

NARA | ORGANIZATIONAL STRUCTURE

August 2011 - March 2013 Cumulative Report



NARA is led by Washington State University and supported by the Agriculture and Food Research Initiative Competitive Grant no. 2011-68005-30416 from the USDA National Institute of Food and Agriculture.

Organizational Structure

NARA Executive Committee

The Executive Committee is responsible for leading the NARA project and communicating directly with the USDA-NIFA leadership and the Advisory Board. Specific areas of leadership include working closely with the Project Area Team Leaders to approve the annual work plans and budgets; reviewing and administering subcontracts; approving scope of work for each affiliated individual institution and supervising staff members.

NARA Executive Committee Members



Ralph P. Cavalieri

Executive Director and Project Director
509-335-5581
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Dr. Cavalieri is currently Associate Vice President for Alternative Energy and Professor of Biological Systems Engineering at Washington State University. He is a Registered Professional Engineer, State of Washington. He served two terms on the Department of Energy's Biomass Research and Development Technical Advisory Committee, serves on the Board of Directors of the

Washington State University Research Foundation and as the Associate Director of the Western Sun Grant Center. His research emphasis is on chemical and biochemical process kinetics and sensors.



Michael Wolcott

Project Co-Director
509-335-6392
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Dr. Wolcott is a Regents Professor in Washington State University's Department of Civil and Environmental Engineering, a member of the interdisciplinary Materials Science and Engineering faculty, and director of WSU's Institute for Sustainable Design. He is an international leader in the field of natural fiber materials and biopolymers while he has led the

development of advanced materials to improve durability, reduce manufacturing costs and pollution, and improve structural performance. He has previously managed nearly \$20-million in funding and large research teams for numerous federal agencies, including the Office of Naval Research, the Department of Energy, the USDA, the US Forest Service, and the Federal Highway Administration.



Linda Beltz

Project Development Analyst

253-924-6638

Linda.beltz@weyerhaeuser.com

Dr. Beltz is currently Director, Technology Partnerships at Weyerhaeuser. In this role, she worked with John Tao to implement Open Innovation at Weyerhaeuser. Linda is responsible for alliances and partner activities with for-profit, non-profit, university and national labs. She is also responsible for government contracts. Linda has been with Weyerhaeuser 12 years. Prior to her current role, she led the transition for Weyerhaeuser's biofuel JV with Chevron, Catchlight Energy, and held technical and market development leadership positions in the businesses. Before joining Weyerhaeuser, Linda worked with Mead and International Paper in technical leadership, capital project, manufacturing and scientist roles.

NARA Advisory Board

The NARA Advisory Board is composed of leaders within a variety of fields such as forestry, chemistry, and engineering. The board's role is to provide an independent overview of NARA's progress towards completing the goals articulated in the USDA NIFA competitive grant no. 2011-68005-30416. The Advisory Board meets annually with NARA and USDA-NIFA leadership, reviews NARA quarterly and annual progress reports, and provides written recommendations to NARA and to the USDA-NIFA. The board is currently composed of six members.

Advisory Board Members

Terrance Cooper

Argo Group International

Dr. Terence Cooper is CEO of Argo Group International, which provides specialized consulting services in chemical and polymer science, materials technology and market and applications development in North America, Europe and Japan. Present areas of major involvement include new product, process and market development in acrylic, methacrylic, olefinic, vinylic and styrenic copolymer systems, strategic research, development and technology portfolio analysis and environmental consulting.

Katrina Cornish

Ohio State University

Dr. Katrina Cornish is the leading U.S. scientific expert, and is internationally recognized as a principal authority, on alternative natural rubber production, properties and products, and on natural rubber biosynthesis in general. As Ohio Research Scholar and Endowed Chair in Bioemergent Materials, Katrina leads a program at The Ohio State University focusing on domestic rubber production, bio-based fillers and fibers, and exploitation of opportunity feedstocks from agriculture and food processing wastes for value-added products and biofuels.

Billy M. Glover

Boeing

Billy Glover is the Vice President of Environment and Aviation Policy for Boeing Commercial Airplanes. In this capacity he leads an enterprise-wide team responsible for shaping global policy on critical issues affecting aviation including domestic and international policy, environmental strategy and product performance, safety and security. Prior to his current position, Glover led a cross-functional team at Boeing responsible for addressing environmental issues including aircraft noise reduction, greenhouse gas emissions, alternative fuels research, and public policy and opinion. His current team continues to provide input on key product design elements to continuously improve the environmental performance of Boeing aircraft.

Thomas P Klin
CH2MHill

Thomas Klin serves as Principal Technologist and Director of Aviation Environmental Services for CH2M Hill. In this capacity he oversees the execution of all environmental impact statements (EIS), environmental audits, permitting, environmental compliance and related environmental projects that enable airport development and operation. Thomas specializes in the National Environmental Policy Act (NEPA) process, environmental impact assessment and creative mitigation planning for unavoidable impacts. He also specializes in education of and consensus building between agencies involved in the airport and aviation environmental regulatory process.

Jack N. Saddler
University of British Columbia

Dr. John (Jack) Saddler is the endowed Professor of Forest Products Biotechnology /Bioenergy and also the former Dean, Faculty of Forestry at the University of British Columbia. He is a Fellow of the Royal Society of Canada, Canada's highest recognition for scientists, and he has received many other awards such as the International Union of Forest Research Organizations (IUFRO's) Scientific Achievement Award, and the Charles D. Scott award for contributions to the field of "Biotechnology for fuels and Chemicals". Recently, Dr. Saddler received the prestigious 2009 Leadership award, presented from Life Sciences British Columbia for demonstrated leadership in the industry and given to individuals who have assisted in the creation and advancement of the broader life sciences communities over time.

Rachael Jamison
Washington State Department of Natural Resources

Rachael Jamison is DNR's Energy and Climate Change Policy Specialist. Her work includes forest biomass-to-energy efforts, statewide and regional bioenergy strategy, state and agency-wide climate adaptation planning and green job creation. Prior to coming to DNR, she led the Department of Ecology's Green Building Program and worked in the Department of Agriculture's Organic Food Program. Rachael is committed to finding economically viable environmental solutions to some of our most challenging environmental questions.

Member and Affiliate Organizations

NARA members and affiliates are the institutions (universities, businesses, governmental entities, and nonprofits) that are signing parties to the NARA Non-disclosure Agreement and are expected to contribute resources, personnel, time, information and other assets to NARA in support the NARA Mission. Member institutions are also signatories to the NARA Intellectual Property Agreement.

Catchlight Energy

Catchlight Energy's vision is to become a major integrated producer of biofuels derived from non-food sources and to deliver renewable transportation products produced from biomass in a manner that is scalable and sustainable—both environmentally and economically. For NARA, they participate with the Pretreatment Team.

Facing the Future

Facing the Future is a national education nonprofit that develops and delivers K-12 sustainability curriculum resources that prepare K-12 students in all 50 U.S. states to become engaged, informed global citizens. As a member of NARA, Facing the Future will support the K-12 education efforts for the NARA project.

Gevo, Inc.

Gevo is a leading renewable chemicals and advanced biofuels company. Through the NARA project, Gevo will optimize their conversion technology to convert woody biomass hydrolysate into feedstocks into isobutanol, biojet fuel and other renewable chemicals.

GreenWood Resources, Inc.

GreenWood Resources develops and manages sustainable, environmentally certified tree farm systems for investment purposes. For NARA, they produce strategic business and financial planning for a network of commercial Douglas-fir plantations that will supplement feedstock supplied from logging residuals and thinnings from fuel-reduction operations. (Note: GreenWood Resources participation in NARA will conclude on May 31, 2013.)

Montana State University

Montana State University Extension Forestry will assist with the NARA Extension Working Group by providing information about the NARA program and research updates to Montana stakeholders.

The National Center for Genome Resources

The National Center for Genome Resources (NCGR) in Santa Fe, New Mexico, is a non-profit research institute dedicated to improving human health and nutrition through the application of genomics and bioinformatics. The NCGR assists NARA's long term goals by providing genomic resources used to breed softwoods with traits beneficial for conversion to a biojet and co-products industry. (Note: NCGR participation will conclude at the end of Year 2 of NARA.)

Oregon State University

Oregon State University is the state's land-grant and leading public research university. A number of NARA researchers work here and contribute primarily to the project's feedstock development and sustainability work.

The Pennsylvania State University

Penn State is Pennsylvania's land-grant university. Research there dedicated to the NARA project investigates the social sustainability of the NARA project.

Salish Kootenai College

Salish Kootenai College, a tribal university, provides research opportunities tied to biofuels and bio-products from woody biomass.

US Forest Service-USDA, Forest Products Laboratory

The Forest Products Laboratory conducts innovative wood and fiber utilization research that contributes to the conservation and productivity of forest resources and sustainably to meet the needs of people for forest products. They contribute pretreatment conversion technology research to the NARA project.

US Forest Service, Pacific Northwest Research Station

The Pacific Northwest (PNW) Research Station is one of seven research centers that are part of the USDA Forest Service. They develop and deliver knowledge and innovative technology to improve the health and use of the Nation's forests and rangelands. They contribute to NARA's outreach tasks.

University of Idaho

Faculty in the College of Natural Resources and College of Art and Architecture participate in NARA's education and outreach tasks.

University of Minnesota

Efforts from the University of Minnesota's Department of Bioproducts and Biosystems Engineering contribute to the NARA project by developing lignin-based co-products and contributing to the sustainability analyses.

University of Montana

University of Montana contributes to the NARA project by identifying and collecting primary data necessary to assess the woody biomass inventory with particular emphasis on mill and logging residue and with outreach assistance.

University of Washington

Researchers at the University of Washington lead NARA's efforts to develop a complete life cycle analysis of the wood residue to biojet and co-product process. Additionally, members from this university serve as NARA liaison with regional tribal organizations to promote educational and supply chain opportunities.

Washington State University

Washington State University is Washington's original land-grant university and the lead institution for NARA providing leadership, research and administrative services.

Western Washington University

Faculty in Western Washington University's Huxley College of the Environment, along with university's Institute for Energy Studies (IES) are involved in the education and outreach goals of the NARA project.

Weyerhaeuser

Weyerhaeuser creates sustainable solutions to the world's challenges through the development of innovative forest products that are essential to everyday lives. Weyerhaeuser NR Company provides research expertise and leadership to many aspects of the NARA project including feedstock sustainability and sourcing, phase and gate project management, techno-economic analyses and co-product development.

NARA Management

NARA is an integrated project. An overarching challenge facing NARA is to provide a management framework that assists team cooperation, direction and achievement. NARA has implemented multiple strategies to provide administrative services and management tools to the project.

NARA Phase-Gate model

Description of Phase and Gate

The Phase and Gate process is a well-known project management and decision support tool that improves project execution and promotes fact-based decision making. Phase and Gate processes typically include “Phases”, where the project work is completed and “Gates” where decisions for continuation and next Phase objectives are set. Each Phase allows progression from the idea phase to implementation, where Gates ensure that the decisions to continue are based on comprehensive information. For NARA, we have developed a customized Phase and Gate process that advances the project through the steps necessary to achieve commercial readiness of a forest residuals to aviation fuels pathway: (1) Feasibility Analysis, (2) Feasibility Validation, (3) Scale Up Readiness and (4) Commercial Options. The process is designed to be adaptable for the range of academic to commercial and technical to social work encompassed within the NARA project with each phase covering key areas of: Technical, Market, Business Models / Integration, Manufacturing, Financial, Health/Safety and Intellectual Assets. Figure 1 shows the NARA Phase and Gate process.

Objectives for NARA Phase and Gate

The Phase and Gate process is an important management element that allows NARA to:

- Coordinate team pathways and milestones in a manner that allows advancement of the project
- Identify gaps in project elements or milestones
- Realign project teams to optimize effectiveness
- Make decisions using a comprehensive fact-based gate framework

Implementation and Results from Phase and Gate

The Phase and Gate process was developed and implemented during the first year of NARA to map critical path milestones across the project teams. During the second year, the Phase and Gate process was refined and utilized to provide important project results:

- Reorganized the pathway teams to provide seamless work integration and more complete results. Examples include (1) moving the Sustainable Production team under System Metrics, (2) providing singular accountability for LCA by aligning all LCA-related work under one leader and (3) combining Community Impact with the LCA team.
- Developed the key phase and time-based critical path milestones, by pathway, for NARA to reach its end goal of commercial readiness. One example includes identification of an overall TEA model and associated material and energy balance as critical missing elements.

- Identified critical linkages between pathway teams allowing cross-team meeting planning and information flow. One example includes extension of Biomass Modeling and Assessment needed to complete the work under Sustainable Production.
- Developed a project-wide integrated work-flow structure focused on the key project outputs (Figure 2).
- Highlighted areas of core and peripheral work, which allowed for optimized budget distribution in year 3. Examples include narrowing and reducing the focus of Feedstock Development, inclusion of pretreatment technologies deployable in regions where feedstock depots may be a preferred option, ASPEN process modeling to support the techno-economic analysis (TEA), and focus on commercially relevant, high volume lignin-based products.
- Implemented a gate decision framework for assessment and down selection of technologies. This is currently being used to reduce the number of retreatment technologies. Specifically, FPL and CLE pretreatment efforts are being consolidated in year 3 to a single “mild sulfite” down selected pretreatment. Another pretreatment gate framework will be applied to non-chemical pretreatment technologies to down select to one during year 3. Determined that two types of pretreatment technologies – chemical and non-chemical may be utilized within the regions covered by NARA, so the gate framework is to down select to one of each technology.

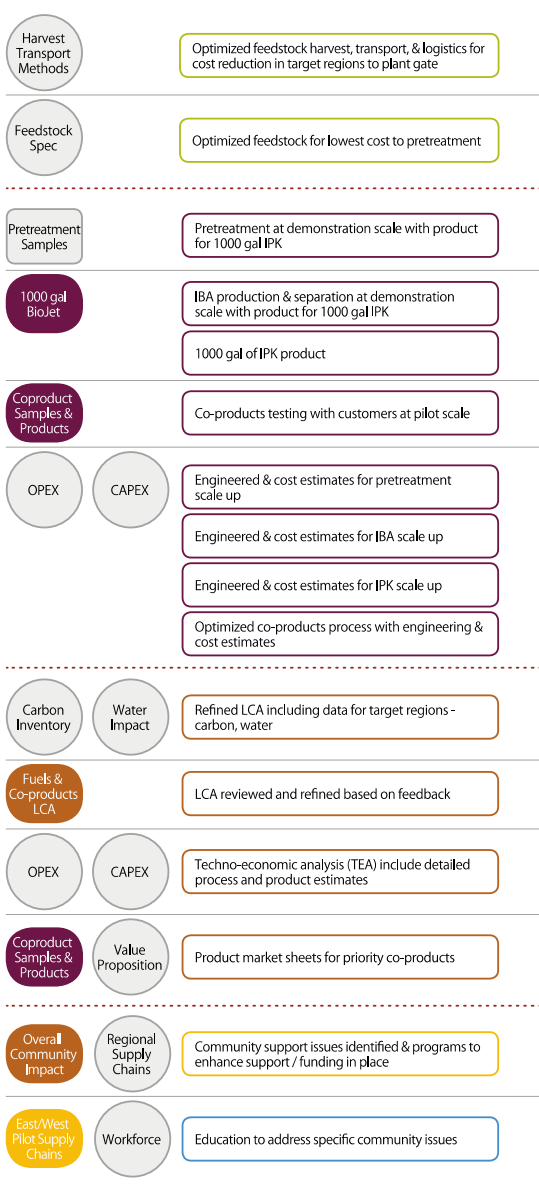
The Phase and Gate process continues to be evolved and implemented deeper in the NARA project. We are currently in the process of developing gate frameworks to facilitate comparison of technologies and support additional down select decisions.

Lessons Learned

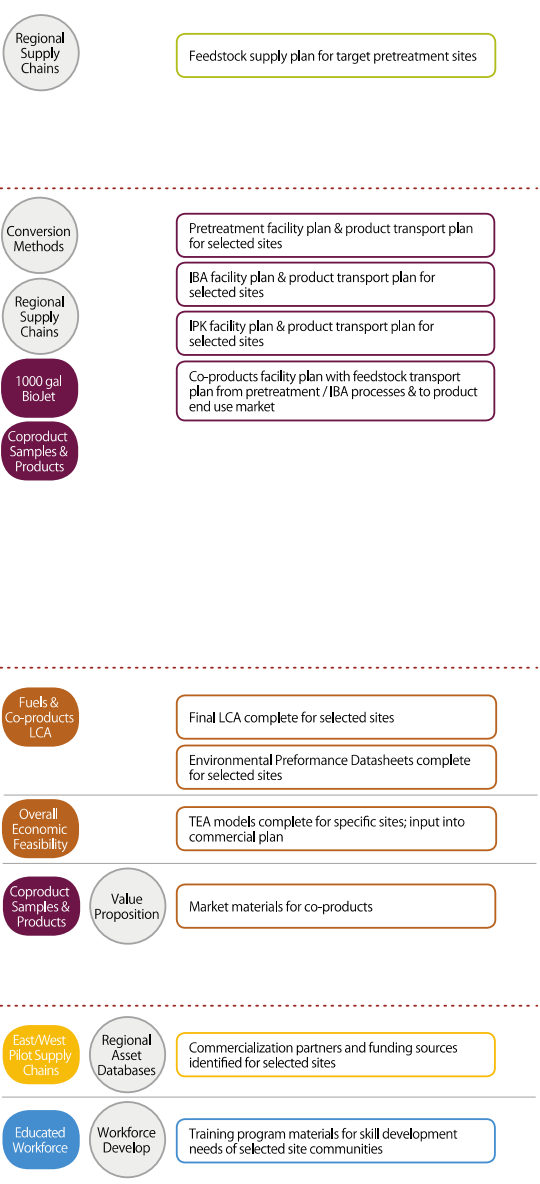
The use of a Phase and Gate process in a complex project such as NARA is both important to bring effective results, but also challenging. However, the use of this methodology in NARA has provided some important lessons:

- The Phase and Gate process is a concept that is familiar to some team members and foreign to many, especially academic participants. The earlier in the project that training on the methodology can be completed, the more team members will structure their work in a manner that corresponds to the Phase and Gate process methodology.
- Use of Phase and Gate during project planning will allow milestones to be fully aligned and coordinated to accomplish the end goal. This should result in fewer gaps and less future realignment.
- The process needs to be flexible enough to be applied to a wide variety of circumstances

PHASE 3: SCALE UP READINESS



PHASE 4: COMMERCIAL OPTIONS



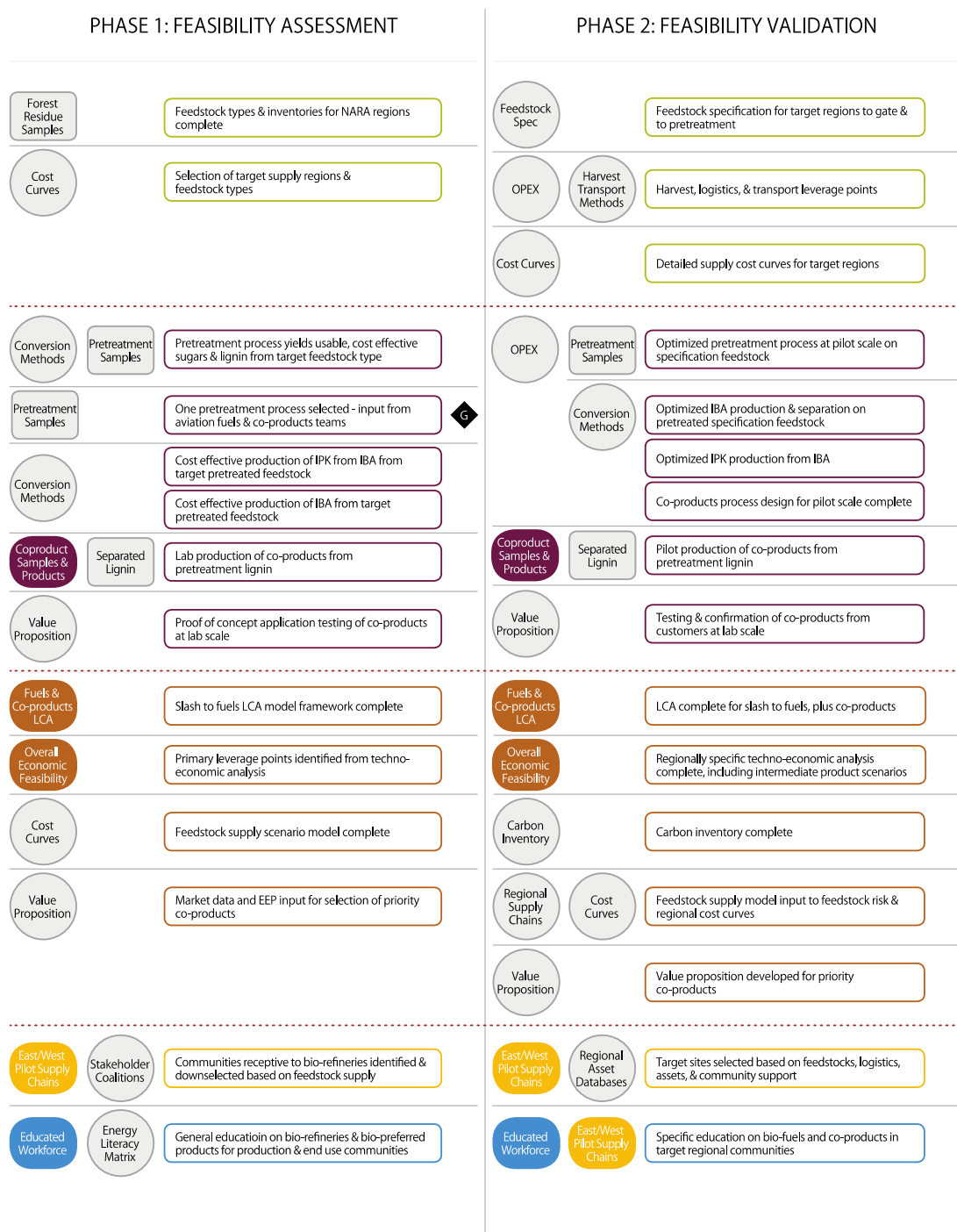


Figure 1: Schematic of NARA Phase and Gate process. Ovals indicate outcomes, elongated rectangles indicate outputs and circles indicate deliverables. Colors align with NARA programs: blue-Education, purple-Conversion, brown-Systems Metrics, gold-Outreach

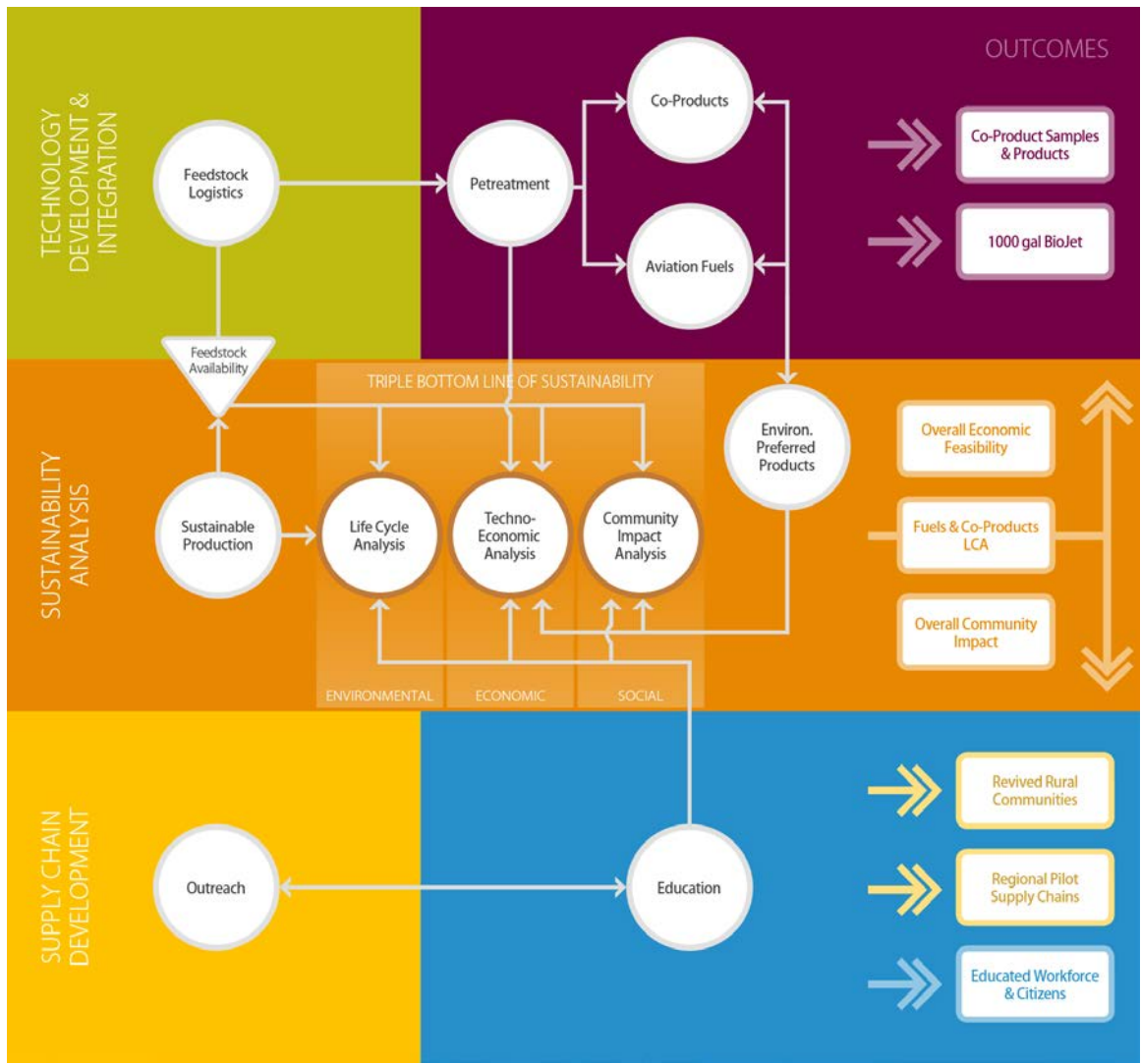


Figure 2: NARA project flow diagram with desired outcomes by project area.

NARA Charter and Ground Rules

This document is the charter and ground rules for use in the NARA project. The Charter and Ground Rules are intended to manage processes, encourage substantive discussions, and provide an operational mechanism for assessing progress in achieving NARA's goals ([link](#)).

Intellectual Property (IP) Management Plan and Non-disclosure Agreement (NDA)

All NARA members endorse a common Intellectual Property (IP) Management Plan and Non-Disclosure Agreement. The purpose of the IP Management Plan is to ensure that the protection process for all IP developed under NARA is well-defined and agreed upon in advance of the IP creation. By agreeing to the terms in advance, the companies involved are more secure of the commercial prospects for licensing/using the technology and the rights and responsibilities of the parties protecting IP are clearly defined.

The purpose for the NDA is so that the companies can talk freely and exchange ideas with the government labs and university researchers without worry that their proprietary information will be disclosed or rendered unpatentable.

NARA staff

NARA retains five staff members to assist in administrative and creative needs. All are funded by Washington State University's administration.

Charles Burke: Communications and Publicity Director ccburke@nararenewables.org

Janet Duncan: Project Coordinator duncanj@nararenewables.org

Stephen Locker: Web Coordinator/ Graphic Designer slocker@nararenewables.org

Julie Semler: Project Coordinator JSemler@nararenewables.org

Travis Woodland: Intellectual Property Management t_woodland@nararenewables.org

Communications

NARA communicates progress to the NARA members, partners and Advisory Board in addition to regional stakeholders, the USDA-NIFA leadership and to the general public. To accomplish this, NARA hosts meetings, maintains communication tools and includes the communication services of outside partners.

NARA Annual meeting

NARA holds an annual meeting each year in the fall. Our first annual meeting was conducted in Missoula Montana September 13-14, 2012. The next scheduled meeting will be in Corvallis Oregon September 10-13, 2013 at the LaSells Conference Center. These meetings provide an opportunity for NARA researchers to present their work to the advisory board, the USDA-NIFA leadership, partners, stakeholders and the general public.

NARA Team Leadership Meetings

NARA is composed of eleven work teams grouped with the feedstock, conversion, systems metrics, education and outreach components of the project. Each month, team leaders and the executive committee meet via conference call to ensure that the process is focused on reaching solutions that achieve NARA goals.

NARA Website

The NARA website functions as the central repository for NARA information to the general public; host portals like “the energy literacy matrix” used as a data retrieval tool for educators; and contains an intranet feature used to share project information internally among NARA researchers. As of March 31, 2013, the website experienced 20,539 individual visits with 83,270 page views. Visitations were from all 50 US states and from 114 countries. NARA website is at <http://nararenewables.org>

NARA Newsletters

NARA distributes a monthly newsletter written to communicate NARA’s progress to the general public and to the NARA team. Past newsletters can be viewed at <http://nararenewables.org/news/newsletter>

Forest Business Network

The focus of the Forest Business Network is to help forest product businesses grow and prosper. They work strategically with the NARA Outreach team to develop stakeholder groups and disseminate information within the forestry industry. Their website is <https://www.forestbusinessnetwork.com>.

Ruckelshaus Center

The Center is a joint effort of Washington’s two research universities and was developed in response to requests from community leaders. Building on the unique strengths of the two institutions, the Center is dedicated to assisting public, private, tribal, non-profit and other community leaders in their efforts to build consensus and resolve conflicts around difficult public policy issues. For NARA, the center assists the Outreach Team communicate with policy makers. They also help facilitate NARA’s internal communications. Their website is <http://ruckelshauscenter.wsu.edu/>