Geosyntec consultants

LANDFILL GAS TO RNG – CASE STUDIES IN INTERSTATE CARBON INCENTIVES, REGULATION & COMPLIANCE

NEBC Bioenergy Summit

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PRESENTED BY

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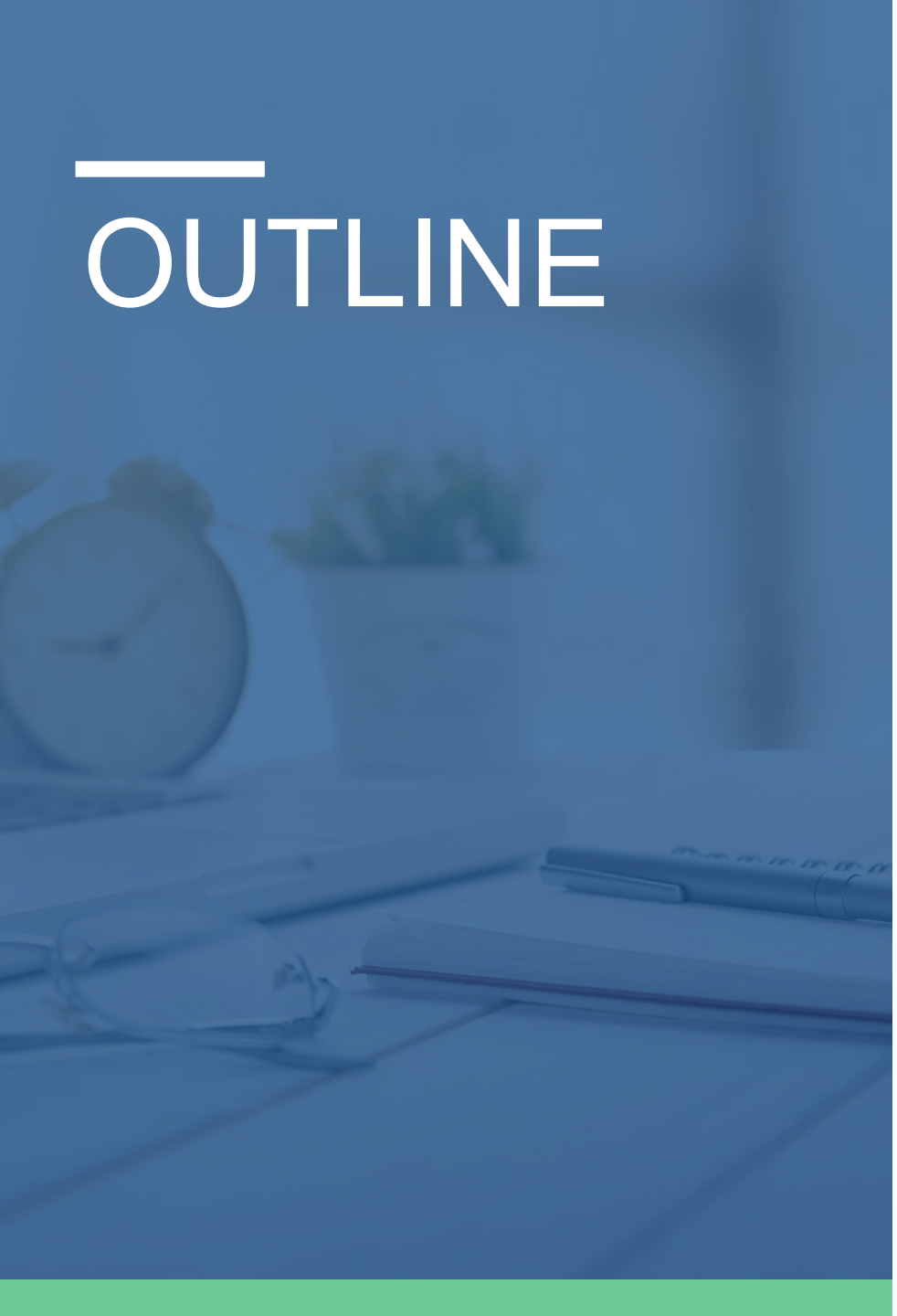
OUTLINE



West Coast Carbon Incentives

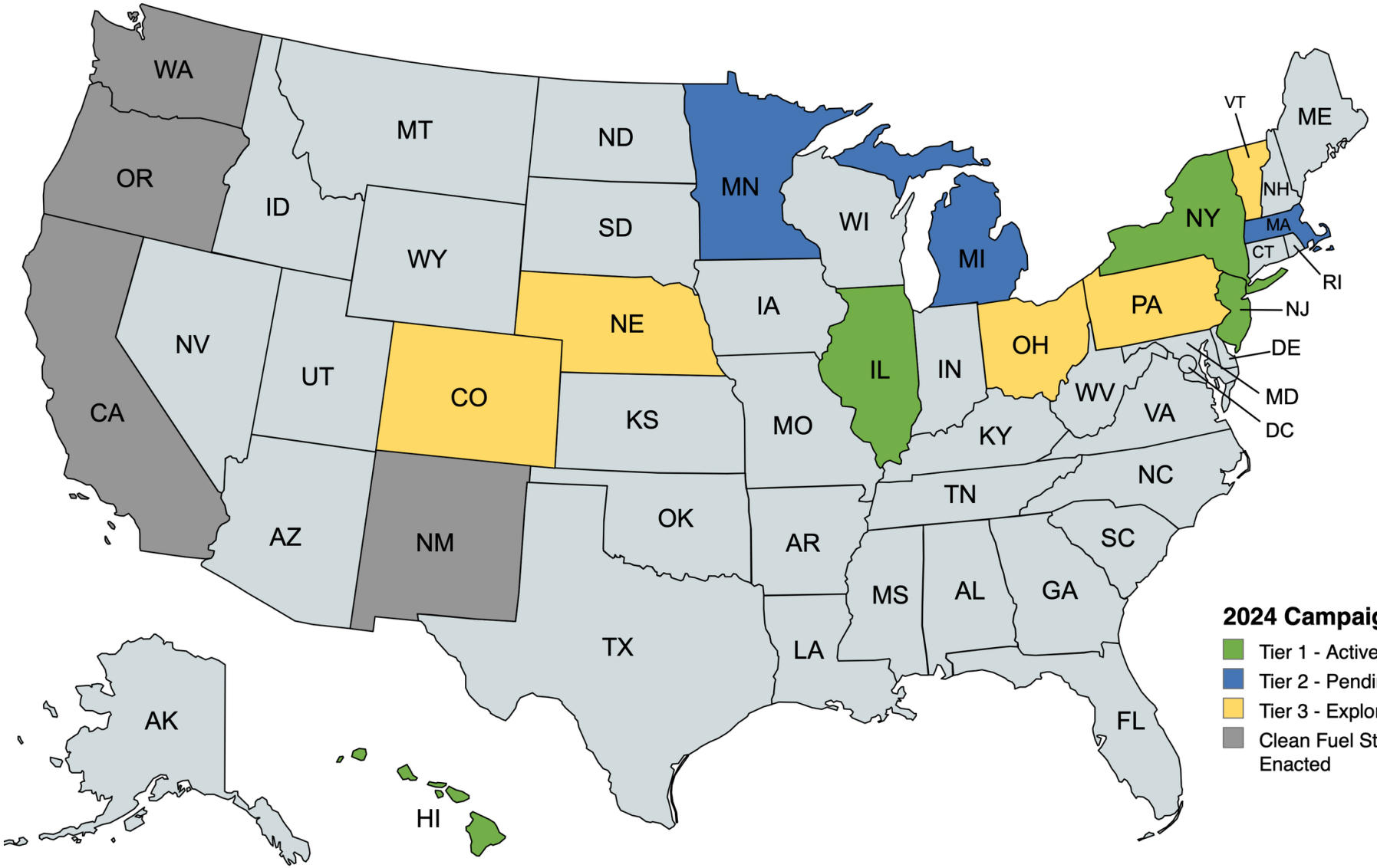
LFG/RNG Design Considerations

Case Studies

Applicability to PNW Projects

Geosyntec Services in LFG/RNG

West Coast Carbon Incentives Overview



Not shown:

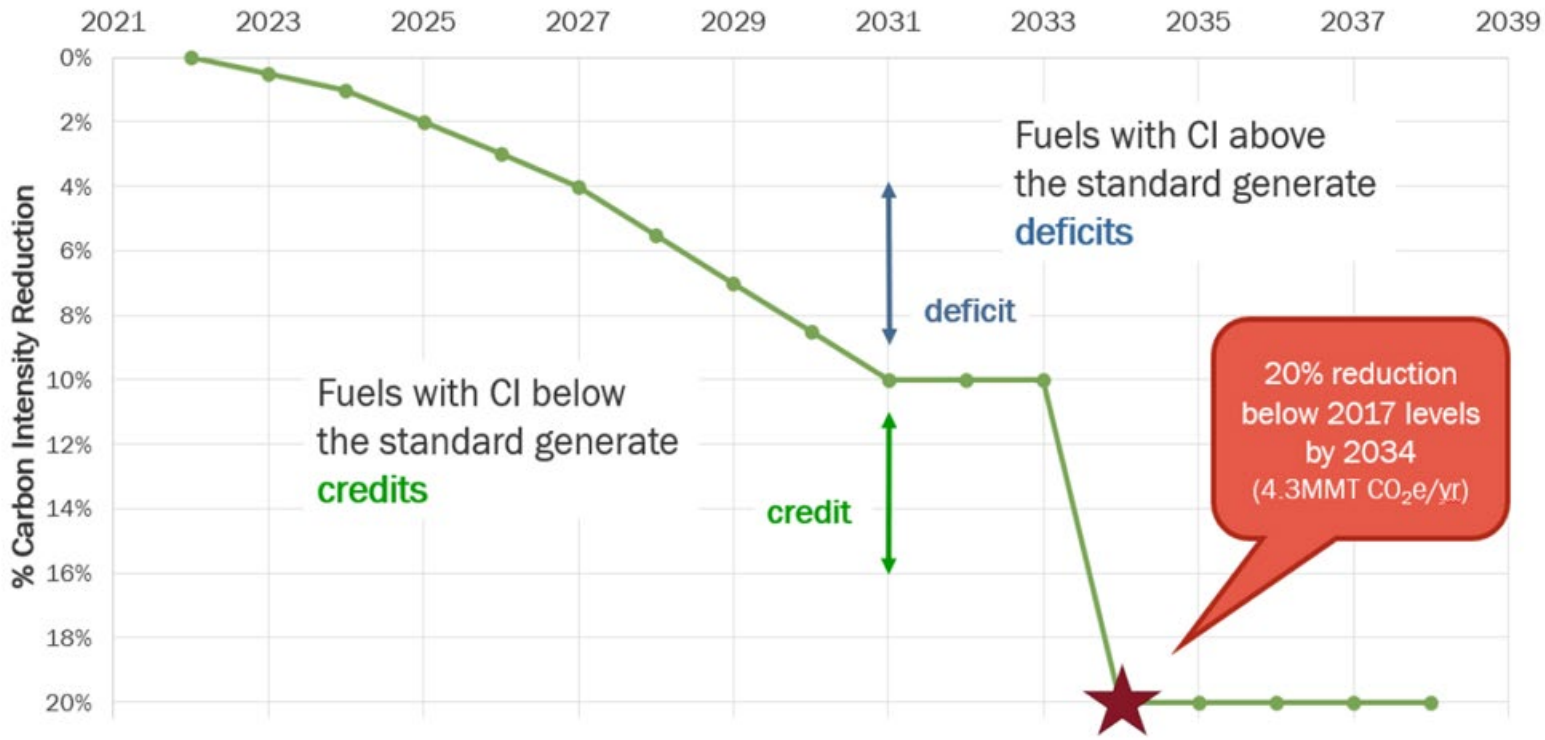
British Columbia (2008) and Canada federal compliance (2023)

https://www.lcfcoalition.com/current-campaigns

West Coast Carbon Incentive Programs - Washington

Washington Clean Fuel Standard

- GOAL – Cut GHG emissions by 20% by 2034
- Mandatory Participants: Producers and Suppliers of fossil fuels, biodiesel, ANY liquid or non-liquid fuel



https://ecology.wa.gov/air-climate/reducing-greenhouse-gas-emissions/clean-fuel-standard

West Coast Carbon Incentive Programs - Oregon

Oregon Clean Fuels Program

- GOAL – decrease CI Score of fuels by 20% (2030) and 37% (2035)
- Mandatory Registered Parties: Importers of liquid fuels
- Voluntary Registered Parties: Producer or Importer of RNG

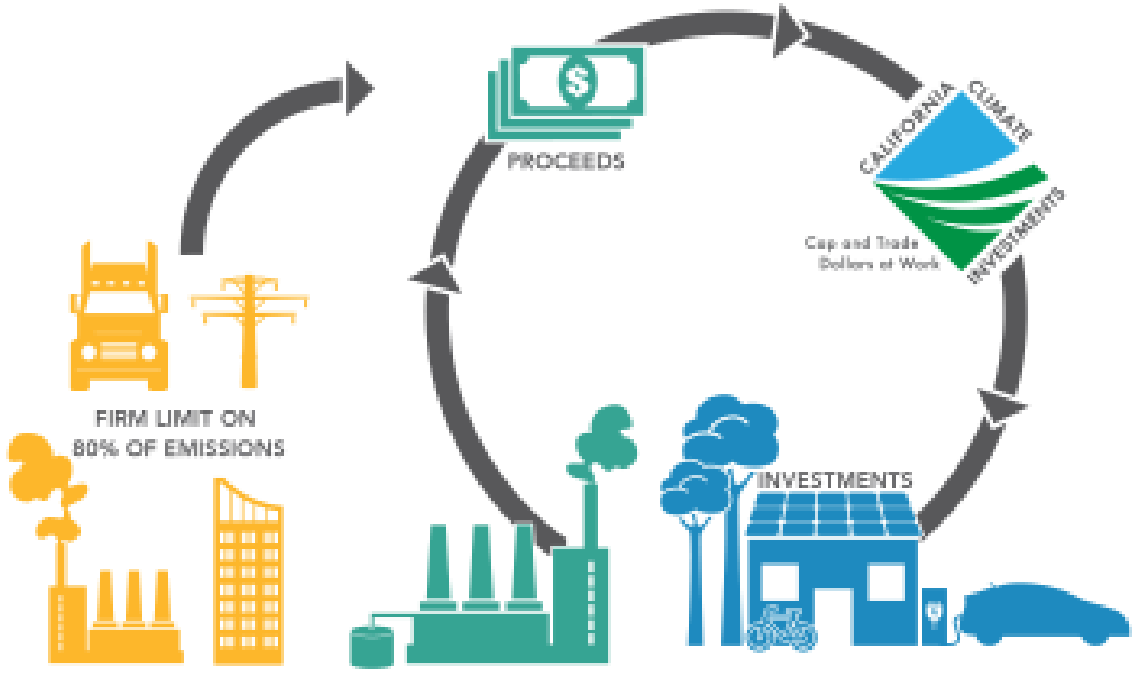
https://www.oregon.gov/deq/ghgp/cfp/pages/cfp-overview.aspx

West Coast Carbon Incentive Programs - California

California Air Resources Board

Low Carbon Fuel Standard (LCFS)

- Reduce CI of transportation fuels by 20% (2030)
- Cap-and-Trade Program – transportation fuels
- Achieved 2020 GHG Reduction Target 4 years ahead of schedule

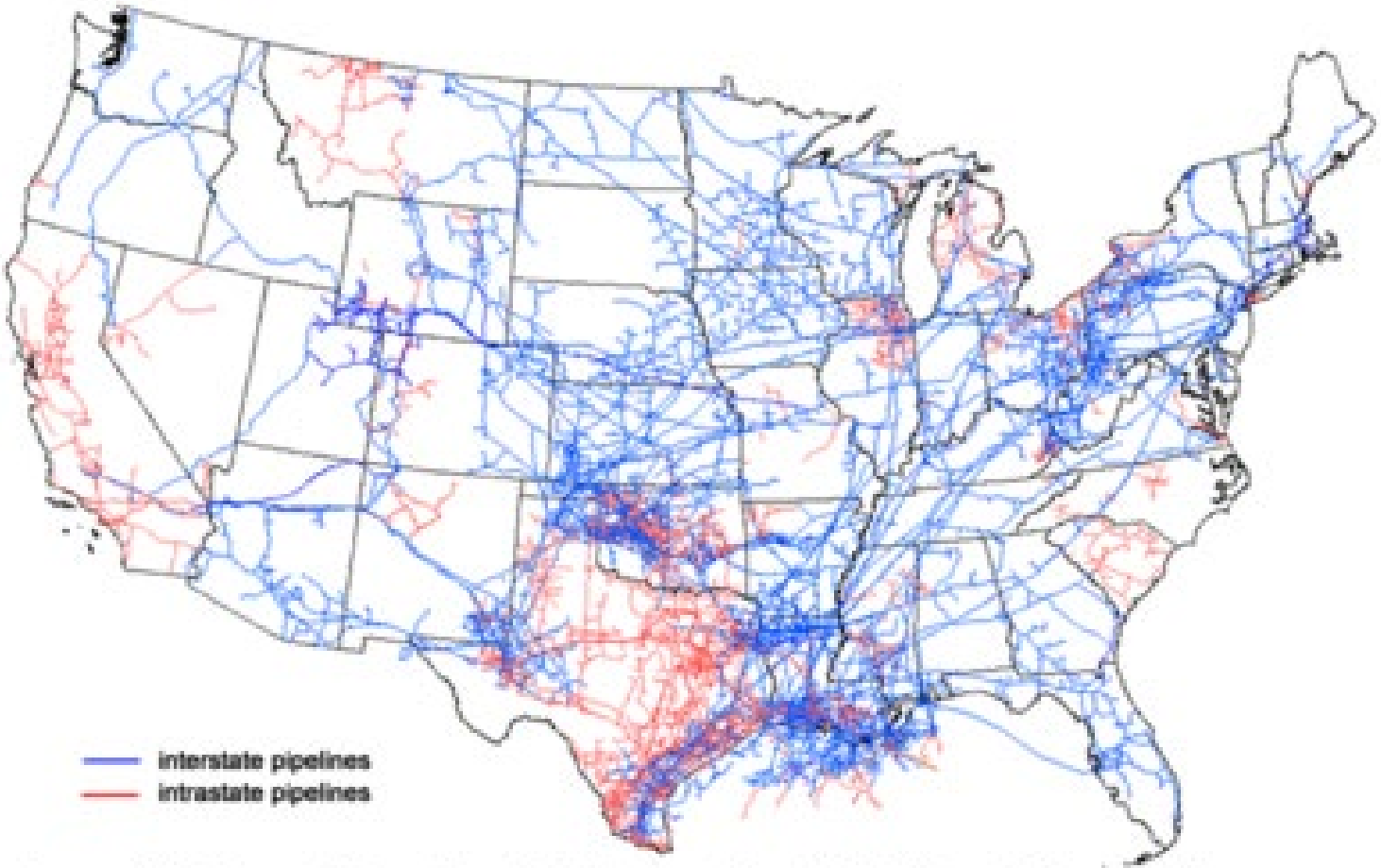


https://ww2.arb.ca.gov/our-work/topics/climate-change

Interstate Natural Gas Pipeline

The interstate natural gas pipeline is the infrastructure backbone that makes importer offsets possible.

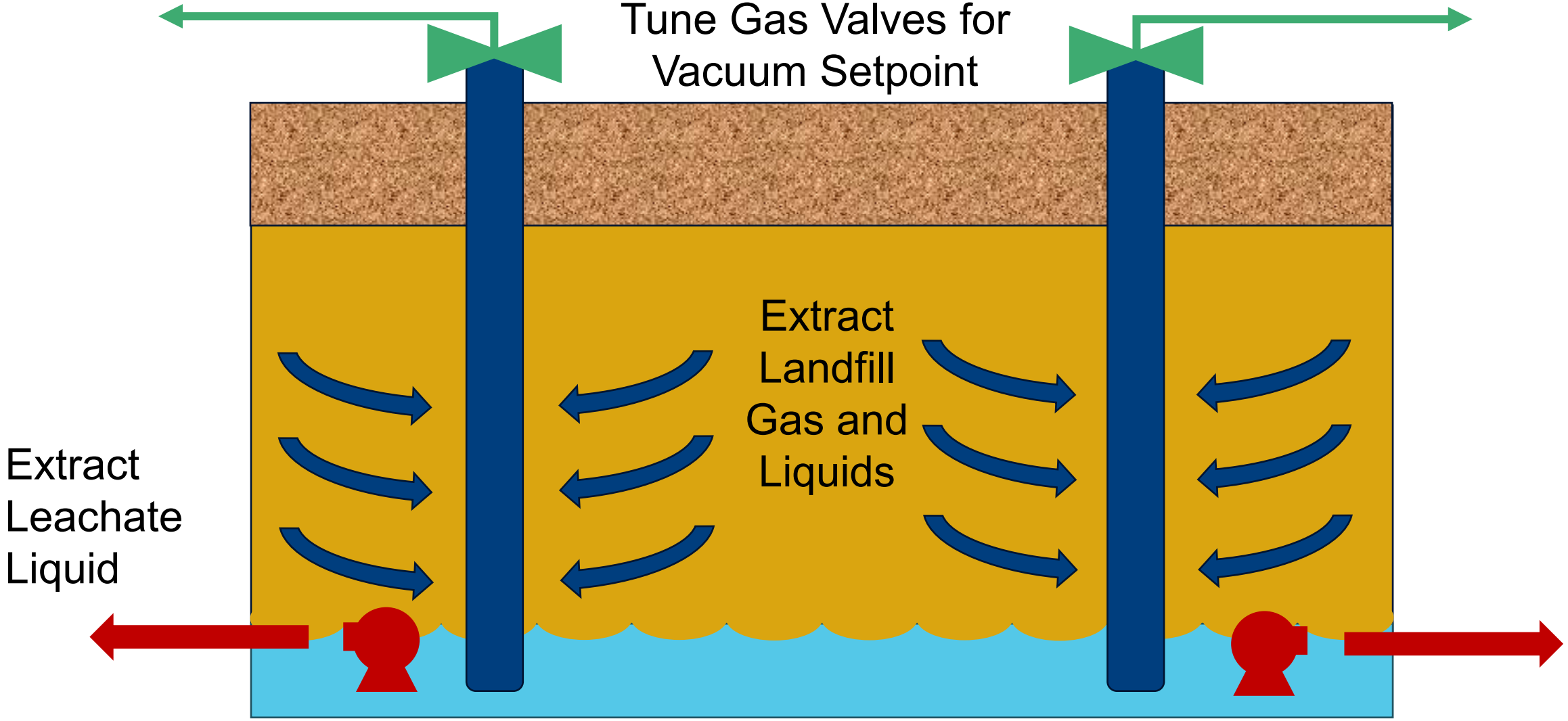
Map of U.S. interstate and intrastate natural gas pipelines



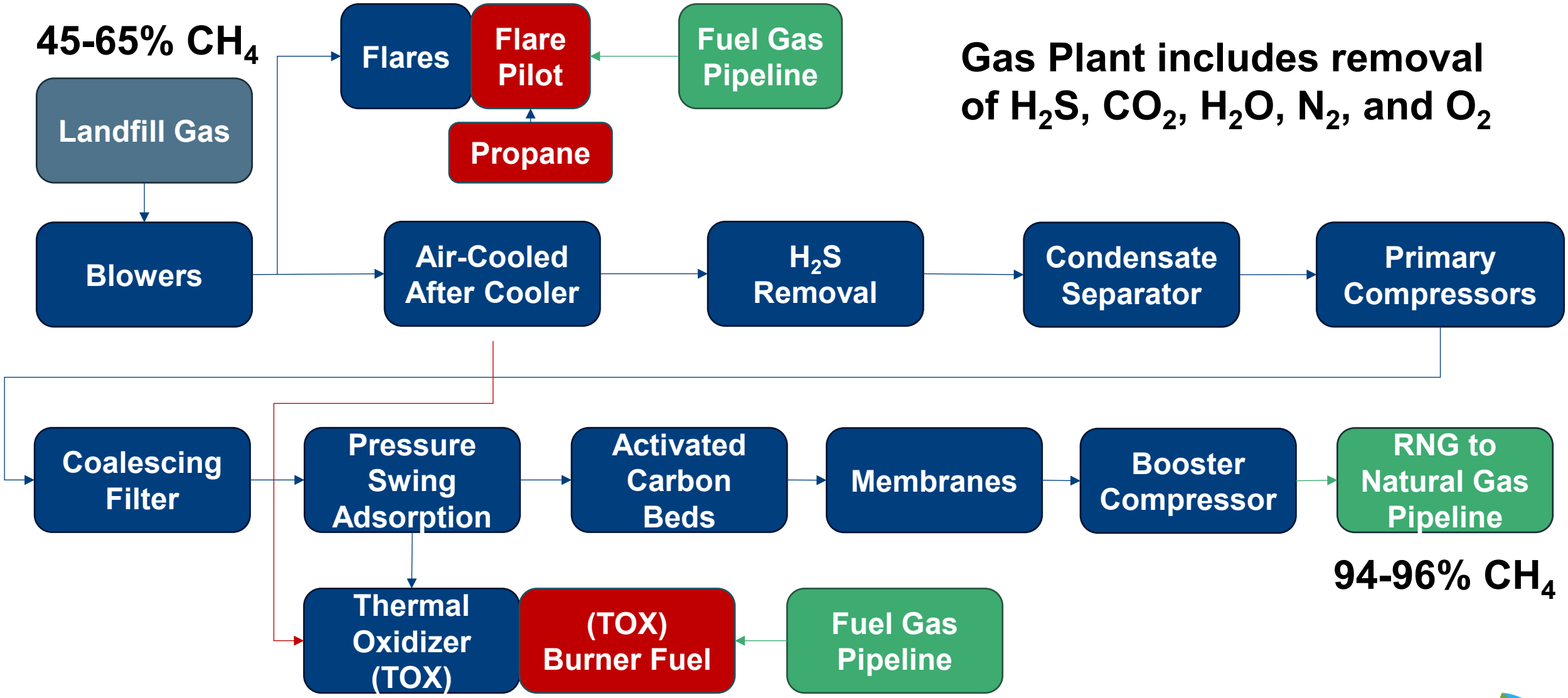
Source: U.S. Energy Information Administration, *About U.S. Natural Gas Pipelines*

RNG created in one area can be counted for credits in another area.

Wellfield Design Considerations



Example LFG/RNG Process Flow Diagram



Case Study 1 – Cedar Hills Regional Landfill, WA

Cedar Hills Regional Landfill (CHRL)

- Only active landfill in King County, WA

Bio Energy Washington – plant operator

- Largest LFG to RNG plant in US
- Plant can use diesel or RNG fuel
- Generates onsite electricity

Case Study 1 – Challenges and Lessons Learned

Wellfield and Piping Design

- Install 60-80 wellheads
- Model landfill gas production
- Varied age of landfill – mixed biogas production

Detailed Design Considerations

- Parse out design-related and operations-related performance limitations
- Key role of liquid management

Case Study 2 – River Birch Landfill, Avondale, LA

River Birch Landfill (RBL) – 53.8 MM tons

- 26th largest US landfill
- 3rd largest supplier of LFG to RNG – 5.8MM SCF/day

High-BTU Gas Upgrading Plant

- H_2S and CO_2 removal
- Design Heating Value ~ 920 BTU/scf

RiverBirch LLC

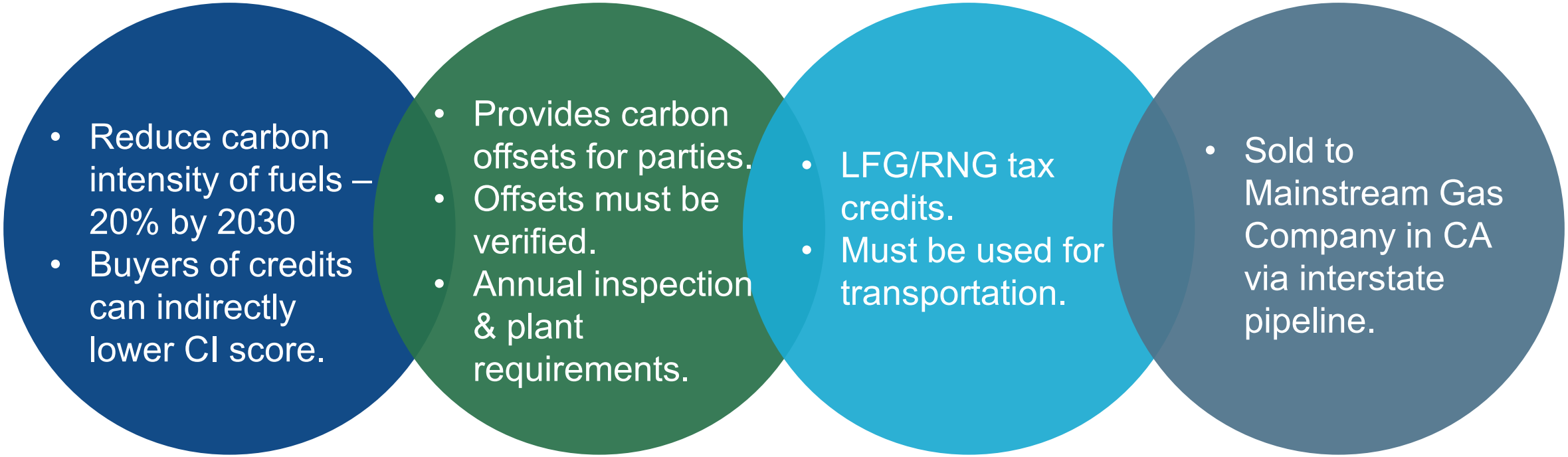
GEOSYNTEC CONSULTANTS

Case Study 2 - Air Permitting and Compliance

New Source Performance Standards (NSPS) Sub. WWW & National Emission Standards for Hazardous Air Pollutants (NESHAP) Sub. AAAA

- Wellfield and surface emissions monitoring required.
- Gas collection and control systems utilized to minimize fugitive emissions.
- Control non-methane organic compounds (NMOC) and hazardous air pollutants (HAP).

Case Study 2 - Carbon Incentive Programs



CA Low Carbon Fuel Standard

CARB Cap-and-Trade Program

EPA Renewable Fuel Standard

Other Potential Revenue

Case Study 2 - Challenges and Lessons Learned

Operational Optimization

- Optimal # of wells for max gas production.
- Minimize O_2 intrusion.
- Automatic wellheads & algorithm to tune valves.

Environmental compliance

- Multi-agency regulatory oversight.
- NSPS WWW adherence to minimize fugitive emissions.
- Strict monitoring schedule.
- RIN and credit auditing and plant inspection.

Applicability to PNW Projects

Market fluctuations are unpredictable.

Utilizing multiple incentives to maximize customer base is crucial.

RNG demand is large for CA mandates – electricity and vehicle fuel.

Frequent and early communications with regulatory agencies.

OR, WA, & CA all have clean fuel standards/programs for tax incentives.

Interstate pipeline can be utilized to sell RNG to out-of-state customers.

Geosyntec Services in LFG/RNG

Permitting, Compliance, and Design

T&E Survey	Wellfield Design
Air Modeling	Modeling landfill gas
USACE Permit	Title V Air Permit – NEW or Modification
Environmental Surveys	Feasibility Analysis
Agency Consultations	Wetlands Delineation
Solid Waste Permit Application Modification	NSPS Design Plans
Cultural Resources Survey	Environmental Due Diligence
LCA carbon intensity documentation	NPDES Permit or Modification
Planning - permit matrix and schedule	Regulatory compliance review and management

Questions?

Thank you.

For further information, contact:

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