Dow @ A Glance: Portfolio Aimed at Addressing Society’s Needs

- **Agricultural Sciences**
  - Crop Protection
  - Seeds

- **Consumer Solutions**
  - Consumer Care
  - Dow Automotive Systems
  - Dow Electronic Materials

- **Infrastructure Solutions**
  - Dow Building & Construction
  - Dow Coating Materials
  - Energy & Water Solutions
  - Performance Monomers

- **Performance Materials & Chemicals**
  - Chlor Alkali
  - Chlorinated Organics
  - Industrial Solutions
  - Polyurethanes

- **Performance Plastics**
  - Dow Elastomers
  - Dow Electrical and Telecommunications
  - Dow Packaging and Specialty Plastics
  - Energy
  - Hydrocarbons

**World Leader in Material Chemistry**
- In 2015: $49B Revenue, 180 manufacturing and 49,000 employees
- $5.7 B in products highly advantaged from sustainable chemistry
- 9 U.S. Presidential Green Chemistry Awards – more than any other company
- 40% reduction in energy intensity since 1990

**Enhancing Value through Operational Excellence, Sustainability & Innovation**
and Investments in Integrated and Feedstock-Driven Value Chains
Redefining the Role of Business in Society.

Sustainability is our commitment. This is how our employees make it happen.

#DOW2025

Billions saved: $5B, 1.6B lbs waste, 183B lbs water, 10K fewer injuries

Up to $6B savings $13B highly adv sales

1B people + impact $1B NPV nature
2025 Sustainability Goals

Leading the Blueprint
Dow leads in developing a societal blueprint that integrates public policy solutions, science and technology, and value chain innovation to facilitate the transition to a sustainable planet and society.

Delivering Breakthrough Innovations
Dow delivers breakthrough sustainable chemistry innovations that advance the well-being of humanity.

Advancing a Circular Economy
Dow advances a circular economy by delivering solutions to close the resource loops in key markets.

Valuing Nature
Dow applies a business decision process that values nature, which will deliver business value and natural capital value through projects that are good for business and good for ecosystems.

Increasing Confidence in Chemical Technology
Dow increases confidence in the safe use of chemical technology through transparency, dialogue, unprecedented collaboration, research and our own actions.

Engaging Employees for Impact
Dow people worldwide directly apply their passion and expertise to advance the well-being of people and the planet.

World-Leading Operations Performance
Dow maintains world-leading operations performance in natural resource efficiency, environment, health and safety.

Valuing Nature
Dow applies a business decision process that values nature, which will deliver business value and natural capital value through projects that are good for business and good for ecosystems.
Dow 2025 Sustainability Goal: Advancing a Circular Economy

Dow advances a circular economy by delivering solutions to close the resource loops in key markets.

Through innovation and collaboration, Dow will help facilitate the world’s transition to a “circular economy,” where waste is designed into new products and services.

By 2025, we will collaborate to implement six major projects that deliver solutions and advance the circular economy.
What is a circular economy for Dow?

The circular economy is maximizing the value and use of our resources, by designing more efficient systems, materials and turning what used to be waste into resources that can be used again.

Circular economy is keeping resources at the highest value throughout their lifecycles.

**SYSTEMS REDESIGN. INNOVATION. COLLABORATION**

**OPERATIONS**
- Feedstock. Water/Energy Nexus
- Supply Chain Operations.

**INNOVATION**
- Market/Value Chain Collaborations

**END OF USE**
- Repurpose. Reuse.
- Remanufacture.
- Waste to Energy.
- Waste to Worth
Innovations Across the Lifecycle

Source: GreenBlue
Building on a solid foundation in operations ....

Reuse

Recycle

Recover

Co-product/By-product streams

... now extending to markets and value chains
OPERATIONS: BEYOND OPERATIONAL EXCELLENCE

• WASTE REDUCTION ALWAYS PAYS (WRAP AWARDS PROGRAM)
  – Waste avoidance, source reduction, GHG emissions reduction, material reuse or recycling, by-product synergy, and water and energy conservation. **Compared to 2005 the total waste from operations has been reduced by 9 percent**

• RESPONSIBLE CARE AWARD (Examples)
  – Hazardous waste reclassified and converted to fuel/energy source
  – Successful elimination of the use of fossil fuels at Landskrona, Sweden Plant

2025 World Leading Operations Alignment
• Dow will improve raw material efficiency utilization index by 10 percent relative to the 2015 baseline
• Dow will reduce the freshwater intake intensity at key water stressed sites by 20 percent.
• Dow will reduce its waste intensity footprint by 20 percent
• Dow will obtain 400 MW of its power demand from renewable sources by 2025.
Remember Sustainability Fundamentals

Performance or Value

Resource Use or Footprint

…utilizing life cycle thinking

Choosing solutions with multiple environmental, social & economic attributes
Polyethylene Stand-Up Pouch

Designing Recyclability into an Existing Package Format
RETAILN  Compatabilizer

Allowing More Types of Packaging to be Recycled

Basic Film Recycling Process

This process works well for films that are made from PE. Typically doesn’t work well for multi-material films.
CASE STUDY: Energy Bag

Creating value through collaboration. The Energy Bag pilot program took place in Citrus Heights, California and Dow helped turn 6,000 pounds of previously non-recycled plastic waste – juice pouches, candy wrappers and plastic dinnerware – into 512 gallons of fuel.
Advancing a Water Circular Economy

Enabling water solutions

1. **Efficiency**
   Solutions that facilitate higher recovery and reuse for Sustainable Water Management.
   - Water-Energy Nexus innovations improving recovery, reliability, and productivity.
   - Real-time monitoring and management systems

2. **Reuse / Recycle**
   Championing adoption of solutions for water reuse and recycle, the need for water recycle and reuse
   - Advanced treatment to recycle impaired waters
   - Alternative beneficial waste water reuse sources

3. **Alternative Sources**
   The right water, at the right time, in the right place….
   - Seawater processing / desalination
   - Waste water reuse from municipalities / industry
Dow Terneuzen Netherlands
Advancing a Water Circular Economy to enable growth in the region

Municipal Wastewater reuse 3X

Circular Economy Solutions for a Scarce fresh water region
Meet Dow’s demand:
22 Mm³/yr of fresh water

Breakthrough Public-Private Partnership established to accept Municipal Wastewater
- Water re-used first to generate
- High Pressure Steam for site
- then reused again for Cooling Towers
- then finally Evaporated

The problem
- Scarce fresh water region
- municipal wastewater

Benefits
- CO₂ emissions reduced
- Cost savings
- Energy savings
- 60,000 ton/year
- 95% reduction
Water Reuse Collaboration
Neptune Water Treatment Facility

DOWEX™ OPTIPORE polymeric adsorbent technology helps enable the treatment of flowback and produced water from fracking operations at Moneta Divide by removing boron and other harmful organic compounds.

Neptune Water Treatment Facility

90% Recovery
10% Wastewater

900,000 Gallons (22,500 BPD) of Clean Water a Day or More Than One Olympic Size Swimming Pool

100,000 Gallons (2,500 BPD) Concentrated Brine

3rd Largest Water Treatment Facility of Its Kind in the World

Can Treat Up to 1 Million Gallons of Produced Water a Day

Innovation + Operations + Waste2Worth
The SAFECHEM Business Model – Circular Economy in Practice

SAFECHEM value-added Waste Management Services

Waste Hierarchy
Prevention
Minimisation
Re-Use
Recycling
Energy Recovery
Disposal

Raw materials (eg. HCL) → Intermediate (eg. CI2) → Solvent manufacturer → Supply of fresh solvent → Take-back of used solvent

(Feed-stream)

SAFE-TAINER™ system with fresh solvent → Closed cleaning machine → SAFE-TAINER™ system with used solvent

(Recycled solvent)

Solvent recycling → Raw material recycling

Disposal + Energy Recovery

Prolongation of the solvent life cycle through stabilization & continuous monitoring

No ground pollution

Innovation + Service Business Model
Thank You

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