National Renewable Energy Laboratory
Innovation for Our Energy Future

A New Energy Economy – The Path Forward

21st NREL Industry Growth Forum

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Laboratory Director

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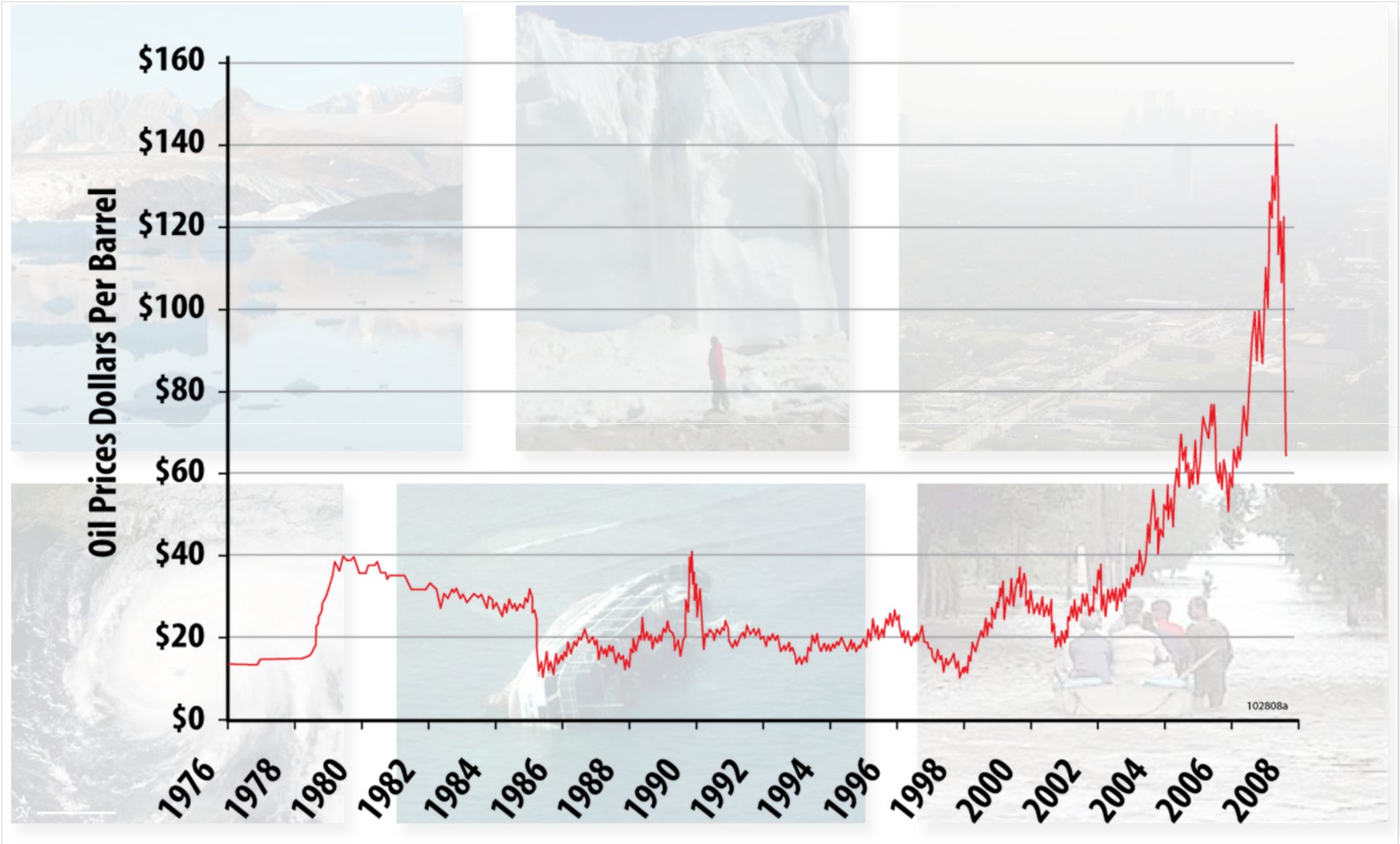
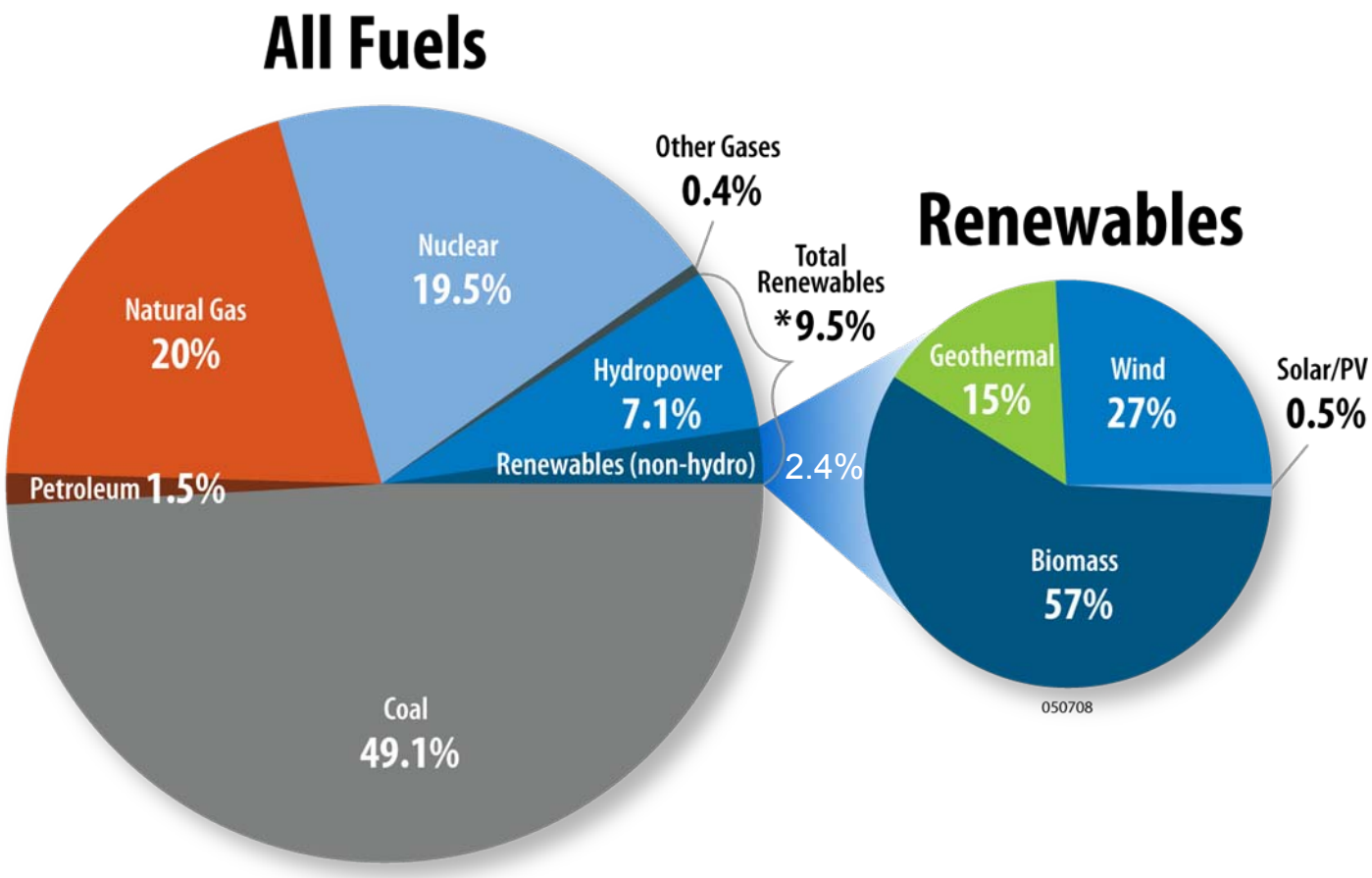
Mounting Evidence



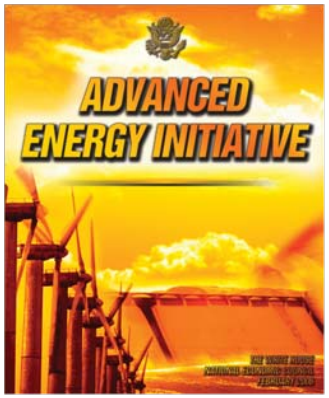
U.S. Electricity Net Generation



Net generation for 2006 = 3814 TWhr UCb

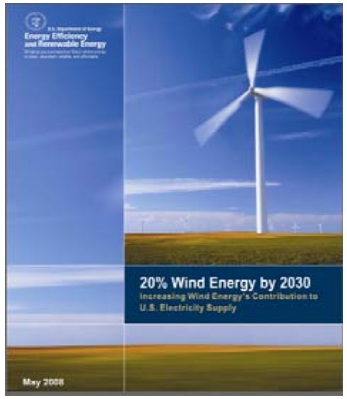
Source: EIA Annual Energy Review 2007, AEO 2008

Setting the Bar Higher – Gigawatt-Scale Renewables



Solar Vision

10% U.S. electricity by 2025



Wind Vision

20% U.S. electricity by 2030

Energy Independence & Security Act 2007

36 billion gallons of renewable fuels by 2022

Requires investment in new infrastructure:

- Overall in U.S. = $2 trillion
- Worldwide = $22 trillion
  - Biofuels
  - Wind
  - Solar

  } $2 trillion (est.)

Getting to "Speed and Scale" – Key Challenges

Implementing Renewable Gigawatts at Scale

NREL 140-1

BARRIERS

- Cost of renewable electricity
- Performance and reliability
- Infrastructure robustness and capacity
- Dispatchability of renewables

Displacement of Petroleum-Based Fuels

NREL 139-1

BARRIERS

- Cellulosic ethanol cost
- Life cycle sustainability of biofuels
- Fuels infrastructure, including Codes/Standards
- Demand and utilization, including intermediate blends

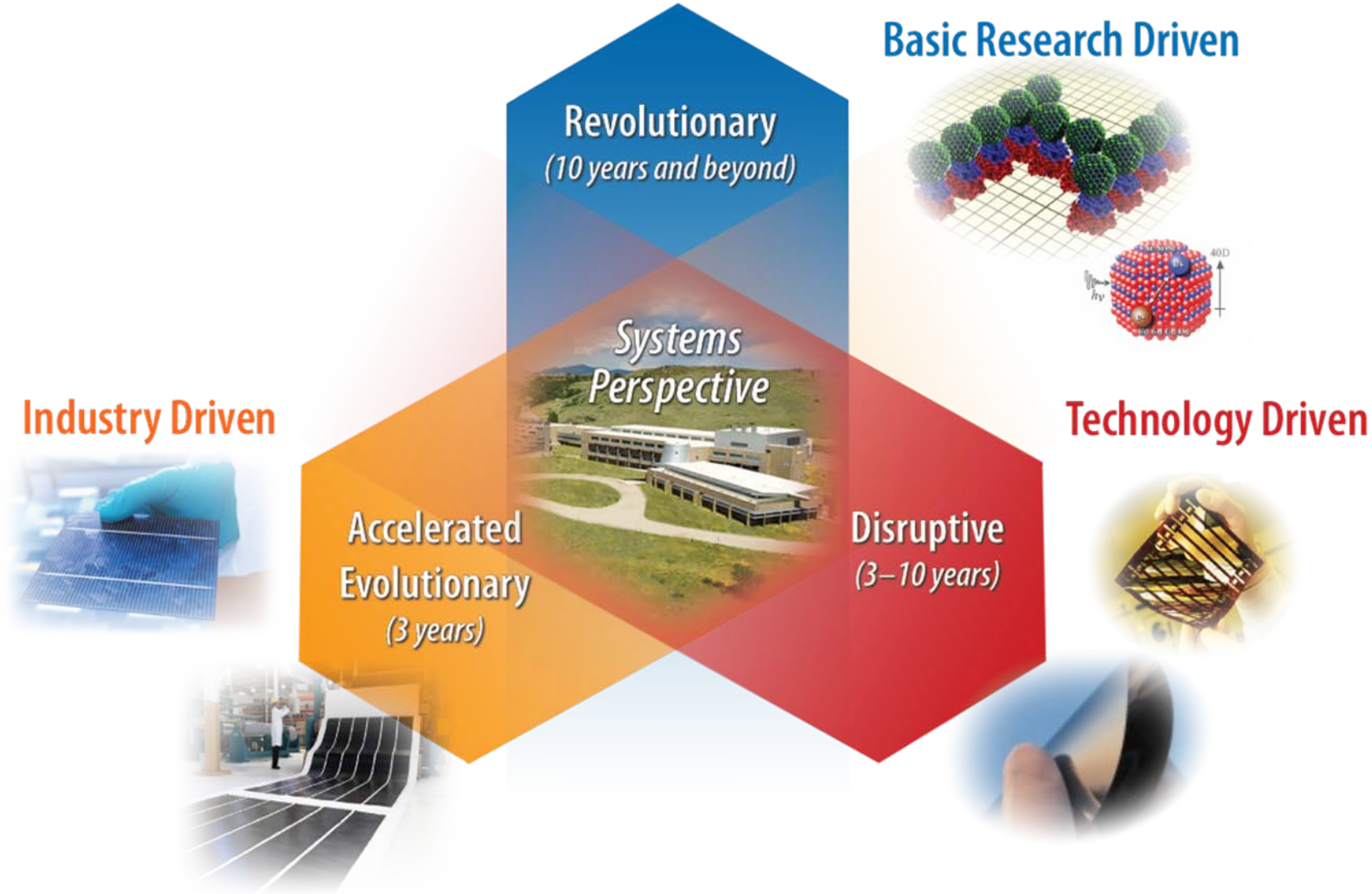
Reducing Energy Demand of Buildings, Vehicles, and Industry

NREL 196-1

BARRIERS

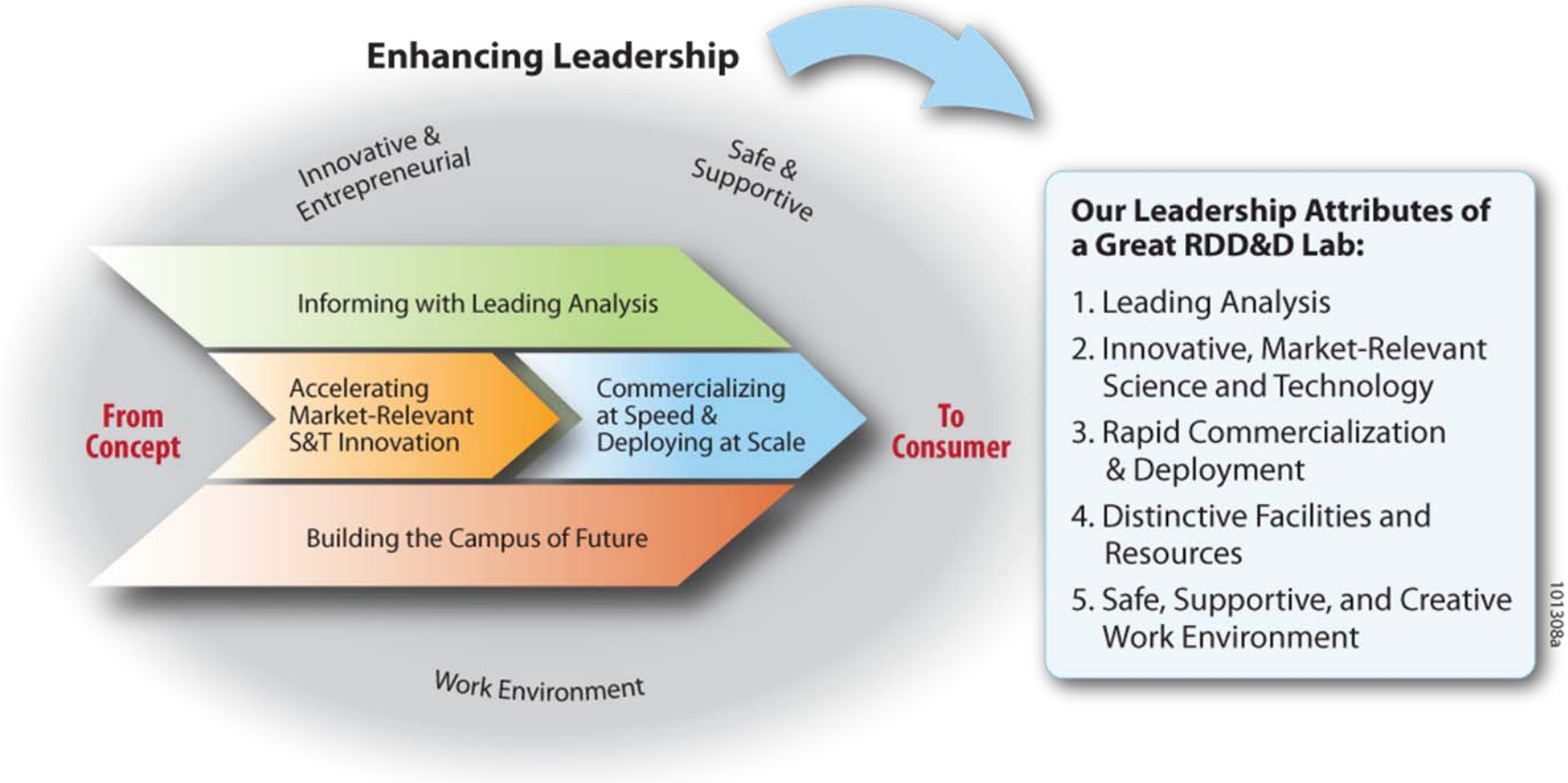
- Coordinated implementation of model building codes
- Market does not value efficiency
- Cost of energy efficient technologies
- Performance and reliability of new technologies

Achieving the Potential
Requires A Balanced Portfolio



Enhanced NREL Leadership

The "Alliance for Sustainable Energy" Approach



Midwest Research Institute, Battelle, Colorado School of Mines, Colorado State University, University of Colorado at Boulder, Stanford University, and Massachusetts Institute of Technology

Making Transformational Change

Requires an integrated approach

Unleashing market-driven innovation

FILL technology pipeline

INFORM decision makers about choices

ENSURE appropriate market price signals

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