
The Nutrient Recycling Challenge



Competition Information, Criteria, and Guidelines

This information is provided by EPA and Partners of the
Nutrient Recycling Challenge.

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About

The U.S. Environmental Protection Agency (EPA) is partnering with pork and dairy producers, USDA, and environmental and scientific experts to launch the Nutrient Recycling Challenge — a competition to develop affordable technologies that recycle nutrients from livestock manure.

Goals of the Nutrient Recycling Challenge

- Accelerate the development of nutrient recovery technologies for pork and dairy farms that produce environmental and economic benefits.
- Increase awareness of issues and opportunities related to nutrients and manure management.
- Connect innovators and agricultural stakeholders.
- Stimulate markets for products generated by nutrient recovery technologies.

Every year, livestock producers manage over a billion tons of animal manure containing valuable nutrients—nitrogen and phosphorus—that plants need to grow. Manure can be a resource as a renewable fertilizer, but should be used properly to minimize water pollution and build healthy soils.

There is a tremendous opportunity to generate environmental and economic benefits from manure. We could realize this potential with cost-effective technologies that extract manure’s nutrients and create products that farmers can use, transport, or sell more easily to where nutrients are in demand.

Scientists and engineers are building technologies that can recover nutrients, but further development is needed to make them more effective and affordable. Now is an optimal time to help cutting-edge innovations advance to the next level.

The Nutrient Recycling Challenge wants you to help us find technologies that are a win-win for the environment, farmers and the economy.

Definitions

For the purposes of the Nutrient Recycling Challenge, the following definitions apply:

- The term **“Seeker(s)”** refers to the Partners hosting this challenge, as named above.
- The term **“Solver(s)”** refers to individuals or teams that submit concept papers for the challenge. Each team or individual is considered as single Solver entity.

Timeline

There are four phases planned for this innovation challenge, in which innovators will be invited to turn their concepts into designs, and eventually, into working technologies to be piloted on livestock farms:

Phase I:	Concept papers First-round awards and DC summit	November 16, 2015 – January 15, 2016 March 2016
Phase II:	Designs	Spring 2016
Phase III:	Prototypes/Proof of Concept Final submissions Final award ceremony	Summer 2016 Fall 2016 January 2017
Phase IV:	Finalists’ demonstration pilots on farms	Spring 2017

Phase I: Call for concept papers opens on November 16, 2015 at 9:00 am EST. Solvers will have until January 15, 2016 at 11:59 pm EST to submit concept papers up to 10 pages in length introducing their idea for a nutrient recovery technology and discussing how it would meet the challenge’s criteria.

Once the submission period ends, there will be a 30-day judging period. Solvers that win awards and/or are selected for the next round will be notified and invited to the two-day summit in Washington, DC, in March 2016.

Solvers with promising submissions will be invited to proceed into subsequent Phases. Solvers will have opportunities in each phase to secure funding to progress their technologies to the next round.

Note: If determined necessary by the Seekers in order to achieve/demonstrate the stated goals of the Nutrient Recycling Challenge, Phases of the Challenge may be extended, re-opened, delayed, or canceled at the Seekers’ discretion.

Partners

[U.S. Environmental Protection Agency](#)

[American Biogas Council](#)

[American Society of Agricultural and Biological Engineers](#)

[Ben & Jerry's](#)

[Cabot Creamery Cooperative](#)

[Cooper Farms](#)

[CowPots](#)

Dairy Farmers of America
Innovation Center for U.S. Dairy®
Iowa State University
Marquette University
National Milk Producers Federation
National Pork Producers Council
Newtrient, LLC
Smithfield Foods
Strategic Conservation Solutions
Tyson Foods
U.S. Department of Agriculture
Washington State University
Water Environment Research Foundation
World Wildlife Fund

EPA has also contracted with [InnoCentive](#) to host this challenge. The website www.innocentive.com has information on innovation challenges, resources for Solvers, and the platform on which Solvers will be required to register and submit their concept papers for the Nutrient Recycling Challenge.

Eligibility

The Nutrient Recycling Challenge is open to innovators around the world. We also encourage collaboration between multiple individuals or groups. Employees of federal agencies must abide by their employers' policies for participating in a challenge or prize competition. Members of the planning committee or judging panel for the Nutrient Recycling Challenge and their immediate family members cannot participate.

Teams

One of the goals of the Nutrient Recycling Challenge is to connect innovators around the globe. We encourage you to submit ideas individually or as teams. Whether you have an idea and need a team to bring it to life, or you have a team but need an expert, you can look for potential partners and learn more about submitting solutions as part of a team on InnoCentive's website:

- Webpage on "[Teaming with Peers](#)"
- FAQ on [teams and requirements](#) for teams
- InnoCentive's "[Solver Forum](#)"

Awards

In the first phase, Solvers will submit brief concept papers about their technology ideas. You could win the following:

Cash prize

A total of up to \$20,000 in cash prizes will be awarded, to be split among up to four concepts (up to two for dairy farms and two for pork farms). Cash prizes will be provided by EPA, World Wildlife Fund, and partners.

-AND-

Invitation and Travel Awards for a Partnering and Investors Summit in Washington, DC

Solvers with promising submissions will be invited to an exclusive two-day event in Washington, DC, which will include an opportunity to meet potential partners and an event to pitch your ideas to investors (including top dairy and pork producers such as Cabot Creamery Cooperative, Ben & Jerry's, Smithfield Foods, and Tyson Foods) and scientists who can help bring your idea to life as real technologies. EPA will provide travel awards of \$1,000 each for up to ten Solvers.

Promising submissions will also receive promotion through widespread exposure and press opportunities, as well as qualify for entry into subsequent rounds of the challenge which will open up access to larger prizes and:

- more direct funding, investors and buyers
- no-cost demonstration testing
- more media exposure
- incubation support
- pilots on dairy and pork farms
- more networks of innovators, experts, and agricultural industry reps
- grant opportunities
- participation in case studies

The organizations sponsoring this challenge may contact Solvers directly about advancing their ideas, through financial support or other types of assistance. Additionally, every Solver who submits to this Challenge may choose whether or not the organizations hosting this Challenge may independently share the Solvers' submission with other potential funding sources. For Solvers with more developed technologies, the organizations hosting the Challenge may contact Solvers directly regarding potential offers of demonstration pilots for the technologies.

Entry Instructions

Please read through all of the information below before submitting your paper. All Solvers must submit concept papers on InnoCentive's online challenge platform. Register for the Nutrient Recycling Challenge platform here:

www.innocentive.com/ar/challenge/9933114

Submit a concept paper up to 10 pages in length (not including references) that introduces your idea for a nutrient recovery technology, and discusses how it would meet the required criteria below. Eight additional "Desirable Characteristics" for nutrient recovery technologies are also listed below. Concept papers should describe which of these additional desirable characteristics the technology would address, and how it would address them. Solvers are permitted to submit separate concept papers for multiple technology ideas.

Every concept paper should be submitted using the Concept Paper Cover Sheet and Template which is available on [InnoCentive's online challenge platform](http://www.innocentive.com/ar/challenge/9933114).

Criteria

Required Criteria
<p>Concept papers must demonstrate that the technology, when scaled-up to commercial-scale, would:</p> <ul style="list-style-type: none"> • recover and concentrate nutrients (nitrogen and/or phosphorus) from dairy or swine manure in a usable form; and, • do so in a cost-effective manner; i.e., the capital cost of the technology would be affordable to adopt relative to other manure management technologies or practices (or generate profit), and/or the technology would save costs (or generate profit) through return on investment that would render it affordable for dairy/swine producers.

Additional Desirable Characteristics (in no particular order)
1. Ability to yield value-added co-products from the recovered nutrients. (Include whether there are identifiable markets for the yielded co-products)
2. Ability to separate liquid & solid streams from manure; decrease moisture content of solids
3. Ability to produce low-nutrient effluent from liquid manure stream
4. Yields multiple benefits; e.g., reduces odors, reduces pathogens, protects/restores water quality, reduces GHG emission, provides other ecosystem benefits, generates reusable water for on-farm use, energy recovery, indoor air quality, benefits to animal health/performance, etc.
5. Compatibility with existing production and manure management systems (e.g, flush, scrape, deep pit, lagoon, digester, solid-liquid separators)
6. Portability
7. Replicability, Scalability
8. Farmer-friendliness (easy to install, operate, etc.)

Required Content for Concept Papers

I. Summary

- Briefly summarize your technology idea

II. Technology Description and Objectives

- Describe how your technology would address the above Primary Criteria, and any applicable “Desirable Characteristics”.
- If possible, include technical information on the system(s), anticipated nutrient recovery performance, expected capital and operations and maintenance costs of the system, and types of operations and waste streams with which the technology would be compatible. Specify whether the system would treat raw manure, digested manure, and/or manure that’s been otherwise conditioned. Include any applicable data or references if available.
- Explain how the concept is unique or transformative. How does the concept improve upon or go beyond technologies that are currently available, and advance the state of nutrient recovery technologies? (See information on existing technologies in the pdf file *Background Information on*

Nutrient Recovery Technologies and Pork and Dairy Production, available [here](#), or once registered, on InnoCentive's platform [here](#).

III. Technology Development and Optimization Plan

- Describe what resources, steps, methodology, and, timeframe would be needed to bring your idea to fruition (i.e., from concept → design → prototype → pilot-scale system → commercially viable technology)?
- How could data on the technology be gathered, analyzed, and quality-assured at each stage?
- Where could the technology be in two years with incubation support and market development?

IV. About you

- Describe the background of you and your team (if applicable). How did you develop this idea? What could you contribute toward its development? What types of partners or resources would be most useful to take your idea to the next level?

Judging Policies: How will your submission be evaluated?

After the submissions period for the challenge closes, a panel of judges will review the submissions and select submissions to receive awards. The judging panel will include representatives from the animal agriculture industry (a variety of dairy and pork producers/companies and representative organizations), academic/scientific/engineering/environmental experts, EPA, USDA, and other potential investors and parties interested in nutrient recovery technologies. All applicants that submitted a proposal will be notified on the status of their submissions; however, no detailed evaluation of individual submissions will be provided.

Submissions will be reviewed using the rubric in the scoring sheet below. Concepts must address the Required Criteria for recovering and concentrating nutrients and cost effectiveness/affordability in order to be eligible for the competition. However, those concept papers that are found to be eligible will then be evaluated for overall potential for effectiveness and adoptability of the technology idea presented, not ranked by listed percentage of nutrient recovery alone.

Example: If Technology A would recover 50% total P, it will not automatically be judged more favorably than Technology B which would recover 30% total P. If Technology B would recover less percentage of a nutrient, but can do so more effectively and affordably (i.e. more farmers can adopt it and generate greater net benefits). The additional "Desirable Characteristics" listed below will also be taken into account in judging submissions that meet the "Required Criteria".

Additionally, concept papers will not be ranked solely based on a cumulative summation of the scores acquired in the criteria listed in the scoring sheet below; i.e. concepts do not necessarily need to be strong in all characteristic areas to be judged as having potential in this challenge. Concepts that score well in some criteria may be considered promising per the discretion of the judges.

Example: If a concept addresses the "Required Criteria" below, and scores well for some "Desirable Characteristics" (such as identified marketable co-products generated by the technology and ability to reduce greenhouse gas emissions), but does not score well for other "Desirable Characteristics" (such as portability or compatibility with existing manure systems), the concept would not necessarily be precluded from being evaluated as a promising concept. If the concept is judged to proceed to the next phase of the challenge, the Solver may be exposed to opportunities to mentor/incubate/partner with experts that could help strengthen or complete their concept into a more viable technology idea.

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Submissions will be evaluated for how the technology ideas would improve upon technologies that are currently available and advance the state of nutrient recovery technologies. For information on existing nutrient recovery technologies, see the accompanying *Background Information on Nutrient Recovery Technologies and Pork and Dairy Manure* document, available [here](#).

Scoring Sheet	
Required Criteria	
	Yes/No ("Yes" required to advance):
Recovers and concentrates nutrients?	
Nutrient Recovery Efficiency	Percentage Recovered:
Nitrogen (N)	
Phosphorus (P)	
Cost-effectiveness/affordability	Score (1-5):
Capital cost	
Operations & Maintenance	
Return on Investment rate	
Additional Desirable Characteristics	
Desirable Characteristic	Score (1-5)
1. Ability to yield value-added co-products from the recovered nutrients. (Any markets for the yielded co-products identified?)	
2. Ability to separate liquid & solid streams from manure; decrease moisture content of solids.	
3. Ability to produce low-nutrient effluent from liquids manure stream.	
4. Yields multiple benefits; e.g., reduces odors, reduces pathogens, protects/restores water quality, reduces GHG emission, provides other ecosystem benefits, generates reusable water for on-farm use, etc.	
5. Compatibility with existing production and manure management systems (e.g, flush, scrape, deep pit, lagoon, digester, solid-liquid separators)	
6. Portability	
7. Replicability, Scalability	
8. Farmer-friendliness (easy to install, operate, etc.)	

Terms and Conditions

Solvers must comply with all the terms of the Challenge Guidelines.

Solvers are not required to transfer exclusive intellectual property rights to the Seekers. By submitting a concept paper in Phase I of this Challenge, Solvers grant to the Seekers a royalty-free, perpetual, and non-exclusive license to use the title and a general description of the proposed technology, but not the general approach that the Solver proposes for developing the technology. For the Nutrient Recycling Challenge, the Seekers may use submissions in the following ways:

- The Seekers will share Solvers' entire submissions with members of the judging panel, solely for the purpose of determining finalist and awarded submissions.
- The Seekers may choose to follow up directly with Solvers about an idea to encourage its advancement.
- Only if explicitly authorized by a Solver, the Seekers may choose to share a Solver's entire submission with other potential funding sources and/or the general public.
- The Seekers may decide to initiate a broader funding call to encourage the advancement of a proposed platform technology submitted by a Solver. The Seekers will not, however, publicize the details of the Solver's general approach to developing the technology.

By entering the Nutrient Recycling Challenge, you will be representing and warranting that the work submitted is your own original work, and that it does not infringe upon the intellectual property rights of any other person.

If it is determined by the Seekers that there is insufficient potential among the entries to achieve/demonstrate the stated goals of the Nutrient Recycling Challenge, Phases of the Challenge may be extended, re-opened, delayed, or canceled at the Seekers' discretion.

Privacy

Privacy: The information collected for this Challenge will only be used to contact Solvers in direct relation to the competition. After consultation with the award winners, winners will be announced publicly, and winning entries will be posted on the Nutrient Recycling Challenge website.

Use of Challenge Name, Challenge Logo, and Marks

Nutrient Recycling Challenge name:

Solvers agree to exclusively and accurately use the Nutrient Recycling Challenge name when referring to the Nutrient Recycling Challenge, including, without limitation, in all news coverage, Nutrient Recycling Challenge media, advertising, public relations, and marketing materials that reference the organizers or the Nutrient Recycling Challenge.

Nutrient Recycling Challenge Logo:

Solvers are granted permission to use the Nutrient Recycling Challenge name and logo on its materials, including its website, informational materials and merchandise. To present a consistent, professional image, it is imperative that all Nutrient Recycling Challenge communications, print and online, clearly establish their connections to the Nutrient Recycling Challenge. The Nutrient Recycling Challenge Administrators reserve the right to review any Solver usage of the Nutrient Recycling Challenge name and / or logo and accept or reject specific proposed uses of logos.

Use of marks:

Solvers shall not use the names, trademarks, service marks, logos, insignias, trade dress, or any other designation of source or origin subject to legal protection, copyrighted material or similar intellectual property (“Marks”) of the organizers or other Nutrient Recycling Challenge partners, sponsors, or collaborators in any way without such party’s prior written permission in each instance, which such party may grant or withhold in its sole and absolute discretion.

Contact

Email: nutrientrecyclingchallenge@epa.gov