CLIMATE ACTION RESERVE

Scoping Webinar:
India Nitric Acid Production Protocol
Version 1.0

August 14, 2025

Housekeeping

- All attendees are in listen-only mode

- Please submit your questions in the Zoom question box and we'll try to answer them at the end, time permitting

- We will follow up via email to answer any questions not addressed during the meeting

- The slides and a recording of the presentation will be posted online on the protocol webpage

Introduction

Reserve Staff

Rachel Mooney, Manager (development lead)

Holly Davison, Associate Director of Programs

Jordan Mao, Senior Associate

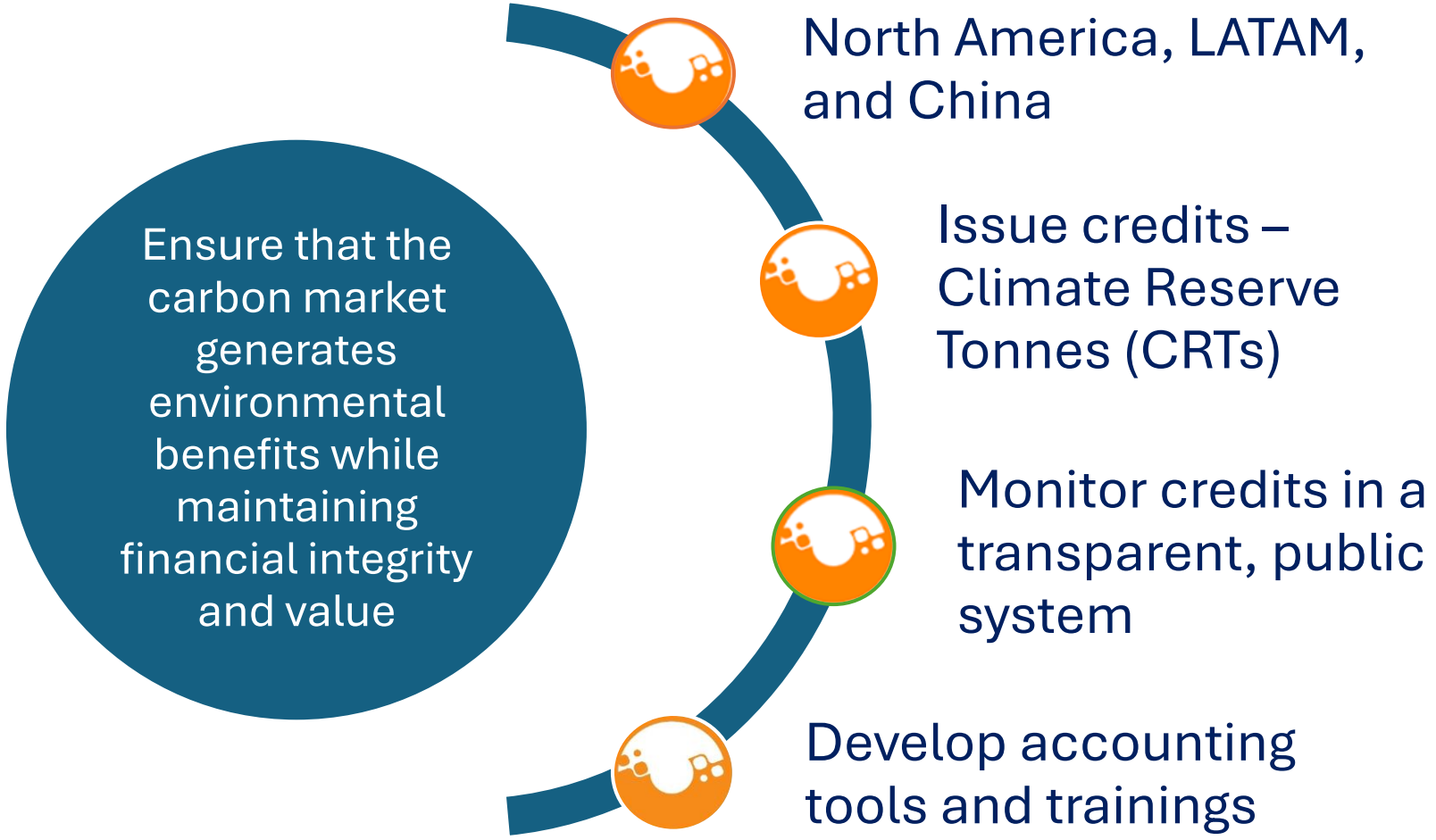
Partial Technical Support

Partial technical support for initial redline drafting provided by ClimeCo Corporation

AGENDA

- Introduction to the Climate Action Reserve
- Background on nitric acid production industry in India
- Protocol development process/timeline
  - REMINDER:
    - Statements of Interest for the technical workgroup due **August 29**
    - Request for Information due **September 19**
    - Stakeholder Engagement Forms available
- Key considerations for protocol development
  - Project definition
  - Project ownership
  - Additionality
  - Permanence
  - Quantification
  - Monitoring / reporting / verification
- Next steps

The Climate Action Reserve



CLIMATE ACTION RESERVE

Climate Action Reserve Projects

Project Type: Select | Status: Select | Country: Select | State: Select | Project ID: Select | Project Video: Select

Number of Projects

1.12k

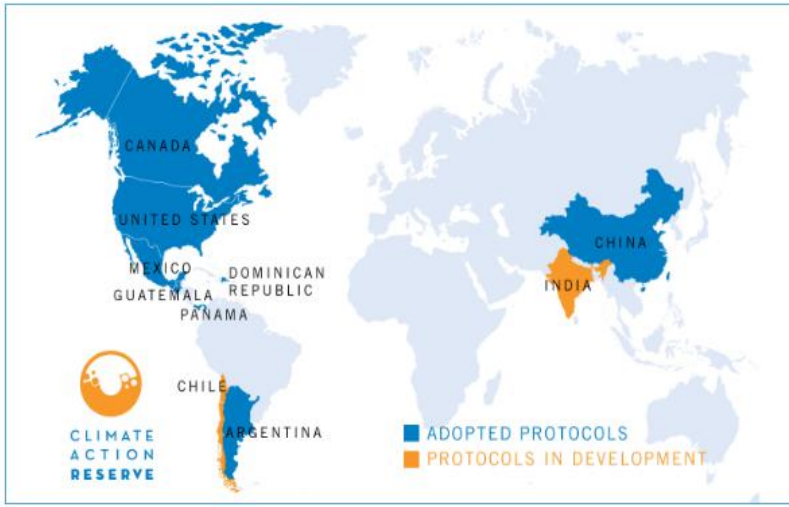
Compliance projects use square icons. Additionally, you can filter by project type and select the protocols that indicate (ARB) to show all California compliance projects.

Status Definitions

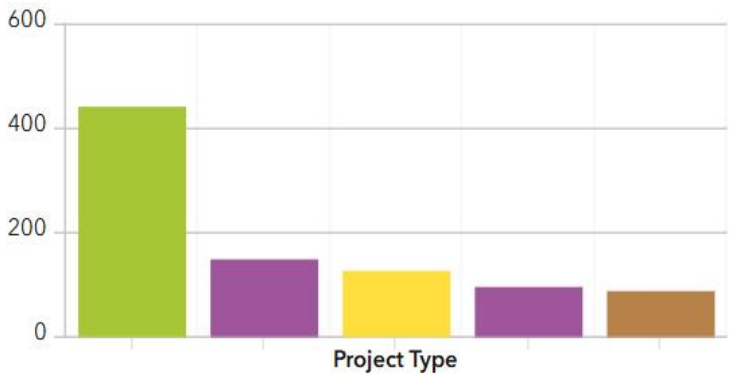
Listed projects have paid the submittal fee and successfully met eligibility requirements and other aspects set forth within the appropriate protocol.

Registered projects change from "Listed" the first time they are verified and

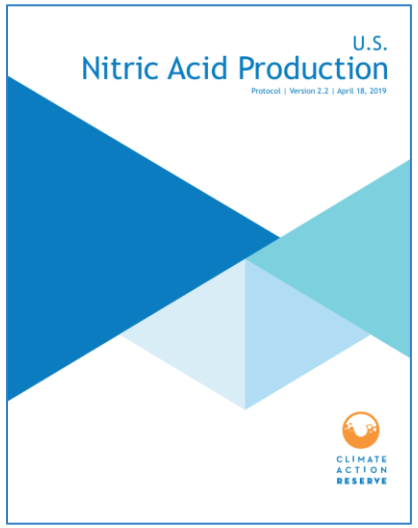
as of 6/3/2025

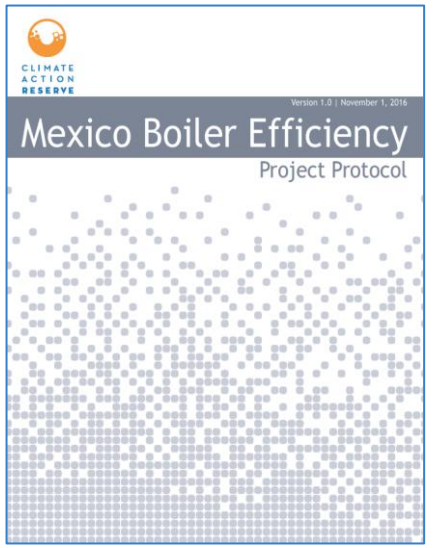


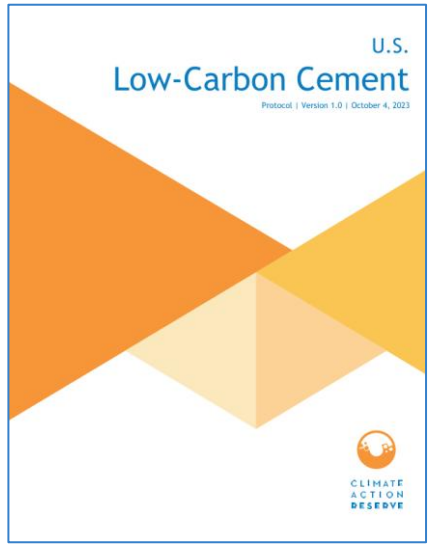
Projects by Type

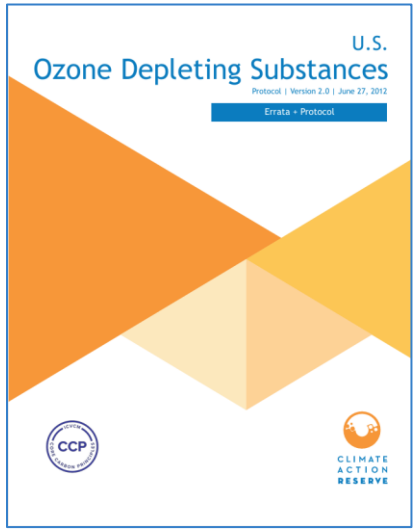


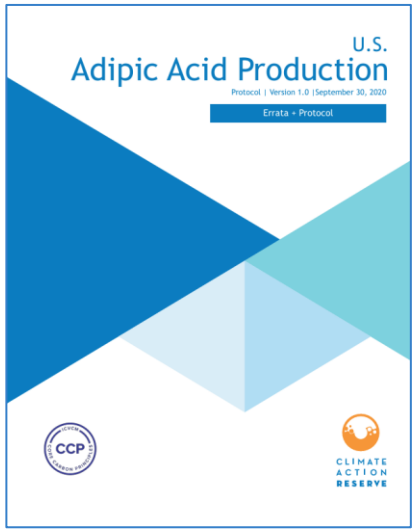
Expertise in Industrial Processes

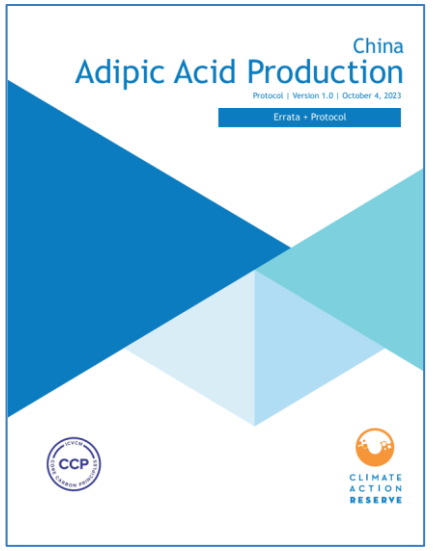


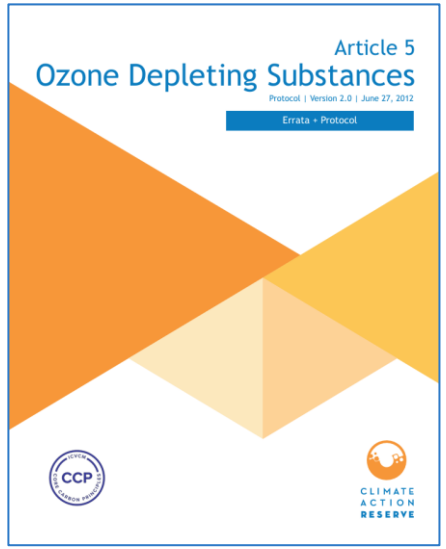












Principles of the Reserve Program

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All registered projects and credits issued by the Reserve must be:

ADDITIONAL

- Beyond common practices
- Beyond regulatory requirements

VERIFIED

- Standardized eligibility criteria and quantification methodologies
- Independent third-party review

REAL

- Conservative emissions accounting
- Prescriptive models and equations
- Uncertainty reduction

PERMANENT

- Monitoring and reporting processes
- Any leakage or loss is quantified and compensated

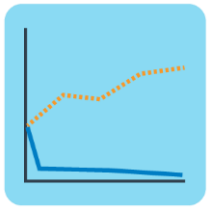
ENFORCEABLE

- Processes to ensure program compliance
- Accountability mechanisms

GHG Accounting Standardization

Two elements:

- Determination of project eligibility and additionality using standardized criteria rather than project-specific assessments.



- Quantification of GHG reductions/removals through a baseline established under certain assumptions, emission factors and monitoring methods.

Objectives:

- Minimize personal judgment in project assessment.

- Reduce transaction costs for the project developer, minimize uncertainties for investors, and increase the transparency of the project when it is approved and verified.

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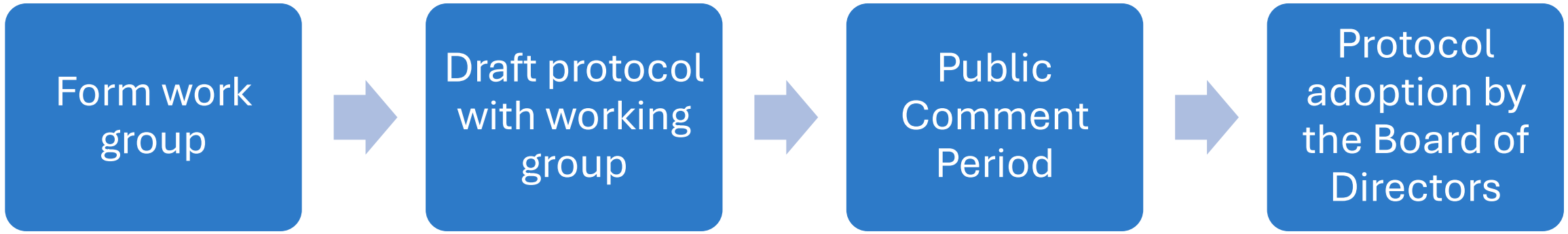
Rigorous, Inclusive and Transparent Process for Protocol Development



Inclusive Process: A balanced multi-stakeholder working group is formed with experts of the sector (nitric acid) and jurisdiction (India), state and federal agencies, environmental organizations, and other stakeholders.

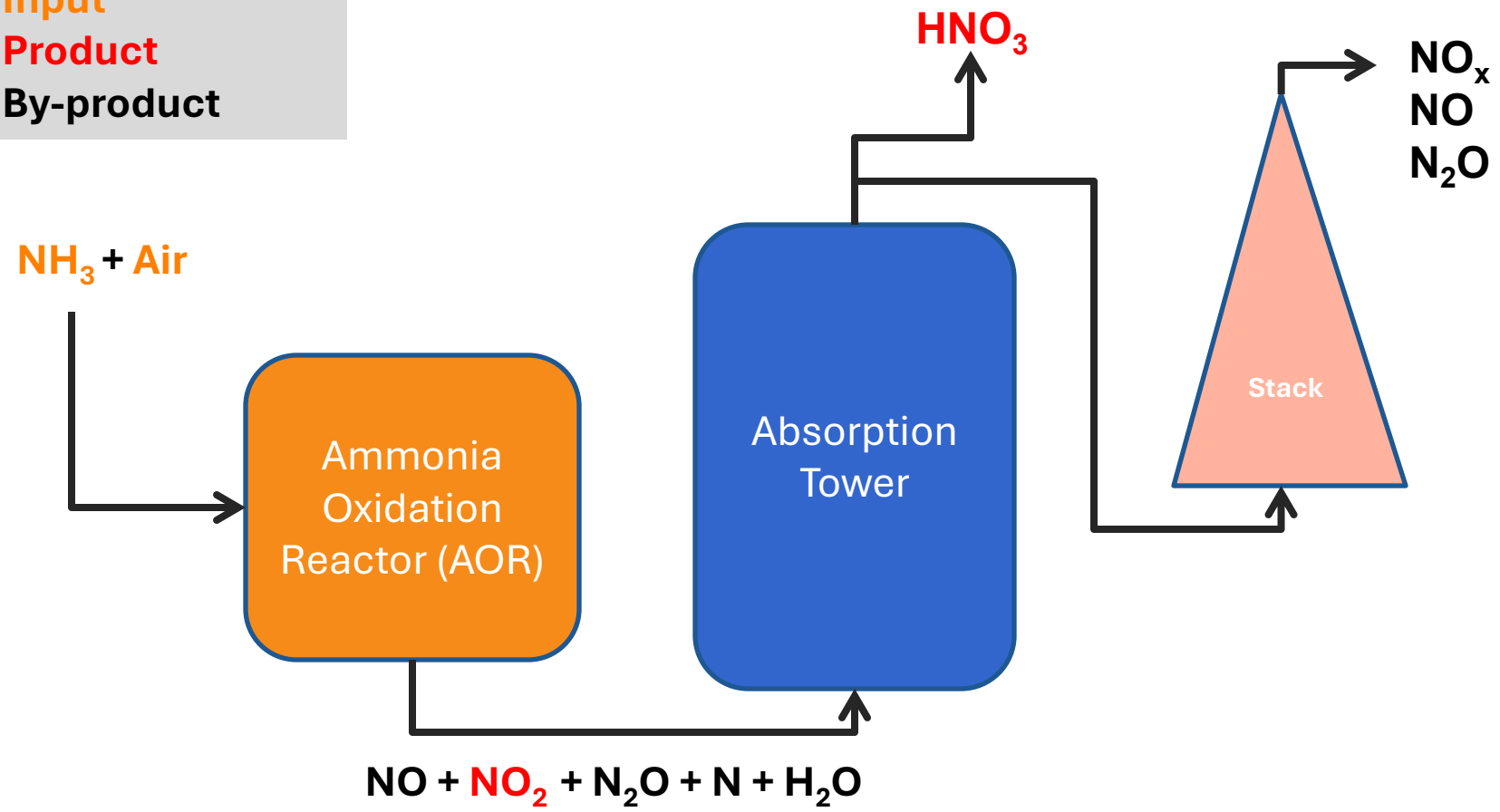
- Stakeholders that are not part of the working group can still participate in the process as "observers".

Transparent Process: All workgroup meetings and webinars for the public comment period are recorded and posted on the website along with the drafts.

DEVELOPMENT PROCESS & TIMELINE

Nitric Acid Production

Input
Product
By-product

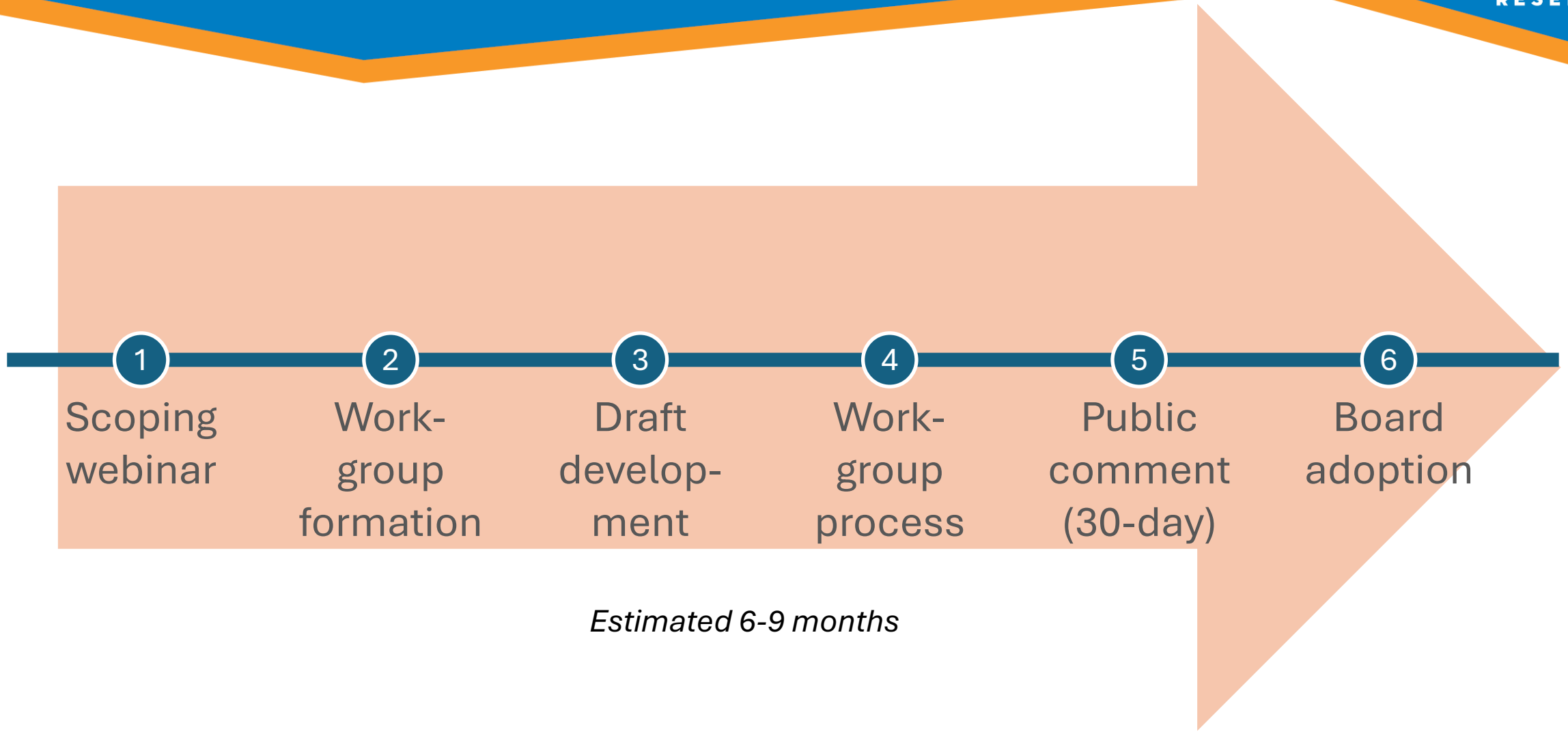


NO – Nitric Oxide
NO2 – Nitrogen Dioxide
NH3 – Ammonia
HNO3 – Nitric Acid

Background: Why Nitric Acid Production

- Nitric acid (HNO_3) is primarily used to make synthetic commercial fertilizers
- N_2O is a byproduct of the oxidation process and remains in the tail gas and is eventually emitted with the stack gas to the atmosphere.
  - 100-year global warming potential of 265 (AR5)
- India's current nitric acid production capacity is an est. 2.044 million metric tonnes per year (ChemAnalyst Report, July 2025)
  - 18 production lines, with one currently abating

Protocol Development Timeline



Estimated 6-9 months

Stakeholder Engagement & Workgroup

- Stakeholder participation & feedback is critical to protocol development
- Stakeholder Engagement form helps the Reserve identify & communicate with interested stakeholders throughout the protocol development process
- An interested and experienced sub-group of stakeholders are identified to construct a **technical workgroup** to advise protocol development and produce rigorous, well-vetted, and credible protocols
- The Reserve strives to construct a workgroup with a balanced representation from industry, project developers, environmental NGOs, verification bodies, independent consultants, academia, and government bodies
- Interested stakeholders invited to submit one of two forms on our website
  - Observer: Please submit the **Stakeholder Engagement Form** at any time
  - Technical workgroup: Please submit the **Statement of Interest** Form by **August 29, 2025**

Workgroup Process and Expectations for Workgroup Members

Process

- Reserve staff identify and solicit feedback on specific protocol criteria
- Reserve staff schedule and hold meetings (generally 3-4)
- Reserve staff produce draft protocol for review
- Reserve staff revise protocol based on feedback

Expectations

- Familiarity with the feedstocks, technologies, and/or end uses for which the protocol is being developed, and/or solid understanding of project-based GHG accounting
- Review, comment on and provide recommendations on specific protocol criteria
- Participate in meetings via webinar
- Provide written comments on draft protocol

KEY CONSIDERATIONS FOR PROTOCOL DEVELOPMENT

Key considerations for protocol development

- Project definition
- Project ownership
- Additionality
- Quantification
- Monitoring
- Reporting & Verification

ELIGIBILITY REQUIREMENTS

Project Definition

- Defined as the installation and operation of an N_2O abatement technology at a single nitric acid plant (NAP) that results in the reduction of N_2O emissions that would have otherwise been vented to the atmosphere.
- Projects can only be implemented at existing, relocated, or upgraded NAPs, provided historical nitric acid (HNO_3) production levels and allowable operating conditions can be established.

Eligible Abatement Technology

Secondary Catalyst Project

Removes N_2O from the gases between the ammonia oxidation reactor (AOR) and the absorption tower. Usually this will mean intervening at the highest temperature, immediately downstream of the primary catalyst and catalytically reducing the N_2O once it has been formed in the AOR.

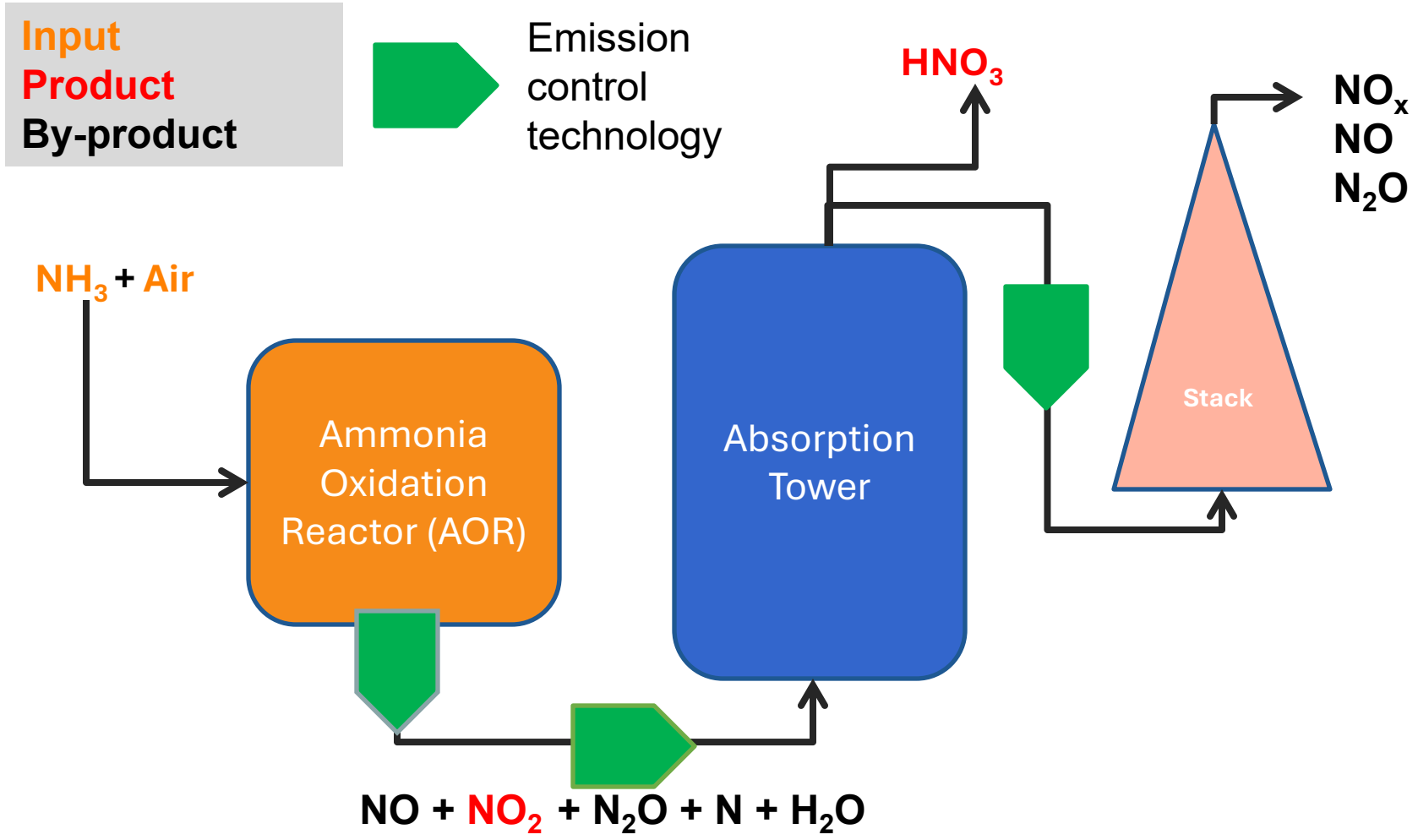
Tertiary Catalyst Project

Treats the tail-gas leaving the absorption tower to destroy N_2O. N_2O abatement can be placed upstream or downstream of the tail-gas expansion turbine. These abatement measures may include catalytic decomposition or Non-Selective Catalytic Reduction (NSCR).

Combined Secondary and Tertiary Catalyst Project

Installs a tertiary abatement system to an existing secondary catalyst without decommissioning the secondary system to improve the project's N_2O control capabilities.

Nitric Acid Production



Project Ownership

- "Project developer" is the entity with an active account with the Reserve and is responsible for project reporting and verification
  - May be facility owners, entities that specialize in project development, abatement technology suppliers, or other entities
- Must demonstrate clear ownership of the GHG reductions
- Must be liable for the emissions of the NAP (i.e., entity on plant's operating permit), unless the rights to emission reductions have been transferred to another entity
- Ownership must be established by clear and explicit title and sign the Reserve's Attestation of Title form

Eligibility Rules

- **Location:** nitric acid plants in India
- **Start Date:** date in which production first commences after the installation of the abatement device/catalyst
  - Must be submitted within 12 months for listing
- **Crediting period:** approximately 10 years, aligning with the last full campaign that begins in the tenth year of reporting.
  - Unless it becomes legally required
- May be eligible for a second crediting period for a project lifespan of 20 years
  - Must meet eligibility requirements of the most recent protocol when applying for second CP
  - Begins the day following the end of the first crediting period

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Additionality Requirements

- Must be additional – yield a surplus of GHG reductions that are additional to what would have occurred in the absence of the value of the carbon credits
- Must satisfy the following two tests:
  - **Performance Standard Test**
    - Installation and operation of an eligible N2O abatement catalyst
      - Secondary catalyst
      - Tertiary catalyst
      - Combined secondary and tertiary catalyst
  - **Legal Requirement Test**
    - Passes when there are no laws, regulations, or other legally binding mandates requiring the installation of N2O abatement technology
    - Not subject to a national or regional emissions trading system

India Carbon Market Framework

- India's Carbon Credit Trading Scheme (CCTS) is under development, and will consist of compliance and voluntary mechanisms
- Will set emissions intensity targets for "obligated entities", including the fertilizer industry. However, we do not anticipate this will extend to nitric acid plants.
- The Reserve will continue to track the development of the CCTS and will request feedback from the workgroup.
- To be eligible, NAPs cannot be subject to India's CCTS
  - Currently does not cap N2O emissions at nitric acid plants

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Regulatory Compliance

- Project developers must attest that project activities do not cause material violations of applicable laws (e.g., air, water quality, safety, etc.)
- Must sign an Attestation of Regulatory Compliance at each verification
- Must disclose in writing all instances of legal violations caused by project activities
- If the verifier and the Reserve determine that project activities have caused a material violation, then CRTs will not be issued for GHG reductions that occurred during the period(s) when the violation occurred
- Administrative violations and “acts of nature” do not impact crediting
  - Re-occurring administrative violations related to project activities may affect crediting

Safeguards

- Social and environmental safeguards
  - Public comment and dispute resolution process for new projects
  - Compliance with labor and safety regulations
  - Compliance with air and water quality regulations
  - Designed and implemented to mitigate potential releases of pollutants

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GHG QUANTIFICATION

Quantification

- Quantification approach is dependent on site-specific conditions,
  1. Secondary catalyst projects
  2. Tertiary catalyst with pre-existing SCR
  3. Tertiary catalyst without pre-existing SCR
  4. Combined secondary and tertiary catalyst with pre-existing SCR
  5. Combined secondary and tertiary catalyst without pre-existing SCR
- Credits are issued on an ex-post basis

Quantification – Secondary Catalyst

Emission Reductions = Baseline Emissions – Project Emissions

- Baseline emissions:
  - Baseline emission factor determined prior to installation during a baseline sampling period
  - Quantity of nitric acid produced
- Project emissions:
  - Mean stack gas volume flow
  - Mean concentration of N2O in stack gas
  - Total operating hours during the campaign

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Quantification – Tertiary Catalyst

Emission Reductions = Baseline Emissions – Project Emissions

- Baseline emissions:
  - N2O in the tail gas before entering the tertiary abatement technology or pre-existing NSCR
- Project emissions:
  - Unabated N2O
  - Ammonia use
  - Hydrocarbon use
  - External energy

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Quantification – Combined Secondary/Tertiary

Emission Reductions = Baseline Emissions – Project Emissions

Approach 1

- Baseline Emissions:
  - Baseline N2O emission factor from standalone secondary catalyst
  - Quantity of nitric acid produced
- Project Emissions:
  - Unabated N2O
  - Ammonia use
  - Hydrocarbon use
  - External energy

Approach 2

- Baseline Emissions:
  - Baseline N2O emission factor from standalone secondary catalyst
  - Quantity of nitric acid produced
  - Baseline emissions for tertiary catalyst
- Project Emissions:
  - Unabated N2O
  - Ammonia use
  - Hydrocarbon use
  - External energy

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MONITORING AND QA/QC REQUIREMENTS

Project Monitoring and QA/QC

- A monitoring plan must be established for all monitoring and reporting activities associated with the project to ensure all requirements of the protocol are met
- Monitoring requirements include:
  1. Continuous emissions monitoring systems (CEMS) must be used to determine the N2O concentration and flow rate of stack/tail gas.
  2. System installation and certification
  3. Calibration tests
  4. Accuracy testing
- Daily, Quarterly, Semi-annually, and Annual QA/QC requirements to ensure data quality

REPORTING AND VERIFICATION CYCLES

Reporting Periods & Project Campaigns

- Campaign: when production commences following installation of a new charge of primary catalyst gauze and ends when production stops to replace or recharge primary catalyst gauze
- Variable length, depending on how long the primary catalyst gauze lasts before it needs to be replaced or recharged
- Reporting period: length of time that GHG emission reductions from project activities are quantified
  - Maximum 12 months, but may be sub-annual (e.g., monthly, quarterly, semi-annually)
  - Each reporting period must be verified by a third-party verification service
  - Must be continuous

Verification Cycle

- Verification cycle: length of time over which GHG emission reductions from project activities are verified
  - After the initial reporting period, two reporting periods may be verified at once
- Site visits are required during initial reporting period
  - Every 24 months of data thereafter, if project meets specified criteria
- Verification documents are required to be submitted to the Reserve no more than 12 months after the end of the reporting period.
- Must be verified and undergo Reserve review in order to receive credits

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REQUEST FOR INFORMATION

Request for Information

1. Please share your general feedback on the upcoming development of the India Nitric Acid Production Protocol.

2. The legal requirement test requires that the project activity is not required by law, regulation, or legally binding mandate, which includes a national or regional emissions trading scheme. Do you know of any potential conflicts with the India Carbon Credit Trading Scheme (CCTS)? If so, what are they are how might they impact the additionality of this voluntary protocol in India?

3. Project developers must demonstrate that their projects will not result in any environmental or social harm. What social and/or environmental safeguards should be included in the protocol?

Request for Information

4. During the workgroup process we will cover all sections within the protocol, utilizing the U.S. Nitric Acid Production Protocol as a base for development. Are there any other considerations (in addition to legal requirements and environmental and social safeguards) not addressed in the U.S. protocol that should be discussed during the development process for India?

5. Please share any information on sector-wide practices that should be considered for monitoring and metering the emission control technology.

6. Please provide other industrial protocol recommendations (i.e. Adipic Acid Production, Nitric Acid Production, Cement Manufacturing, etc.) in the Asia Pacific Region, including jurisdiction, project activity, and a brief description supporting your recommendation.

Request for Information Process

- All comments received will remain confidential and the Reserve will not formally respond to comments received.
- Link is available on the India Nitric Acid Production Protocol development webpage
- **Comments due by 5:00 pm PST September 19, 2025**

Next steps

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Protocol development process & timeline

Milestone	Date
Public Scoping Webinar	August 14, 2025
Statements of Interest Form (Workgroup)	**August 29, 2025**
Request for Information (all stakeholders)	**September 19, 2025**
Formation of workgroup	Week of September 1, 2025
Staff drafts protocol	*Ongoing*
First workgroup meeting	Late September / Early October 2025
Public comment period	Winter 2025/2026
Protocol presented to Reserve Board for approval	Spring 2026

Next steps

- ***For interested stakeholders:***
  - Submit Stakeholder Engagement Form (ongoing)
  - **Submit a Statement of Interest** to become a workgroup member **(by August 29, 2025)**
  - **Complete the Request for Information (by September 19)**

- ***For Reserve:***
  - Form workgroup
  - First Workgroup meeting late September/early October (via webinar)

Contact Information

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THANK YOU!