

DOCKETED

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Lithium Valley Commission Meeting

April 29, 2021





Housekeeping

- Meeting conducted remotely via Zoom
 - Recorded and transcribed by court reporter
- To participate in public comment:
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- Written comments:
 - Submit through the e-commenting system at:
 - <https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=20-LITHIUM-01>



Welcome and Roll Call



Agenda

- Welcome and Roll Call
- Administrative Items
 - Approval of Past Meeting Action Minutes
 - Report Schedule/Expectations
 - Sub-bodies
 - Rules of Order
 - Community Workshop Planning
- Panel on Global Lithium Perspective
- Determination of Agenda Topics, Speakers, and Presentations for Future Meetings
- Media and Legislation Updates
- Public Comment
- Adjourn



Administrative Items

- Approval of Past Meeting Action Minutes



Public Comment

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Administrative Items

- Report Schedule and Expectations



Report Outline

CHAPTER 1: Background

AB 1657

Overview and Mandates

Lithium Valley Commission

Commission composition and meeting history;
public engagement

Vision

High level goals and opportunities



Report Outline

CHAPTER 2: Areas of Analysis

AB 1657 requires the Commission to review, investigate, and analyze the following topics regarding lithium extraction and use in California:

Themes/Sub-topics

- Public/community engagement
- Local impacts and benefits
- Infrastructure needs
- Workforce needs & considerations

Supporting Development

Of geothermal power to provide the co-benefit of lithium recovery.

Market Opportunities for Lithium

Benefits

Of geothermal facilities for the state, western grid, and US.

Overcoming Challenges

Currently limiting lithium extraction, processing, and production.

Extraction Methods

From geothermal brines and how this compares to other methods.

Economic and Environmental Impacts

Resulting from extraction, processing, and production.

Incentives

Importance of local, state, and federal incentives and investments.



Report Outline

CHAPTER 3: Legislative Recommendations and Regulatory Changes

Recommendations for legislative or regulatory changes that may be needed to encourage lithium extraction from geothermal brines

Including whether the development of a centralized tracking system for lithium project permitting would assist with development of the lithium industry.

Conclusion



Report Process Proposal

Dedicate time at each monthly meeting to address 1 topic

Assign 1 sub-body to each to facilitate workshop and guide report chapter

CEC would assign staff to assist with each chapter. External resources will be considered as needed.

Supporting Development

Market Opportunities for Lithium

Benefits

Overcoming Challenges

Extraction Methods

Economic and Environmental Impacts

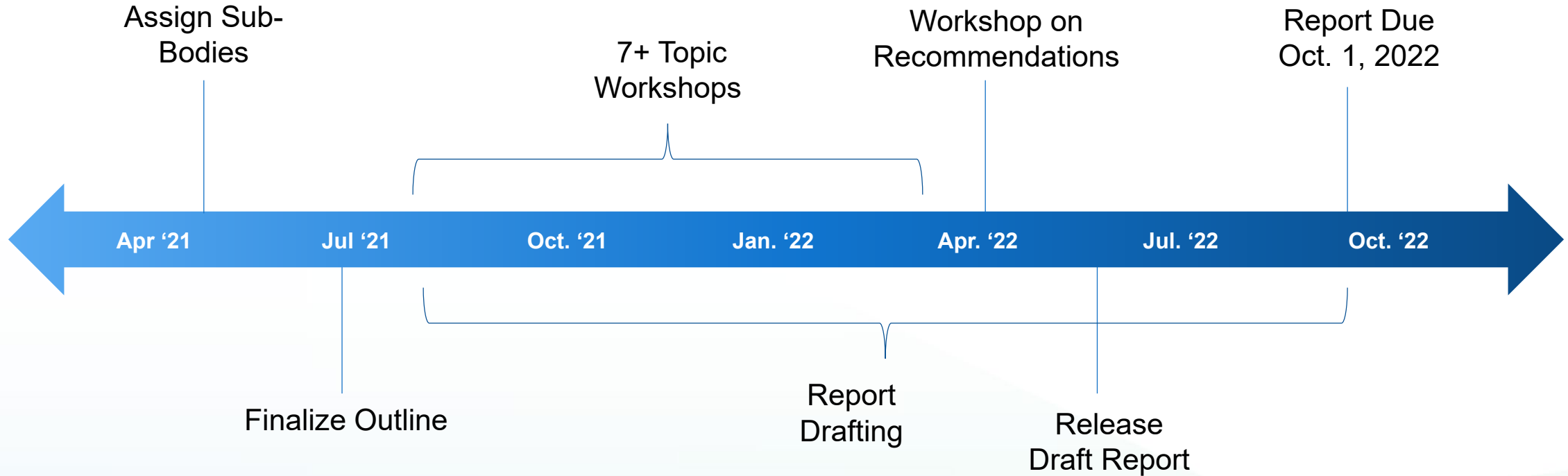
Incentives

Full Lithium Valley Commission would discuss and guide recommendations

Legislative and Regulatory Recommendations



Draft Report Schedule





Questions for Consideration

Are there additional topics that should be included in the report?

What sub-topics should be included in each chapter?

Is there quantitative analysis that needs to be completed? What resources, expertise, and/or data would be required?

Are there additional topical workshops you would like to hold?

Will any topics require more than one workshop?

Are there any activities in addition to workshops you would like the Commission to partake in to support report development?

Do you have relevant literature/resources that can support report development?



Public Comment

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Administrative Items

- Sub-bodies



Bagley-Keene Open Meeting Act and Sub-Bodies

**Lithium Valley Commission
April 29, 2021**

**Deborah Dyer
Senior Staff Counsel
California Energy Commission**



Bagley-Keene General Application:

Bagley-Keene's noticed public meeting requirements apply to any Lithium Valley Commission meeting where "a majority of the members congregate to hear, discuss, or deliberate" upon matters within the body's jurisdiction



Application to Sub-bodies:

"An advisory board, advisory commission, advisory committee, advisory subcommittee, or similar multimember advisory body of a state body, **if created by formal action** of the state body or of any member of the state body, and if the advisory body so created **consists of three or more persons.**"

Gov. Code § 11121(c)



Two Important Questions:

1. How is the sub-body created?
2. How many members will the sub-body have?



Possible Outcomes:

BK DOES APPLY

Formal Action &
3 or More Members

BK DOES NOT APPLY

No Formal Action &
7 or Fewer Members

Less than 3 Members
(regardless of method of
creation)



Administrative Items

- Sub-bodies Discussion



Sub-Bodies Discussion

- Supporting Development
- Market Opportunities
- Benefits
- Overcoming Challenges
- Extraction Methods
- Economic and Environmental Impacts
- Incentives



Public Comment

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Administrative Items

- Rules of Order



Public Comment

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Administrative Items

- Community Workshop Planning



Public Comment

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Panel on Global Lithium Perspective

- EnergySource – Derek Benson, Chief Operating Officer
- Cornish Lithium – Dr. Rebecca Paisley, Exploration Geochemist
- UC Santa Cruz - Professor Fernando Leiva



ENERGYSOURCE
MINERALS





ENERGYSOURCE
MINERALS

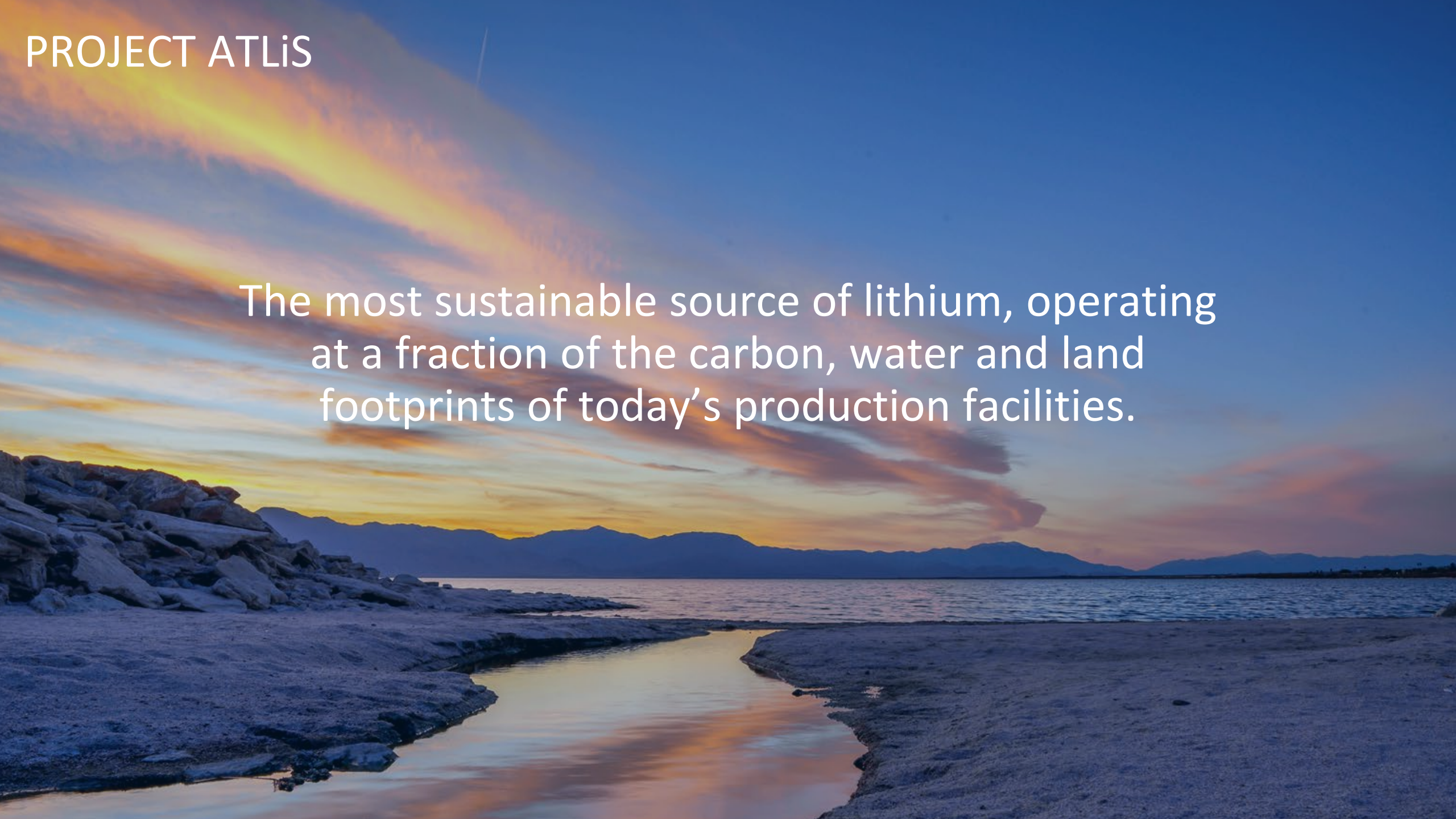
Lithium. Delivered.

Lowest environmental footprint
Resilient US-based supply
Executing on-time, at quality



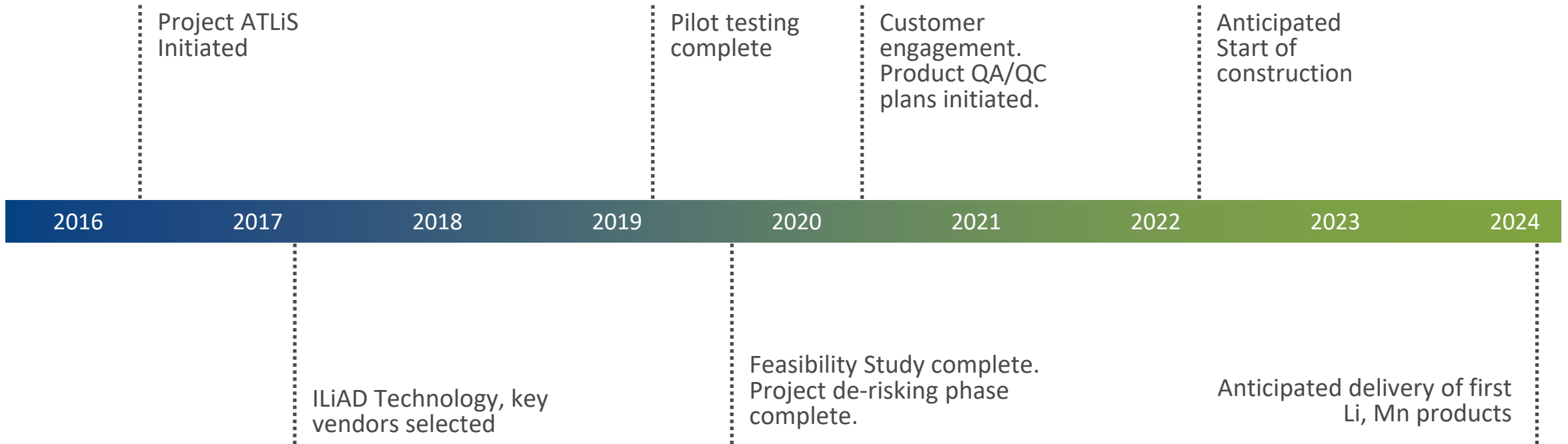
PROJECT ATLiS

The most sustainable source of lithium, operating at a fraction of the carbon, water and land footprints of today's production facilities.



EXECUTION FOCUSED

Timeline of ESM Lithium Development



INFRASTRUCTURE NEED

Substantial Regional Benefits



Improved **RAIL ACCESS** to improve transportation efficiency

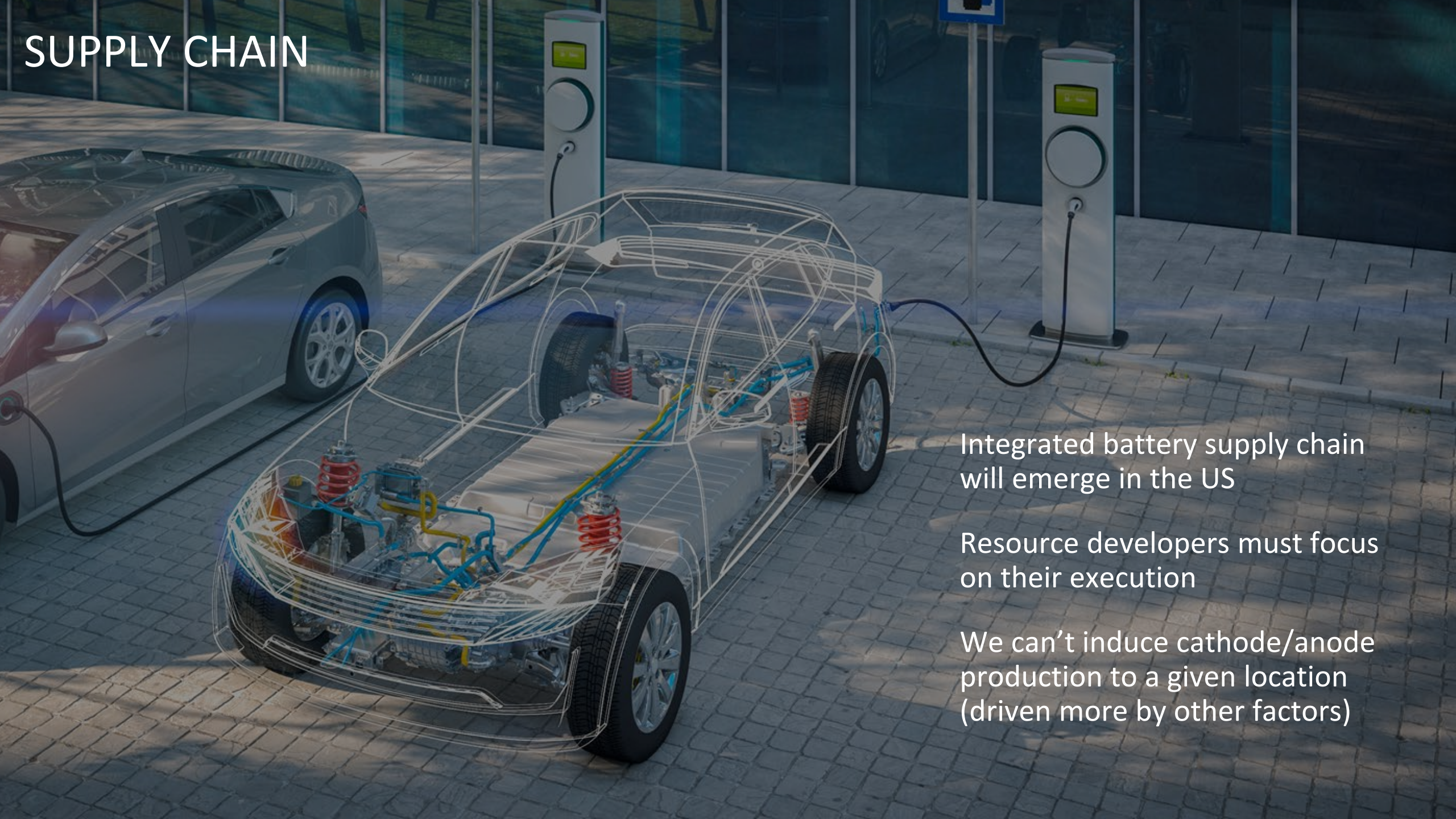


Primary & secondary **ROADS** – project by project improvement is inefficient



Reliable **BROADBAND** service is essential

SUPPLY CHAIN



Integrated battery supply chain will emerge in the US

Resource developers must focus on their execution

We can't induce cathode/anode production to a given location (driven more by other factors)

WORKFORCE NEEDS



>1,000,000

work hours in construction phase
Electrical, mechanical and structural



60

full-time positions for operation
Managers, control room operators, chemists, engineers,
technicians, and mechanics



3x

in Support Services
Transportation, logistics, maintenance and services

Thank You





Cornish Lithium

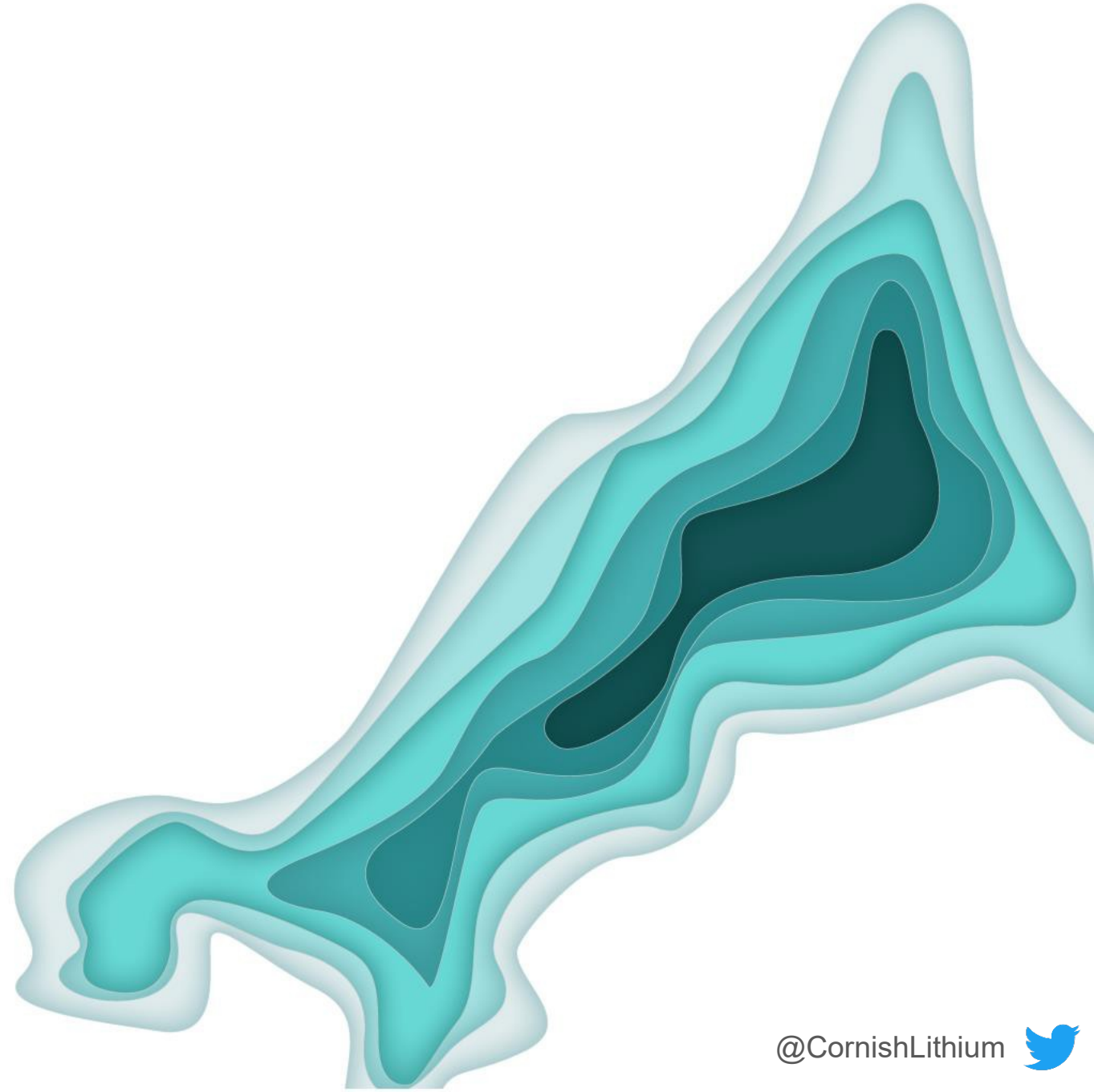
Cornish Lithium Updates

*Lithium Valley Commission
April 2021*

Dr. Rebecca Paisley



@RebeccaPaisley9



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Cornish Lithium

- Private company founded in 2016.
- Responsible extraction of lithium and other battery metals.
- Secured mineral rights agreements over >500km² area.
- Raised funds via shareholders, crowdfunding and government grants.



Responsible Exploration

- Four major exploration streams:
 - Hard-rock lithium (Mica deposits)
 - Shallow geothermal (<2000 m)
 - Deep geothermal (~5000 m)
 - Critical metals (e.g. Cu, Sn)



Hard-Rock Exploration

- Drill Campaign Two underway, in progress to achieve JORC compliant resource.
- Exclusive license for Lepidico's L-MAX®/LOH-MAX® hydrometallurgical process for use in St Austell region.
- **Bulk Test Work Results:** >90 % Li extraction and production of battery grade LiOH.
- Extraction from existing China Clay pits, utilise existing port and industrial units to support plant development.



Geothermal Exploration

- Exploration, Resource Estimation, DLE Testing
- Commission pilot-scale Li extraction (Q1 2022)
- Co-production of lithium and geothermal power
- GeoCubed Project



GEO³
POWERING
CLEAN GROWTH



Supporting Infrastructure

- Material extraction!
- Material refining, cathode production
- UK-based Gigafactories
- Utilise existing port and infrastructure
- Assay laboratories, Quality control
- Appropriate standards



Supporting Workforce

- Processing Engineers
- Geothermal Expertise
- Skilled Technicians
- Metallurgists
- Data Scientists
- Land Agents



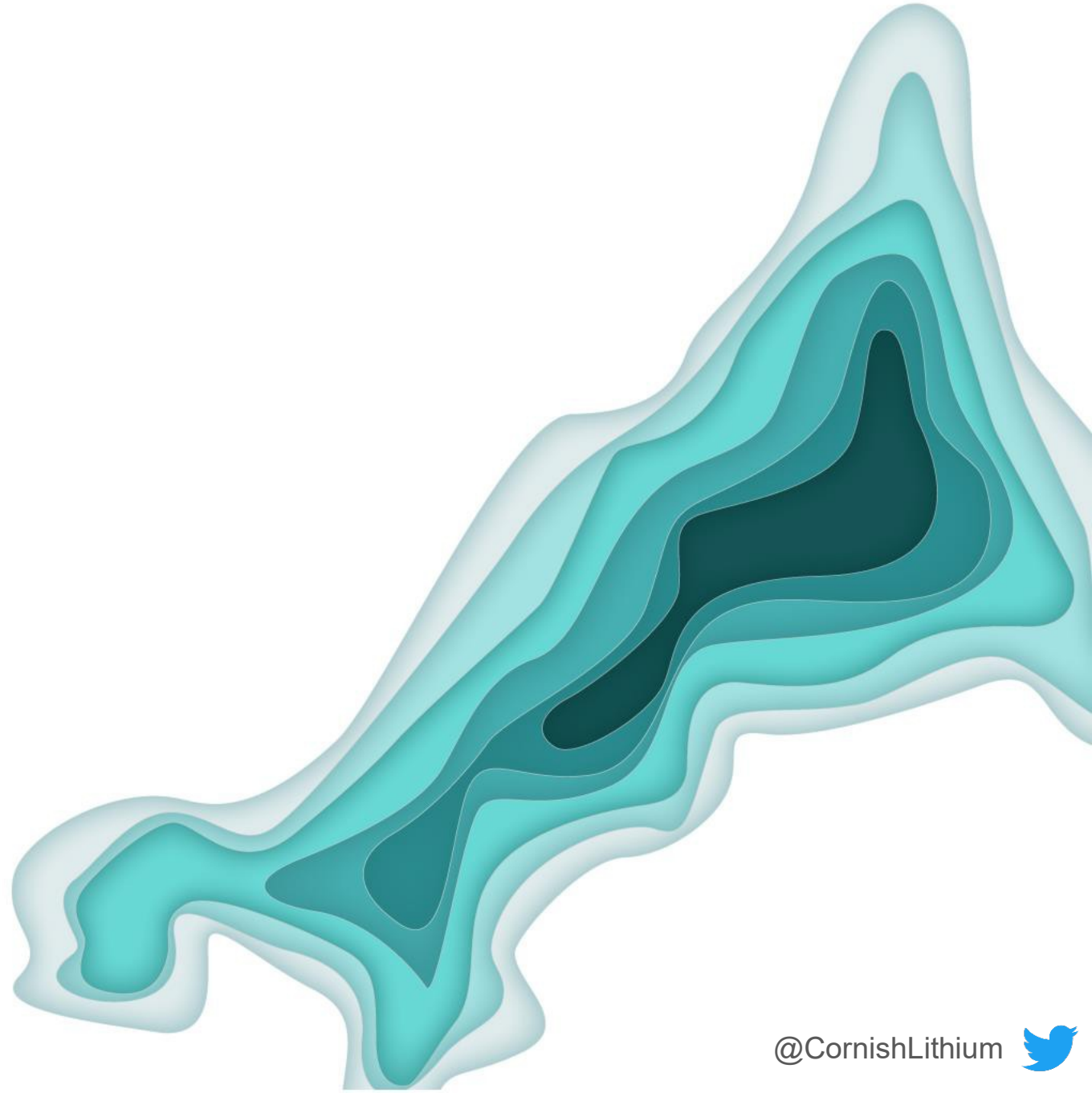


Cornish Lithium

Any Questions?



@RebeccaPaisley9





LITHIUM LESSONS: FROM CHILE TO THE SALTON SEA

Dr. Fernando Leiva

University of California Santa Cruz

fleiva@ucsc.edu

WHY CHILE? WHY ATACAMA SALT FLATS?



- **Chile is home to the largest lithium brine reserves in the world.**
- Holds 54 % of world lithium carbonate reserves
- The brines of Chile's Salar de Atacama lie 7,500 feet above sea level on an Andean plateau and supply roughly 20 percent of the world's lithium
- Andean salt flats (*salares*) with extremely arid climate and scarce water. are characterized by complex socio-ecological interactions that support biodiversity hotspots, community livelihoods, and a rich indigenous cultural heritage.
- Water sources in the middle of this desert are extremely limited, despite many lakes, lagoons, salt lakes, and wetlands located on the Andean highlands
- Large amounts of national and transnational capital are currently being invested in mining projects located in the Atacama Desert
- Socio-environmental conflicts have multiplied
- Li-mining and local communities are closely linked through conflicts over use of water resources, economic opportunities, and resource governance

LEARNING FROM MISTAKES AND PAST-INTERACTIONS (1990 TO PRESENT)

- **Communities:** (from passivity => defensive action => crafting visions of alternative & sustainable development)
- **Citizens :** (from trusting promises by corporate and political leaders => protest over elite capture of state institutions => demands for a new social pact and constitution)
- **Government and State authorities:** (from deregulation => corporate self-reporting => enhancing regulatory power of state institutions)
- **Mining Corporations:** (from hubris => cooptation and transactional relations with communities => participatory dialogues)
- **Non-Governmental Organizations**
- **Academic Institutions**

FOUR KEY LESSONS

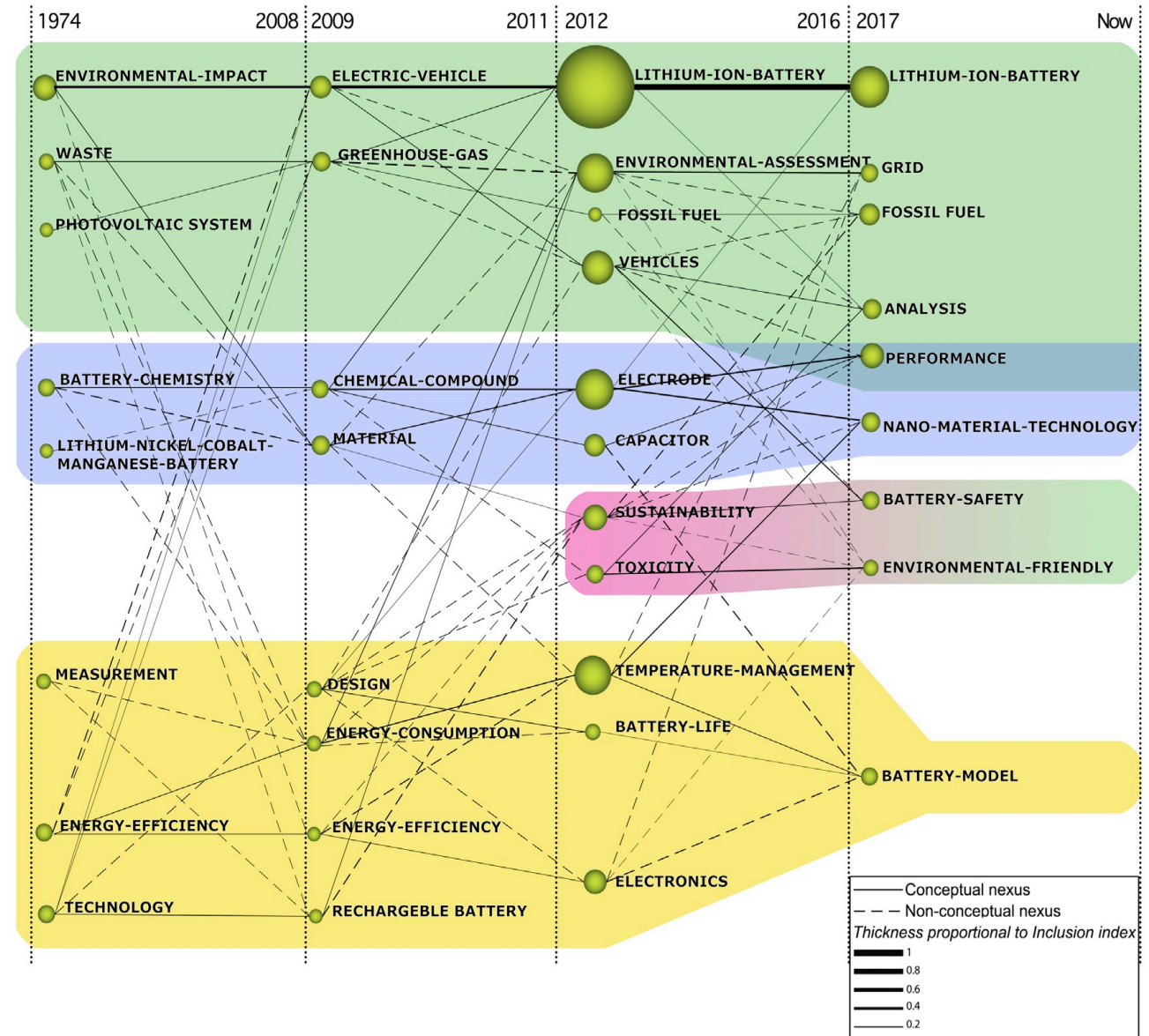
- **Lesson 1: The costs of late learning or learning late**
 - Exhaustion of socio-ecological systems
 - Loss of development opportunities
 - Recurring and multi-scalar crisis of political legitimacy
 - Corporate entrenchment

Lesson 2: The need to move from reductionist (“economicist” or “environmentalist”) to more holistic and socio-ecological perspectives

- **Lesson 3: The value of participatory governance**
- **Lesson 4: Contribution and synergy of different knowledges**
 - Technical, scientific, administrative, community-based

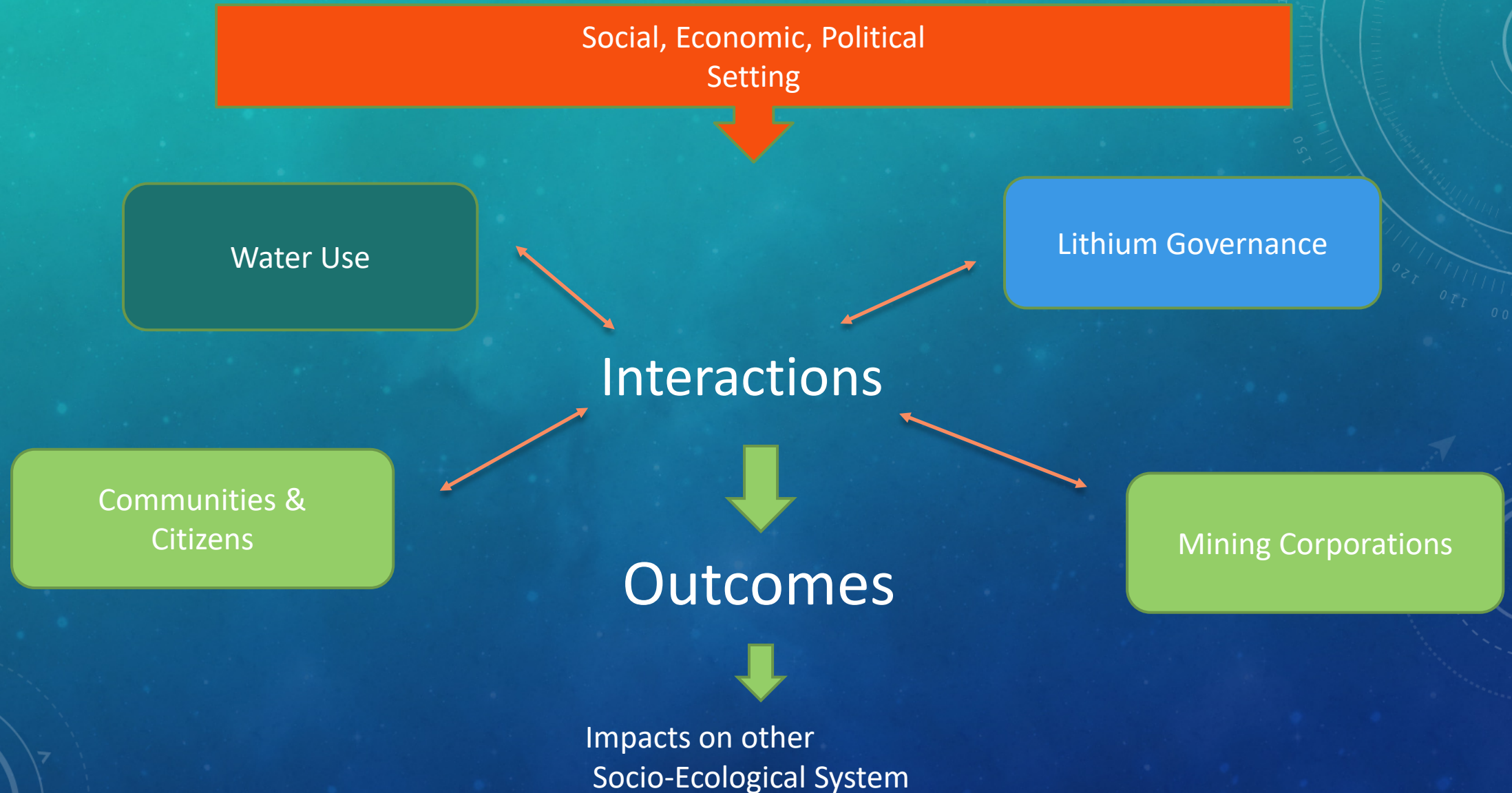
• “The potential impacts of lithium extraction, especially on frontline communities, have not been studied holistically.”

(Liu & Agusdinata 2020)



A HOLISTIC PERSPECTIVE: SOCIO-ECOLOGICAL SYSTEMS

[Adapted from Olstrom (2009) and (Liu & Agusdinata (2020)]



REFERENCES

- Agusdinata, D. et al. (2018) “Socio-environmental impacts of lithium mineral extraction: towards a research agenda,” *Environmental Research Letters*, 13 (12), p. 123001
- Babidge, S. et al. (2019) “That’s the problem with that lake: it changes sides’: mapping extraction and ecological exhaustion in the Atacama,” *Journal of Political Ecology*, vol. 26, pp. 738-760.
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- Liu, W. and D. Agusdinata (2020) “Interdependencies of lithium mining and communities sustainability in Salar de Atacama, Chile,” *Journal of Cleaner Production* v. 260, 120838.
- Olstrom, E. (2009) “A general framework for analyzing the sustainability of social-ecological systems,” *Science*, 24, pp. 419-422
- Images
 - Title page: https://giorgetta.ch/images/salar_de_atacama/salaratacama1/salar_atacama_dsc_1382.jpg
 - Other pages: <https://www.pinterest.com/pin/215680269627532663/visual-search/>



Moderated Panel Discussion on Global Lithium Perspective

- EnergySource – Derek Benson, Chief Operating Officer
- Cornish Lithium – Dr. Rebecca Paisley, Exploration Geochemist
- UC Santa Cruz - Professor Fernando Leiva



Q&A with Lithium Valley Commissioners



Public Comment

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Future Meetings Discussion

- Determination of:
 - Agenda Topics
 - Speakers
 - Presentations



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Media and Legislation Updates



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Adjourn



Webpage: <https://www.energy.ca.gov/data-reports/california-power-generation-and-power-sources/geothermal-energy/lithium-valley>

List Serv: Lithium Valley Commission

Thank you!

LithiumValleyCommission@energy.ca.gov



Break

LithiumValleyCommission@energy.ca.gov