STATUS AND OPPORTUNITIES FOR AGRICULTURE, FORESTRY, AND OTHER LAND USE PROJECTS IN US CARBON MARKETS

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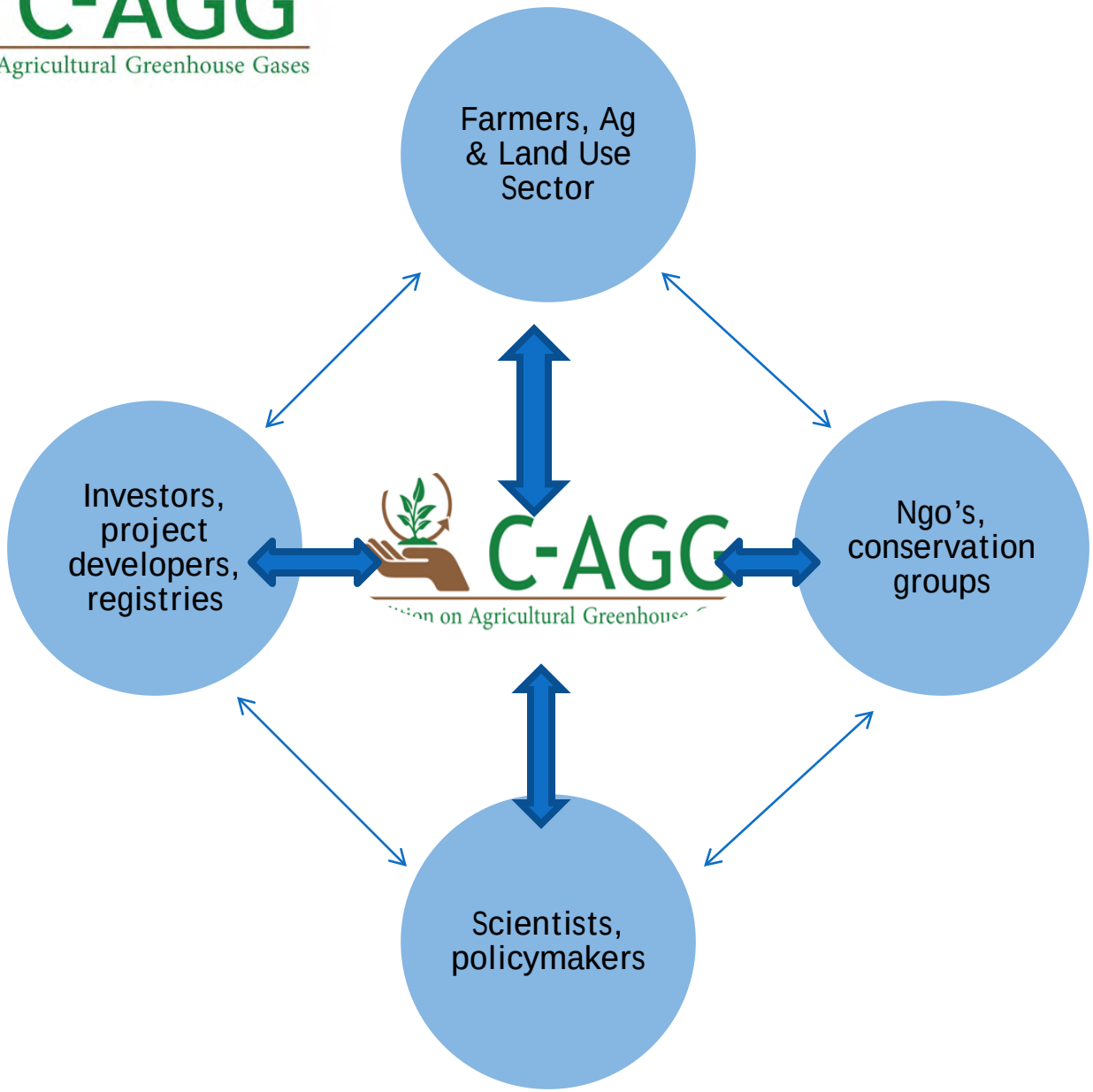
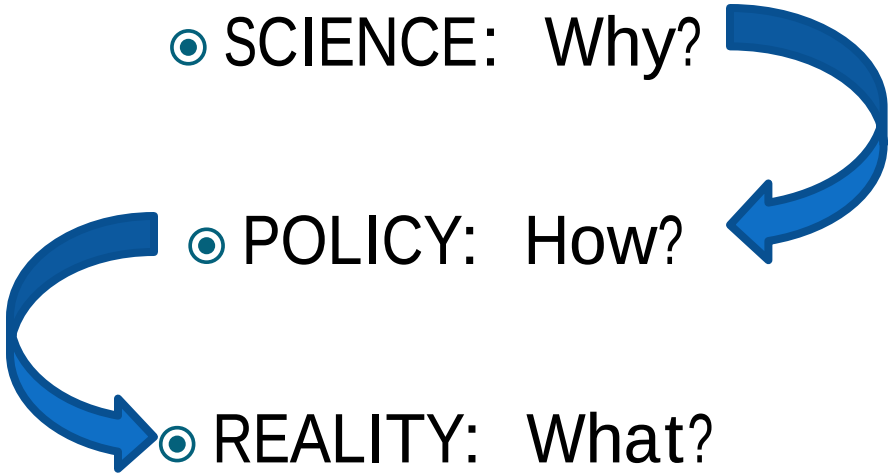


OVERVIEW: THE BIG PICTURE

Status & Opportunities for Agriculture, Forestry, and Other land Use Projects in US Carbon Markets

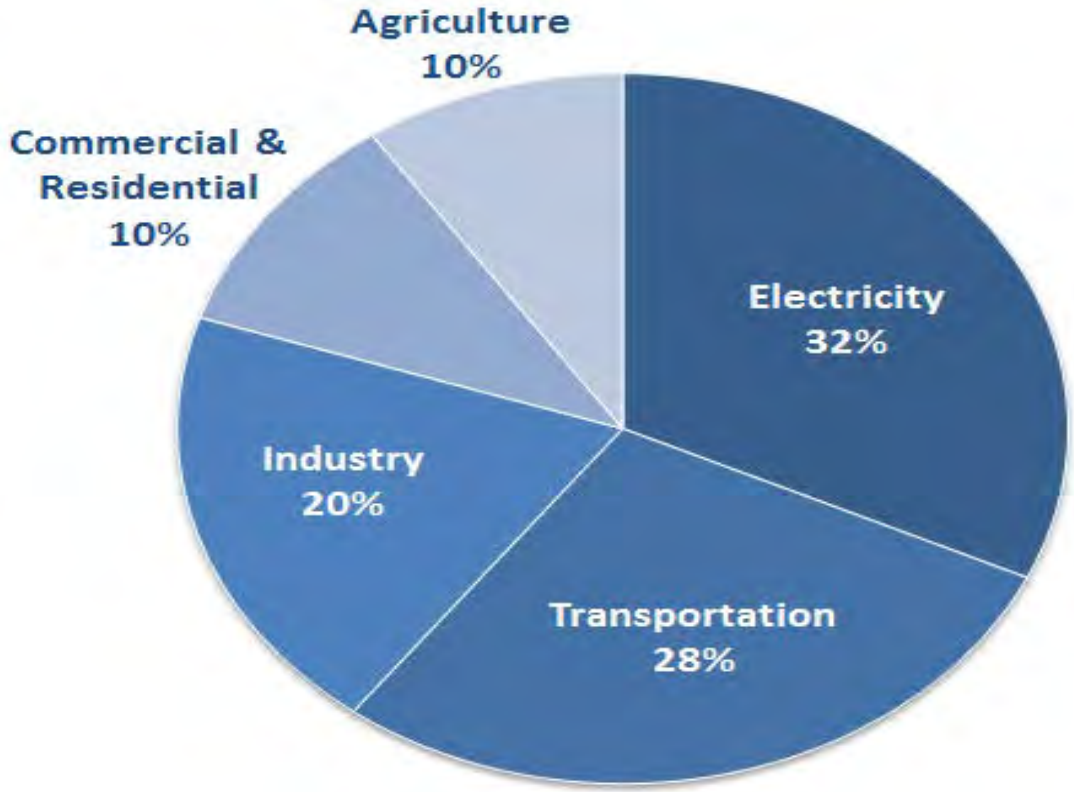


WHAT DOES THE SCIENCE TELL US?

- We are running out of time: UNFCCC IPCC Report on November 2, 2014: irreversible impacts in 20 years without major action.

- We cannot address climate change mitigation and adaptation without squarely and adequately addressing land use, land use change, and agriculture.

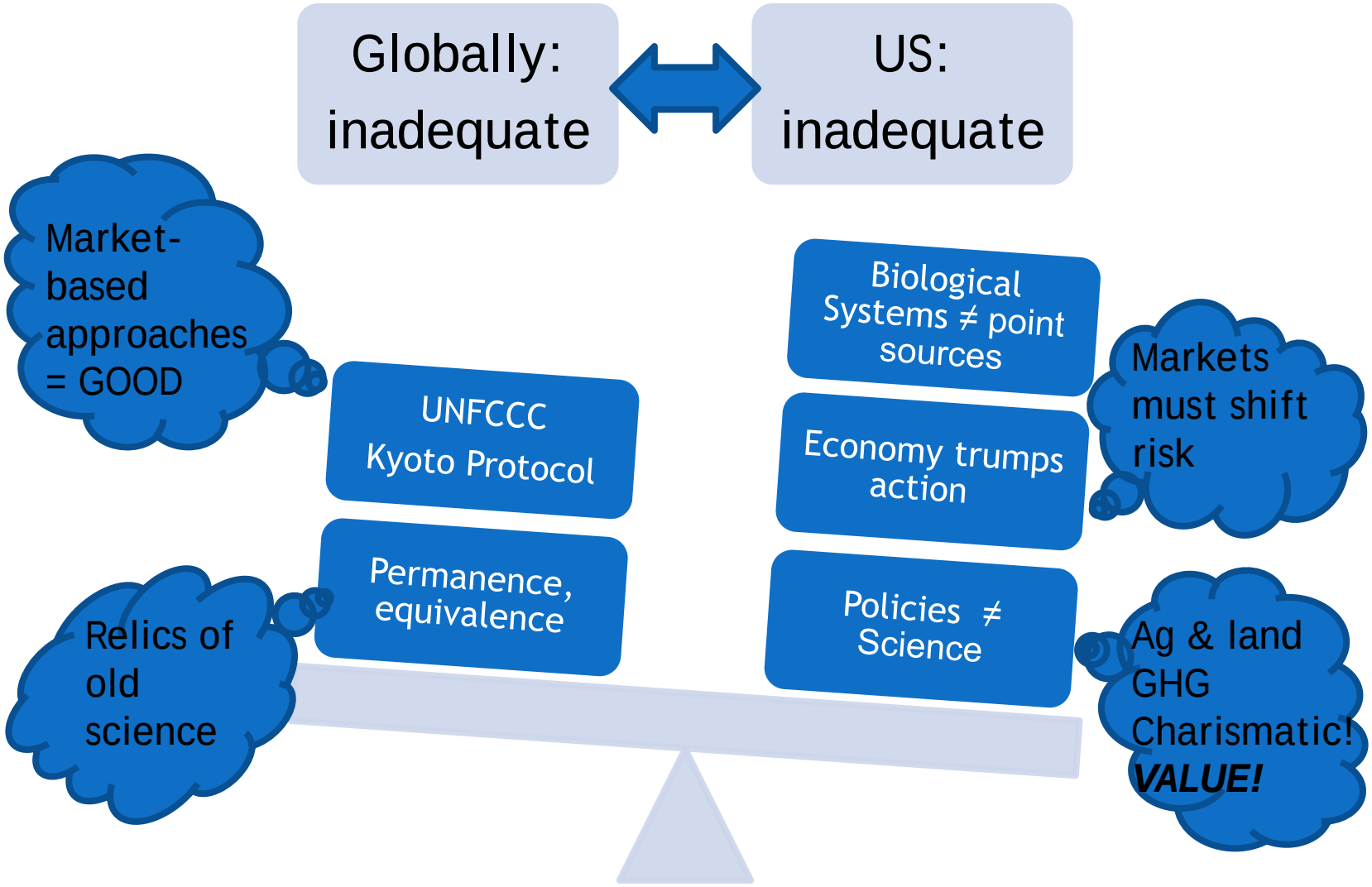
WHAT DOES THE SCIENCE TELL US?



Total Emissions in 2012 = 6,526 Million Metric Tons of CO_2 equivalent

* Land Use, Land-Use Change, and Forestry in the United States is a net sink and offsets approximately 15% of these greenhouse gas emissions. All emission estimates from the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012 (USEPA*

THE POLICY RESPONSE



GHG MARKETS & REGISTRIES

Mandatory CA GHG Market:

- Regulated entities can meet up to 8% compliance obligations via offsets
- CA Air Resources Board (ARB) has approved 5 offset protocols:
  - US Forests Protocol
  - Urban Forests Protocol
  - Ozone Depleting Substances Protocol
  - Livestock Protocol
  - Mine Methane Capture Protocol
- ARB seeking approval of Rice Cultivation Offset Protocol

GHG MARKETS & REGISTRIES

Mandatory CA GHG Market:

- ARB issued offset credits (*aka* ARBOCS) total ~12.3 M (over last 13 months)
  - 49% = US forest offsets
  - 45% = ozone depleting substances (ODS) offsets
  - .05% = livestock methane offsets

GHG MARKETS & REGISTRIES

Voluntary GHG Registries:

- American Carbon Registry (ACR)
- Climate Action Reserve (CAR)
- Verified Carbon Standard (VCS)

VOLUNTARY REGISTRY PROTOCOLS: US/NORTH AMERICA

49%

Registry	CA Market	Voluntary Market	Total	Ag & LULUCF	In Progress	Ag & LULUCF
ACR	√	√	20	12	4	3
CAR	√	√	15	9	2	1
VCS	√	√	54	23	19	14

72%

Registry	Wetlands Protocols Approved	Wetlands Protocols in Development
ACR	0	1
CAR	0	0
VCS	3	0

THE REALITY: SUCCESSES & CHALLENGES

Challenges:

- Policies
  - KP relics of permanence, equivalence, additionality stymie innovative, flexible policies necessary for biological ecosystems, including agricultural systems, subjected to weather, climate variability
    - Agricultural producers manage on daily, weekly, monthly, seasonal timescales, and are highly variable
  - Project developers must interpret and develop offset project opportunities for agricultural producers and land owners: AGGREGATION

THE REALITY: SUCCESSES & CHALLENGES

Challenges:

- Policies
  - Measurement, monitoring, verification must be cost-effective, not onerous
    - Programmatic approaches such as process models (that model biological responses and GHG impacts based on weather, climate, region, crop, moisture, etc.) are necessary
    - Verification must be randomized and risk-based: cannot visit every field, every farm every credit period
    - Incentives to participate must be greater (USD$3-$10/credit), and risks of participation (burden, penalties) lower

THE REALITY: SUCCESSES & CHALLENGES

Challenges:

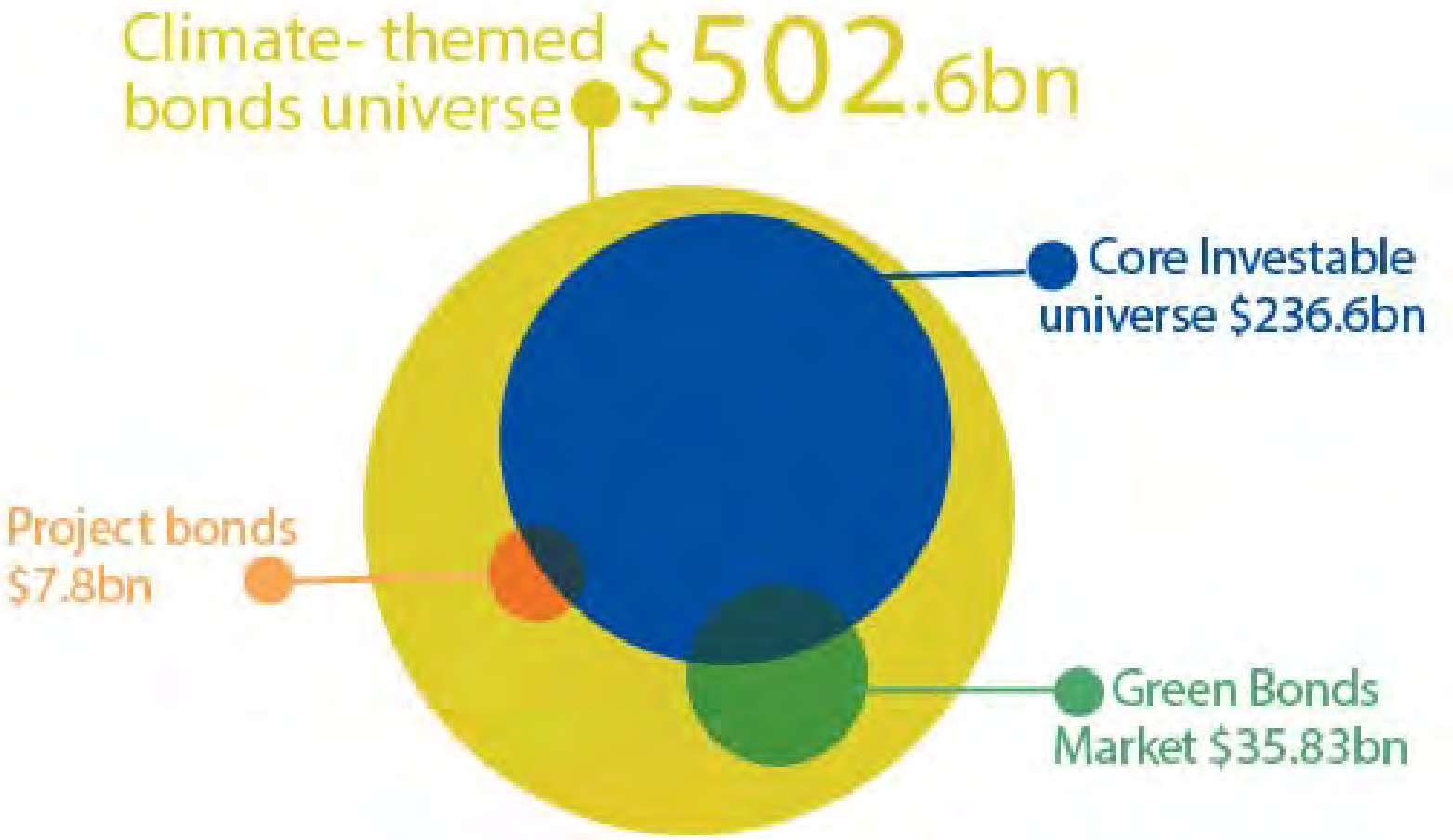
- Markets and market confidence
  - Must value multiple benefits of charismatic land-based offsets
    - Resiliance, enhanced biodiversity and wildlife habitat, localized and global impacts, resource conservation, ancillary environmental and ecosystem benefits such as water quality, air quality, etc.
  - RISKS must be mitigated, shifted away from landowners and project developers
    - Delivery risk: credits brought to market
      - Investment tools, insurance
    - Market risk: credits must be sold
      - **MARKET DEMAND IS AN ISSUE**

THE REALITY: SUCCESSES & CHALLENGES

Challenges:

- Markets and market confidence
  - RISKS – threat of invalidation is real!
  - CA ARB recently invalidated 230,000 offset credits (CFC incinerator)
  - CAR has developed an insurance tool for certain compliance offsets in the CA market: provides additional confidence for buyers and sellers and mitigates risk!

CLIMATE BONDS: OFFSET DEMAND



Bonds and Climate Change: State of the Market in 2014. HSBC and Climate Bond Initiative White Paper. July 2014.

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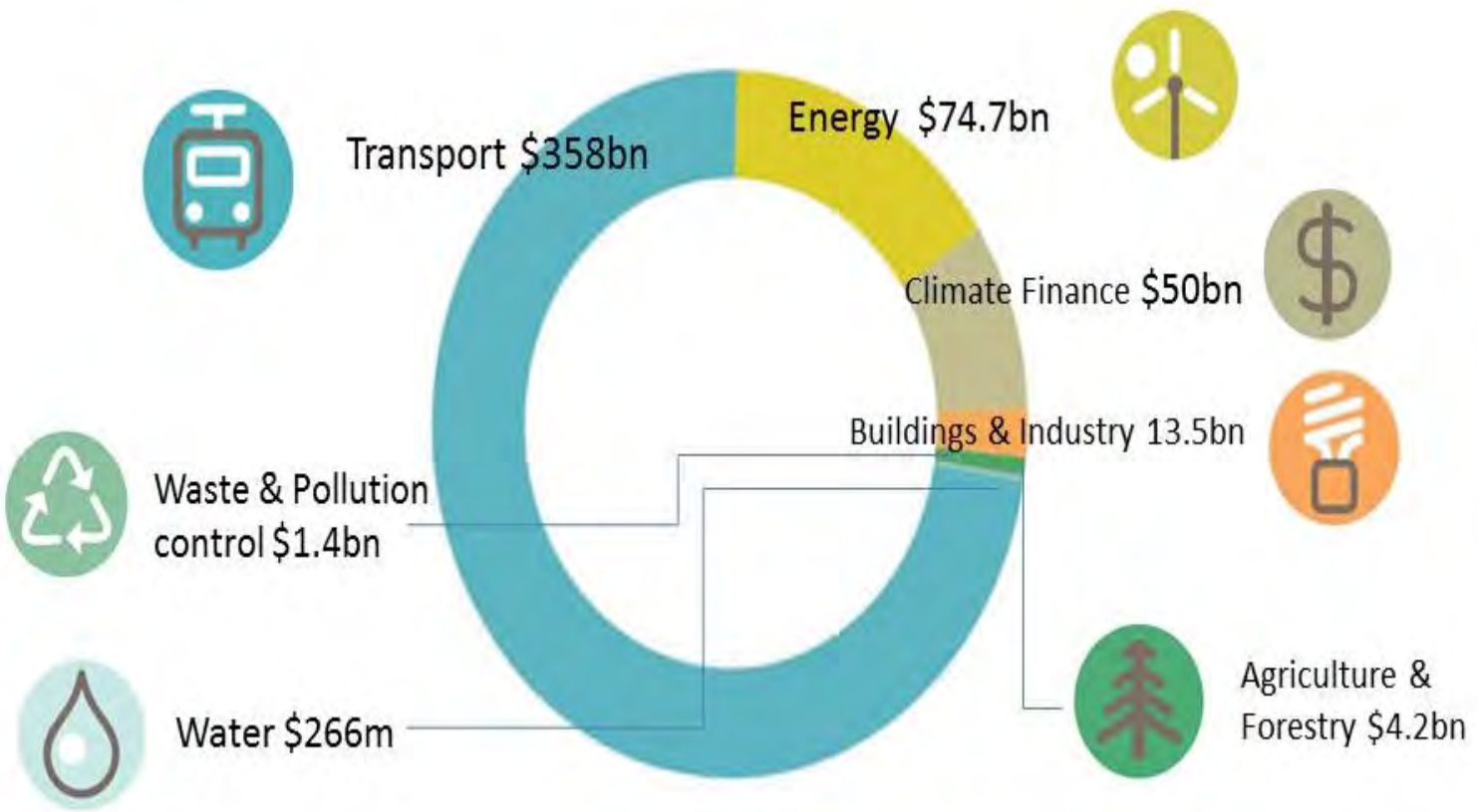

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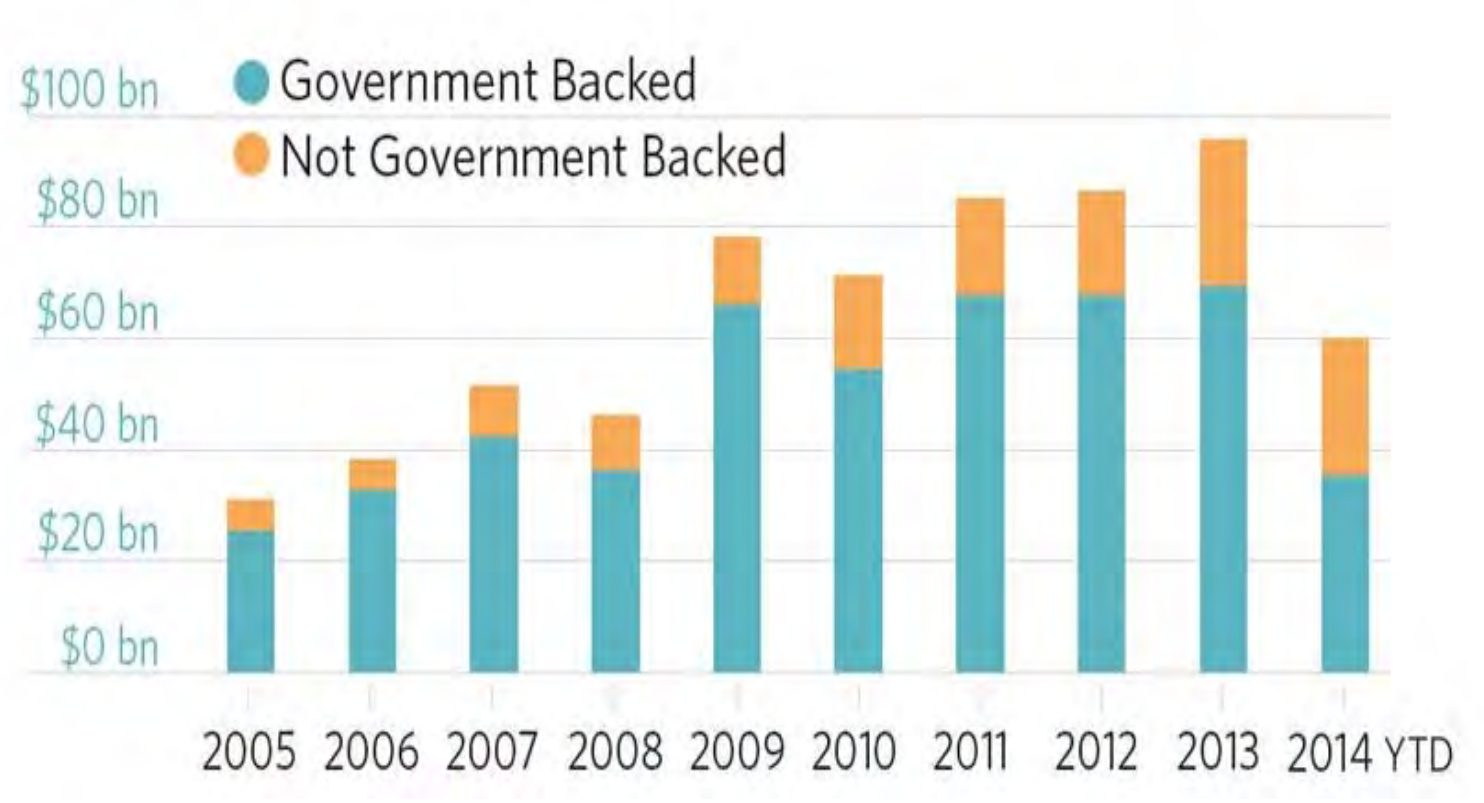

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THE REALITY: SUCCESSES & CHALLENGES

Challenges:

- Semantics
  - Climate variability v climate change
  - Inputs, resource conservation v GHG
- Value proposition
  - Must address needs of agricultural producers and landowners: identify value proposition by meeting their pain points
    - e.g., resource input and utilization efficiencies enhance profit margins
- Decision support tools, systems
  - Identify actions, changes in management

THE REALITY: SUCCESSES & CHALLENGES

Successes:

- USDA GHG CIGS: Public-Private Partnerships have demonstrated proof of concept on a small scale, vis a vis agricultural offset credit generation
- In June 2014, ACR issued the first verified carbon offsets to a Michigan farmer participating in the Delta Institute Nitrogen Credit Program. The offsets generated by the farmer's project were sold by the Program to The Climate Trust, an Oregon-based non-profit organization engaged in efforts to reduce GHG emissions.

THE REALITY: SUCCESSES & CHALLENGES

Successes:

- The USDA Natural Resource Conservation Service (NRCS), along with project partners Ducks Unlimited (DU), The Climate Trust (TCT) and The Nature Conservancy, jointly developed an Avoided Grassland Conversion carbon project. The sale of credits from this project to a major US automaker will be announced later this month in Michigan.

CONCLUSIONS

- The need for action is urgent; but policies are lagging science.
- Biological ecosystems require flexible approaches that incentivize innovation to mitigation GHG emissions and deliver societal benefits, whether food, water, recreation.
- Markets = most effective means to catalyze GHG mitigation – in *any* sector – but RISKS are high, DEMAND is low.
- Public-private partnerships beneficial to close policy, tool, and market gaps.