What is the ReFED Roadmap?

ReFED is a nonprofit collaboration formed in 2015 of over 30 business, nonprofit, foundation and government leaders committed to reducing food waste in the United States.

On March 9th, ReFED launched A Roadmap to Reduce U.S. Food Waste by 20 Percent, the first ever national economic study and action plan driven by a multi-stakeholder group committed to tackling food waste at scale.
THE PROBLEM
OF FOOD WASTE
Every year, American consumers, businesses and farms spend $218 billion (roughly 1.3% of GDP) on food that is never eaten.

U.S. Food Waste utilizes:

18% of Cropland
19% of Fertilizer
21% of Freshwater
21% of landfill volume
ReFED Food Waste Baseline: Nearly 63M tons of waste per year

- 52.4 MILLION TONS SENT TO LANDFILL
- 10.1 MILLION TONS ON-FARM LOSS

= 62.5 MILLION TONS FOOD WASTED IN THE U.S. EVERY YEAR

FOOD WASTED BY WEIGHT — 63 MILLION TONS ($218 billion)

- FARMS: 10M, 16% ($15B)
- MANUFACTURERS: 1M, 2% ($2B)
- CONSUMER-FACING BUSINESSES: 25M, 40% ($57B)
- HOMES: 27M, 43% ($144B)
THE SOLUTIONS AND ECONOMIC ANALYSIS
AN $18 BILLION INVESTMENT IN 27 SOLUTIONS TO REDUCE U.S. FOOD WASTE BY 20% WILL YIELD $100 BILLION IN SOCIETAL ECONOMIC VALUE OVER A DECADE

TOTAL INVESTMENT

$18B

NET SOCIETAL ECONOMIC VALUE

$100B

BENEFITS PER YEAR

- 1.8B Meals Recovered
- 1.6T Gallons Water Conserved
- $2B Business Profit
- $6B Consumer Savings
- 18M Tons Greenhouse Gas Emissions Reduced
- 15K Jobs Created*

*Jobs created is a total number, not annual new jobs

Jobs and environmental benefits not included in $100b calculation
Data Analysis: 13M tons of potential (20%)

**Prevention**
Stopping waste from occurring in the first place

12 solutions
Most Cost Effective

**Recovery**
Redistributing food to people

7 solutions
Best at Alleviating Hunger

**Recycling**
Repurposing waste as energy and agricultural products

8 solutions
Greatest Diversion Potential

![Pie chart showing 13.2M tons of food waste to be reduced, with Prevention at 2.6M tons, Recovery at 1.1M tons, and Recycling at 9.5M tons.]

REduce 13.2 M tons of food waste

PREVENTION: 2.6 M tons
RECOVERY: 1.1 M tons
RECYCLE: 9.5 M tons
## 27 Solutions Evaluated

<table>
<thead>
<tr>
<th><strong>Prevention Solutions</strong></th>
<th><strong>Recovery Solutions</strong></th>
<th><strong>Recycling Solutions</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaging, Product &amp; Portions</td>
<td>Donation Infrastructure</td>
<td>Donation Matching Software</td>
</tr>
<tr>
<td>Standardized Date Labeling</td>
<td>Donation Storage &amp; Handling</td>
<td></td>
</tr>
<tr>
<td>Packaging Adjustments</td>
<td>Donation Transportation</td>
<td></td>
</tr>
<tr>
<td>Spoilage Prevention Packaging</td>
<td>Value-Added Processing</td>
<td></td>
</tr>
<tr>
<td>Produce Specifications (Imperfect Produce)</td>
<td>Donation Policy</td>
<td></td>
</tr>
<tr>
<td>Smaller Plates</td>
<td>Donation Liability Education</td>
<td></td>
</tr>
<tr>
<td>Trayless Dining</td>
<td>Standardized Donation Regulation</td>
<td></td>
</tr>
<tr>
<td>Waste Tracking &amp; Analytics</td>
<td>Donation Tax Incentives</td>
<td></td>
</tr>
<tr>
<td>Cold Chain Management</td>
<td><strong>Energy &amp; Digestate</strong></td>
<td></td>
</tr>
<tr>
<td>Improved Inventory Management</td>
<td>Centralized Anaerobic Digestion (AD)</td>
<td></td>
</tr>
<tr>
<td>Secondary Resellers</td>
<td>On-Site Business Processing Solutions</td>
<td></td>
</tr>
<tr>
<td>Manufacturing Line Optimization</td>
<td>In-Vessel Composting</td>
<td></td>
</tr>
<tr>
<td><strong>Operational &amp; Supply Chain Efficiency</strong></td>
<td></td>
<td>Commercial Greywater</td>
</tr>
<tr>
<td>Consumer Education</td>
<td></td>
<td>Agricultural Products</td>
</tr>
<tr>
<td>Consumer Education Campaigns</td>
<td></td>
<td>Community Composting</td>
</tr>
<tr>
<td><strong>Available Data</strong></td>
<td></td>
<td>Centralized Composting</td>
</tr>
<tr>
<td><strong>Cost effective</strong></td>
<td></td>
<td>Animal Feel</td>
</tr>
<tr>
<td><strong>Feasible</strong></td>
<td></td>
<td>Home Composting</td>
</tr>
<tr>
<td><strong>Scalable</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Criteria for Selection

- Available Data
- Cost effective
- Feasible
- Scalable
Prevention

Generally low levels of investment and food valued at high wholesale/retail prices

Largest net environmental benefit by avoiding wasted resources in agriculture – twice the GHG impact per ton reduced of recycling

Top 3 Most Scalable Solutions:
• Standardized Date Labeling
• Consumer Education Campaigns
• Waste Tracking & Analytics
Recovery

3 pillars to scale:
1) Enabling policy that financially incentivizes donations from businesses with standardized regulations
2) Education for businesses on donor liability protections and safe food handling practices
3) Logistics and infrastructure to transport, process, and distribute excess food.

Top 3 Most Scalable Solutions:
• Donation Tax Incentives
• Standardized Donation Regulation
• Donation Matching Software
Recycling

Nearly three-quarters of total *Roadmap* diversion potential

3 main recycled products: compost, biogas, animal feed

Northeast, Northwest, and Midwest show the highest economic value per ton from recycling due to high disposal fees and high compost & energy prices

Top levers to scale recycling: (1) increase in landfill disposal costs, (2) efficiencies in hauling and collection through siting near urban centers, and (3) denser routes

Top 3 Most Scalable Solutions:

• *Centralized Composting (highly variable scale)*
• *Centralized Anaerobic Digestion (AD)*
• *Water Resource Recovery Facility with AD*
KEY LEVERS FOR ACTION
Levers to Drive Action Across all Stakeholders

Four crosscutting actions needed to quickly cut 20% of waste and put the U.S. on track to achieve a broader 50% food waste reduction goal by 2030.

- **POLICY**: Commonsense tweaks leading to standardized national policy
- **FINANCING**: New catalytic capital and quantified non-financial impacts
- **INNOVATION**: 5 focus areas and innovation incubator networks
- **EDUCATION**: National Consumer and Employee campaigns

[ReFED]
Financing

The Roadmap will require an $18 billion investment, less than a tenth of a penny of investment per pound of food waste reduced, which will yield an expected $100 billion in societal Economic Value over a decade.

**Financing Needs for 20% Reduction in Food Waste Over a Decade**

<table>
<thead>
<tr>
<th>CAPITAL SOURCE</th>
<th>PREVENTION</th>
<th>RECOVERY</th>
<th>RECYCLING</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIVATE</td>
<td></td>
<td></td>
<td></td>
<td>$6.6B</td>
</tr>
<tr>
<td>GOVERNMENT</td>
<td></td>
<td></td>
<td></td>
<td>$8.2B</td>
</tr>
<tr>
<td>PHILANTHROPIC</td>
<td></td>
<td>$3B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Big Opportunity:** Form impact investment funds focused on food waste solutions, while better incorporating social and environmental benefits into government budgeting.
Policy

Near Term Priorities

• **Donation Tax Incentives** — Maintain and build upon the recent expansion of permanent federal food donation tax incentives for all farms and food businesses.

• **Food Donation Regulation** — Create a common standard of safe handling practice regulations among state and local health departments.

• **Recycling Best Practices** — Spread best practices to encourage recycling, such as streamlined permitting of processing facilities, improved enforcement of waste bans, and expanded incentives to encourage diversion of food waste from landfills.

**Big Opportunity:** Pass comprehensive federal food waste legislation that ties together nearly a dozen individual policies and signals a market shift to food businesses.
Big Opportunity: Incubator network focused on 5 Big Ideas: Packaging & Labeling, IT-enabled Transportation & Storage, Logistics Software, Valued-add Compost Products, Distributed Recycling
Education

Consumer Education
• One of the most cost effective of the 27 solutions
• Spurs consumer demand for smarter retail offerings, such as Standardized Date Labeling, Spoilage Prevention Packaging, Imperfect Produce, and Trayless Dining.
• In late April, NRDC and the Ad Council will launch the first widespread public service campaign promoting food waste awareness.

Employee Education
• Half of Roadmap solutions require employee involvement in day-to-day execution
• Training can avoid the removal of product from shelves when it is still safe to eat, identify food that can be donated, and properly source-separate scraps to remove contaminants for recycling.
• Quickest path to widespread employee training would be to link a new Food Waste Certification to existing Food Safety Certification programs

Big Opportunity: Expand national social-based marketing campaign to achieve widespread consumer awareness and behavior change in coordination with a national food waste employee certification effort.
## Education

**Consumer Education**
- One of the most cost effective of the 27 solutions
- Spurs action at retail, such as Standardized Date Labeling, Spoilage Prevention Packaging, Imperfect Produce.
- In April, NRDC / Ad Council launched widespread awareness campaign.

**Employee Education**
- Required in 50% of Solutions
- Time-appropriate culling, promote donations, and properly source-separate.
- Leverage existing Food Safety Certification programs

**Big Opportunity:** Expand national social-based marketing campaign to achieve widespread consumer awareness and behavior change in coordination with a national food waste employee certification effort.
How to get involved? Visit refed.com

Interactive Cost Curve ranks solutions by economic value, scalability, and environmental/social benefits

Download and share the Roadmap full report (96pg), Key insights (5pg), and Technical Appendix

Additional Detail on the 27 solutions and priorities for each stakeholder

Future Research Priorities

Contact Us to join a multi-stakeholder working group to take action

Contact: info@refed.com