



Accelerating Sustainable Land Use Policies in the United States

November 24, 2020

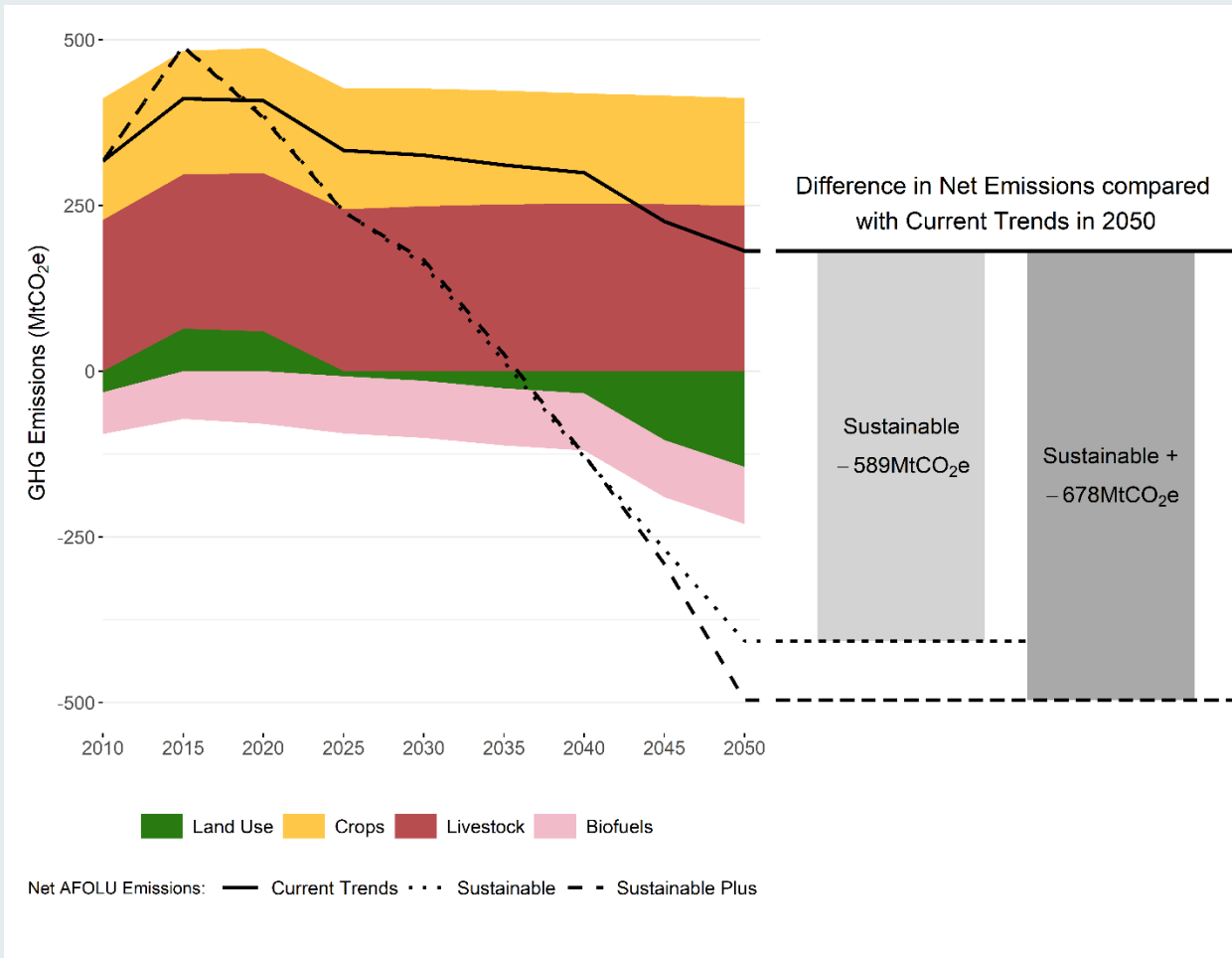
Plan for Presentation

- Siting Renewable Energy Infrastructure (Jennifer Sklarew, GMU)
- Promoting Reforestation (Michael Jacobson, PSU)
- Soil Carbon Storage & Biofuels (David Kanter, NYU)
- Promoting Low-Carbon Diets & Reducing Waste (Gordon McCord, UC San Diego)
- Overall Policy Recommendations

Policy Proposals founded on Pathways

ZCAP's policy proposals founded on technical pathways

- Infrastructure siting and biofuel requirements in energy system modeling
- Sustainable Land Use pathway from SDSN's Food, Agriculture, Biodiversity, Land Use & Energy (FABLE) project

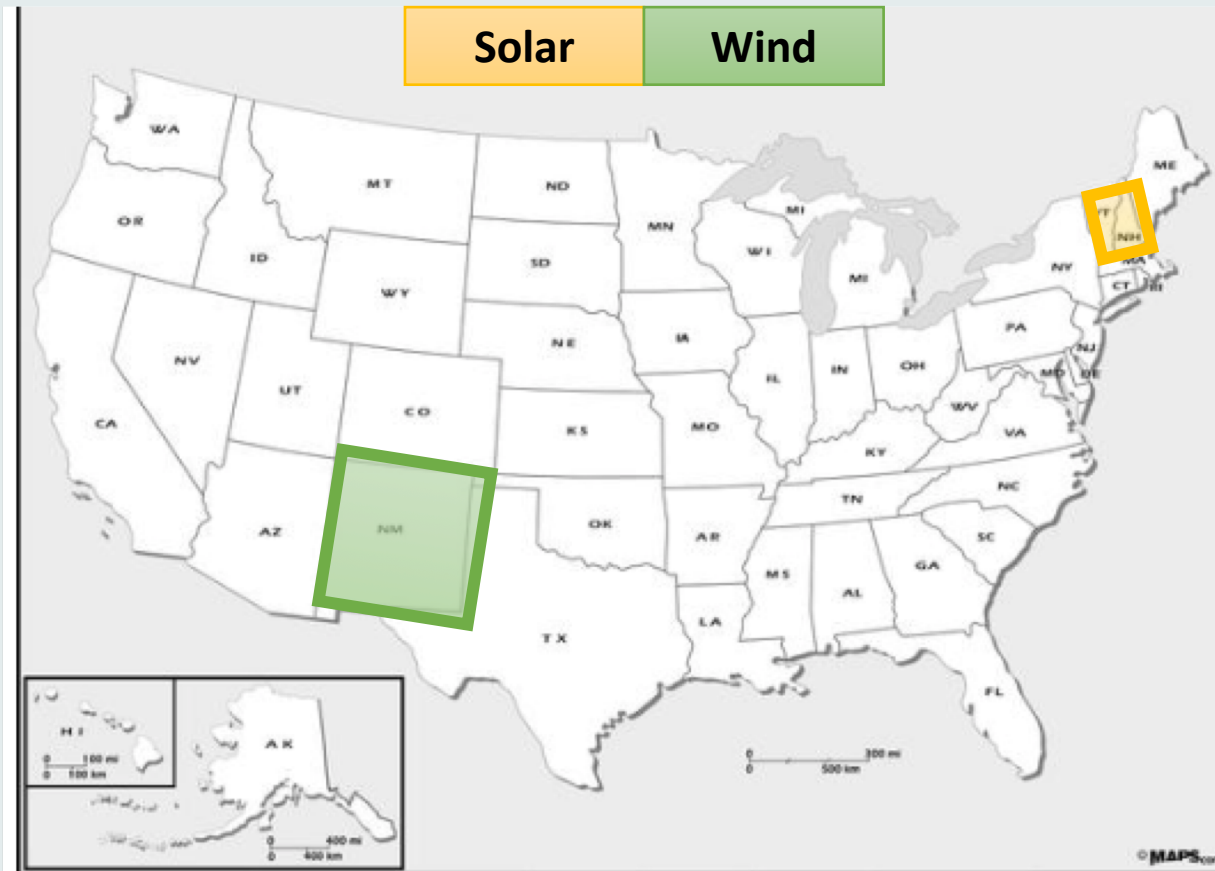




Siting Renewable Energy Infrastructure

Jennifer Sklarew

Renewables Land Requirements



- Ground-mounted, utility-scale **solar PV installations** (~1485 GW) require area of VT + NH
- Total **onshore wind installations** (~ 990 GW) require area of NM

Renewables Siting Parameters

- Policies need to address several key issues:
 - Siting concerns due to environmental, land use & social impacts
 - Siting & permitting challenges for long distance & interconnection transmission infrastructure
 - Split federal & local responsibility for transmission & siting

Bottom Line: Integrative policies need to frame transparent siting processes & financing mechanisms for RDD&D, project development, & host community impacts.

Integrated Planning

Need to build on EPA's existing RE-Powering America's Land initiative: identifies sites' renewable energy potential & provides information on reusing sites for renewable energy development.

Lessons from NY:

- Accelerated Renewable Energy Growth & Community Benefit Act (April 2020) = model for federal legislation to concurrently advance decarbonization & sustainable land use.
- Authorizes NYSERDA's Clean Energy Resources Development & Incentives Program to rapidly advance new "Build-Ready" projects & prioritize renewables development on existing or abandoned commercial sites, brownfields, landfills, & other underutilized sites.

Siting on Federal Lands

Need transparent, well-defined policies that:

- enable renewable energy facility siting on federal lands
- account for & address environmental effects
- establish content & timing parameters for environmental impact assessments for siting of renewable energy facilities

Financing Mechanisms

Need to support research on & promotion of small-scale siting & distributed generation, e.g., agrivoltaics, by:

- Framing & expanding the Business Energy Investment Tax Credit
- Promoting USDA's Rural Energy for America Program (REAP)

Transmission Siting

- Need federal regulations that fairly allocate costs for long-distance transmission lines
- Need transparent environmental impact assessment process & timeline to enable accurate calculations of project development costs, time & environmental effects
- Need support for RDD&D to address technical challenges of HVAC to HVDC conversion

Lessons from NY: State Power Grid Study and Investment Program

- Identify investments in distribution & local/bulk transmission necessary to meet NY requirements under Climate Leadership and Community Protection Act.
- Authorizes expedited permitting process for transmission projects planned for existing rights-of-way.

Addressing Impacted Communities

- Need regulatory & financing frameworks to engage impacted communities in siting process & compensation decisions
- Need streamlined, transparent environmental impact assessments with defined timelines, plus established funding mechanisms to address effects on endangered & threatened species
- Need incentives for host communities, particularly when facilities provide interstate power
- Need requirements that localities & states create transparent processes for host community input
- Need funding for green workforce training in host communities, with program models & guidelines

Lessons from NY: Office of Renewable Energy Siting

- Centralized forum to promote predictability & timeliness of siting decisions
- Opportunities for local community input
- Efficient, effective environmental reviews
- Wildlife conservation
- Host community economic benefits



Promoting Reforestation
Michael Jacobson

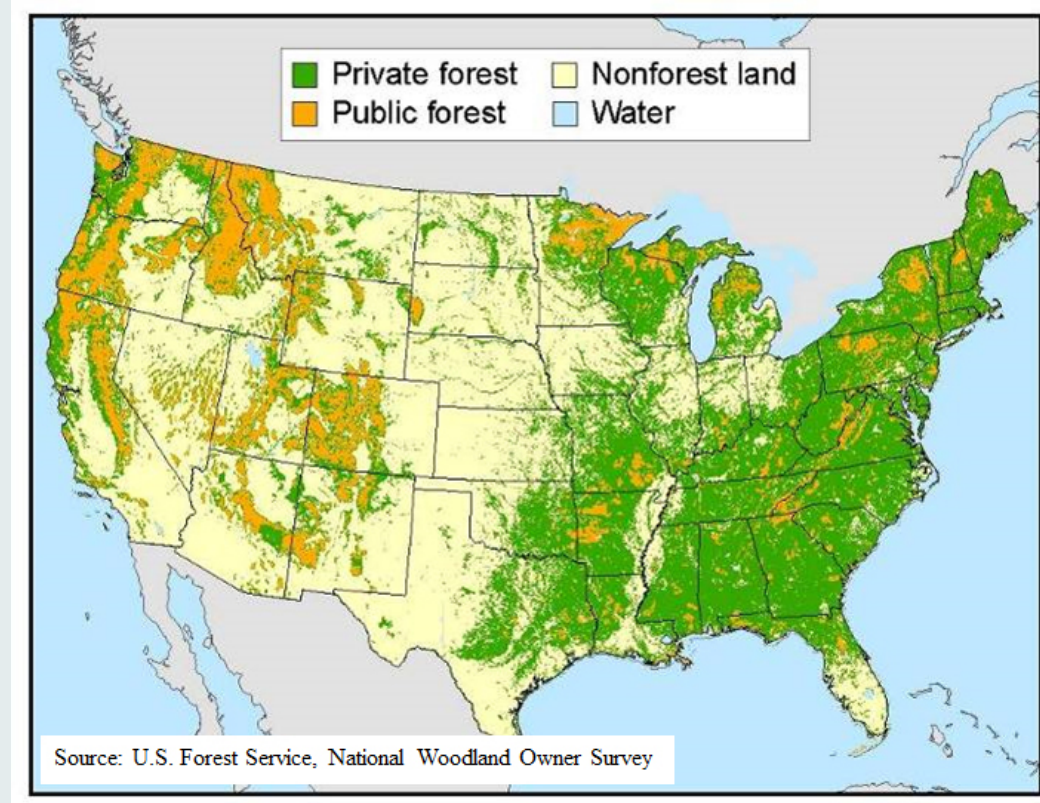
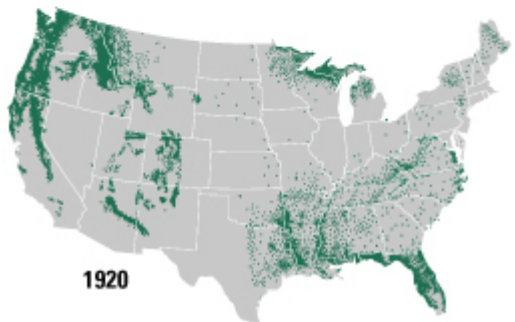
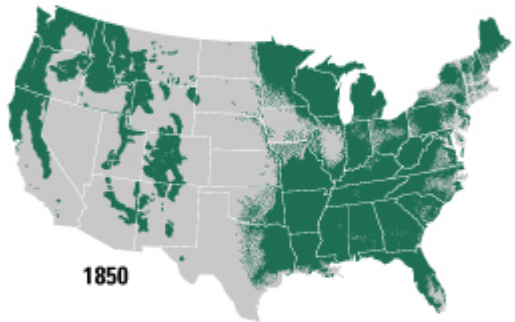
Deforestation in the US

Deforestation is a significant (10-15%) source of global CO₂ emissions

Currently, forests cover 30% of US land area, which is more than the area in 1920

More wood is grown in the US than is cut, and the total area planted with trees is increasing

Most US forests are privately owned



How forest management mitigates climate change?

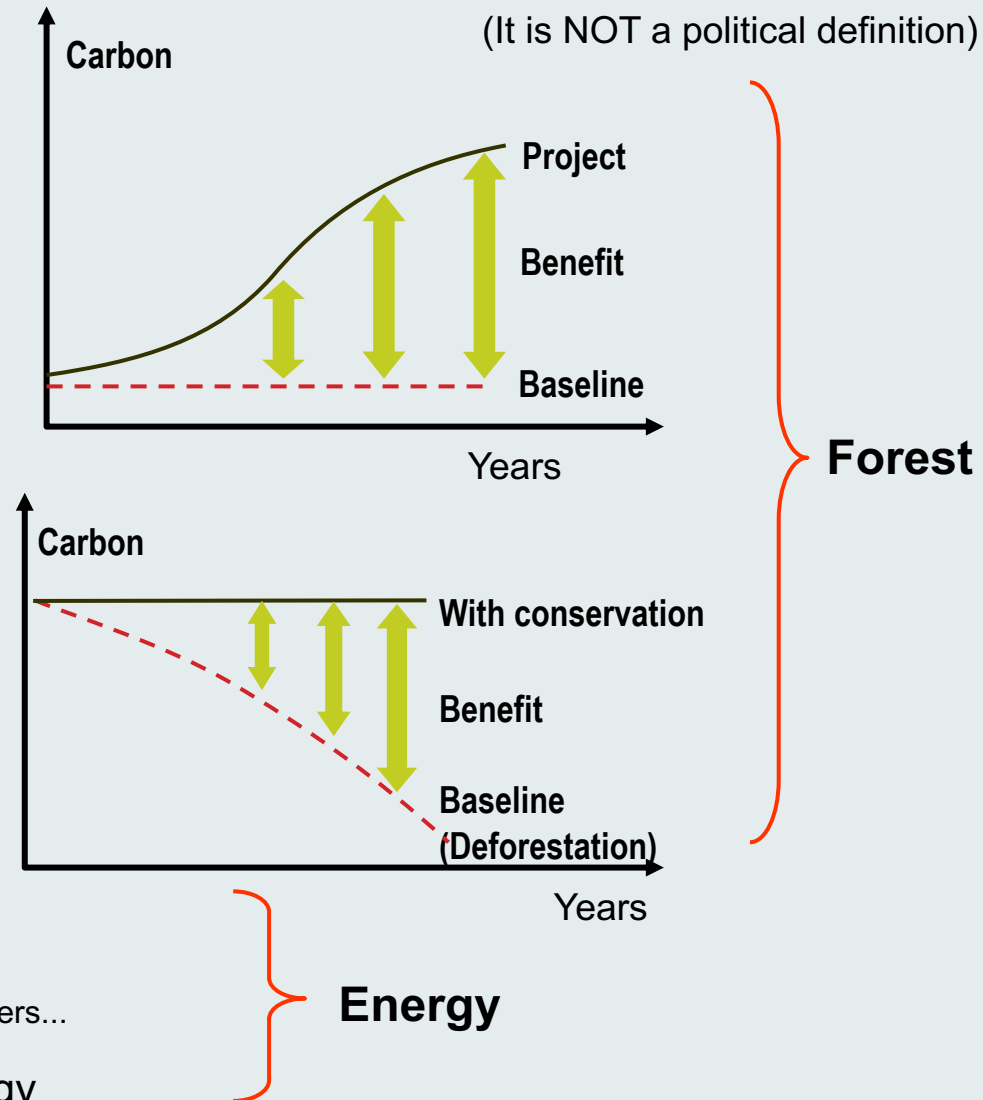
- **Increasing** carbon stocks



- **Avoiding** losses of carbon stocks



- **Reducing** emissions caused by forest activities Less energy, oil, fertilisers...
- **Producing** biomaterials and bioenergy

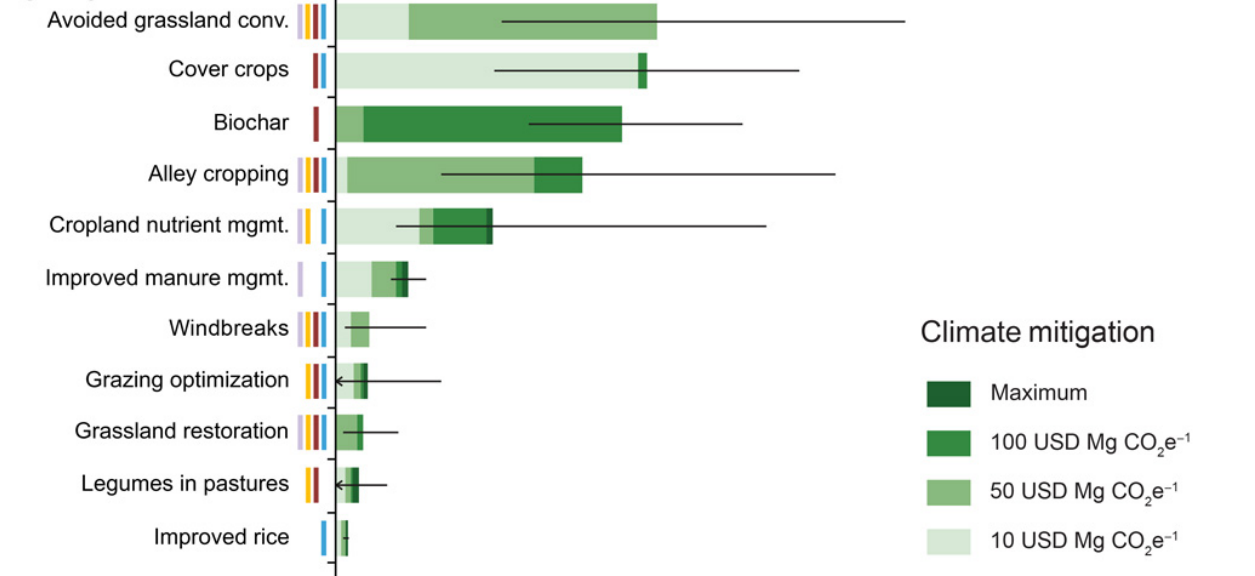


Climate mitigation potential in 2025 (Tg CO₂e year⁻¹)

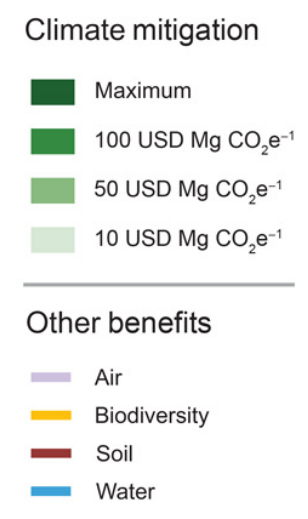
Forests



Ag. & grasslands



Wetlands



Forest activities have most potential of all land uses to mitigate climate

White House's United States Mid-Century Strategy for Deep Decarbonization

- **20 to 40 million ha** of reforestation needed to meet the land sector's contribution towards the goal of 80% reduction of GHG emissions below 1990 levels by 2050
- Other studies have shown a potential of over 60 mHa of reforestation
- Approximately **1.3 mHa** of forest need to be planted annually, which would sequester about 1.77 TG/ha/yr of CO₂ equivalent or a total of 53.2 Tg CO₂ equivalent over 30 years

Reforestation Details

- Definition: on-forest (<25 percent tree cover) to forest (>25 percent tree cover).
- Reforestation will occur on lands labeled '**natural ecosystems**' which used to have trees
- Carbon removal benefits depend on geographic location and species planted.
- **Private landowners** will need incentives (an average cost of \$900 per hectare)

Approach

- Spatially explicit mapping out potential areas of reforestation and carbon removal quantity by location.
- Funding sources
 - Federal cost share programs
 - Federal tax programs
 - State and local programs
 - Forest carbon programs

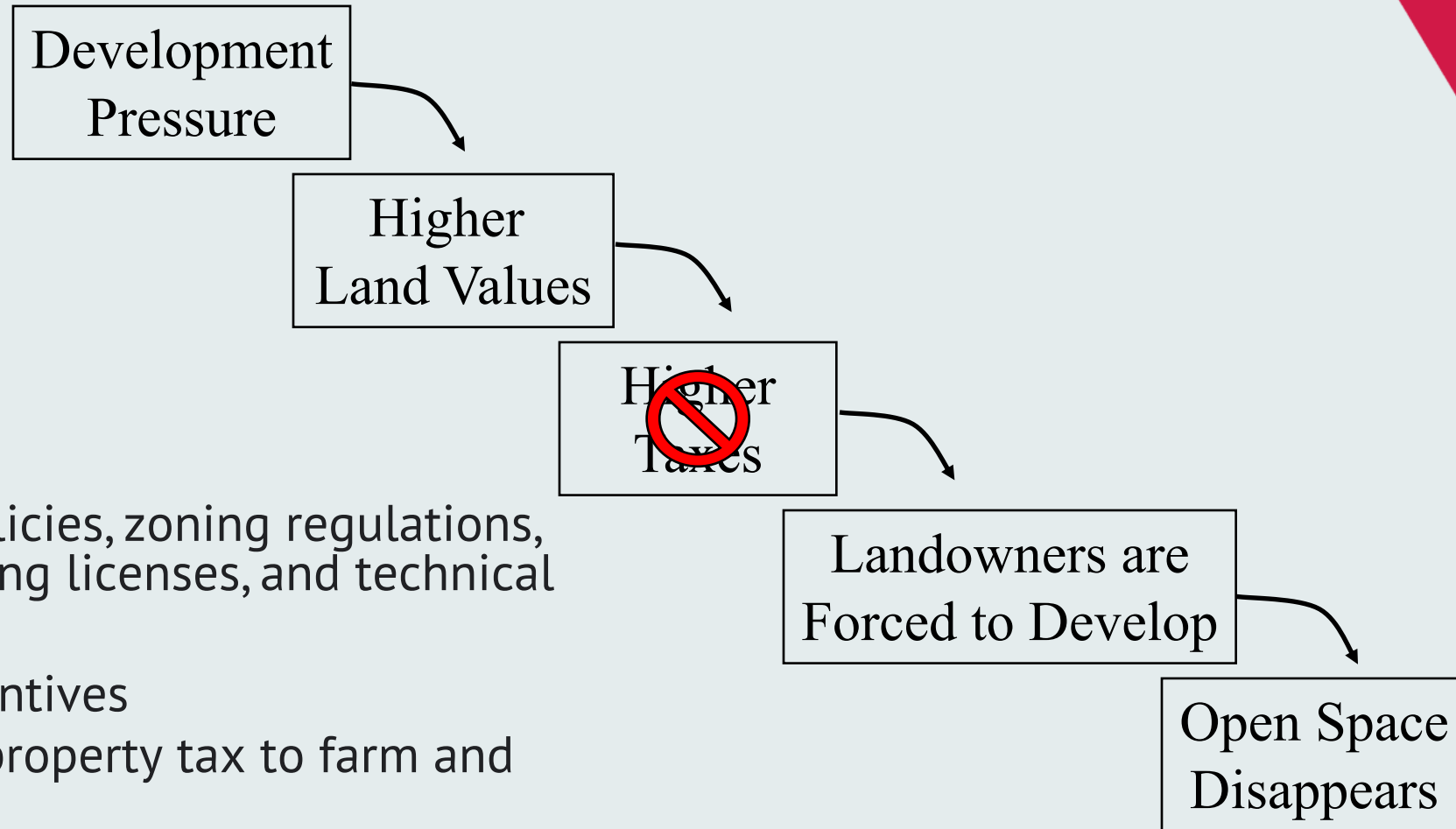
Federal cost share programs

- Farm Bill administered by the Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA)
- Onetime payments and and/or annual (rental) payments
- Examples:
 - EQIP: Environmental Quality Incentives Program
 - CSP: Conservation Stewardship Program
 - CRP: Conservation Reserve Program
- New idea: Dedicated reforestation cost share program
 - Trees planted volume, tons of CO₂ sequestered, or pay-for-performance programs

Federal Tax Incentives

- Reforestation Tax Incentive Program
 - Provides up to a \$10,000 per year deduction
 - Additional amount over \$10,000 per year may be amortized over 84 months
- Re institute tax credits
- Other opportunities
 - Cost share payment exclusion
 - Casualty loss deductions

State and local level programs



- Green growth policies, zoning regulations, hunting and fishing licenses, and technical assistance
- Property tax incentives
 - preferential property tax to farm and forest land.
- Programs could be enhanced to offer specific incentives for planting trees

Forest carbon programs

- Market-based approaches
- NGOs e.g. The Nature Conservancy, American Forest Foundation - American Forest Carbon Initiative
- Aggregators e.g. Bluesource create connection to voluntary, compliance and pre-compliance carbon, markets.
- Carbon credits are verified and sold to companies willing to purchase the carbon credits as offsets.

The **FAMILY FOREST CARBON PROGRAM** offers companies:



VERIFIED CARBON CREDITS generated by the actions of family forest owners, then measured through Verra's Verified Carbon Standard (VCS), and third-party verified.



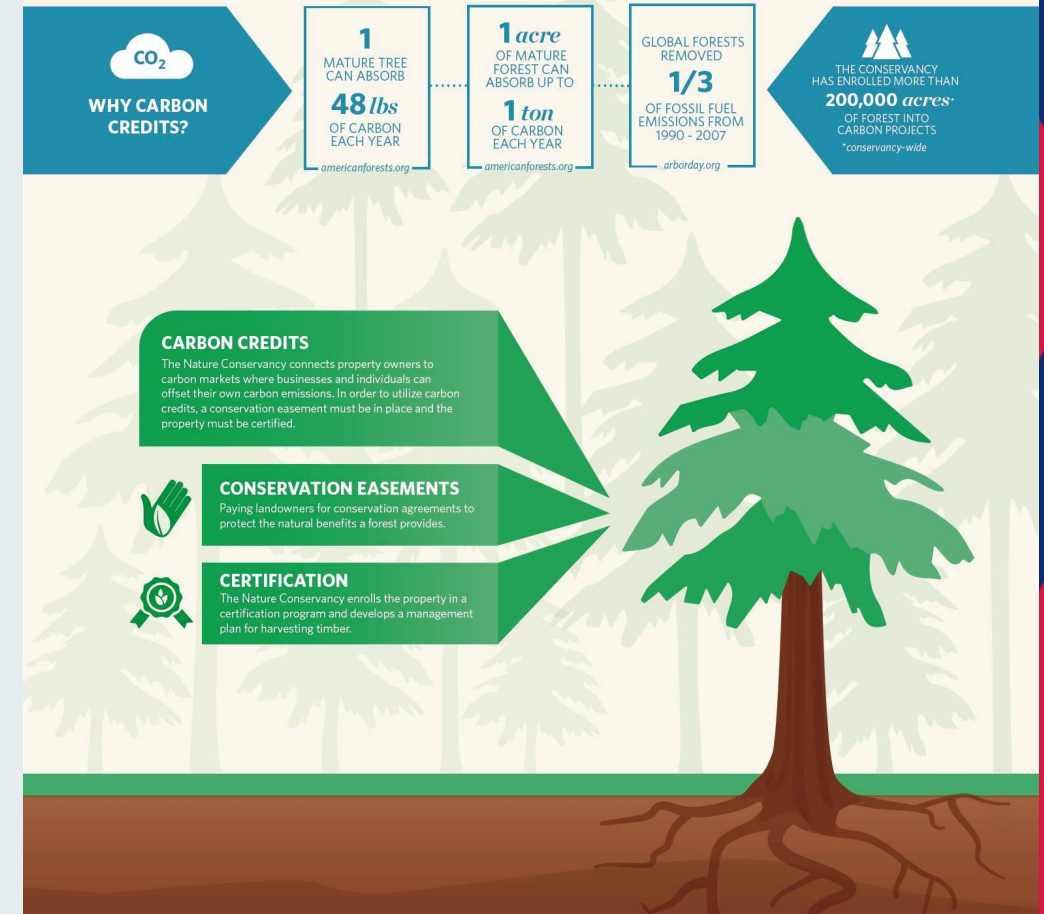
SUPPORT FOR RURAL AMERICAN FAMILIES by investing in a program that economically supports rural landowners and communities.



IMPROVED FOREST HEALTH as well as better wildlife habitat, protected water resources and more resilient forests for the future.

WORKING WOODLANDS GOOD FORESTRY EQUALS GOOD BUSINESS

Working Woodlands is a forest conservation program that aims to protect critical forests while improving private forest management, providing revenue for forest landowners and fighting climate change. To learn more, visit nature.org/workingwoodlands



Summary

- Incentives are key (private land)
- Recurring costs
 - Account for varying carbon sequestration rates in a forest over time
- Compliment (not compete) with other land use measures
 - Improved forest management – lengthening rotations
 - Expanding national forests by acquiring and reforesting private lands, and land transfers and conservation easements



Soil Carbon Storage & Biofuels

David Kanter

Soil carbon

- Increasing soil carbon storage could make a significant contribution to US decarbonization: 100 million tons CO₂ per year via cover crops alone. Four policy pillars include:
 - R&D program focused on improved monitoring, reporting and verification
 - Financing via existing conservation programs and innovative approaches such as crop insurance reform and cross-compliance
 - Tripling NRCS extension staff to stimulate farmer adoption
 - Public-private partnerships such as recycling of food waste recycling in supply chains as soil amendments

Biofuels

- Biofuels will be key in transport sub-sectors such as heavy-duty vehicles and aviation. Three policy pillars include:
 - Increased RDD&D into next-gen biofuels, particularly from non-food sources
 - Low-carbon fuel standard at least 80% below carbon intensity of gasoline and diesel with guardrails against conversion of non-ag lands into cropland
 - Federal procurement standards (e.g. from DoD) to increase demand for next-gen biofuels



Promoting Low-Carbon Diets & Reducing Waste
Gordon McCord

Promoting Low-Carbon Diets

- Pastureland and cropland for the production of meat and animal feed constitute 40% of continental US land.
- Integrated modeling shows that moving US diets to USDA “healthy US-style” Dietary Guidelines for Americans by mid-century is critical to land-use goals
- Recommendations:
 - Update dietary guidelines to include sustainability
 - Climate-friendly certification
 - Health, low-carbon standards in schools
 - Community Eligibility Provision, WIC, SNAP can all increase incentives for nutritious foods
 - Government procurement should prioritize low-carbon agricultural products

Reducing Food Loss and Waste

- 31% of food produced in 2010 was wasted by consumer or retail
- EPA and USDA have goal of reducing waste by 50% by 2030
- Need specific policies and guidance for states:
 - Standardize measurement and data analysis tools to monitor progress
 - Backed loans for on-farm harvest storage facilities
 - Create and deliver public messaging on food stewardship
 - Sell-by and use-by guidelines that distinguish between quality and safety
 - Streamline procedures and rules for donations from traders & retailers
 - Public reporting of food waste and recycling by private actors in food sector
 - Tax incentives for R&D on tech for reducing food waste
 - Incentives for recovery & recycling of food waste as animal feed and composting

Overall Policy Recommendations

- ARPA-Land
 - Innovate on complex technical challenges of decarbonization of land sector
- Inter-agency task force on land
 - Coordinate work of multiple agencies with incidence on land
 - Renewable infrastructure siting, soil carbon, biofuel production, reforestation, shifts from animal agriculture, managing competing priorities
- Integrated Spatial Planning
 - Spatially explicitly planning pathways to balance multiple goals of land sector (agricultural, livestock and forest production; decarbonization; conservation)