

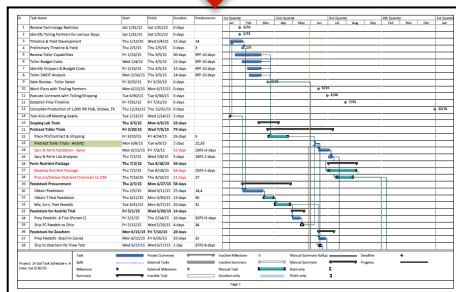
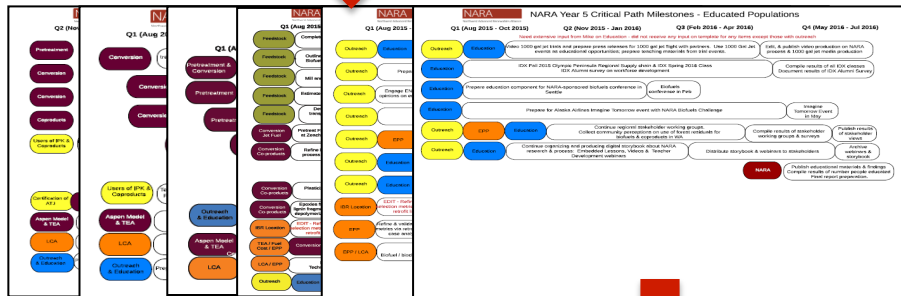
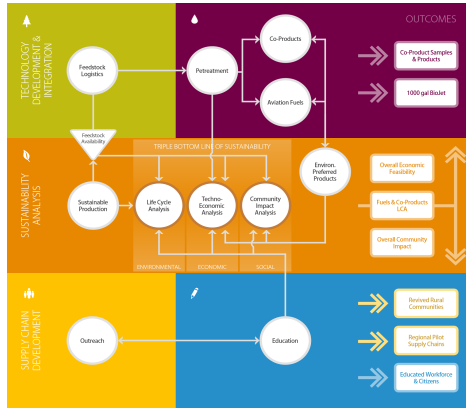
The logo for NARA (Northwest Advanced Renewables Alliance) consists of the letters "NARA" in a white, sans-serif font, centered within a dark gray square. A thin red horizontal line is positioned at the bottom edge of the square.

Phase & Gate Critical Path Milestone Management

Linda A. Beltz, PhD, NPDP

Tools Keep Us on Track to the End State

Management Support Tools



Decision Support Tools

Gate 3 – Context Within Phase & Gate Process

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	Phase 1	Phase 2	Phase 3	Phase 4	Gate
Technical	Technical approval demonstrated at gate 1	Technical approval demonstrated at gate 2	Technical approval demonstrated at gate 3	Technical approval demonstrated at gate 4	Integrated technical process complete & commercial scale ready
Market	Market segmentation complete & viable target market	Market segmentation complete & viable target market	Market segmentation complete & viable target market	Market segmentation complete & viable target market	Final product being sampled, product approval & regulatory plan for commercial scale
Partnership, Business Model, Supply Chain Integration	Commercial partners for gate 1	Commercial partners for gate 2	Commercial partners for gate 3	Commercial partners for gate 4	Target sales volume for Gate 3 met & favorable logistic & communication support
Manufacturing	Manufacturing information & build plan complete	Manufacturing information & build plan complete	Manufacturing information & build plan complete	Manufacturing information & build plan complete	Manufacturing process design & approval complete
Financial	Financial information & model complete	Financial information & model complete	Financial information & model complete	Financial information & model complete	Financial data for Phase 4 complete & favorable financial model
Health, Safety, Legal, Regulatory, Environmental	Health, safety, legal, regulatory, environmental issues identified	Health, safety, legal, regulatory, environmental issues identified	Health, safety, legal, regulatory, environmental issues identified	Health, safety, legal, regulatory, environmental issues identified	Health, safety, legal, regulatory, environmental issues identified & resolved & in use being addressed
Intellectual Asset Management	IP of assets complete	IP of assets complete	IP of assets complete	IP of assets complete	IP of assets complete

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Gate 3 Review Recycle Form – Start Up Readiness

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Date: August 7, 2015

Topic Reviewed:

- Schedule for production of 1000 Gal Jet: **Completion on 2/9/2016**
- Overall cost for production of 1000 Gal Jet and budget recommendation

Reviewers:

- Ralph Cavaleri, NARA Project Director (Gatekeeper)
- Mike Wolcott, NARA Associate Project Director (Advisor to Gatekeeper)

Overall Budget Authority for 1000 Gal Jet: **\$ 1,513,000 additional expense / 1,600,000 total**

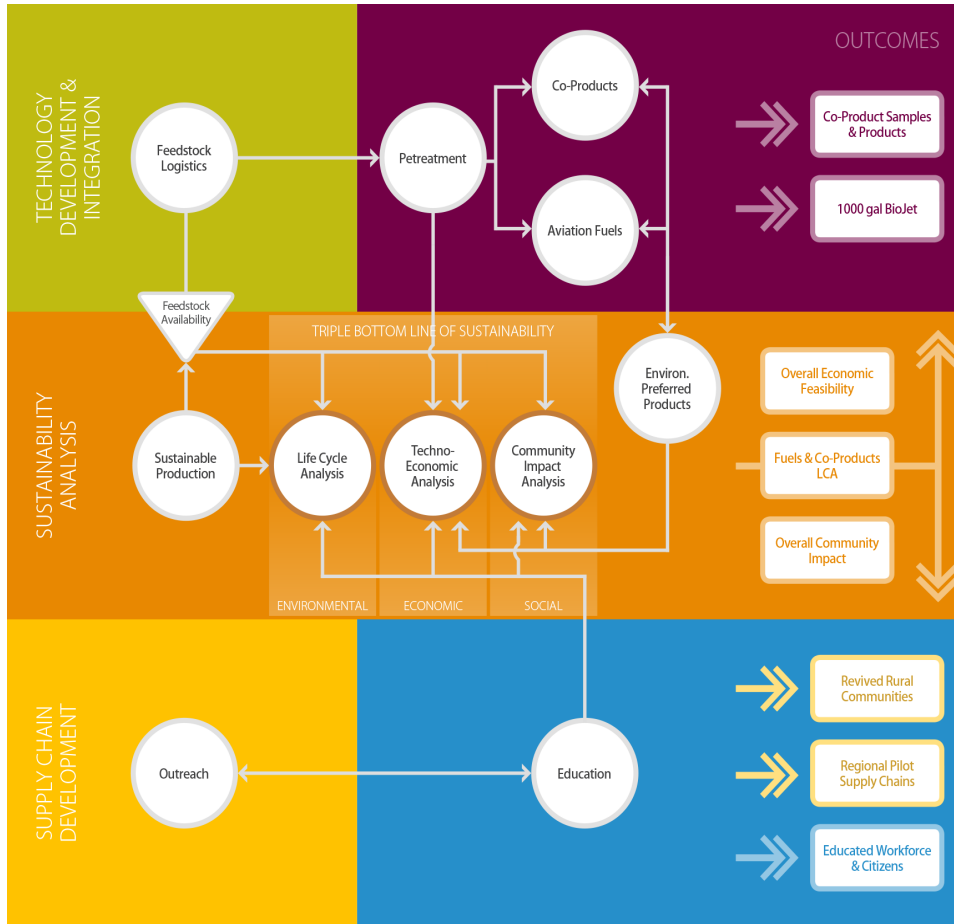
- Pending receipt of ICM estimate within the proposed budget

Gatekeeper Signature: *Ralph P. Cavaleri* Date: August 7, 2015

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Overall NARA Outcomes Defined



Commercially ready bio-refinery for SW to jet / co-products



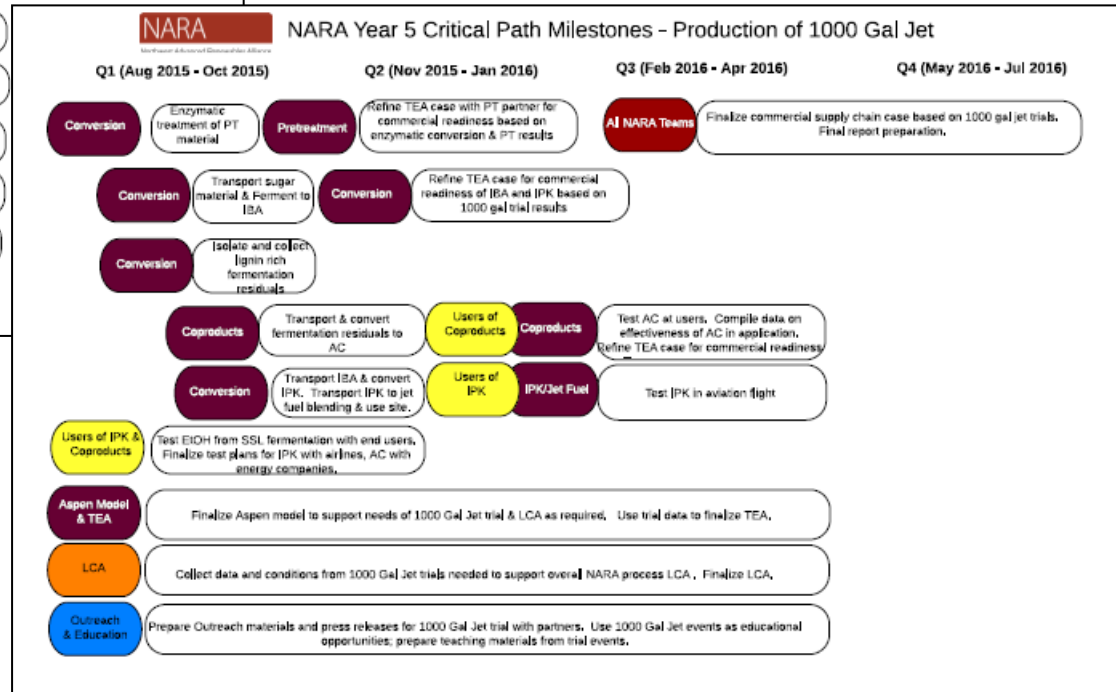
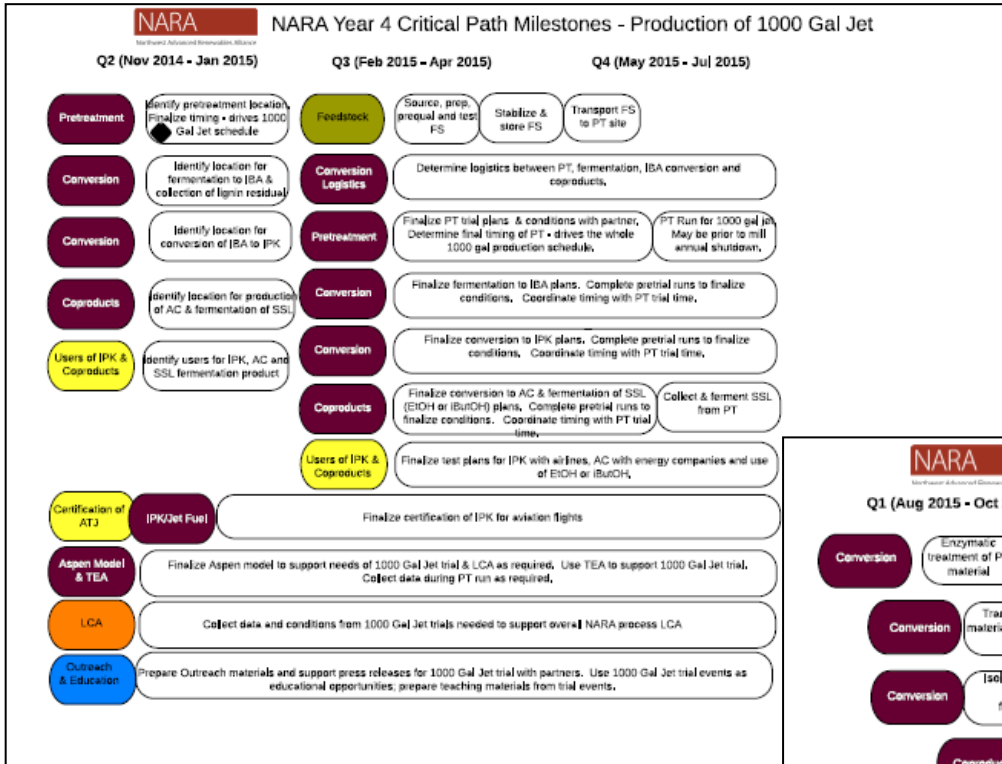
Communities that welcome & are able to support development



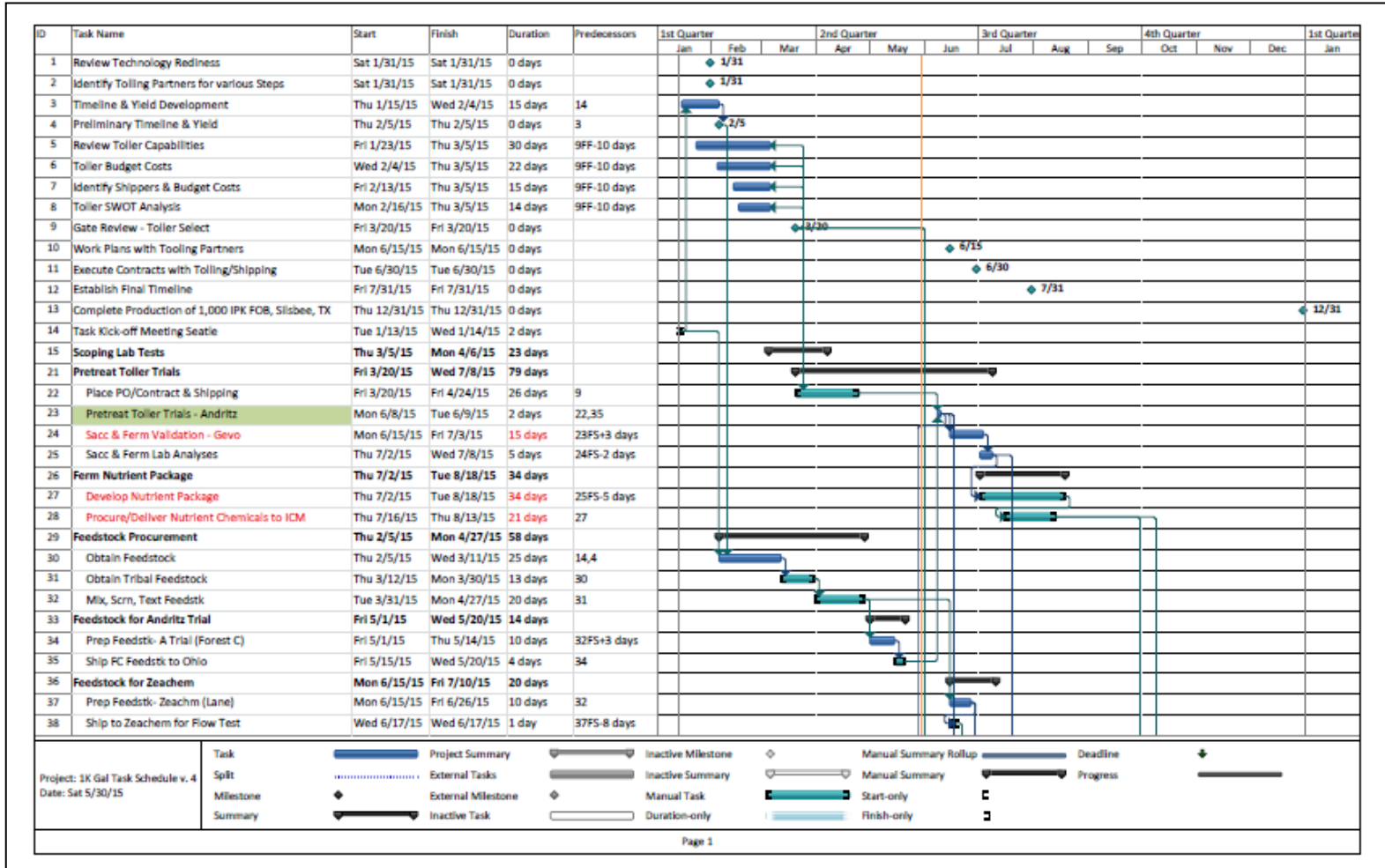
New engineers & scientists educated in the sustainable products arena

Critical Path Milestones Defined

- By Year
- By NARA End State
- For Major Deliverables




Gantt Charts Detail Tasks



Gate Reviews Provide For Robust, Fact-Based Decision Making

Gate 3 – Context Within Phase & Gate Process

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 Northwest Advanced Renewables Alliance	NARA Phase & Gate Process Revised 08/10/2015	
	Gate 1	Gate 2
	Phase 1 Feasibility Analysis	Phase 2 Feasibility Validation
	Determine if the need for the project is justified Determine if the project is financially viable	Optimize approach to access supply chain & validate for cost of production
Technical	Technical approach is demonstrated at pilot scale Design and engineering completed	Technical approach is demonstrated at pilot scale Design and engineering completed
Market	Market segmentation complete and identified	Product design completed at pilot scale
Partnership, Business Model, Supply Chain Integration	Determine key partners targeting to market	Determine key risks in phase & business model integration
Manufacturing	Manufacturing at pilot scale & process scale demonstrated Design and engineering completed	Manufacturing process identified & flight trial complete Design and engineering completed
Financial	Process economic analysis complete Design and engineering completed	Process economic analysis complete Design and engineering completed
Risk, Safety, Legal, Regulatory, Environmental	Risk issues identified for all processes at pilot scale	Risk issues & processes understood for pilot scale commercial demonstration
Intellectual Asset Management	Patent search complete	Patent applications complete & pending

Gate 3 Review Cycle Form – Start Up Readiness

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Gatekeeper Signature:

Date:

Ralph P. Cavaleri

August 7, 2015

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NARA

Phase & Gate Critical Path Milestone Management

- Using Management Support Tools make a difference:
 - Map and provide coordination for complex projects, such as NARA
 - Critical Path Milestones guide task planning toward overall NARA end state
 - Provides organization and creates focus
 - Guides cross-team coordination
- Decision Support Tools provide due diligence in decision making:
 - Work together with Management Support Tools
 - Gate reviews provide all the information for critical decisions
 - Decision documentation

Management Support Tools + Decision Support Tools = Effective Management