



# EPA Green Chemistry Challenge Awards Webinar for 2022

## SEPTEMBER 22, 2021



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# WHAT ARE THE GREEN CHEMISTRY CHALLENGE AWARDS?

- The Green Chemistry Challenge Awards recognize the environmental and economic benefits of developing and using novel green chemistry.
- Green chemistry can significantly contribute to EPA's effort in promoting source reduction.
- This is an opportunity to share and be recognized for your innovations in green chemistry!



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# HISTORY OF THE GREEN CHEMISTRY CHALLENGE AWARDS

- The Green Chemistry Challenge Awards began in 1996.
  - EPA's Office of Chemical Safety and Pollution Prevention co-sponsors the Awards in partnership with the American Chemical Society Green Chemistry Institute<sup>®</sup> (ACS CGI).
  - Throughout the 25 years of the awards program, EPA has received over 1,800 nominations.
  - EPA has presented awards to 128 winners.





## HISTORY OF THE AWARDS (2)

- Through 2021, the 118 winning technologies provided big opportunities for pollution prevention:
  - 830 million pounds of hazardous chemicals and solvents eliminated each year—enough to fill almost 3,800 railroad tank cars or a train nearly 47 miles long.
  - 21 billion gallons of water saved each year—the amount used by 980,000 people annually.
  - 7.8 billion pounds of carbon dioxide equivalents released to air eliminated each year—equal to taking 770,000 automobiles off the road.





# WHAT IS GREEN CHEMISTRY?

- For the purposes of these awards, green chemistry is the design of chemical products and processes that reduces or eliminates the use or generation of hazardous substances.
  - Green chemistry applies across the lifecycle of a chemical product, including its design, manufacture, use, and ultimate disposal.
  - Green chemistry reduces pollution at its source by minimizing or eliminating the use of hazardous chemicals, feedstocks, reagents, solvents, and products.



# WHAT ARE THE AWARD CATEGORIES?

- For the 2022 competition, there are six award categories.
  - Focus Area 1: Greener Synthetic Pathways
  - Focus Area 2: Greener Reaction Conditions
  - Focus Area 3: The Design of Greener Chemicals
  - Small Business
  - Academic
  - Specific Environmental Benefit: Climate Change



## WHAT IS THE SCOPE OF THE PROGRAM?

- To be eligible for an award, a nominated technology must meet each of these six criteria:
  1. Be a **green chemistry technology** with a significant chemistry component
  2. Include **source reduction**
  3. The sponsor must be an **eligible entity**
  4. Have a **significant milestone** in its development within the past five years
  5. Have a **significant U.S. component**
  6. Fit within at least one of the **three focus areas** of the program





# EXAMPLES OF GREEN CHEMISTRY TECHNOLOGY

- Improve upon any chemical product or process by reducing negative impacts on human health and the environment.
- Include all chemical processes: synthesis, catalysis, reaction conditions, separations, analysis, and monitoring.
- Make improvements at any stage of a chemical's lifecycle.
- May substitute a single improved product or an entire synthetic pathway.
- Benefit human health and the environment at any point of the technology's lifecycle.
- Incorporate green chemistry at the earliest design stages of a new product or process.
- Employ a significant change in chemistry, although they may also incorporate green engineering practices.
- Reduces or eliminates the hazardous chemicals used to clean up environmental contaminants.



# WHAT IS SOURCE REDUCTION?

- For this program, EPA defines green chemistry as the use of chemistry for **source reduction**.
  - According to the Pollution Prevention Act of 1990 (PPA), the term “source reduction,” also known as Pollution Prevention or P2, means any practice which:
    - (i) reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and
    - (ii) reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants. The term includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control.

# WHO ARE ELIGIBLE ENTITIES?

- Companies, individuals, academic institutions (including state and tribal universities and their representatives), non-profit and not-for profit organizations and their representatives are eligible for Green Chemistry Challenge Awards.
  - Federal scientists are ***NOT*** eligible to apply for this award.





## WHAT ARE SIGNIFICANT MILESTONES?

- A green chemistry technology must have reached a significant milestone within the past five years. Some examples are:
  - Critical discovery made
  - Results published
  - Patent application submitted or approved
  - Pilot plant constructed
  - Relevant regulatory review initiated or completed
  - Technology implemented or launched commercially



## SIGNIFICANT U.S. COMPONENT

- A significant amount of the research, development, or other aspects of the technology must have occurred within the United States.
- If the only aspect of the technology within the United States is product sales, the technology may not meet the scope of the program.





## FOCUS AREAS OF THE GREEN CHEMISTRY CHALLENGE

- Green chemistry technologies fit into at least one of the three focus areas below.
  - Greener Synthetic Pathways
  - Greener Reaction Conditions
  - The Design of Greener Chemicals



## FOCUS AREA 1: GREENER SYNTHETIC PATHWAYS

- Designing and implementing a novel, green pathway to produce either a new or existing chemical substance. Examples from the synthetic pathway focus area:
  - Use greener feedstocks that are innocuous or renewable (e.g., biomass, triglycerides).
  - Use novel reagents or catalysts, including biocatalysts and microorganisms.
  - Use natural processes, such as fermentation or biomimetic syntheses.
  - Are atom-economical.
  - Are convergent syntheses.



## FOCUS AREA 2: GREENER REACTION CONDITIONS

- Improving conditions other than the overall design or redesign of a synthesis. Greener analytical methods often fall within this focus area. Examples include reaction conditions that:
  - Replace hazardous solvents with solvents that have less impact on human health and the environment.
  - Use solventless reaction conditions and solid-state reactions.
  - Use novel processing methods that prevent pollution at its source.
  - Eliminate energy- or material-intensive separation and purification steps.
  - Improve energy efficiency, including reactions running closer to ambient conditions.
  - Reduce greenhouse gas emissions.



## FOCUS AREA 3: THE DESIGN OF GREENER CHEMICALS

- This focus area involves designing and implementing chemical products that replace more hazardous products. Examples include chemical products that are:
  - Less toxic than current products.
  - Inherently safer because they reduce the likelihood or severity of accidents.
  - Recyclable or biodegradable after use.
  - Safer for the atmosphere (e.g., do not deplete ozone, form smog, etc.).



## SPECIAL CATEGORIES

- There are three special award categories for green chemistry technologies in one or more of the three focus areas:
  - Small Business\*
  - Academic
  - Specific Environmental Benefit: Climate Change\*\*

\* A small business for purposes of this award must have annual sales of less than \$40 million, including all domestic and foreign sales by the company, its subsidiaries, and its parent company.

\*\* New in 2022.



# WHAT ARE THE SELECTION CRITERIA?

- Nominated chemistry technologies that meet the **scope of the program** will be judged on how well they meet the following three selection criteria:
  1. Science and Innovation.
  2. Human Health and Environmental Benefits.
    - Consider the whole lifecycle, *show quantitative and qualitative measures of benefits.*
  3. Applicability and Impact.





## HOW TO APPLY?

- Award nominations are due by December 10, 2021.
- There is ***NO application fee.***
- There is no standard entry form, but nominations must meet certain requirements or EPA may reject them.
  - Refer to the nomination package for structure of nominations.
- To nominate more than one technology per company, you must submit a separate, stand-alone nomination for each technology. Multiple applications of the same general technology are most likely to win an award if you combine them in a single nomination.



## HOW TO APPLY? (2)

- The nomination package is available online:
  - <https://www.epa.gov/greenchemistry/information-about-green-chemistry-challenge>
  - Nominations must be submitted by email to [greenchemistry@epa.gov](mailto:greenchemistry@epa.gov).
    - Include the primary sponsor's name in the file name.
    - You may want to submit your nomination as a .pdf file to minimize possible reading errors
  - If you encounter problems submitting your nomination, contact us at [greenchemistry@epa.gov](mailto:greenchemistry@epa.gov) or (202) 564-8849.



## HOW TO APPLY? (3)

- Make sure you addressed every element of the Award Nomination Checklist (highlights):
  - Indicate if your technology is eligible for the special award categories, including the new Climate Change Category.
  - In the Abstract, make sure you address both the novel chemistry AND provide quantitative description of environmental benefits of your technology.
    - We raised the word limit from 300 to 500 so you can describe both aspects in greater detail.



## HOW ARE THE APPLICATIONS JUDGED?

- EPA will conduct an initial screen of all nominations.
- A panel of technical experts convened by the (ACS CGI) along with EPA will judge nominations.
  - The judges will recommend as award recipients those green chemistry technologies that best meet the selection criteria. The judges may use their discretion, however, to recommend more than one award (or no award) in any one category.
- Award nominations will also be subject to EPA compliance enforcement screening.
  - Civil and criminal screening will be conducted at federal and state/local levels.



# AWARD CEREMONY: WHEN AND WHERE?



- Exact date and time TBD – early summer 2022.
- At a distinguished location in Washington, DC.
- Evening award ceremony planned, including:
  - Keynote speeches
  - Award Ceremony



# THANK YOU! ANY QUESTIONS?

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