

NYC Private Ferry Emissions Reduction Program ... A Project Update

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Emissions Controls - An Operator's Perspective

Challenges Going Into the Project:

- We're not an R&D lab. Installing, demonstrating, debugging emissions control technologies is outside of, and detracts from, our normal business operations
- Any emission control measures that increase fuel usage will impact the competitiveness of ferries in the NYC transit market

But, Having Said That.....

We Have Maintained an Interest and Commitment to the Program:

- Our intent is to be as environmentally friendly to the Harbor as we can
- Attaining public financial support to achieve widespread, voluntary deployment of retrofit devices and cleaner engines is attractive to us

Bottom Line So Far:

- We've learned a lot: e.g., mature, demonstrated on-road control technologies do not just "drop seamlessly into" a marine propulsion environment
- But they can be made to work !
- We've invested much time, effort and risk... but initial results indicate it's worth it

NYC Private Ferry Emissions Reduction Program

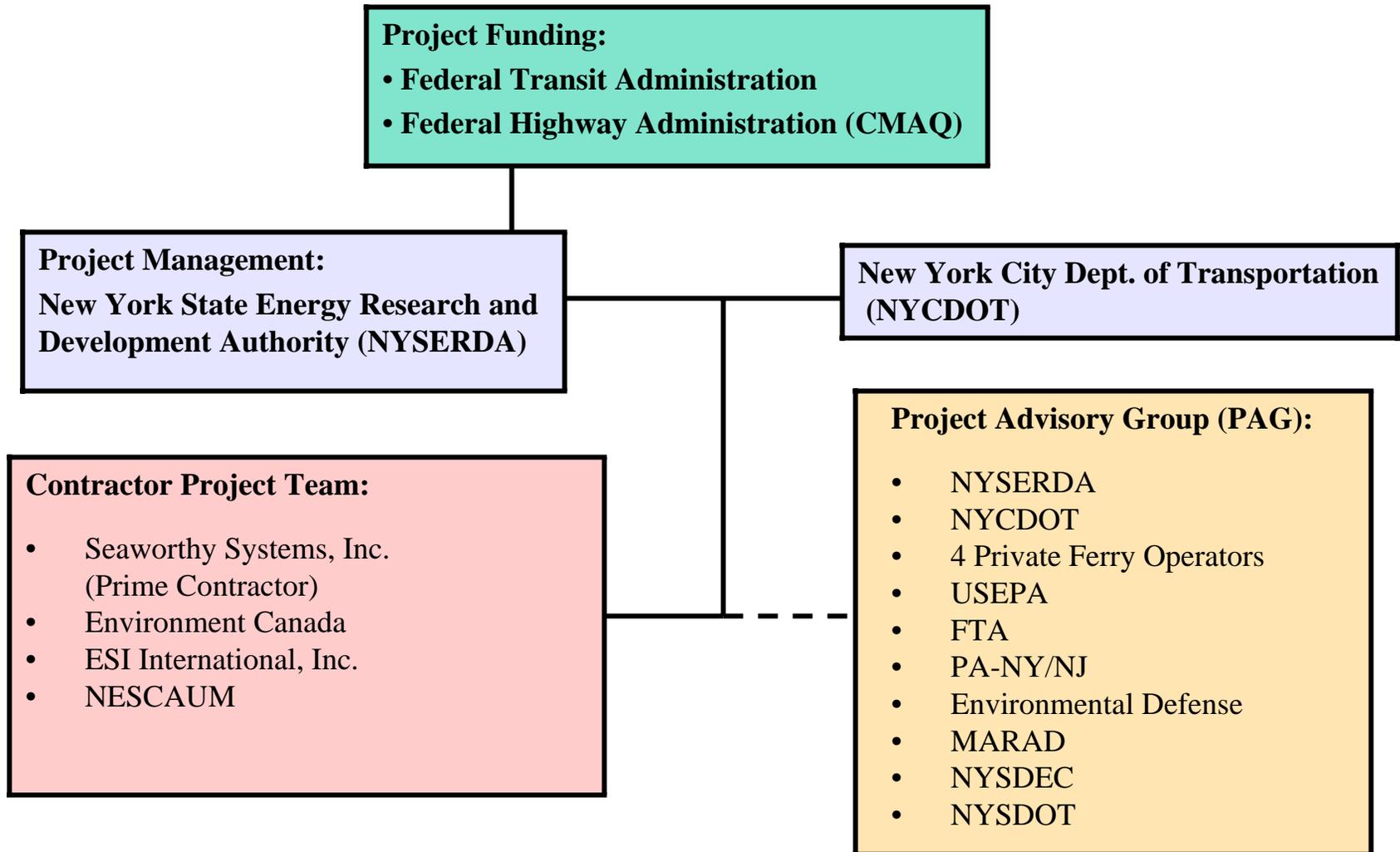
Objectives:

- Reduce private ferry fleet emissions
- Focus on Particulate (PM2.5) and NOx
- Aim at near term results – not new technology development
- Ultimate widespread deployment throughout fleets

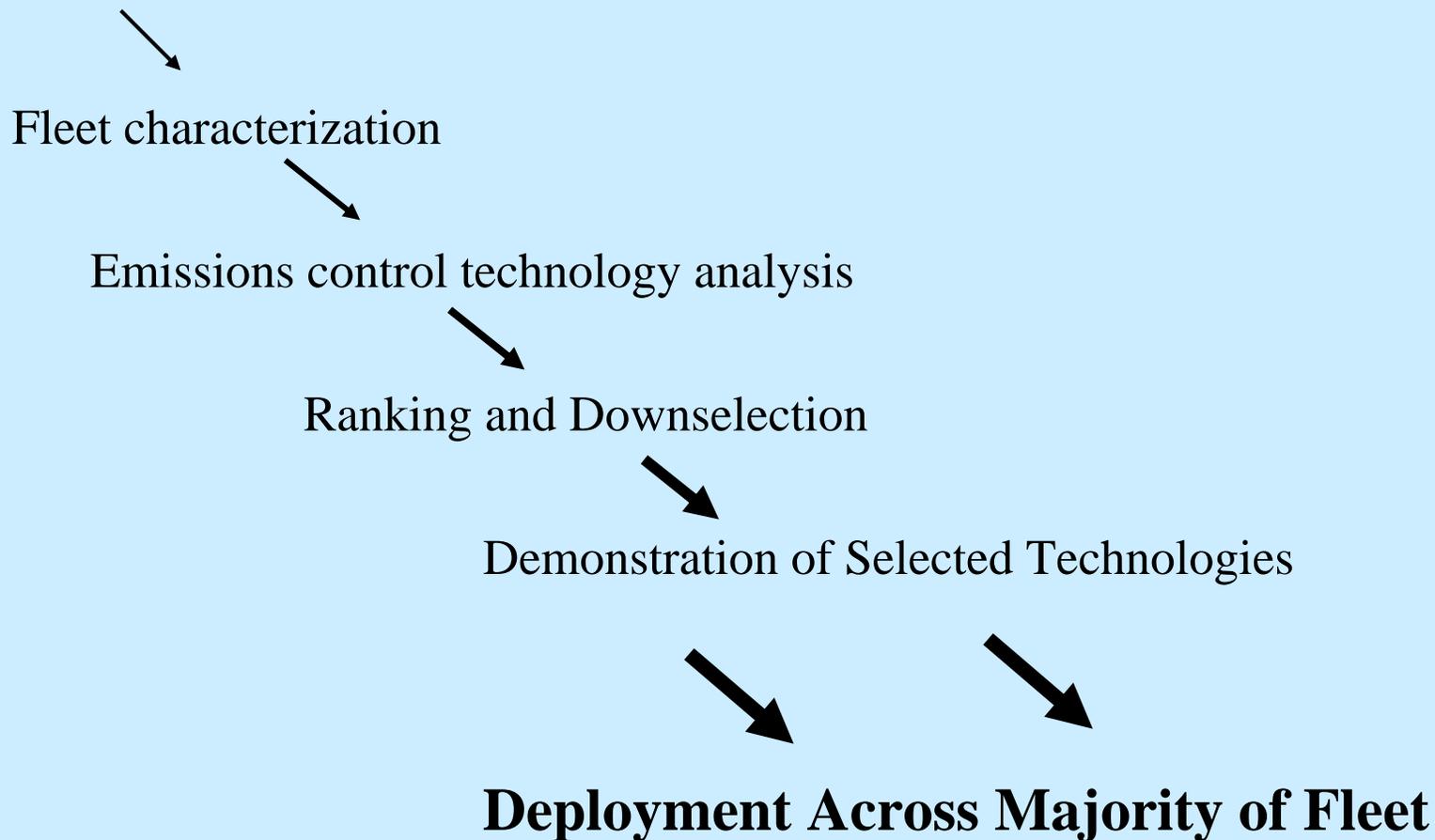
Genesis:

- Successful NYCDOT CMAQ funding proposal (\$1.8 mil)
- Outreach to NYSERDA for program management support
- Subsequent FTA grant to expand (\$4.8 mil additional)

Project Team and Stakeholders



Engineering Analysis and Demonstration Effort



Technologies Selected for Demonstration and Possible Ultimate Deployment



New York Waterway

(16 Vessels with CAT 3406E,
3412E or 3412C engines)

Technology (CAT 3412E vessels):

Diesel Oxidation Catalyst
plus Fuel Borne Catalyst

Effectiveness:

Est. % Reduction NO_x: 0% with LSD; 5% with
ULSD

Est. % Reduction PM: 50%

Demonstration Hardware Supplier:

Clean Diesel Technologies, Inc.
Stamford, CT

Technologies Selected for Demonstration and Possible Ultimate Deployment



Seastreak

(4 Vessels with Cummins KTA50M2 engines)

Technology (all vessels):

Selective Catalytic Reduction plus Diesel Oxidation Catalyst

Effectiveness:

Est. % Reduction NOx: 70%

Est. % Reduction PM: 25%

Demonstration Hardware Supplier:

Combustion Components Associates
Monroe, CT

Technologies Selected for Demonstration and Possible Ultimate Deployment



New York Water Taxi

(6 vessels with Detroit
Diesel Series 60 engines)

Technology (all vessels):

Diesel Oxidation Catalyst

Effectiveness:

Est. % Reduction NO_x: 0%

Est. % Reduction PM: 40%

Demonstration Hardware Supplier:

Johnson Matthey Catalysts

Malvern, PA

Technologies Selected for Demonstration and Possible Ultimate Deployment



BillyBey Ferry Company

(16 Vessels with CAT 3406E or 3412C engines)

Technology (CAT 3406E vessels):

Diesel Oxidation Catalyst

Effectiveness:

Est. % Reduction PM: 40%

Demonstration Hardware Supplier:

Johnson Matthey Catalysts (DOC)

Malvern, PA

Sidenote: Continuous water injection system also originally planned, but eliminated due to perceived operational and performance issues

Non-Retrofit Alternative for Deployment in Selected Vessels

The 9 vessels of NY Waterway and BillyBey with mechanically controlled CAT 3412C engines are targeted for repowering with Tier2 engines plus a DOC as the optimum alternative



Estimated Emissions Reduction Impacts with Full Deployment of Selected Technologies

Original Targets:

15-30% less NO_x

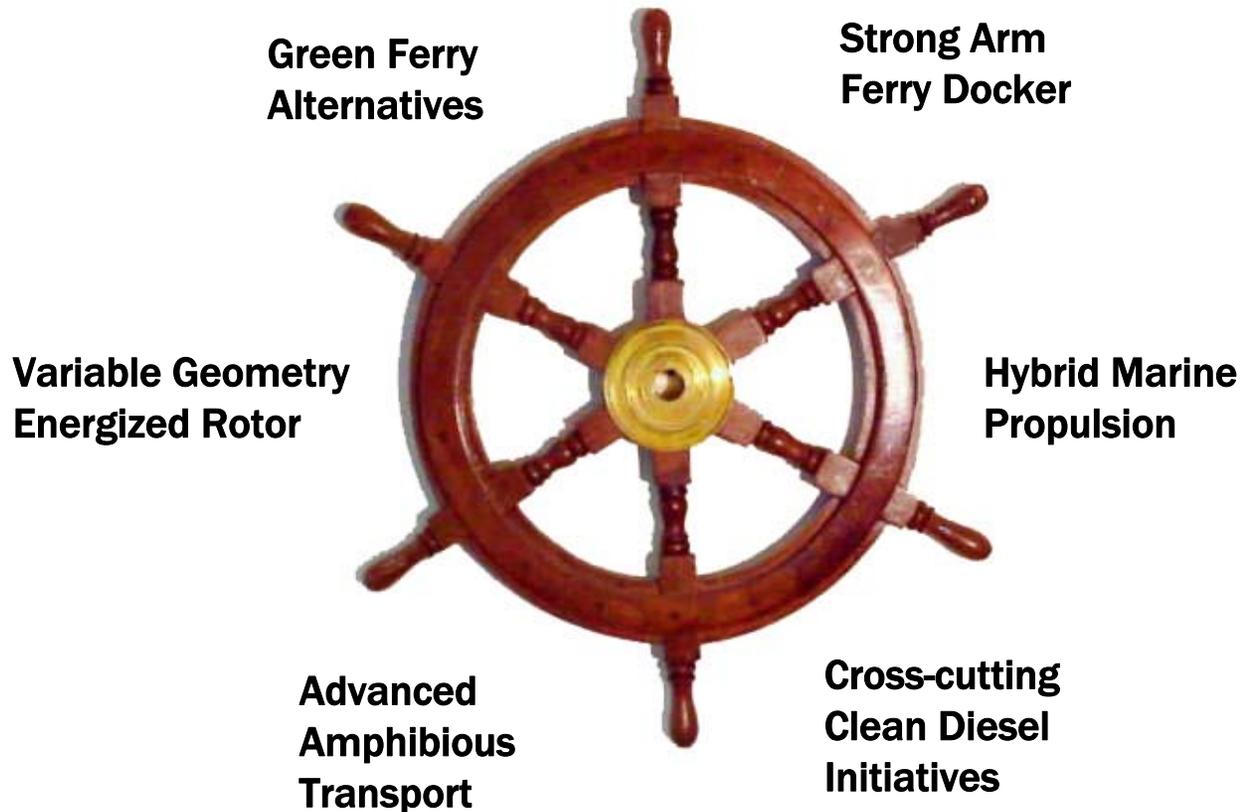
20-60% less PM

Current Potential:

36% less NO_x (360 tons/year reduction)

49% less PM (11 tons/year reduction)

Additional NYSERDA Initiatives in Clean, Efficient Marine Transportation



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