

**MARCH 2012**

**NORTHWEST ENERGY EFFICIENCY TECHNOLOGY ROADMAP SERIES**

**FOOD PROCESSING TECHNOLOGY ROADMAPS**

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## Special Thanks

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While the Bonneville Power Administration funded and managed the overall development of the Northwest Energy Efficiency Technology Roadmap Portfolio, the effort would not have been possible without the active engagement of nearly seventy representatives from more than twenty organizations. In particular, the members of the newly formed Regional Emerging Technology Advisory Committee played a key role the roadmap's creation. Those members include representatives from Bonneville Power Administration, Northwest Power and Conservation Council, Northwest Energy Efficiency Alliance, Electric Power Research Institute, Pacific Northwest National Laboratory, Washington State University Extension Energy Program, Energy Trust of Oregon, Puget Sound Energy, Snohomish Public Utility District, Seattle City Light, Idaho Power, and Avista. Thanks as well to the project team, who worked behind the scenes to plan, coordinate, analyze, evaluate, revise, and prepare everything needed to pull this roadmap together in such a short amount of time. Without the help of contractors from the Department of Engineering and Technology Management at Portland State University, the Washington State University Extension Energy Program, Livingston Energy Innovations, and Energetics this roadmap would look very different than it does today. Finally, a special thanks to the staff at E Source, who brought their collective experience to bear in helping us evaluate the current status of the R&D gaps for the March 2011 and March 2012 revisions.

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# Introduction

Technology roadmaps are created to develop tactical research and development (R&D) plans to meet the strategic goals of a wide array of industries and organizations. The Food Processing Industry Roadmap in this document is one of the eight roadmaps available in the larger Northwest Energy Efficiency Technology Roadmap Portfolio. These roadmaps provide a snapshot of stakeholders' current perspectives in regard to a shared research agenda for the next twenty years, developed to provide clarity on:

1. Key drivers (environmental/global, market, policy and regulatory, and technology innovation) affecting the Northwest in regard to energy efficiency
2. Products/services needed to address identified drivers
3. Technologies needing developed in order to bring non-existing products to market
4. Gaps in existing R&D programs designed to address identified technology needs
5. Regional priorities in regard to the treatment of R&D gaps.

Ultimately, the goal of identifying and prioritizing R&D gaps allows for a more rational allocation of limited funding and resources by organizations such as the BPA, national labs, research universities, private businesses, and venture capitalists.

BPA's Office of Technology Innovation uses these roadmaps to guide its annual solicitation for proposals for energy efficiency R&D projects. This annual solicitation typically reopens every year in March; proposals not linked to technology needs identified in the roadmap are not eligible for awards. Because the roadmap is shared public resources, any organization can also use them to guide their own research efforts with some confidence that their work fits into a larger research agenda crafted and vetted by technical experts from across the country.

In the process of identifying gaps in existing energy efficiency R&D programs, roadmapping participants also identified a list of products and services already available in the marketplace but not widely adopted due to various technical and/or market barriers. While treating this group of products and services was not the primary purpose of the roadmapping endeavor, some effort was dedicated to articulate:

1. Barriers to the wider adoption of existing products/services
2. Necessary components to future market intervention programs and other initiatives to increase adoption rates for these targeted products/services

To avoid confusion, the findings articulated by participants in these latter efforts are located in Appendix A.

By creating these regional technology roadmaps, the Northwest has taken an important step toward the goal of creating continuity between its R&D efforts to bring non-existing technologies to market, ongoing work in emerging technologies, and present and future market intervention strategies.

## Using the Roadmaps

The Northwest Energy Efficiency Technology Food Processing Industry Roadmap is a reference tool designed to be living, working documents. It was not crafted with any expectation of being read from beginning to end like a traditional report or narrative. Rather, its design allows for quick reference to technology development research agendas in relation to specific energy efficiency products and services.

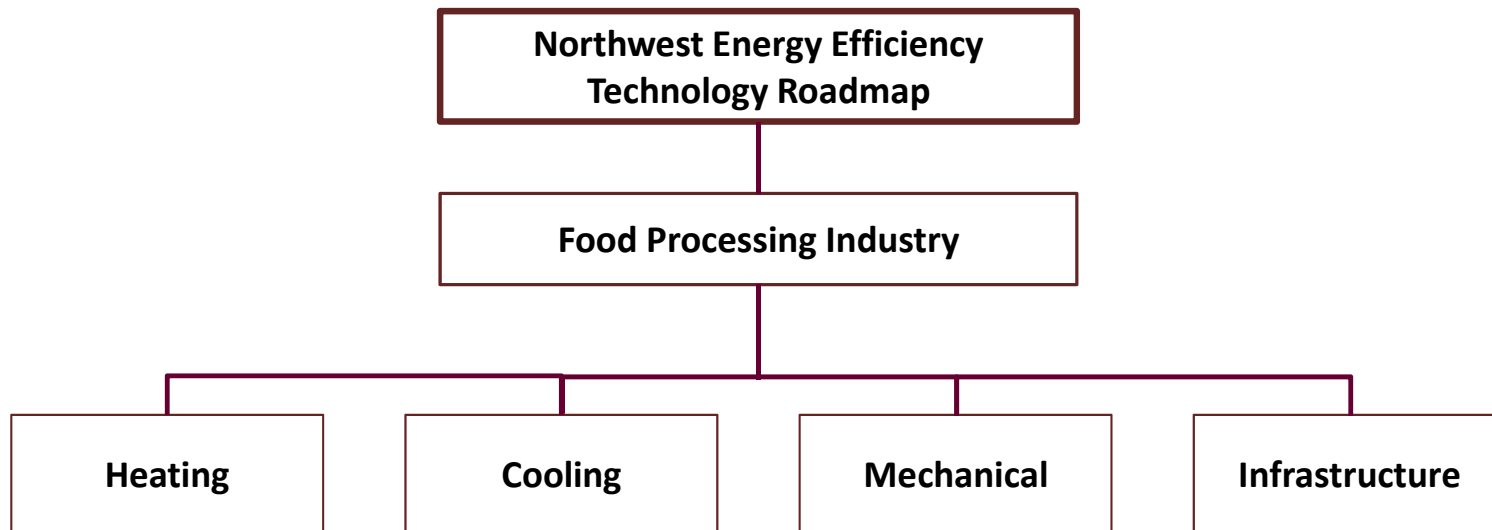
The content herein is organized into four technical product/service-level roadmaps. The areas are:

1. Heating Technology
2. Cooling Technology
3. Mechanical Technology
4. Infrastructure Technology

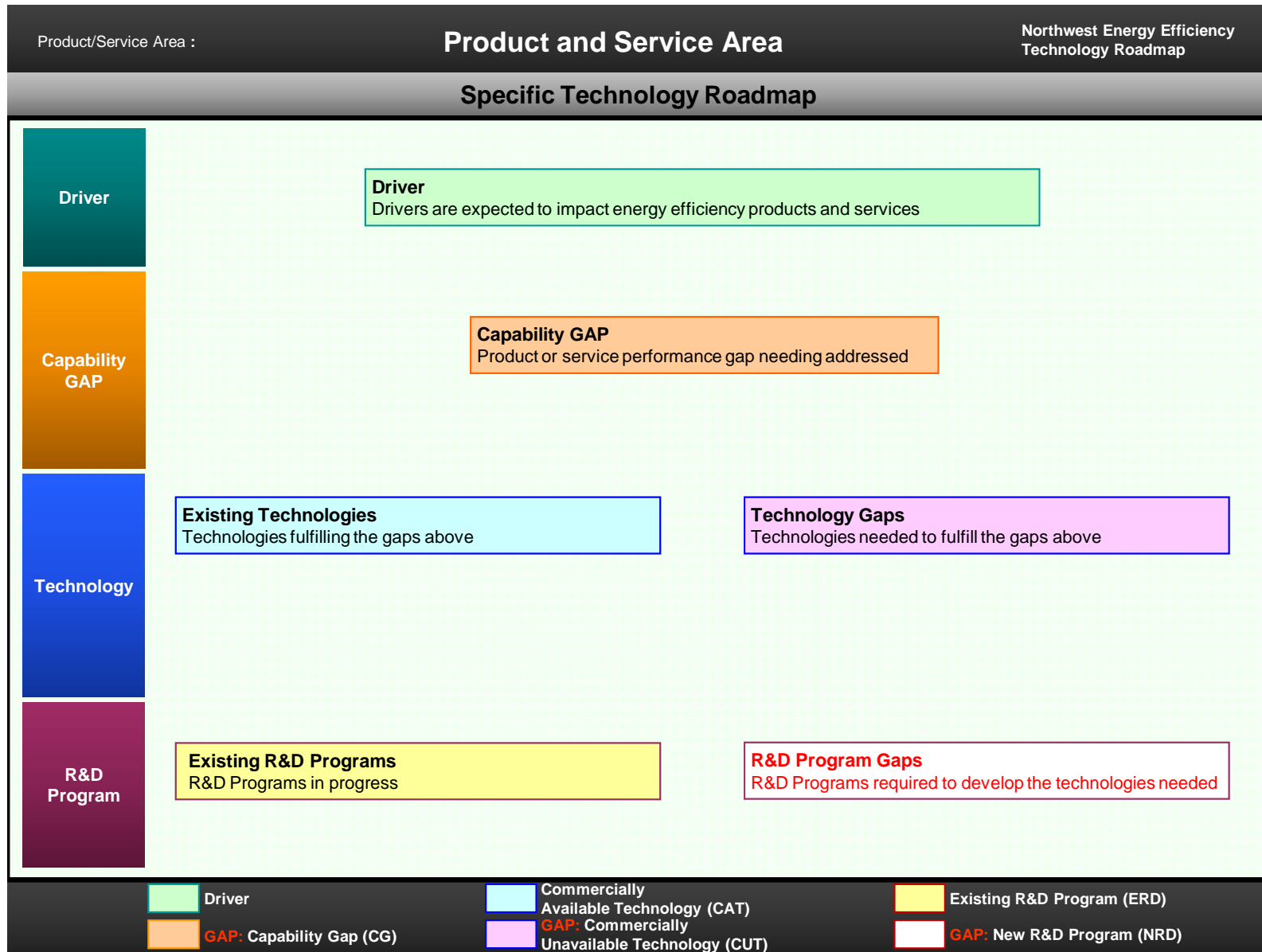
## Disclaimer

Some roadmaps, project summaries, and appendix pages identify specific vendors, commercial products, or proprietary systems and technologies. BPA and regional stakeholders make these references solely for context; these references do not constitute endorsement on the part of BPA, the Department of Energy, or any stakeholder involved in the creation and refinement of these roadmaps.

# Food Processing Roadmap Structure



# Roadmap Key



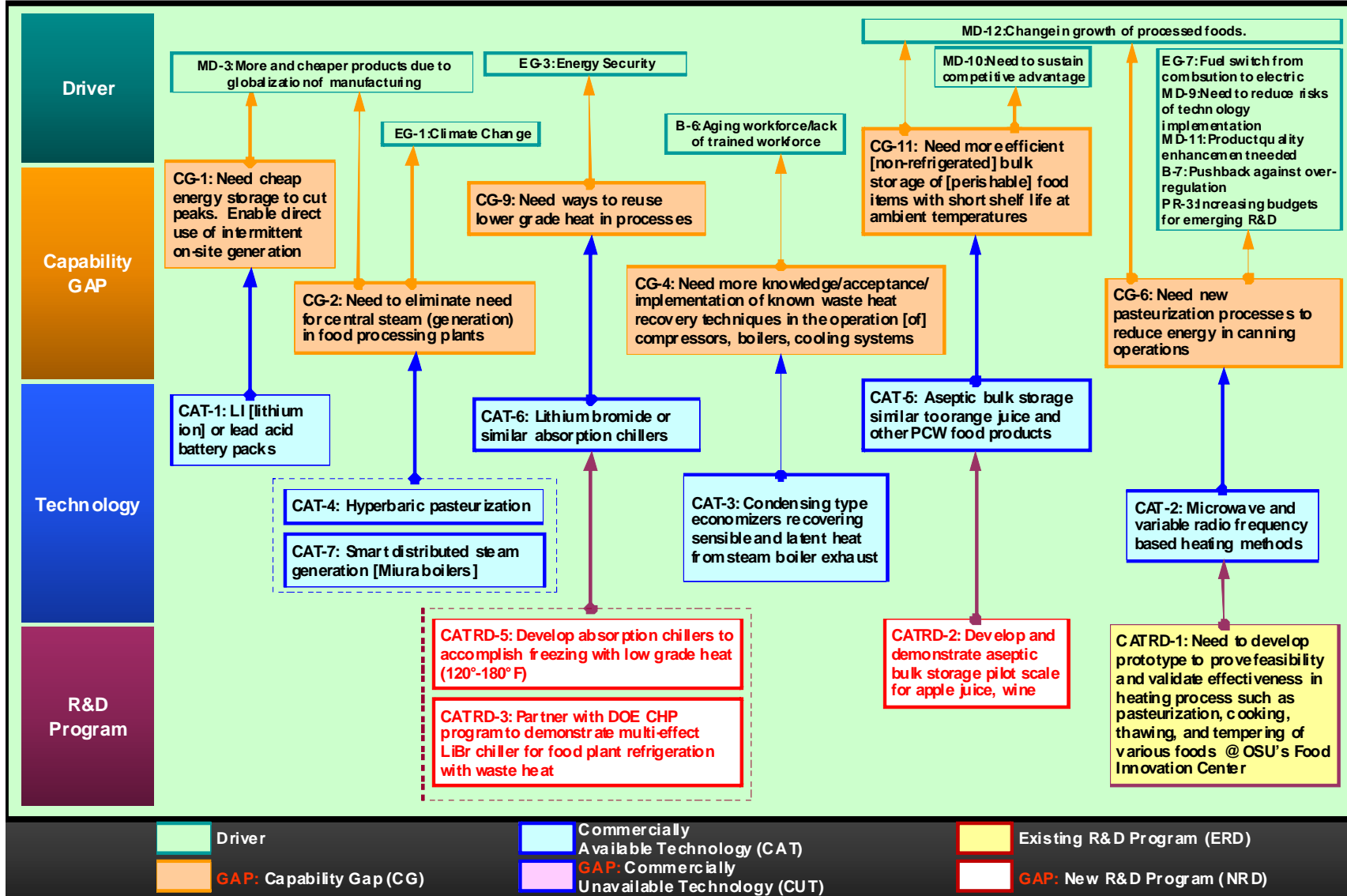
# Food Processing Technology Roadmaps



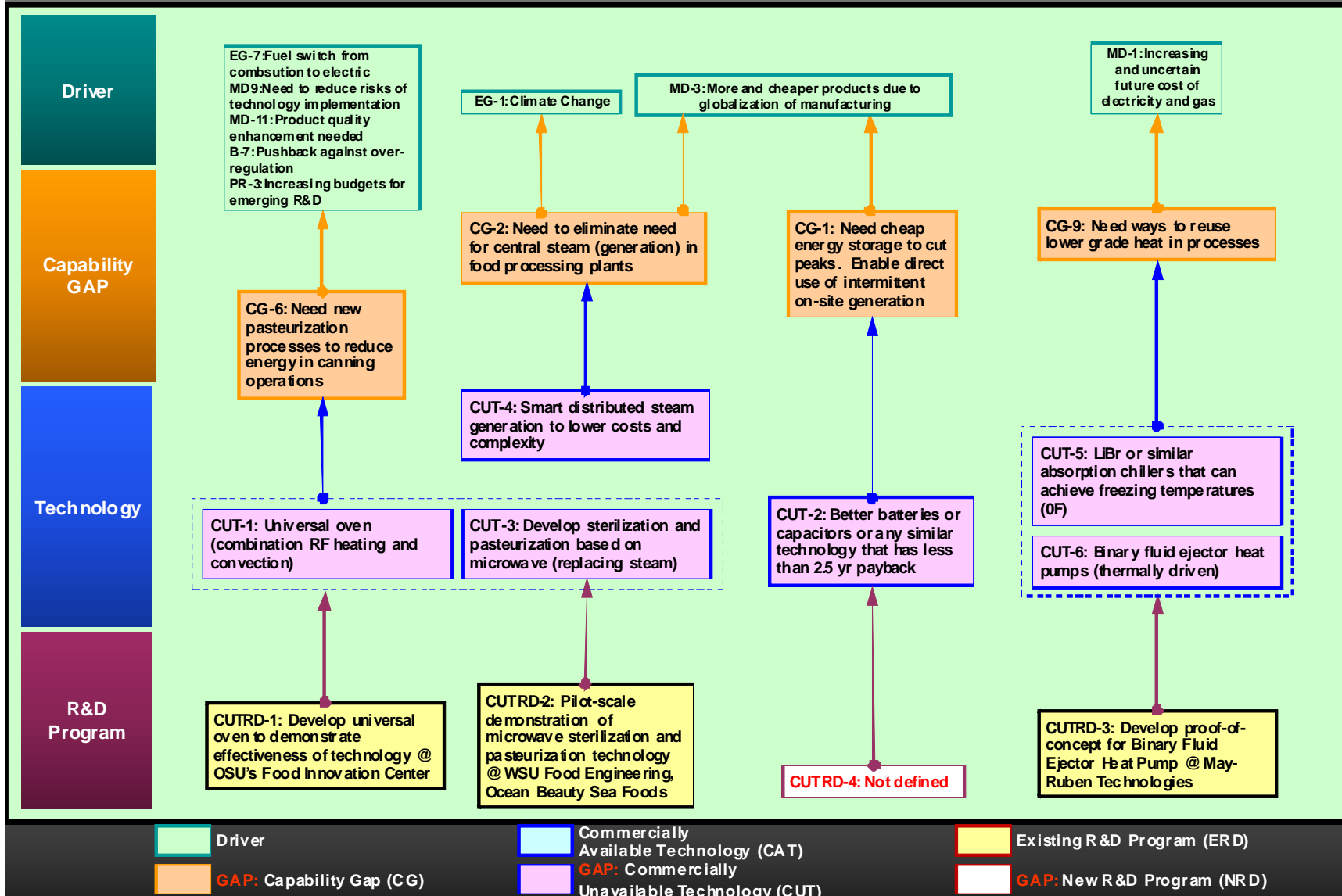
# Food Processing Heating Technology Roadmap

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## Food Processing Heating Technology Roadmap (1 of 2)



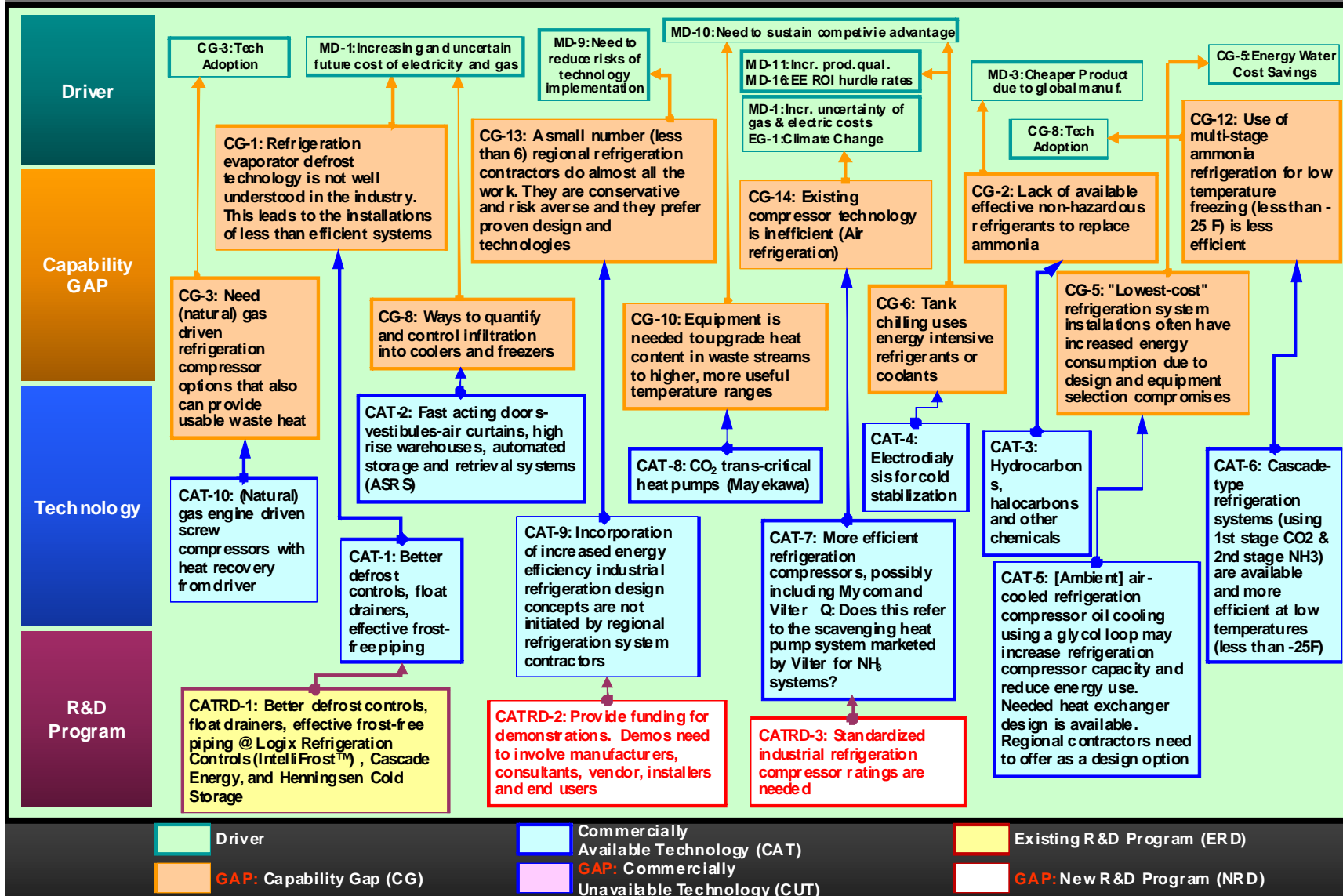
## Food Processing Heating Technology Roadmap (2 of 2)



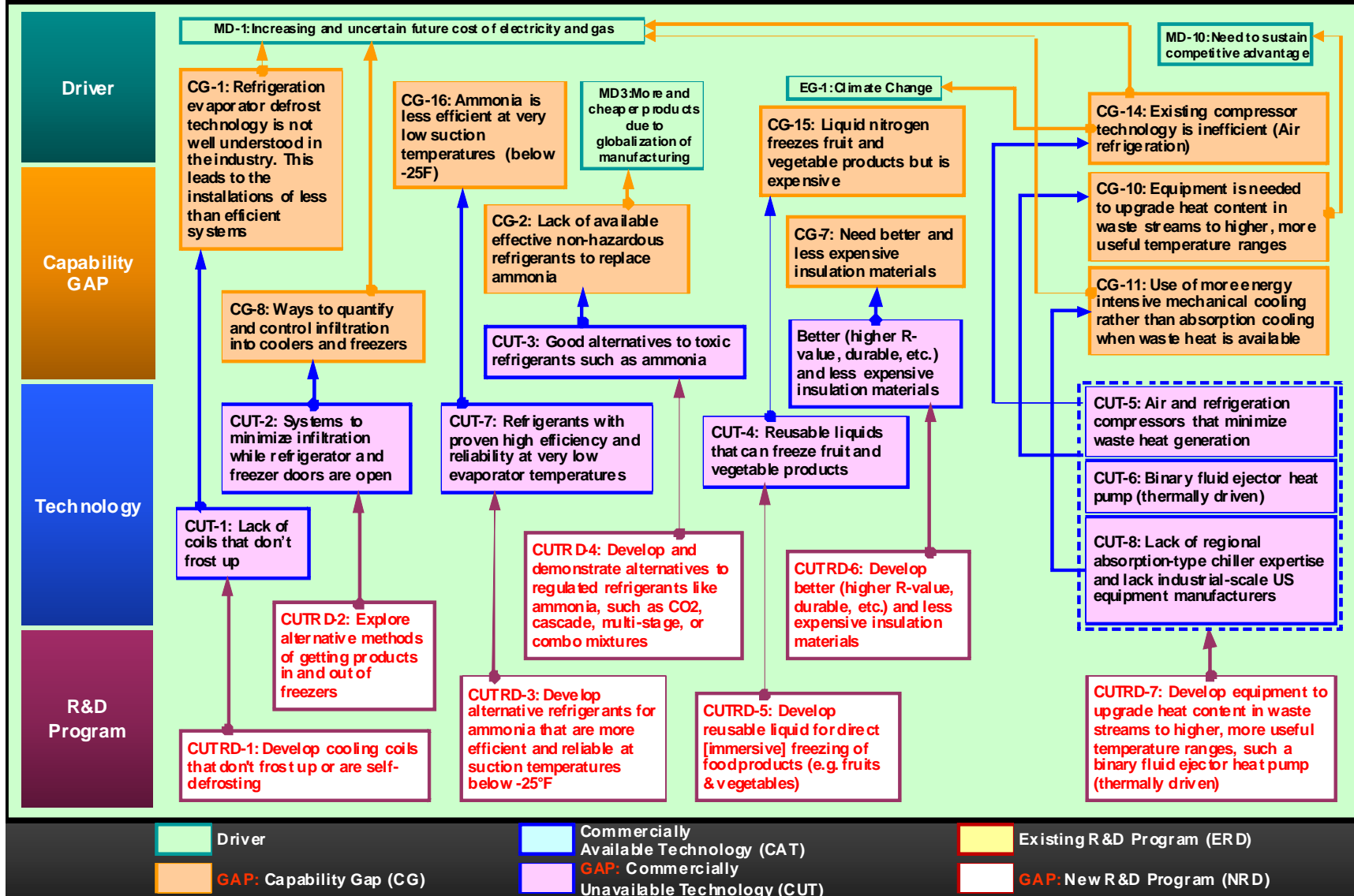
# Food Processing Cooling Technology Roadmap



## Food Processing Cooling Technology Roadmap (1 of 2)



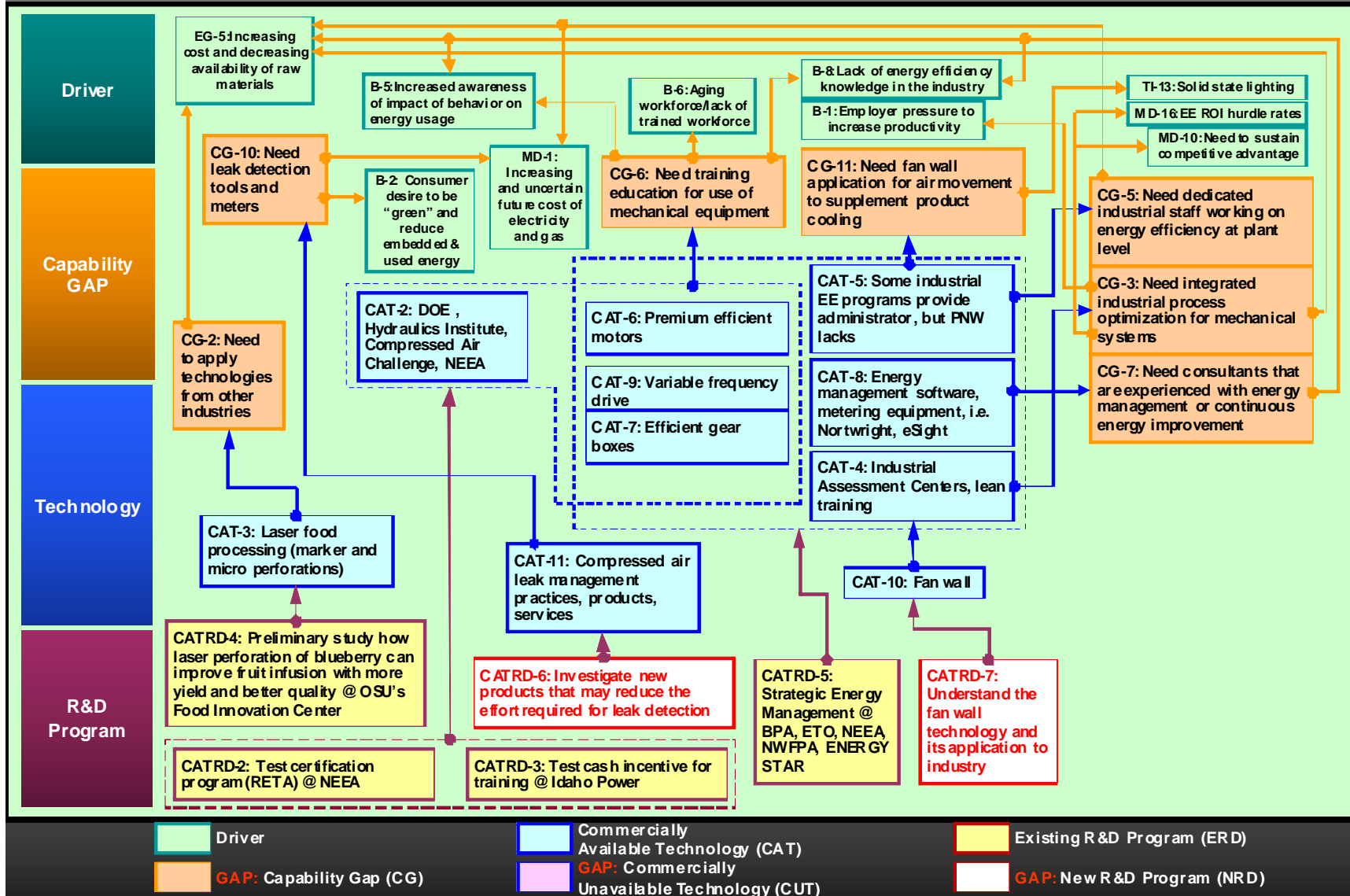
## Food Processing Cooling Technology Roadmap (2 of 2)



# Food Processing Mechanical Technology Roadmap

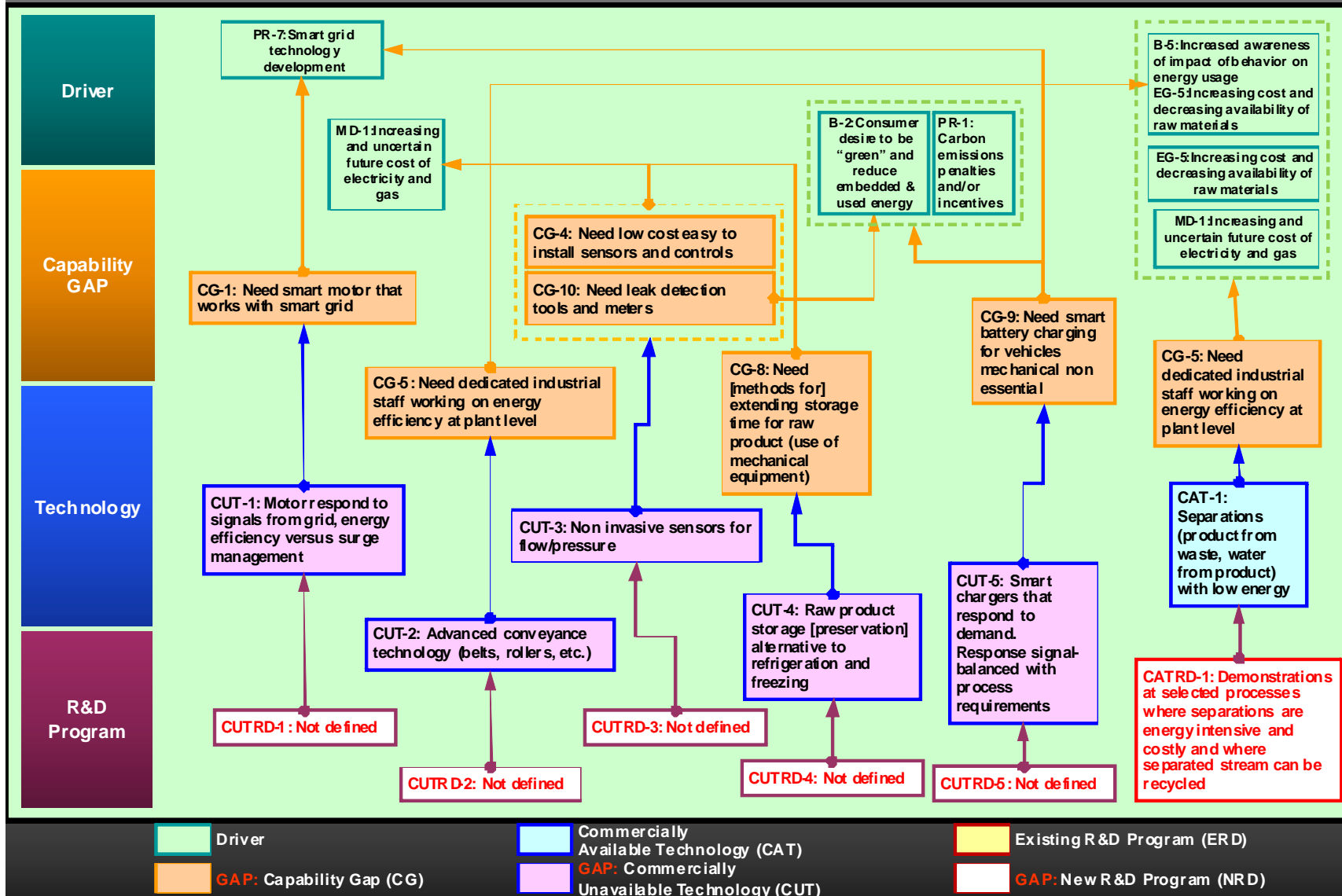
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## Food Processing Mechanical Technology Roadmap (1 of 2)





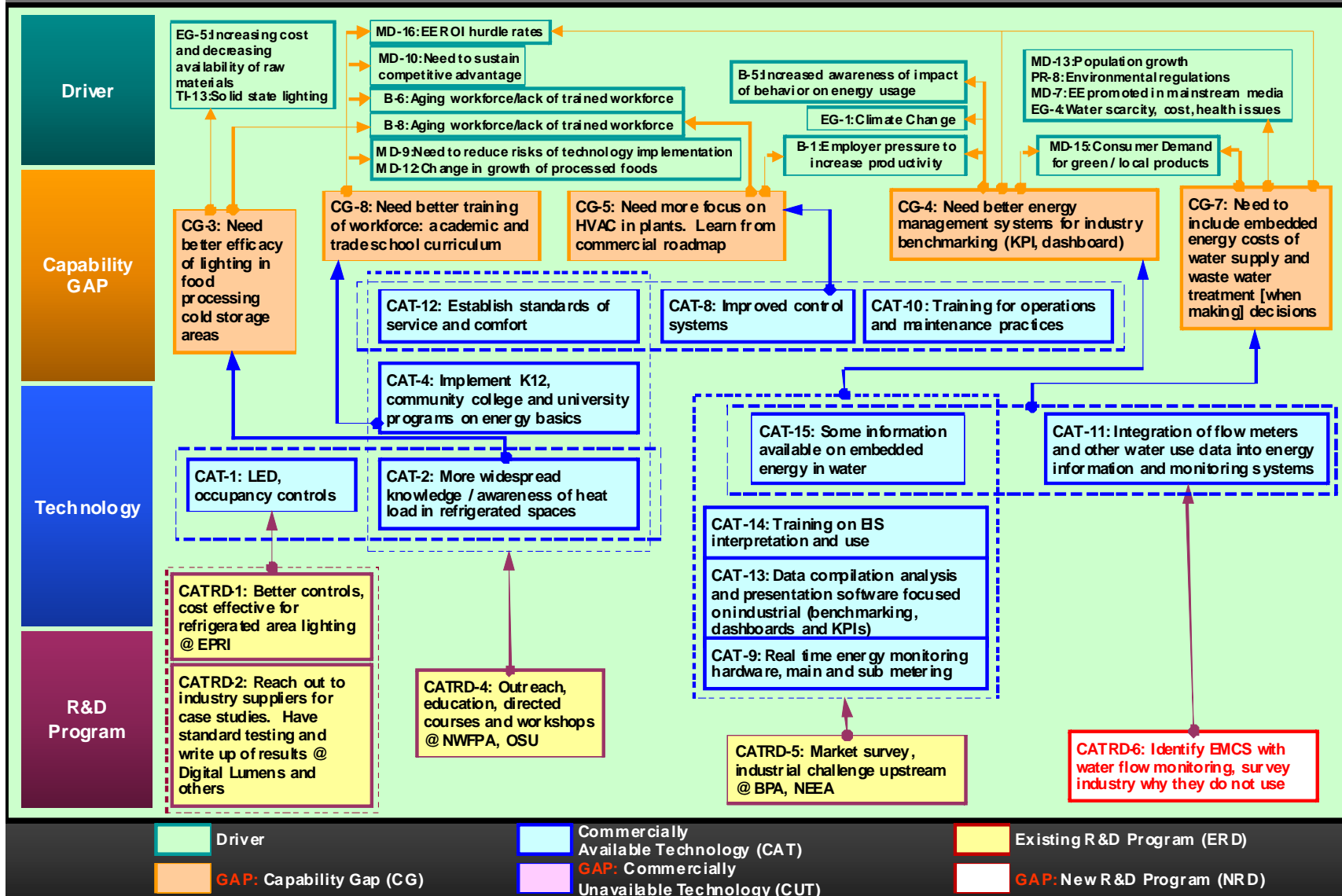
## Food Processing Mechanical Technology Roadmap (2 of 2)



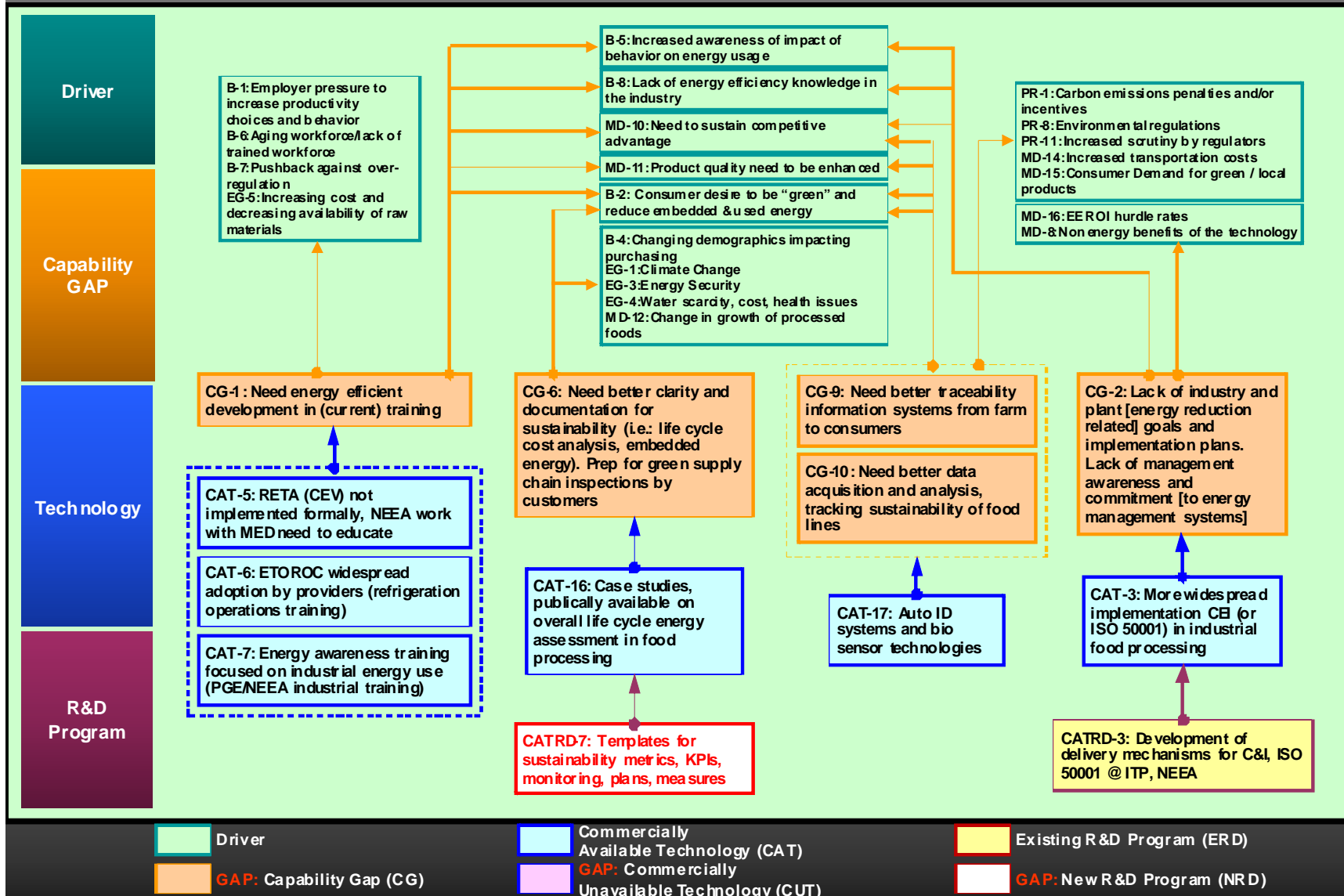
# Food Processing Infrastructure Technology Roadmap

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## Food Processing Infrastructure Technology Roadmap (1 of 3)



## Food Processing Infrastructure Technology Roadmap (2 of 3)



## Food Processing Infrastructure Technology Roadmap (3 of 3)

