Why? climate, economic resilience, jobs, public health, …

Where? spoiler: Washington State

How? holistic approach
Why?
Making, processing, and disposing of stuff makes more than a third of global GHG emissions.
Industrial GHG emissions are a third of US emissions.
These emissions are concentrated in a small number of materials industries.

**Cement:** 4 billion tons per year
1250 lbs. per person per year

**Steel:** 2 billion tons per year
600 lbs. per person per year

**Plastic:** 0.5 billion tons per year
150 lbs. per person per year

These materials are the foundation of a resilient manufacturing sector and economy.

U.S. and Washington are quite import-dependent in many of these industries.

Supply chain disruptions in the last two years show the vulnerabilities this import-dependence can create.
Manufacturing has created ladders to the middle class for generations.

Average compensation for manufacturing jobs in Washington is 50% higher than for other types of jobs.

Union density is much higher in these industries than in the rest of the private sector.
We can improve air quality and public health at the same time that we reduce climate damage.

Almost all of the coal-burning facilities remaining on the West Coast are cement kilns, many with very high SOx emissions.

Many CO2 reduction pathways, like electrification and CCS, will necessarily reduce local pollution and improve air quality.
Where?
Washington has everything needed for a successful clean materials manufacturing economy.

**Energy resources:** Clean grid and substantial developable renewable resources

**Workforce:** Skilled, dynamic, growing

**Institutions:** Strong state government with broad support for manufacturing and climate action. Leading academic and research orgs.

**Firms:** Diversified manufacturing economy with all the biggest materials industries represented in state
How?
Promoting a robust materials manufacturing sector will require a holistic approach.

- Creating markets
- Supporting Innovation
- Supporting Deployment
- Protecting and Investing in People
Create Markets

Underlying logic: make sure cost of low-GHG production is passed through to final consumers

Buy Clean – Public Procurement
• 20% of steel and half of cement goes into civil engineering
• Incentivize both best practices and innovation

Clean Product Standards
• Apply to both public and private purchasing
• Critical for material efficiency, especially in building codes

Private Procurement
• Multiple structures: voluntary standards, advance market commitments, buyers’ clubs
Support Innovation

Both public and private investment in heavy industry innovation is very low compared to other sectors.

Increase and realign expenditures
• Many only consider energy efficiency, not overall environmental performance and other co-benefits
• Integrate manufacturing, construction, and waste-processing

Demonstration at scale
• Many technologies languishing in laboratories and pilots for decades (H2-reduction, inert Al anodes, &c.)
Support Deployment

As more decarbonization options become available, we can support deployment like we have in the power sector.

Tools include:
• Credit supports
• Tax credits
• Subsidies, including carbon contracts-for-differences
• Direct contracting and investment

Enabling infrastructure (electricity, H2, CO2) will be critical
Protecting and investing in people

None of the other approaches will work if we don’t have the right people to implement them and if people don’t see clear benefits.

- Training practitioners throughout the value chain
- Targeting underserved communities for investment
- Emphasizing quality job creation, protecting workers’ rights and safety
- Properly funding workforce transitions, where needed
- Building informational infrastructure to support markets and policies
- Investing in enforcement of the rules, especially labor and environmental regulation
A clean materials manufacturing in Washington is possible and affordable.

**Why?**  
Global climate leadership, economic resilience, good jobs, public health, …

**Where?**  
Washington State has everything needed

**How?**  
A holistic approach for a sustainable transformation