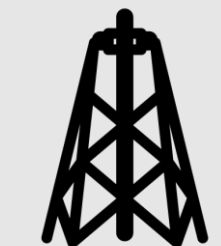
28 million
Geo Heat Pumps



17,500
District Heating Systems



60+ GW
Geothermal Power



10,000+
New Wells Per Year



On the Hill – 2019 has been a busy year!



Committee Hearings

- June 20, 2019 – **Senate Committee on Energy and Natural Resources** – Hearing to Examine Geothermal Development
- September 19, 2019 – **House of Representatives Committee on Natural Resources, Subcommittee on Energy and Mineral Resources** – legislative hearing to review the “Enhancing Geothermal Production on Federal Lands Act”
- November 14, 2019 – **House of Representatives Committee on Science, Space and Technology, Subcommittee on Energy** – Water And Geothermal Power: Unearthing The Next Wave Of Energy Innovation

Draft Legislation

- Senator Catherine Cortez Masto (D-Nev.) and Senator Ron Wyden (D-Ore.), “**Geothermal Energy Opportunities (GEO) Act**”.
- Chairwoman Lisa Murkowski (R-Alaska) and Ranking Member Joe Manchin (D-W.Va.), Senate Energy and Natural Resources Committee, “**The Advanced Geothermal Innovation Leadership Act of 2019**” (the “**AGILE**” Act).
- Senator Jim Risch (R-Idaho) and Congressman Russ Fulcher (R-Idaho), S.2270/H.R.4026, “**Enhancing Geothermal Production on Federal Lands Act**”.
- Chairwoman Eddie Bernice Johnson (D-TX) and Ranking Member Frank Lucas (R-OK), House Committee on Science, Space, and Technology, “**Advanced Geothermal Research and Development Act of 2019**”.



New Legislation – Core Pieces

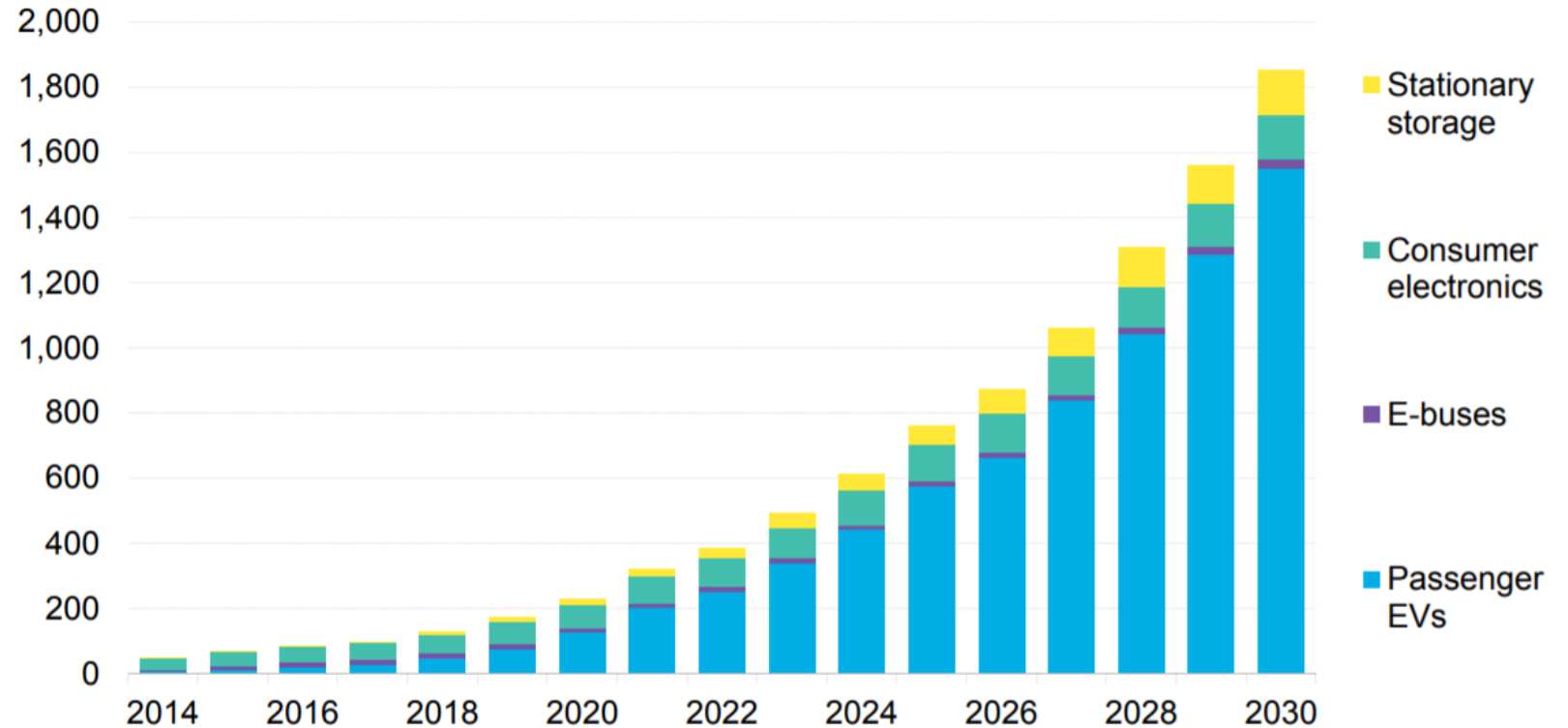
- The “Further Consolidated Appropriations Act of 2020” enacted into law in December 2019:
 - Tax extenders package retroactively revived and extended Production Tax Credit (PTC) through 2020 (expired end 2017);
 - Appropriations for DOE Geothermal Technologies Office in 2020 budget increased 30% to \$110M.
- Main threads of proposed draft legislation:
 - Increased research, including EGS, drilling, technology transfer, subsurface computer simulations;
 - Establishing more FORGE-type sites, including east of Mississippi;
 - Streamlining permitting process for geothermal exploration and leasing activities to bring in line with oil & gas;
 - Development of coproduction with petroleum and mineral industries.



Annual Lithium-ion Battery Demand

Berkshire Hathaway Energy – Geothermal development in Southern California could also supply over two-thirds of the world's lithium demand in 2025! And at competitive cost...

Annual GWh demand



Source: Bloomberg NEF

4 November 15, 2018

BloombergNEF

Lets ask ourselves this...

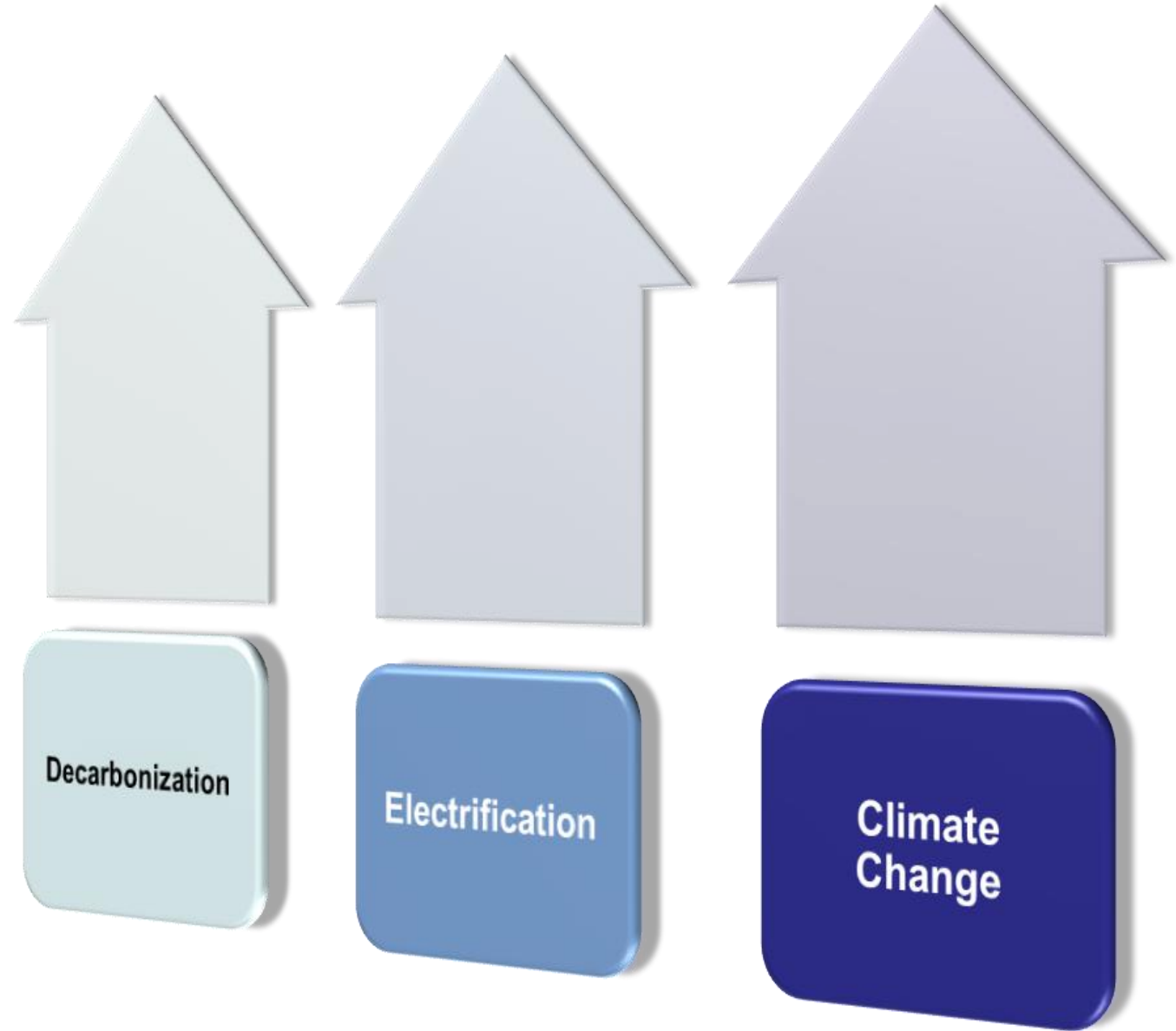
Where is my clean energy coming from
on a still, dark, winter night in 2030?

What about 2050?





What will be happening in 2030?





2017 Climate Change Scoping Plan Policy Portfolio



Double building efficiency



50% renewable power**



More clean, renewable fuels



Cleaner zero or near-zero emission cars, trucks, and buses



Walkable/bikeable communities with transit



Cleaner freight and goods movement



Slash potent "super-pollutants" from dairies, landfills and refrigerants



Cap emissions from transportation, industry, natural gas, and electricity



Invest in communities to reduce emissions



Protect and manage natural and working lands

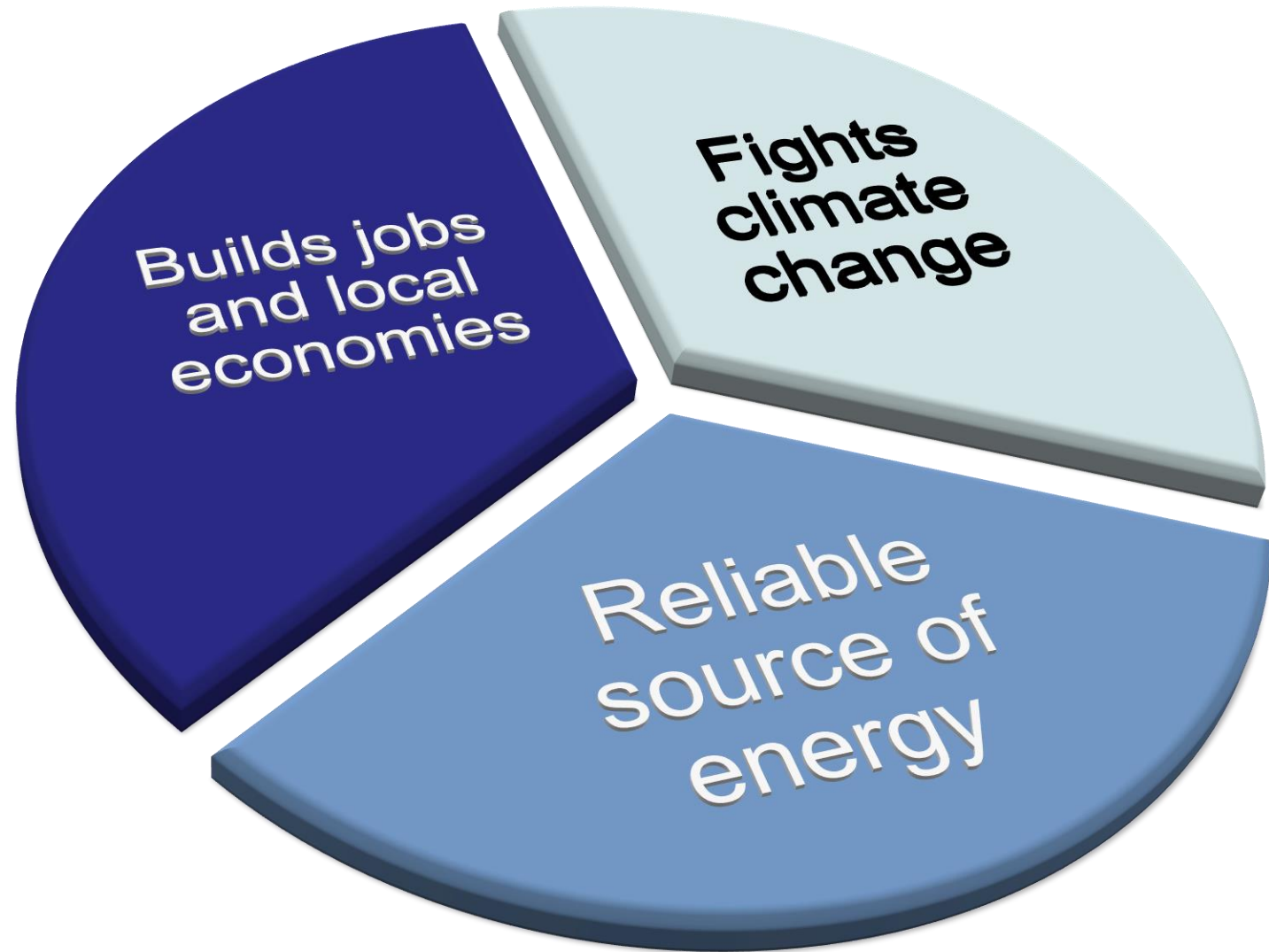
**In 2018, SB 100 increased the Renewables Portfolio Standard to 60% by 2030

From: SB 100 Scoping Report – Scoping Workshop, California Energy Commission, October 2019

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What does Geothermal Bring?





Geothermal is 24/7 always on

Renewable Energy that Works Around the Clock

- Clean
- Reliable
- Flexible
- Balancing
- Resilient
- Stable
- Facilitator



Thank you!

