Maine GHG Action Plan Development Process

Agriculture & Forestry Greenhouse Gas Reduction Options

March 19th, 2004

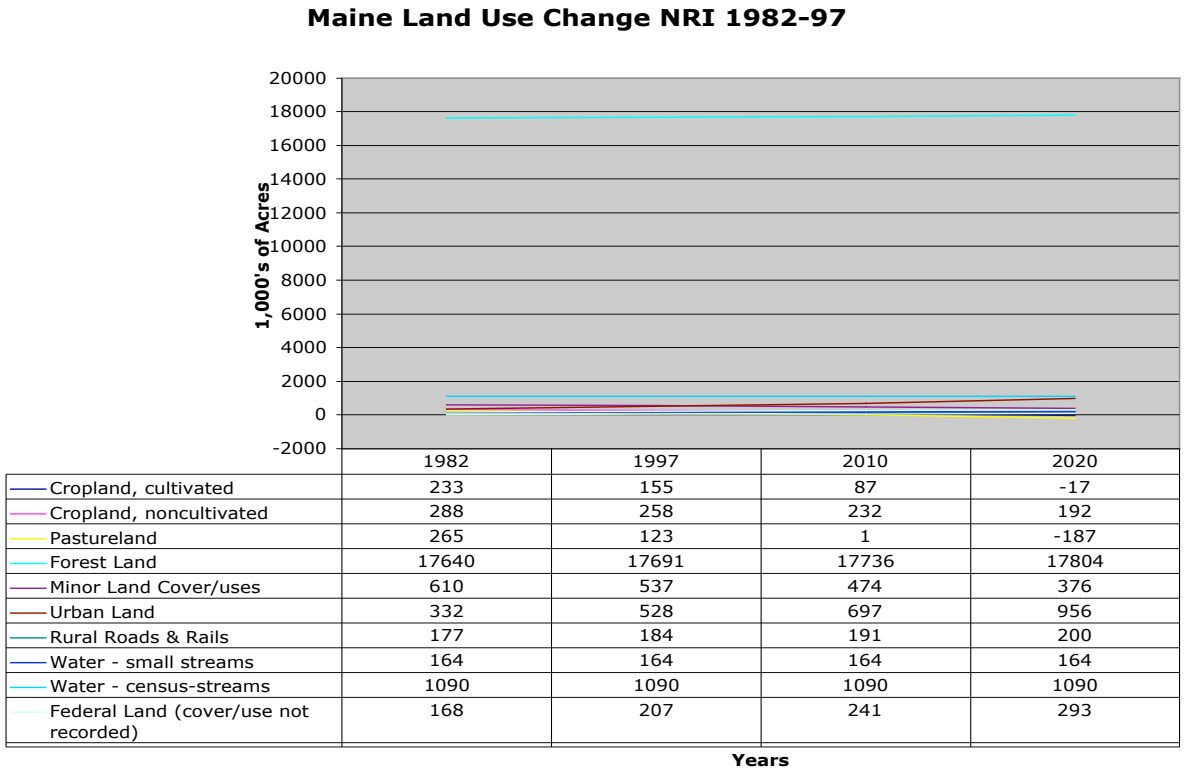
Agenda

- Report Comments on Meeting #1 Summary
- Agriculture Sector
  - **Inventory: update from consultant research and WG**
  - **Baselines: updates**
  - **Mitigation Options: updates on quantification**
- Forest Sector
  - **Inventory: Update from forestry experts meeting**
  - **Baselines: Update from forestry experts meeting**
  - **Mitigation Options: Update from forestry experts meeting**

Maine Agriculture Sector

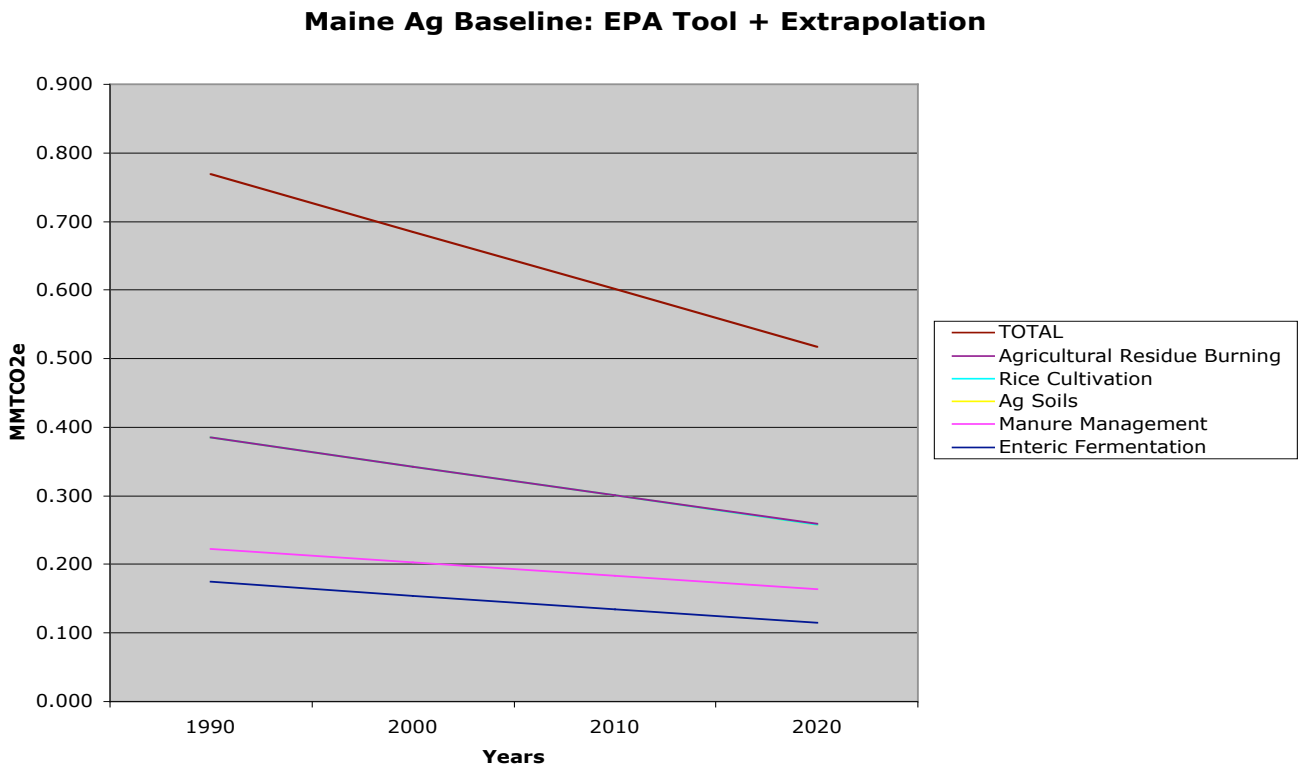
- Agriculture Inventory, Baseline Follow Up
- Baseline Updates
- Summary Of Options
- Priorities For Analysis
- Preliminary GHG Savings & Cost Estimates for Priority Measures
- Mitigation Options

Maine Land Cover Changes NRI

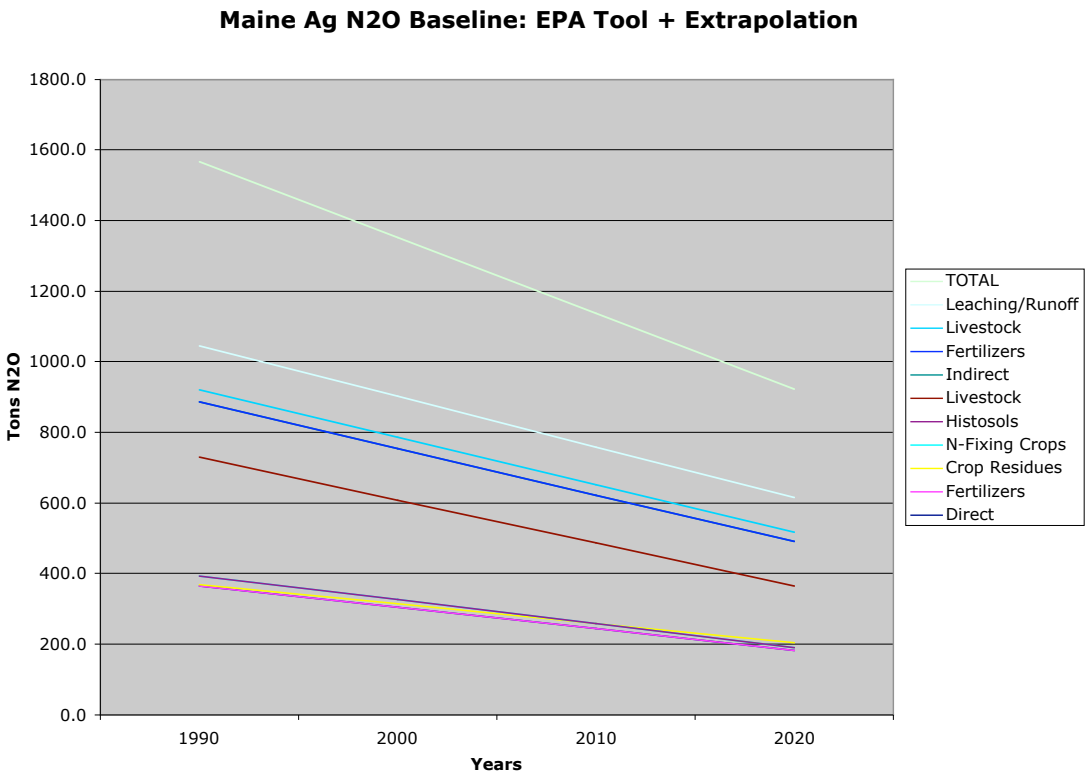


	1982	1997	2010	2020
Cropland, cultivated	233	155	87	-17
Cropland, noncultivated	288	258	232	192
Pastureland	265	123	1	-187
Forest Land	17640	17691	17736	17804
Minor Land Cover/uses	610	537	474	376
Urban Land	332	528	697	956
Rural Roads & Rails	177	184	191	200
Water - small streams	164	164	164	164
Water - census-streams	1090	1090	1090	1090
Federal Land (cover/use not recorded)	168	207	241	293

Maine Agriculture Baselines



Maine Agriculture Baselines



Agriculture Options - PFA

- A-1 Agriculture Biomass Feed Stocks for Electricity
- A-2 Biodiesel or Ethanol Fuel for Farm Equipment
- A-3 Nutrient Management
- A-4 Conservation Tillage/No-Till
- A-5 Increase Cover Crops
- A-6 Agricultural Land Conservation
- A-7 Organic Farming
- A-8 Support Local Farming/Buy Local

Agriculture Options - PFA

AGRICULTURE MITIGATION OPTION	PRIORITY FOR ANALYSIS
1. Ag Biomass Feed Stocks For Electricity	**High**
2. Biodiesel And/Or Ethanol For Farm Equipment	**High**
3. Nutrient Management – Organic And Synthetic	**High**
4. Conservation Tillage/No-Till	**High**
5. Increase Cover Crops And/Or Rotations Of High Organic Matter Crops	**High**
6. Agricultural Land Preservation	**High**
7. Organic Farming	**High**
8. Support Local Farming/Buy Local	**High**

Agriculture Options - Estimates

Policy Action	GHG savings 2010	GHG savings 2010	Cost Effectiveness
Ag Biomass Feed Stocks for Electricity	Very low	Very low	NA
Biodiesel and/or Ethanol for Farm Equipment	Very low	Very low	NA
Nutrient Management – Organic And Synthetic	Low	Low	TBD
Increase Cover Crops And/Or Rotations Of High Organic Matter Crops	Low	Low	TBD
Increase Cover Crops	Low	Low	TBD
Agricultural Land Preservation	Potentially High	Potentially High	TBD
Organic Farming	Low	Low	TBD
Support Local Farming/Buy Local	Low	Low	TBD

Maine Forestry Sector

- Forestry Inventory and Baseline Follow Up
- Inventory and Baseline Updates
- Summary Of Options
- Priorities for Analysis
- Forestry Mitigation Follow Up
- Updated Mitigation Options
- Updated Priorities for Analysis
- Preliminary GHG Savings & Cost Estimates for Updated Priority Measures
- Mitigation Options

Forestry Inventory & Baseline

- Next steps on FORCARB development
  - **Tree biomass**
  - **Forest floor**
  - **Soils**
  - **Wood products**
  - **Land use change**
  - **Time series**
  - **Wetlands**

Forestry Inventory & Baseline

- FORCARB projection to 2010, 2020
  - **Back casting to 1982**
  - **Connecting to recent post 2000 data**
  - **Forecasting to 2020**

Forestry Options - PFA

- F-1 Carbon Offsets (in-state and out-of-state)
- F-2 Forestry Biomass Feed Stocks for Electricity
- F-3 Promote Use of Wood Products
- F-4 Reduce Conversion Of Forestland
- F-5 Reduce Conversion Of Wetlands
- F-6 Restore Longer-Lived Softwood To Sites That Have Reverted To Hardwoods
- F-7 Shorten Spruce Harvest Rotation, Reduce Fir Component

Forestry Options - PFA

- F-8 Expanded Local Wood Products Use
- F-9 Afforestation (Rural)
- F-10 Afforestation (Urban)
- F-11 Application Of Bio Solids To Forest Lands
- F-12 Maintain Fire Suppression Programs
- F-13 Fertilization Of Forests
- F-14 Restore Wetlands

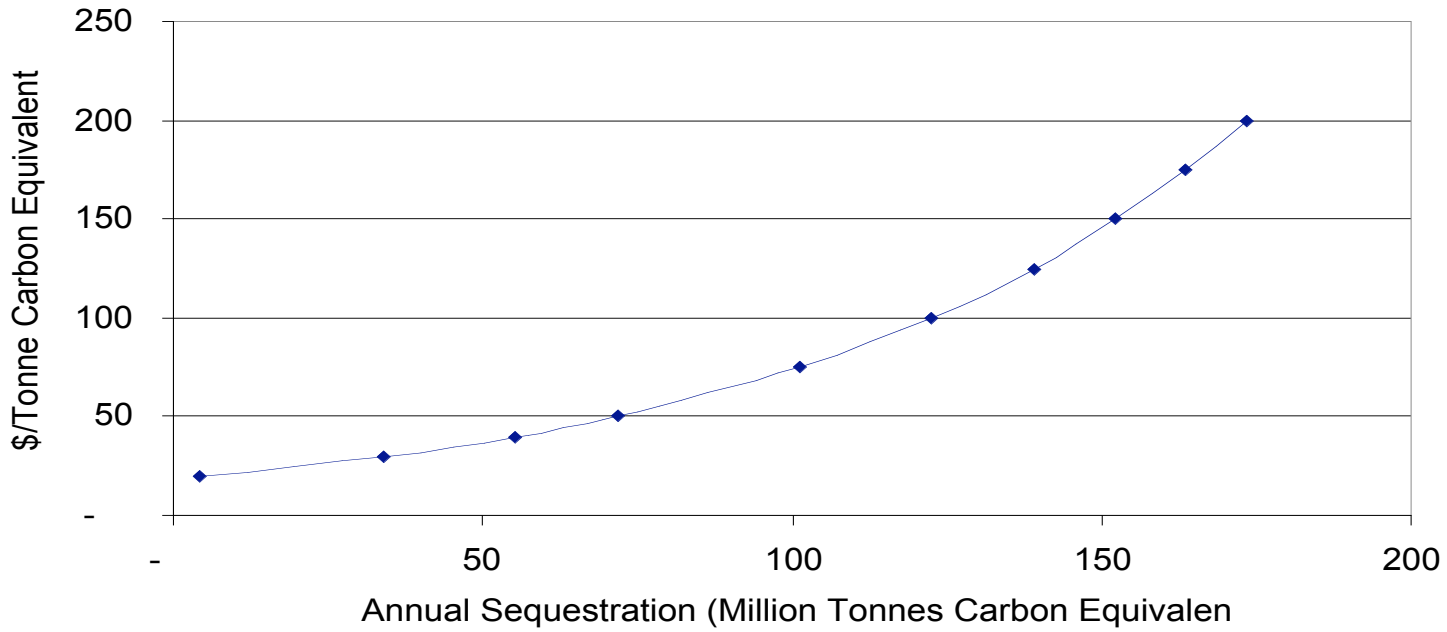
Forestry Options - PFA

FORESTRY MITIGATION OPTION	PRIORITY FOR ANALYSIS
1. **Carbon offsets policy development**	**High**
2. **Expanded use of biomass electricity feed stocks**	**High**
3. **Expanded wood products use**	**High**
4. **Reduce conversion of forestland to other land uses**	**High**
5. **Reduce conversion of wetlands to other land uses**	**High**
6. **Restore longer-lived softwood to sites that have reverted to hardwoods**	**High**
7. **Shorten spruce harvest rotation and reduce fir component**	**High**
8. **Expanded *local* wood products use**	**Medium**
9. **Afforestation (rural)**	**Low**
10. **Afforestation (urban)**	**Low**
11. **Application of bio solids to forest lands**	**Low**
12. **Maintain fire suppression programs**	**Low**
13. **Fertilization of forests**	**Low/Uncertain**
14. **Restore wetlands**.	**Low/Uncertain**

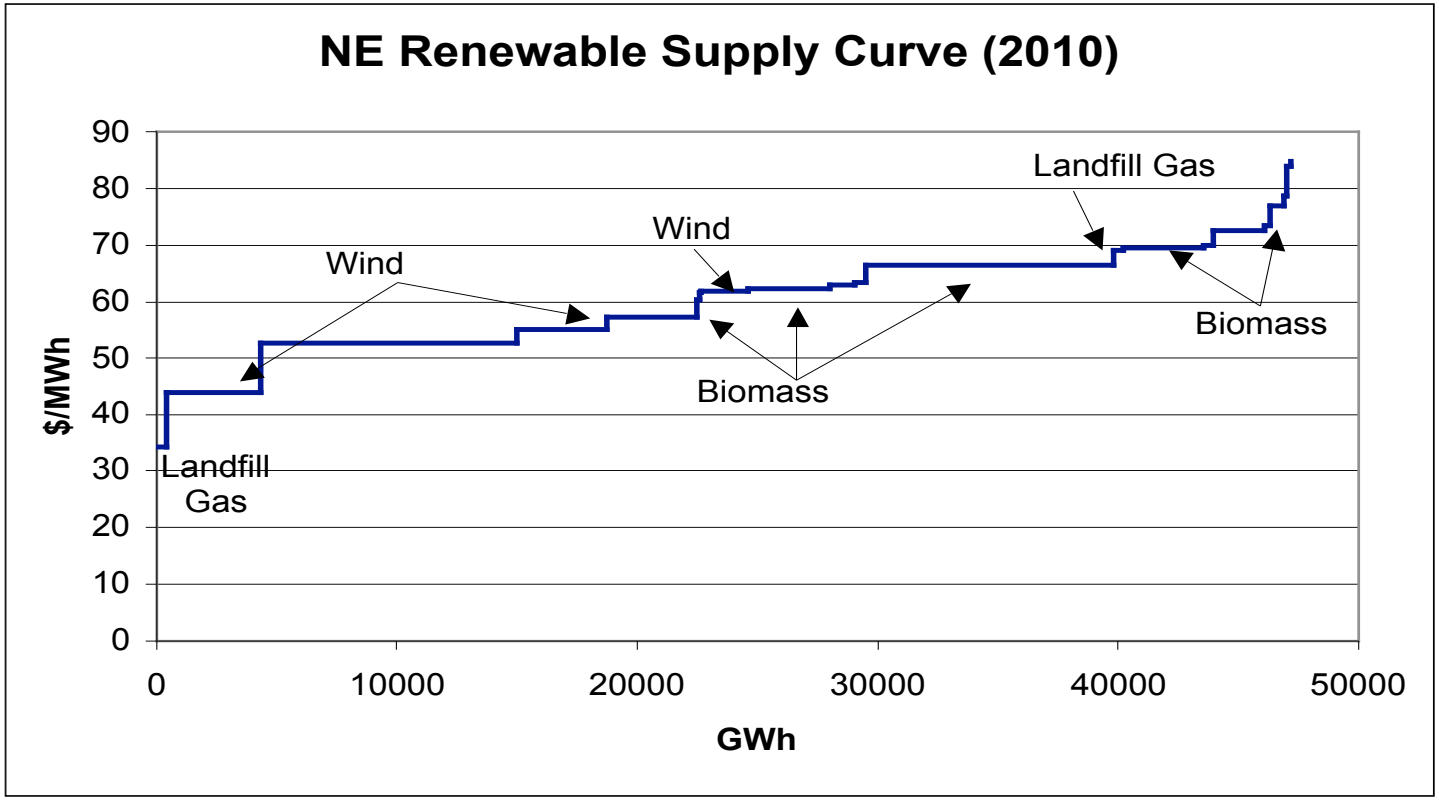
Forestry Options - Estimates

FORESTRY MITIGATION OPTION	Potential GHG Savings 2010	Potential GHG Savings 2020	Potential Cost Effectiveness
Carbon Offsets Policy Development	Potentially High	Potentially High	TBD
Expanded Use Of Biomass Electricity Feed Stocks	Potentially High	Potentially High	TBD
Expanded Wood Products Use	TBD	TBD	TBD
Reduce Conversion Of Forestland To Other Land Uses	Potentially High	Potentially High	TBD
Reduce Conversion Of Wetlands To Other Land Uses	Potentially High	Potentially High	TBD
Restore Longer-Lived Softwood To Sites That Have Reverted To Hardwoods	Potentially High	Potentially High	TBD
Shorten Spruce Harvest Rotation And Reduce Fir Component	Potentially High	Potentially High	TBD
Expanded *Local* Wood Products Use	TBD	TBD	TBD
Afforestation (rural)	Very Low	Very Low	TBD
Afforestation (urban)	TBD	TBD	TBD
Application of bio solids to forest lands	Very Low	Very Low	TBD
Maintain fire suppression programs	TBD	TBD	TBD
Fertilization of forests	Very Low	Very Low	TBD
Restore wetlands	TBD	TBD	TBD

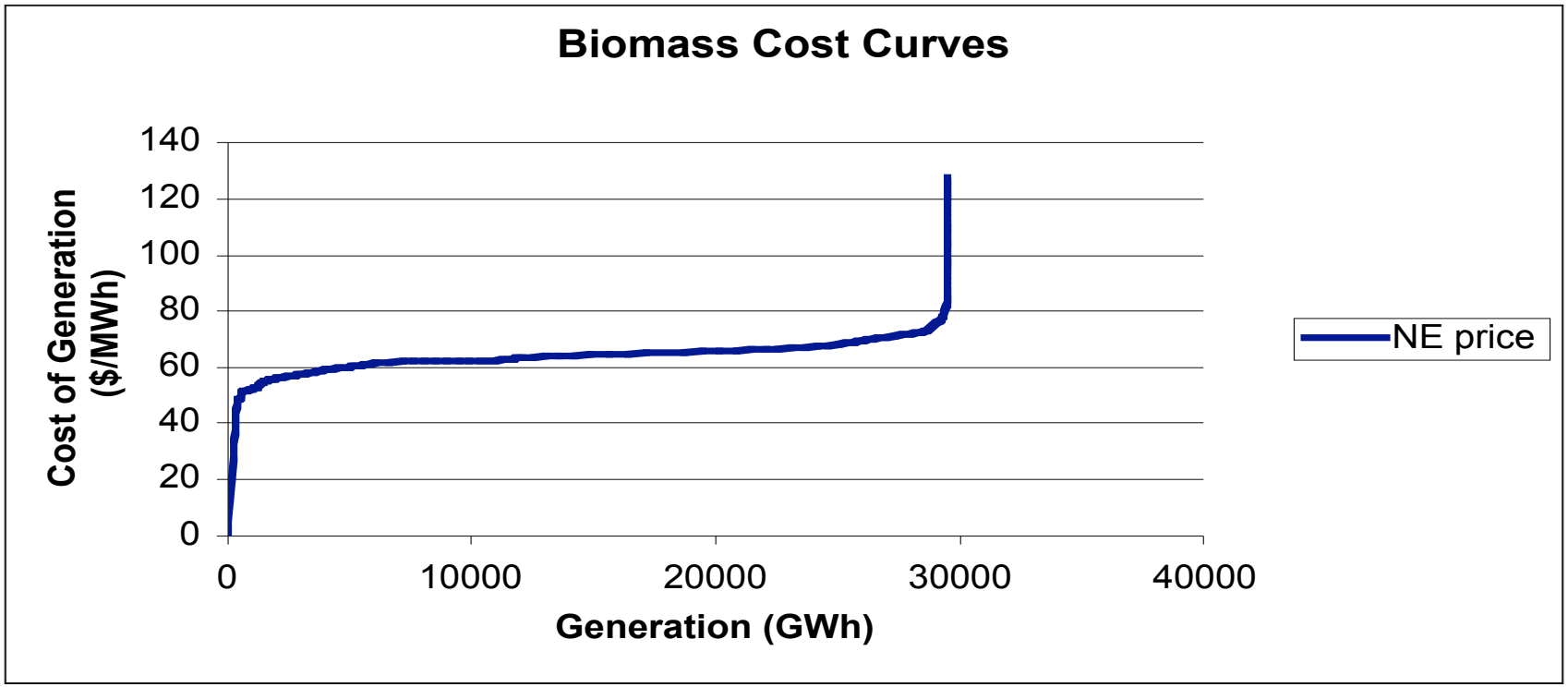
Forest Sequestration Offsets



Renewable Energy Supply Curve



Biomass Feed Stocks Cost Curve



Wood Products v. Energy

- Simple sawed wood product: 3 GJ Mg^{-1}
- Plywood: 14 GJ Mg^{-1}
- Steel: 20–25 GJ Mg^{-1}
- Plastic: 60–80 GJ Mg^{-1}
- Aluminum: 190 GJ Mg^{-1}