



SYSTEM INTEGRATION/EPC CONSIDERATION WITH GEOTHERMAL PROJECTS

Geothermal Energy Machinery And Systems Workshop

AGENDA

Kiewit Overview

Why Geothermal Power

Factors in Project Execution



KIEWIT OVERVIEW

LEADER IN SAFETY

TRIR **0.16**

Energy Group

2022 EARNED REVENUE

\$13.7 B

\$10.6 billion yearly average
over the past 10 years

KIEWIT-OWNED EQUIPMENT

26,000 UNITS

Totaling \$3.4 billion in value

DIRECT-HIRE MANHOURS

55M+

ANNUALLY

Providing significant safety, quality and
schedule advantages to our projects

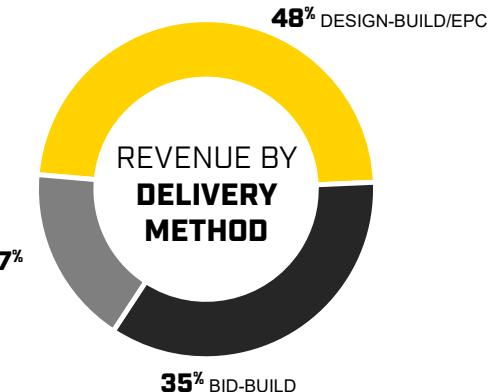
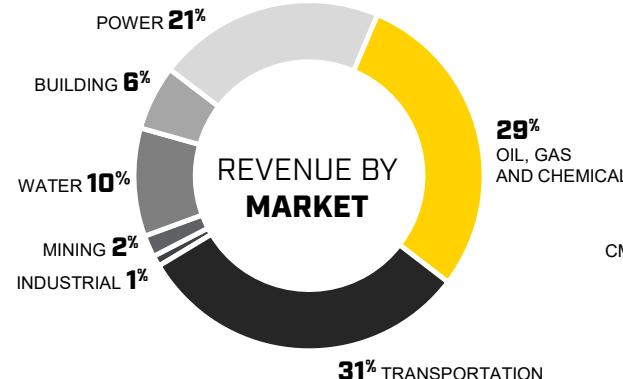


25,700 EMPLOYEES

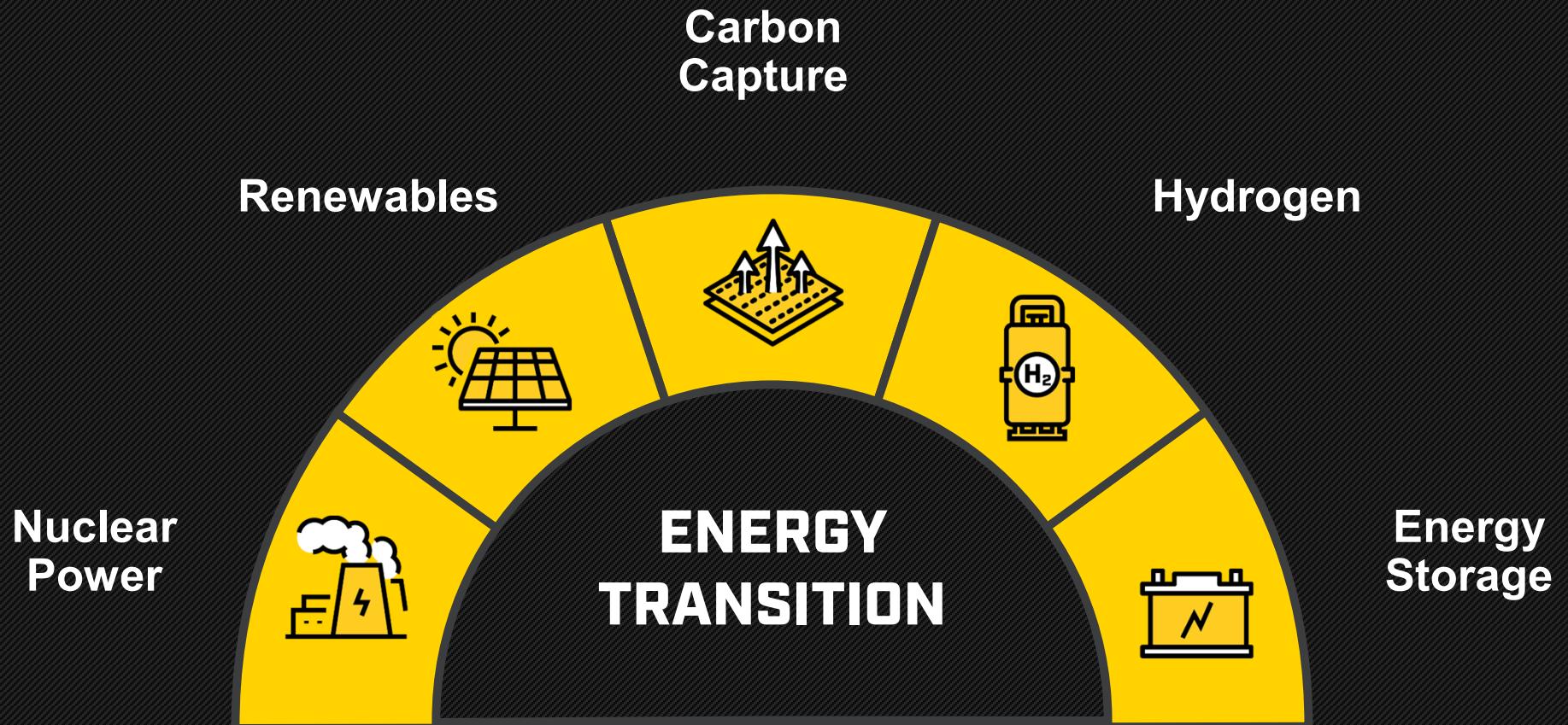
mobile workforce

✓ **13,300+** craft

✓ **12,400+** staff
➤ 3,000+ engineers



ELEMENTS OF THE ENERGY TRANSITION



PROJECT READINESS



**OWNERSHIP /
INVESTORS**



**OFFTAKE &
INTERCONNECT
AVAILABILITY**

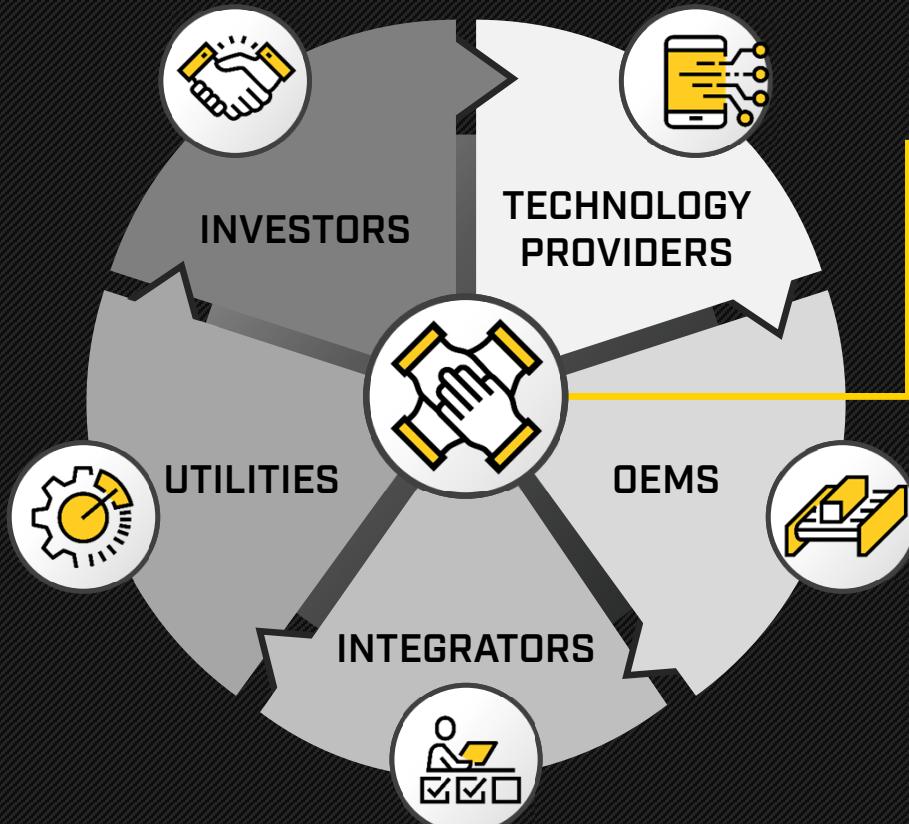


**PERMITTING AND
REGULATORY STATUS**



**ENGINEERING
STUDIES & ESTIMATES**

PARTNERS / COLLABORATION



- Projects tend to be more viable as a collaboration
- All parties play an important role in project success

RISKS AND OPPORTUNITIES



**PROJECT
EXECUTION PLAN**



**CONSTRUCTABILITY
INPUT**



**GEOTECHNICAL
INFORMATION**



**CLIENT & SUPPLIER
COORDINATION**

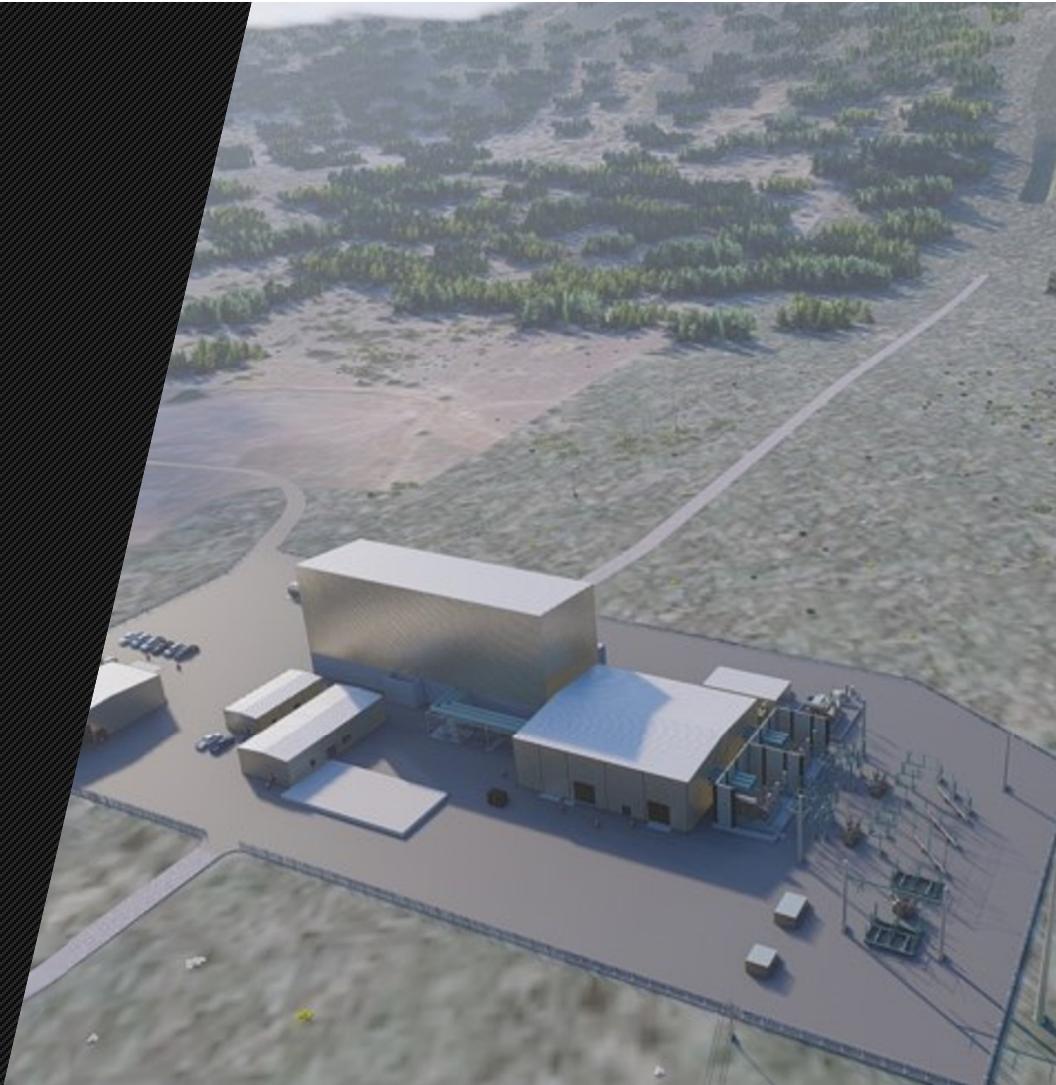
SUPPLY CHAIN LEAD TIMES

	CURRENT LEAD TIME	PREVIOUS LEAD TIME
LARGE TRANSFORMERS:	32 - 36 months	12 months
HV CIRCUIT BREAKERS:	120 - 160 weeks	10 - 40 weeks
MV SWITCHGEAR	50 - 80 weeks	20 - 40 weeks
ENCLOSURES:	100+ weeks	30 – 50 weeks

REGULATORY

ENVIRONMENTAL

- Air permit (“Permit to Construct”) for projects with emission sources
 - Minor source – 3 months to prepare, 6 months to approve
 - Major source – 5 months to prepare, 12 months to approve
 - Lack of staff may extend approval times in some jurisdictions (18 to 24 months)
- Threatened & endangered species clearances (bugs & bunnies), wetlands
- FAA clearance
- NEPA if applicable
 - One year+ for environmental assessment and FONSI
 - Federal checkerboard of land ownership in West makes NEPA review more likely
- Environmental justice concerns
 - Can persuade a regulator to block a project



REGULATORY

STATE

- **Certificate of Convenience & Necessity**

- Often required for utilities for owned resources or PPA's
- May be required in some states for non-utility projects
- Procedural schedule varies – assume 12 months from date application is filed

- **California Energy Commission Permit**

- Plants 50MW or greater
- Assembly Bill 205 allows special path for renewable energy and energy storage projects
- Must have PLA and demonstrate economic benefit
- CEC is required to approve projects within 270 days of accepting the application as complete
- Sunset June 2029

LOCAL

- **Zoning**

- 3 – 6 months including community outreach
- Compliance with regulations does not ensure a successful outcome
- Reports of increasing public resistance to renewables projects





TRANSMISSION RIGHT OF WAY

- ROW ACQUISITION OFTEN TAKE LONGER THAN PLANNED.
- COST OFTEN HIGHER THAN BUDGET.
- BEWARE THAT SOMEONE ON THE ROUTE MAY HOLD YOU HOSTAGE.
- EMINENT DOMAIN DOESN'T SAVE MONEY OR TIME.

CAN EXISTING NETWORKS HANDLE THE ADDITIONAL LOAD?

POWER-INTERCONNECTION QUEUES CAN TAKE **YEARS**

- Feasibility, system impact and facility studies
- Study fees are significant
- Site control must be demonstrated
- Network upgrades may be required – cost allocation by the RTO
- No one gets preferential treatment
- If queue durations are reduced, all projects should benefit



POWER DELIVERY





FINAL THOUGHTS

OEM equipment sizing is critical to project success

Electrical equipment purchase is driving project schedules

Geography and location play a large role in projects in many different ways



THANK YOU!

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