Electric Generation and Supply Work Group Meeting
In Support of the
Governor's Task Force on Global Warming

Monday, August 6^{th}, 2007
10:30 a.m. – 3:30 p.m.

Public Service Commission of Wisconsin Building
Pecatonica River Conference Room (basement level)
610 North Whitney Way
Madison, WI 53705

There will be a work group meeting from 10:30 a.m. to 3:30 p.m. on Monday, August 6^{th}, 2007, at the Public Service Commission of Wisconsin Building, in the Pecatonica River Conference Room, 610 North Whitney Way, Madison, Wisconsin, to discuss policy options, reduction targets, and baseline data in support of the Governor's Task Force on Global Warming. The meeting is open to the public. For more information, or if you need special accommodations to attend this meeting, call Lori Sakk at (608) 266-1383.

<u>Agenda</u>

- Welcome and Review of Agenda
- Updates from Task Force
- Review Outcome from Scoring of Policy Options
- Work Group Discussion of Scoring Results
- Review Additional Policy Option Recommendations
- Break/Lunch
- Development of Sub-set of Policies for Further Evaluation
- WRI-Review of Baseline
- Brainstorm Ideas to Achieve Reduction Targets
- Public Input
- Next Meeting Assignments
- Other Items for Discussion--Adjourn

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Meeting Agenda/Action Items

Meeting Name: **Electric Generation & Supply Workgroup, Governor's Task Force on Global Warming**
Date: **August 6, 2007**
Time: **10:30 – 3:30 pm**
Location: **PSC Pecatonica Conference Room**
610 North Whitney Way, Madison

Members (* in attendance, # absent, T teleconference, P partial attendance)

	Name		Name		Name
	Peter Taglia, Co-chair Clean Wisconsin		Kathy Lipp, Co-Chair Alliant Energy		Lori Sakk, Amber Storms, PSC State Agency Support
	David Bender Sierra Club		Forrest Ceel IBEW		John Clancy Godfrey & Kahn
	Dennis Dums Citizen's Utility Board		Dave Jenkins Wisconsin Federation of Cooperatives		Andy Kellen Wisconsin Public Power, Inc
	Charles Matthews Wisconsin Energy Corp.		Phil Montgomery, Representative Wisconsin Assembly		Adam Raschka Staff Representative Montgomery
	Scott Neitzel Madison Gas & Electric		Tom Smies Wisconsin Public Service Corp		Todd Stuart Wisconsin Industrial Energy Group
	Jim Turnure Xcel Energy		Michael Vickerman RENEW Wisconsin		Lynn Wilson Plum Creek
	Tom Damassa, John Larsen WRI				

Agenda for 08/06/07 (*- Handouts)

Item No.	Subject	Approx. Time	Presenter
1.	Welcome and Review of Agenda	10:30	All
2.	Updates from Task Force ▪ Revised Template for Policy Recommendations * ▪ Public Meeting Agenda ▪ Rules on Lobbying		Lipp/Taglia Callisto
3.	Review Outcome from Scoring of Policy Options		Lipp
4.	Work Group Discussion of Scoring Results		
5.	Review Additional Policy Option Recommendations ▪ Scoring of New Policy Recommendations		
6.	Break / Lunch		
7.	Development of Sub-set of Policies for Further Evaluation ▪ Criteria for Selection ▪ Identification of Work Group Member Interests	1:00	
8.	WRI – Review of Baseline	1:30	Damassa/Taglia

Item No.	Subject	Approx. Time	Presenter
9.	Brainstorm Ideas to Achieve Reduction Targets		
10.	Public Input		
11.	Next Meeting Assignments		Taglia/Lipp
12.	Other Items for Discussion --- Adjourn	3 :30	

Open Action Items from Prior Meetings

Item No.	Open Date	Description	Assigned To	Target Date
1.	7/11	Set initial meeting approach and confirm membership of work group	Taglia/Lipp	Done-7/23
2.	7/11	Poll working group members for meeting dates and announce first meeting	Sakk	Done-7/17
3.	7/25	Rules on Lobbying Time for Work Group Activity	Callisto	8/6
4.	7/25	Policy Scoring Template and description of policies	Sakk Damassa	Done – 7/26
5.	7/25	Scoring by each Work Group Member; return to L. Sakk	WG	8/2

v1, 7-06-07

State Policy Options to Reduce Greenhouse Gas Emissions

Prepared for the Wisconsin Global Warming Task Force, July 2007

	Policy		Preferred	Could Work	Not Likely	Not Worth Considering	Total Responses
	Generation and Delivery (Supply-Side) Subgroup	Don't Know	1	2	3	4	
1)	Enhance State Renewable Portfolio Standard (RPS)	0	10	4	1	0	15
2)	Creation of state-financed fund for use of local renewable energy resources by governmental entities, schools, and nonprofits	0	3	7	4	1	15
3)	Tax or other incentives for consumers and businesses for renewable electricity (e.g., PTC, ITC)	0	3	10	2	0	15
4)	State and local tax and rate incentives for utilities investment in renewable resources	1	5	5	3	1	15
5)	Create funding opportunities for targeted R&D	1	2	5	5	2	15
6)	Renewable/clean energy feed-in tariffs	1	5	5	2	2	15
7)	Increase reliance on biofuels (biodiesel) for generation	1	1	5	6	2	15
8)	Increase nuclear power generation	0	8	2	1	4	15
9)	Distributed generation regulatory reform (real-time pricing, net metering, interconnection, standby rates)	0	6	5	4	0	15
10)	IGCC with carbon capture & storage portfolio standard	1	0	8	5	1	15
11)	Incentives for construction of new IGCC plants	1	0	9	5	0	15
12)	Transmission system upgrades to reduce line losses and to support new renewables/low-emitting generation	0	9	5	1	0	15
13)	Reduce release of SF6 when high voltage equipment is serviced	3	1	7	2	2	15
14)	Incentives to improve energy efficiency of existing power	0	9	0	3	3	15
15)	Imports of synthetic gas (with sequestration)	3	2	3	6	1	15
16)	Change CPCN (Certificate of Public Convenience and Necessity) approval process for new generation to recognize GHG impacts	1	3	7	2	2	15
17)	Develop tracking system for renewable energy certificates and/or energy efficiency certificates	1	5	6	1	2	15
18)	Carbon performance standards for electricity generation and/or procurement	1	5	3	6	0	15
19)	Energy Efficiency Portfolio Standard (EEPS)	1	7	4	3	0	15
20)	Require utilities to factor CO2 into procurement and planning	1	7	6	0	1	15
21)	Appliance buy-back programs	3	2	4	3	3	15
22)	Technical assistance to electric plants to assess CHP technology and oversee installation	1	4	6	2	2	15
23)	CHP portfolio standard	1	2	4	8	0	15
24)	CHP performance standard	1	1	5	7	1	15
25)	Incentives for CHP and boiler construction and upgrades	1	6	6	2	0	15
26)	Expand transmission capacity for wind power	0	5	8	0	2	15
27)	Siting and monitoring regulations for geologic storage of carbon dioxide	0	0	6	6	3	15

	Policy		Preferred	Could Work	Not Likely	Not Worth Considering	Total Responses
	Generation and Delivery (Supply-Side) Subgroup	Don't Know	1	2	3	4	

	Additional Policy Recommendations for Work Group Discussion (Scoring will occur during next meeting)					
B1	Incentives to promote/develop bio-digester and biogas engine manufacturing industry in Wisconsin					
B2	Incentives for renewable R&D work for biogas, biofuel, PV solar, geothermal, etc. for renewable power					
C1	Modify 1.12 Priority Statute; Cleaner coal technology should be ranked equal to higher than natural gas in the priority status					
C2	Implement an annual review process to determine the progress made by the generation sector in reducing GHG emissions. This may be a consideration already included in Option 18 and Option 20.					
C3	Dispatch system with CO2 impact cost adder - this will increase output from natural gas units and reduce output from coal units					
C4	Retrofit existing large pulverized coal units with CO2 capture					
C5	Carbon capture on new and/or existing coal-fired units					
C6	Siting and monitoring regulations for CO2 pipelines to states with suitable geologic storage formations					
C7	Greenhouse gas emission reductions from electrical and utility infrastructure (Reduce CH4 emissions from gas pipelines, SF6 emissions from high voltage equipment). Reduce targets over time as a percentage of energy use.					
C8	Incorporate greenhouse gas dispatch in MISO market.					
C9	Power Plant Retirement Planning Process					
C10	Assessment of Potential to Cost-Effectively Retire Certain Existing Coal Fired Plants in Wisconsin to reduce GHG Emissions. This may be a consideration already subsumed in Option 18) Carbon performance standards, and Option 20) Utility's factoring C02 into procurement and planning.					
F1	Environmental Trust Financing (ETF) should be reviewed for all environmental projects; Should not be voluntary					
F2	Providing ratepayers option of making tax deductible payments/donations to non-profit to increase renewables above RPS requirements					
F3	Examining potential modifications to utility shared revenues to encourage the siting of renewable generation					
F4	Exploring other options for making siting of renewable energy easier					
F5	Expand incentives and rate structures for distributed CHP in commercial/high density residential including monetization of reduced transmission infrastructure requirements					
F6	Plug-in Vehicle Infrastructure and Purchase Incentives					

	Policy		Preferred	Could Work	Not Likely	Not Worth Considering	Total Responses
	Generation and Delivery (Supply-Side) Subgroup	Don't Know	1	2	3	4	
H1	Transfer hydroelectric water quality certification authority from the DNR to PSC						
H2	R& D for low-head hydroelectric on Mississippi River dams						
H3	Remove 60 MW cap on hydro power facilities to qualify as renewable						
H4	Incorporate large Hydro (Canada) power purchases as a source of supply						
N1	Repeal nuclear moratorium						
N2	Expand definition of renewables to include recycling of spent nuclear fuel						
N3	Include nuclear energy in the energy priorities law						
O1	Renewable energy incentive similar to New Jersey Solar Renewable Energy Certificate Program						
O2	Standardization of DG equipment performance testing and rating standards consistent with other states such as California						
O3	Explore partnership with Michigan to utilize Lake Michigan for wind						
W1	PSC Permitting Option for Wind Projects Under 100 MW						
W2	Zoning law changes to facilitate renewable distributed generation such as PV solar system and small wind generators						
W3	Incentives to promote/develop renewable manufacturing industry in Wisconsin such as wind turbines & parts, PV solar panels, cells, and PV grade silicon, fuel cells						
W4	Incentives for developing solar water heater manufacturing industry in Wisconsin						
W5	Assessment of Technical and Economic Potential for Wind Generation in the Great Lakes Bordering Wisconsin. This may already be a consideration subsumed in Option 1) Enhance State RPS.						

Wisconsin Global Warming Task Force Workgroup Template For Presentation Policy Options

1. **Workgroup**:

2. **Policy Name:**

3. **Policy Type:** (Fiscal measure, regulation, legislation, voluntary R&D, market based mechanism, etc.)

4. **Affected Sectors, Sub-Sectors and/or Entities:**

5. **Estimated Greenhouse Gas Emissions Reduction Impact:** (Relevant target year(s) should be selected based on timing of measure, with reductions estimated as of that year(s) and not on a cumulative basis, in comparison with a rough cut business as usual scenario. WRI will assist in this task. Later in the process, reduction estimates will be refined based on Reference Case developed for the Task Force.)

6. **Estimated Costs:** (Rough estimate of administrative costs and other material costs such as electric rate impact, for same years as selected for GHG reduction impact.)

7. **Specific Description of Policy Proposal:** (Description should be specific, including material terms so that people understand what is being agreed upon; however, legislative or regulatory language should not be drafted.)

8. **Timetables, Duration and Stringency Option:** (When will the measure take affect, how long will it last, how stringent will it be over time?)

9. **Explanation of Rough Estimate of GHG Reductions:** (Concise, transparent and well-referenced explanation of estimate of GHG emissions reduction estimate for years selected, including description of important assumptions. Final number should be in million metric tons of CO_2 or other GHG.)

10. **Rough Estimate of Costs for Selected Years:** (Concise, transparent and well-referenced explanation of estimates of administrative cost of policy for designated years and other key material costs that should be considered by the Task Force.)

11. **Barriers to Implementation:** (Description of barriers to implementation identified for policy, including technological, political and financial barriers, and where possible, recommendation on how to overcome these barriers.)

12. **Other Factors:** (Where relevant, identify potential duplication with other policies that may be recommended and other policy interaction issues which group believes the Task Force should be aware of.)

Wisconsin Global Warming Task Force Workgroup
Template For Presentation Policy Options

[This example is not a recommended outcome or policy. It is presented as an example template for illustrative purposes.]

1. **Workgroup**: Utility Energy Conservation and Efficiency

2. **Policy Name:** Enhanced Renewable Portfolio Standard (RPS)

3. **Policy Type:** Legislation amending existing RPS, with regulatory implementation and enforcement.

4. **Affected Sectors, Sub-Sectors and/or Entities:**

   Sector: Electric utility

   Sub-Sector: Distribution utilities

5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Reduction in 2020 of _______ million metric tons of CO_2 compared to “business as usual” and of ________ million metric tons of CO_2 in 2025.

6. **Estimated Costs:** Administrative costs will be negligible (incremental to existing program). Other material cost is potential electric rate impacts ranging from _________% to ______% in 2020, and ______% to ______% in 2025.

7. **Specific Description of Policy Proposal:** Wisconsin currently has legislation imposing an RPS that has been implemented by a PSCW rulemaking and is backed by PSCW enforcement authority. This policy recommendation would modify the RPS as specified below. The current standard is 10% by 2015. The revised standard would increase to 20% by 2020 and 25% by 2025. The current off-ramp for high cost impact would continue. In addition, up to _____% of the 2020 RPS and _____% of the 2025 RPS would be able to be met by power from [new] hydro electric facilities wherever located and regardless of size and _____% in 2020 and ______% in 2025 would be required to meet by qualified biomass facilities located in Wisconsin. In calculating compliance with the revised RPS in 2020 and beyond, amounts sold to the State of Wisconsin to meet the state's obligation to purchase 20% of its requirements from renewable resources may be counted by utilities in meeting the revised RPS. However, premium sales under green pricing programs to other customers would not by counted.

8. **Timetables, Duration and Stringency Option:** The timetable is implicit in this policy recommendation. Duration is until changed by law. This policy should be regarded as stringent as a result of PSC enforcement authority, subject to the possible implementation of high cost impact off-ramp.

9. **Explanation of Rough Estimate of GHG Reductions:** Meeting the new RPS standard would require an estimated _________ million MWh of additional

renewable energy annually by 2020 and _______ million MWh of additional renewable energy by 2025. Range of GWh reduction estimates assumes displacement of _______ million MWhs of coal generation and ________ million MWhs of gas-fired generation in 2020 and _______ million MWhs of coal generation in 2025 and _________ million MWhs of gas-fired generation in 2025. An average capacity factor for renewable resources of _______% is assumed, requiring an additional ________ MW of renewable capacity above the existing RPS in 2020 and _______ MW in 2025.

10. **Rough Estimate of Costs for Selected Years:** Incremental administrative costs of the revised RPS are estimated to negligible because the PSCW already has in place the infrastructure for regulating this requirement. The main other costs is potential impact on electric rates. This impact will depend on the projected costs of power and energy from the mix of renewable resources employed to meet requirement compared with the estimated cost of coal and gas-fired generation that is displaced, including carbon adders. The range projected carbon adder costs used is $______ to $_______ per ton of CO_2. Gas prices used range from $______ per million BTU to $_______ per million BTU in 2020, increased by ______% per year for 2025. Coal prices used range from $______ per ton to $______ per ton in 2020, increased by ______% per year for 2025. The mix of renewable resources assumed for both 2020 and 2025 is ______% wind, and _______% biomass, ______% hydro, and ______% solar.

11. **Barriers to Implementation:** The major barrier to implementation of this policy is the need for legislation to amend to the existing standard. Opposition may come from large electric customers who believe that this requirement will materially increase their electricity costs. To the extent that a significant carbon-adder is perceived as likely, and that the installed costs of renewable resources will come down over time compared to new, coal and gas-fired units, as a result of increased manufacturing capacity and technology advances, opposition may lessen.

12. **Other Factors:** It is possible that with a stringent cap and trade requirement an RPS may be viewed as unnecessary in that renewables will have to be used in order to meet the cap. Federal preemption also is possible, as well as substitution of a "clean energy portfolio" standard that includes energy efficiency and other technologies as well as renewables. There will be a potential overlap of impacts if policies related to these matters also are proposed by the Task Force.

Wisconsin Greenhouse Gas Inventory: Data update

Meeting of the Wisconsin Governor's Task Force on Global Warming
Pyle Center, UW-Extension
702 Langdon St., Madison, WI
July 11, 2007

WORLD RESOURCES INSTITUTE

John Larsen, Research Analyst
Climate and Energy Program
World Resources Institute
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202-729-7661

Topics to Cover

- Review of WRI Wisconsin GHG data
- Additional Wisconsin data and regional comparison
- Discussion

WI GHG data sourced from WRI's CAIT-US

Free, online at http://cait.wri.org/cait-us.php

WI Emits 1.8% of US emissions, Ranks 21st

Top 25 GHG Emitting U.S. States, 2003

CO_2, CH_4, N_2O, HFCs, PFCs, SF_6

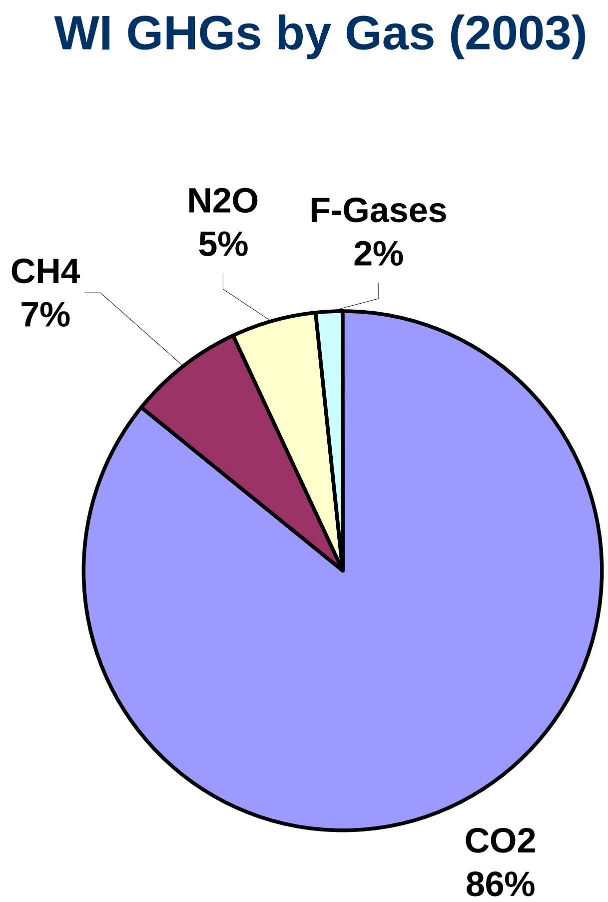
State	GHG Emissions ($MtCO_2e$)	% of U.S. GHGs	State	GHG Emissions ($MtCO_2e$)	% of U.S. GHGs
1. Texas	782	11.6	14. Kentucky	164	2.4
2. California	453	6.7	**15. Missouri**	**163**	**2.4**
3. Pennsylvania	301	4.5	16. Virginia	143	2.1
4. Ohio	**299**	**4.4**	17. Tennessee	141	2.1
5. Florida	271	4.0	18. New Jersey	137	2.0
6. Indiana	**269**	**4.0**	19. West Virginia	133	2.0
7. Illinois	**268**	**4.0**	20. Oklahoma	124	1.8
8. New York	244	3.6	**21. Wisconsin**	**123**	**1.8**
9. Michigan	**212**	**3.1**	**22. Minnesota**	**120**	**1.8**
10. Louisiana	209	3.1	**23. Iowa**	**108**	**1.6**
11. Georgia	186	2.8	24. Colorado	107	1.6
12. North Carolina	168	2.5	25. Kansas	101	1.5
13. Alabama	164	2.4			

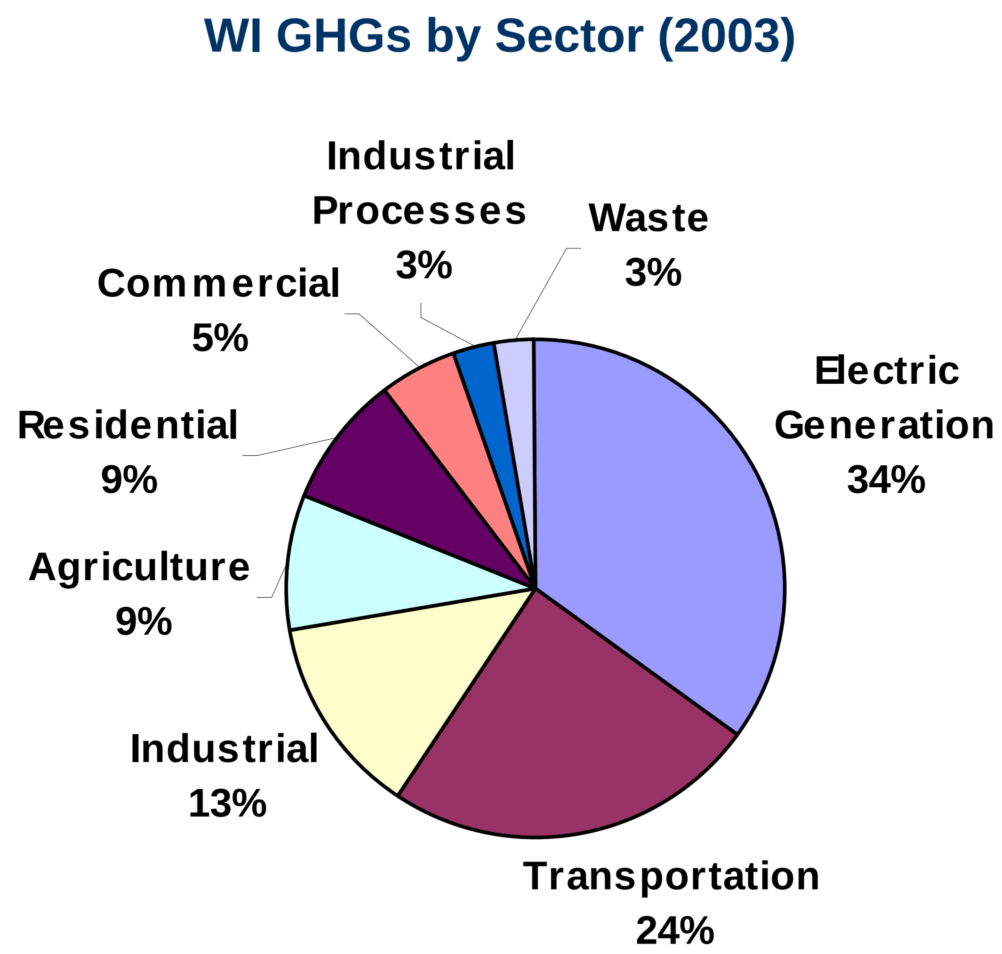
Source: WRI, CAIT (2007)
Notes: Data are for 2003. Totals exclude emissions from international bunker fuels and land use change and forestry.

CO2, Energy use lead WI emissions

Wisconsin 2003 Emissions by Sector and Gas ($MtCO_2e$)					
	Greenhouse Gas				
Sector	**CO_2**	**CH_4**	**N_2O**	**F-Gases**	**Total**
Energy	*104.3*	*0.2*	*1.1*		*105.6*
Electricity Generation	42.9	< 0.1	0.2		43.1
Residential	10.5	0.1	< 0.1		10.6
Commercial	6.1	< 0.1	< 0.1		6.1
Industrial	15.8	0.1	0.1		15.9
Transport	29.1	< 0.1	0.8		29.9
Fugitive Emissions	--	--	--	--	--
Industrial Processes	1.2			2.2	3.5
Agriculture		6.1	4.8		10.9
Waste		2.8	0.3		3.1
Total	**105.5**	**9.1**	**6.3**	**2.2**	**123.1**

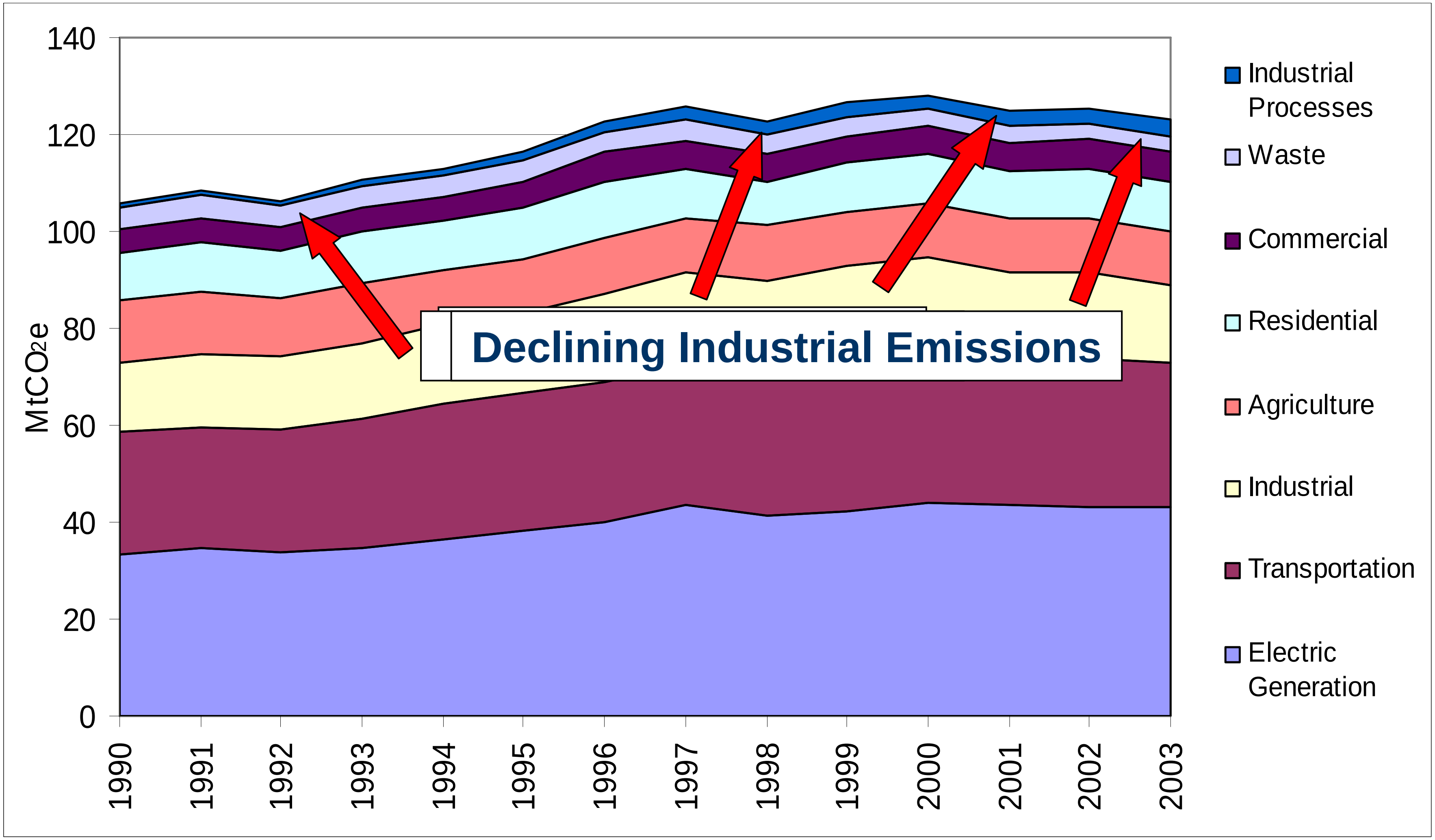
Transportation and electric generation represent majority of WI emissions



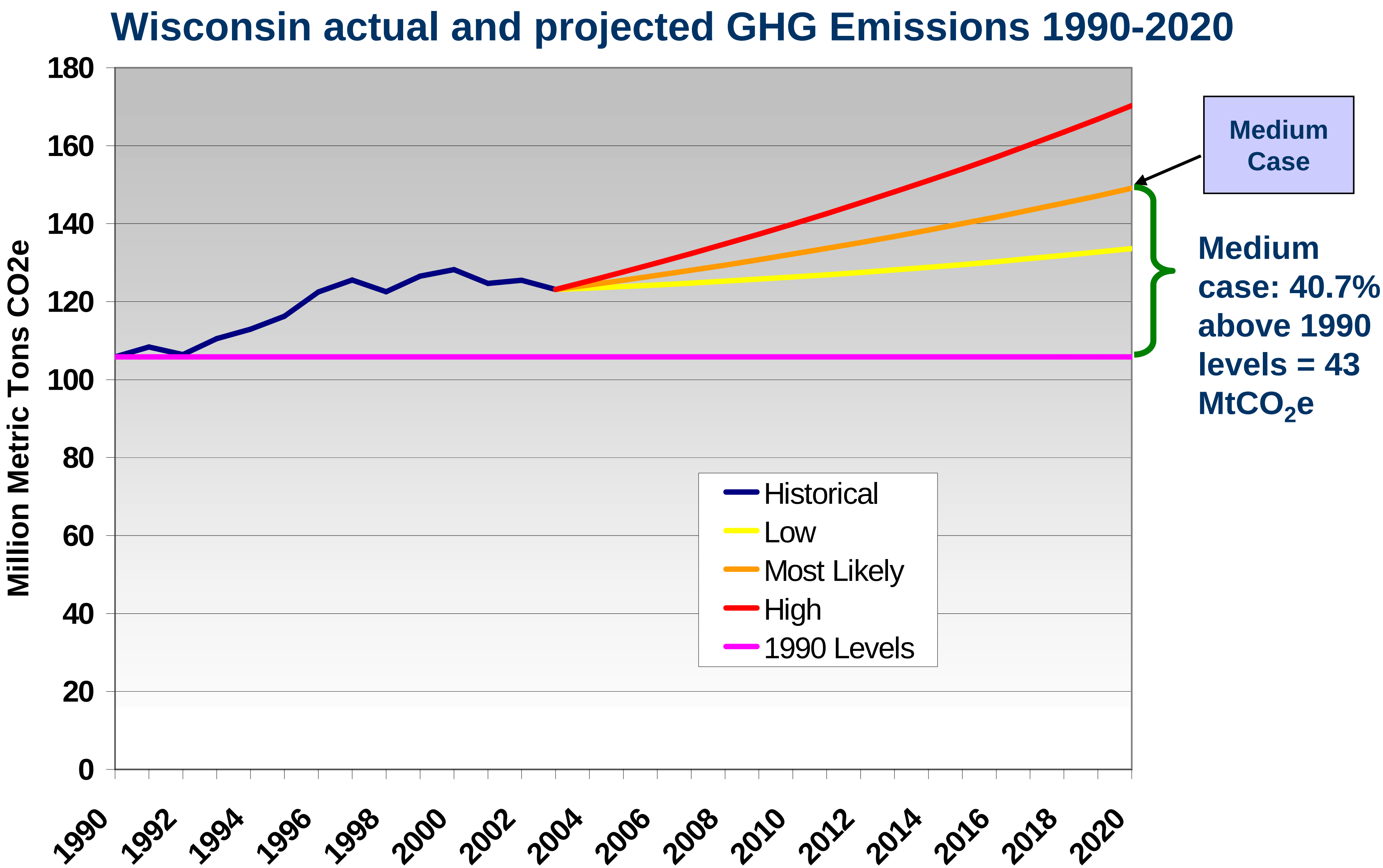


Emissions growth varies but trends upward

Wisconsin GHG Emission Trends by Sector 1990-2003



WI GHGs projected to be 149 $MtCO_2e$ by 2020



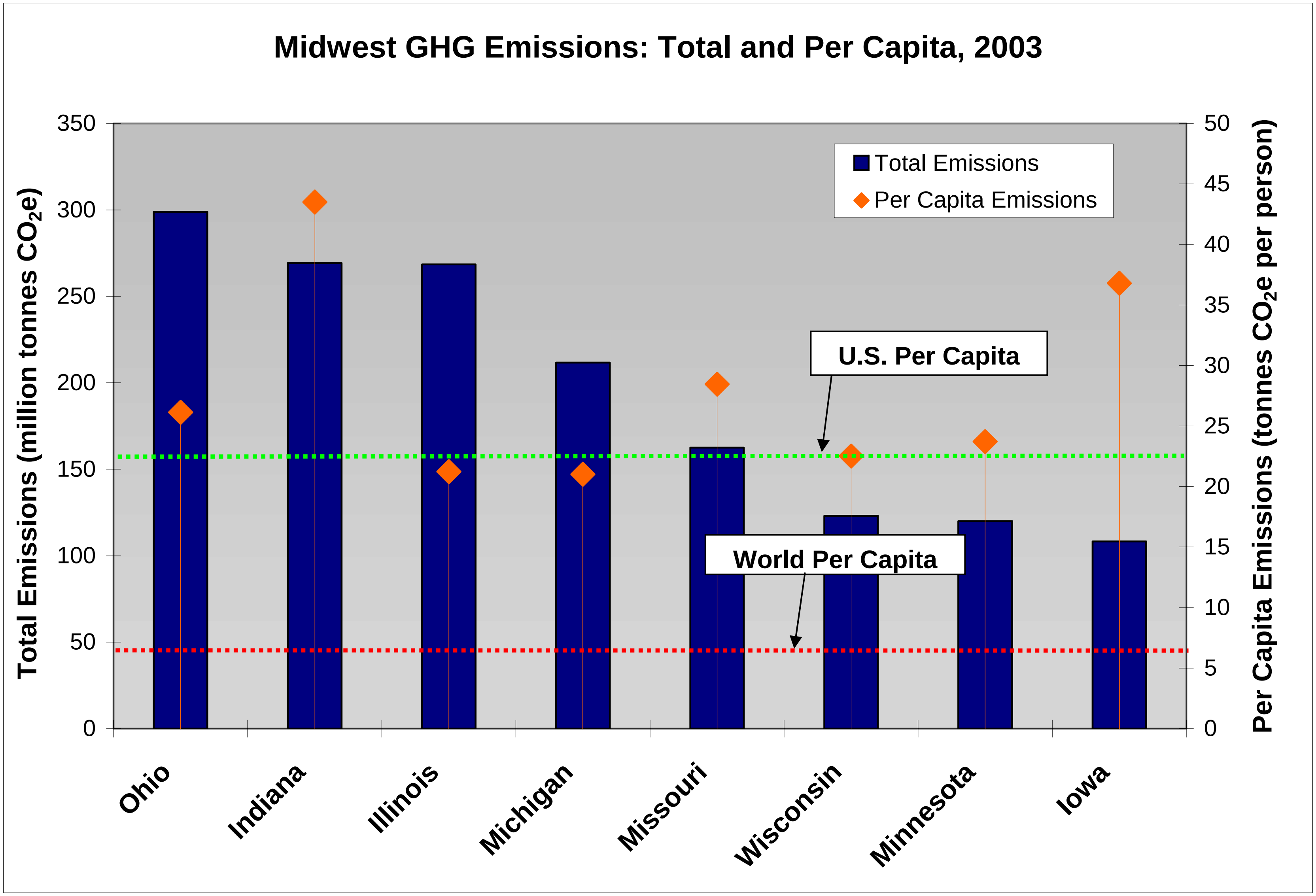
WI GHGs in 2020 projected to be 43.2 MtCO2e higher than in 1990

WI GHG emissions in 2020 under projection scenarios and comparison with 1990 emissions levels			
Projection Case	Total GHG Emissions 2020 (MtCO2e)	Total Increase from 1990 (MtCO2e)	Percentage Increase from 1990
Low	133.6	27.8	26.2%
Medium	149.1	43.2	40.8%
High	170.3	64.4	60.8%

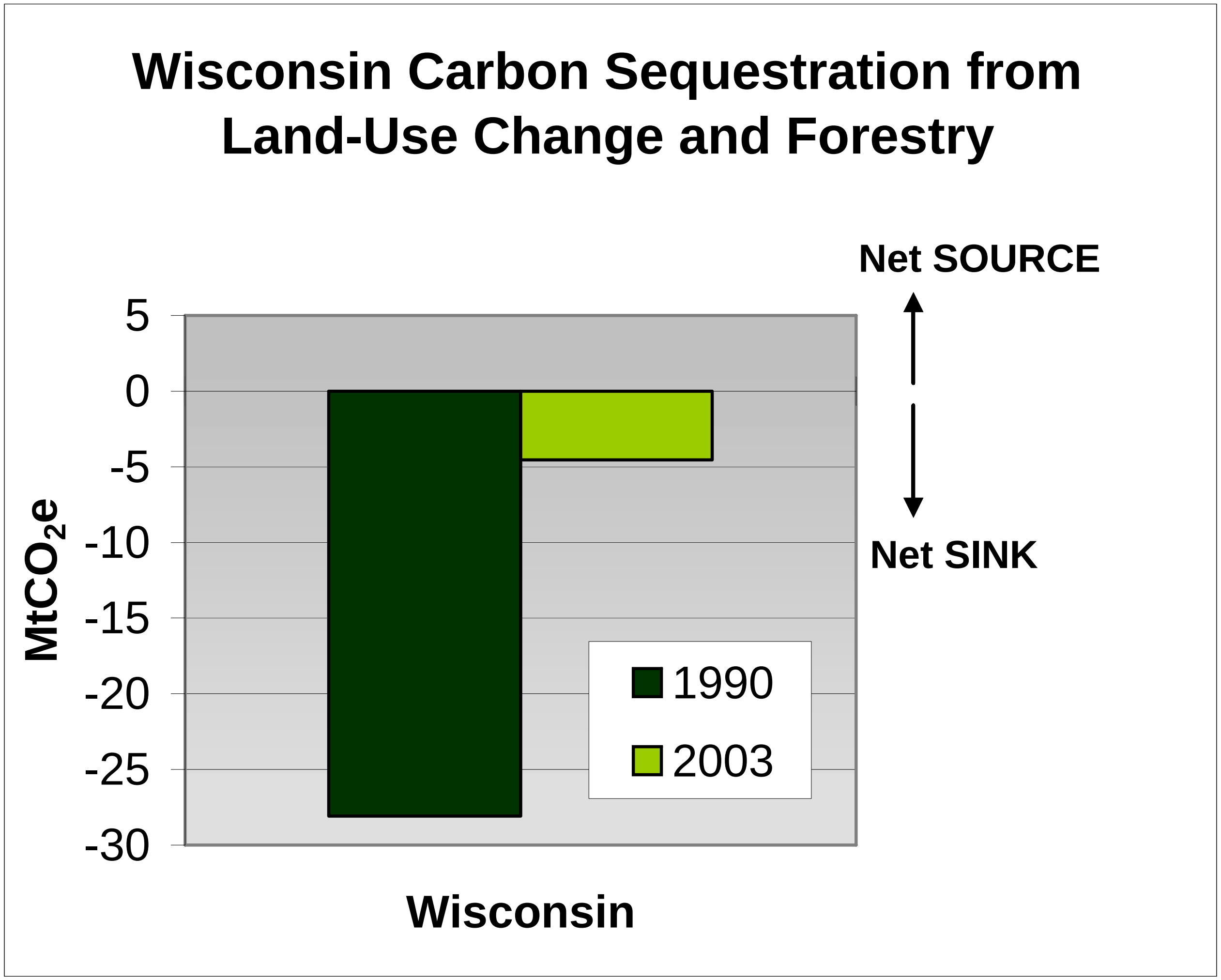
Topics to Cover

- Review of WRI Wisconsin GHG data
- Additional Wisconsin data and regional comparison
- Discussion

WI per capita emissions similar to U.S.



WI Carbon sink declining

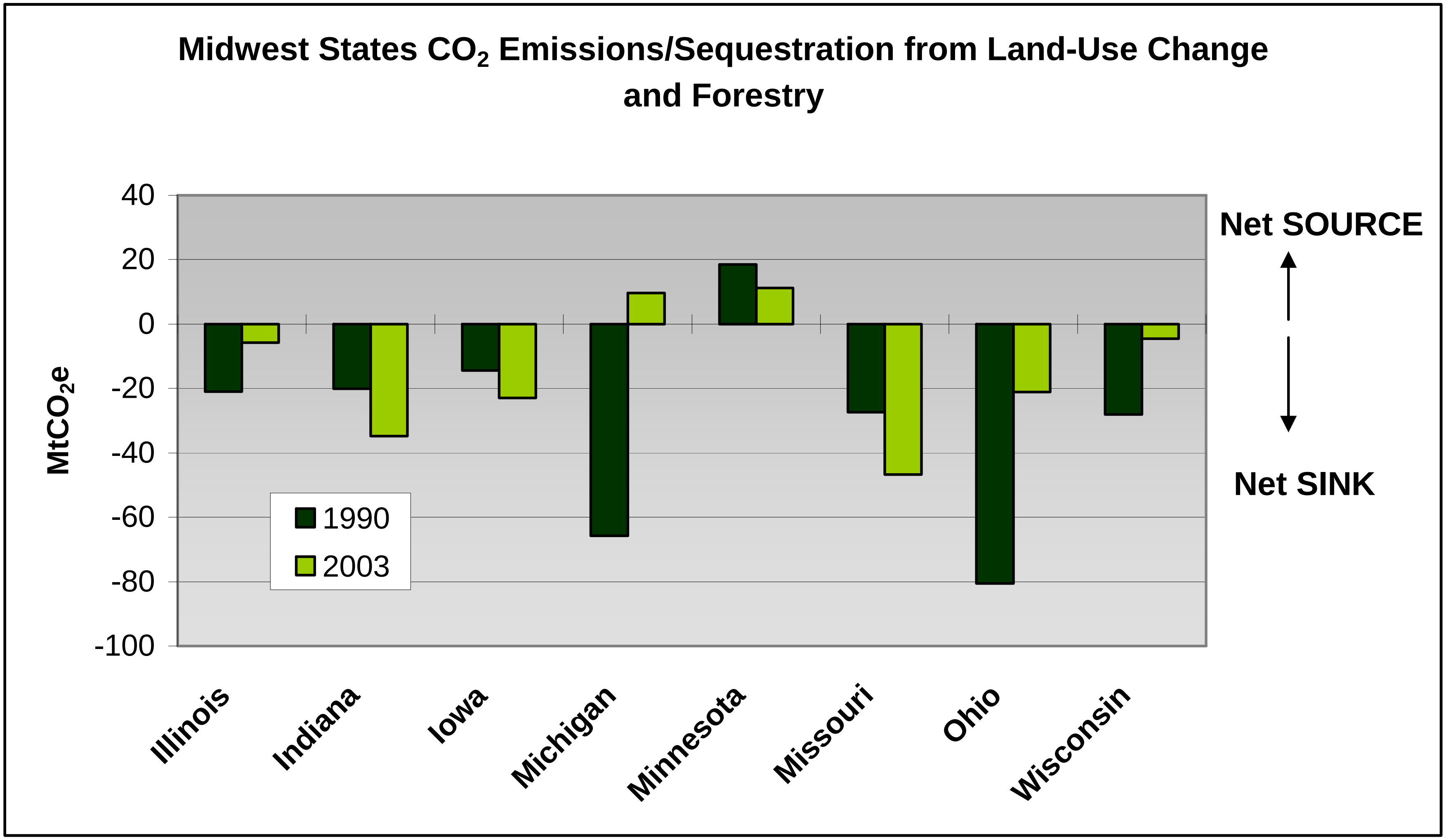


Source: WRI, CAIT (2007)

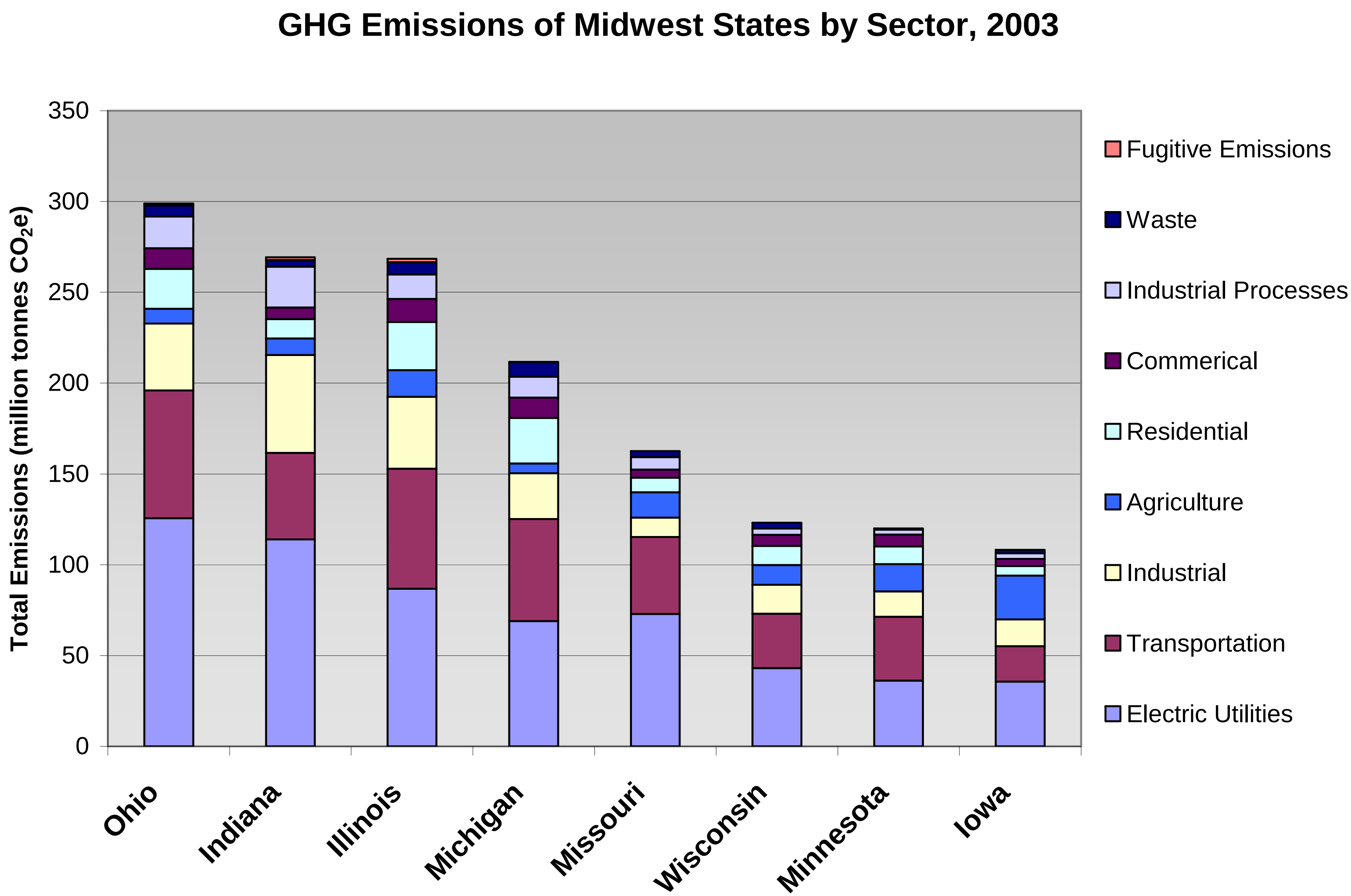
Wisconsin share of sequestration to total emissions:

- **1990: 26%**
- **2003: 4%**

Net regional carbon sequestration is declining as well



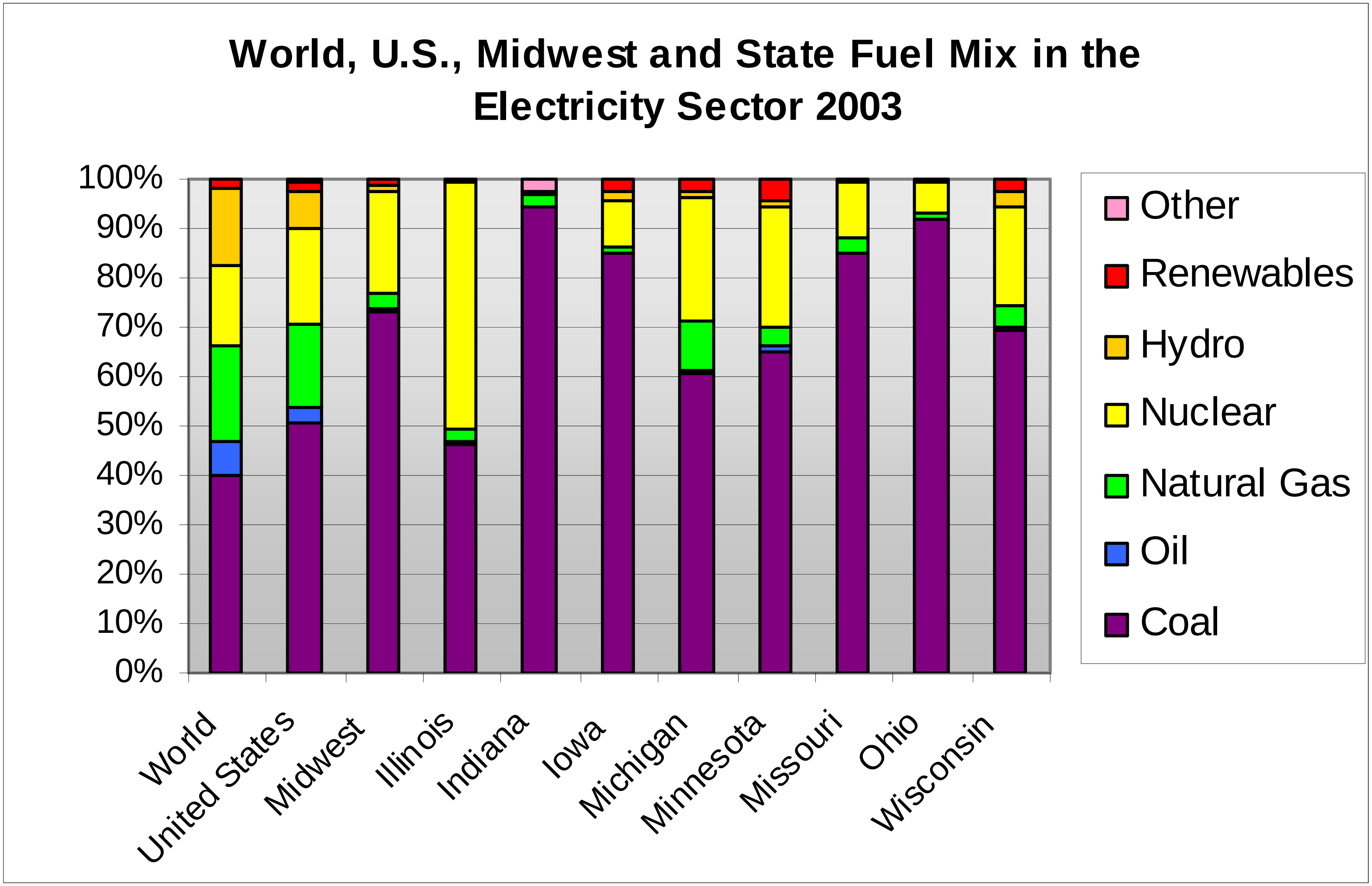
Sector contributions to emissions vary considerably across states



MO, IL, IA outpaced WI emissions growth in the electric generation sector

GHG Emissions from Electric Generation, (2003) and Emissions Trends (1990-2003)				
	2003 emissions ($MtCO_2e$)	**% of U.S.**	**U.S. Rank**	**% change 1990-2003**
Ohio	125.6	5.56	2	15.73
Indiana	113.9	5.05	5	19.49
Illinois	86.8	3.85	6	52.55
Missouri	72.9	3.23	11	53.85
Michigan	68.9	3.05	12	2.16
Wisconsin	**43.1**	**1.91**	**19**	**29.31**
Minnesota	36.2	1.61	25	21.84
Iowa	35.6	1.58	26	33.08
Midwest	**583.1**	**25.83**	**N/A**	**25.28**
U.S.	**2,257.0**	**100.00**	**N/A**	**24.32**
Source: WRI, CAIT (2007).				

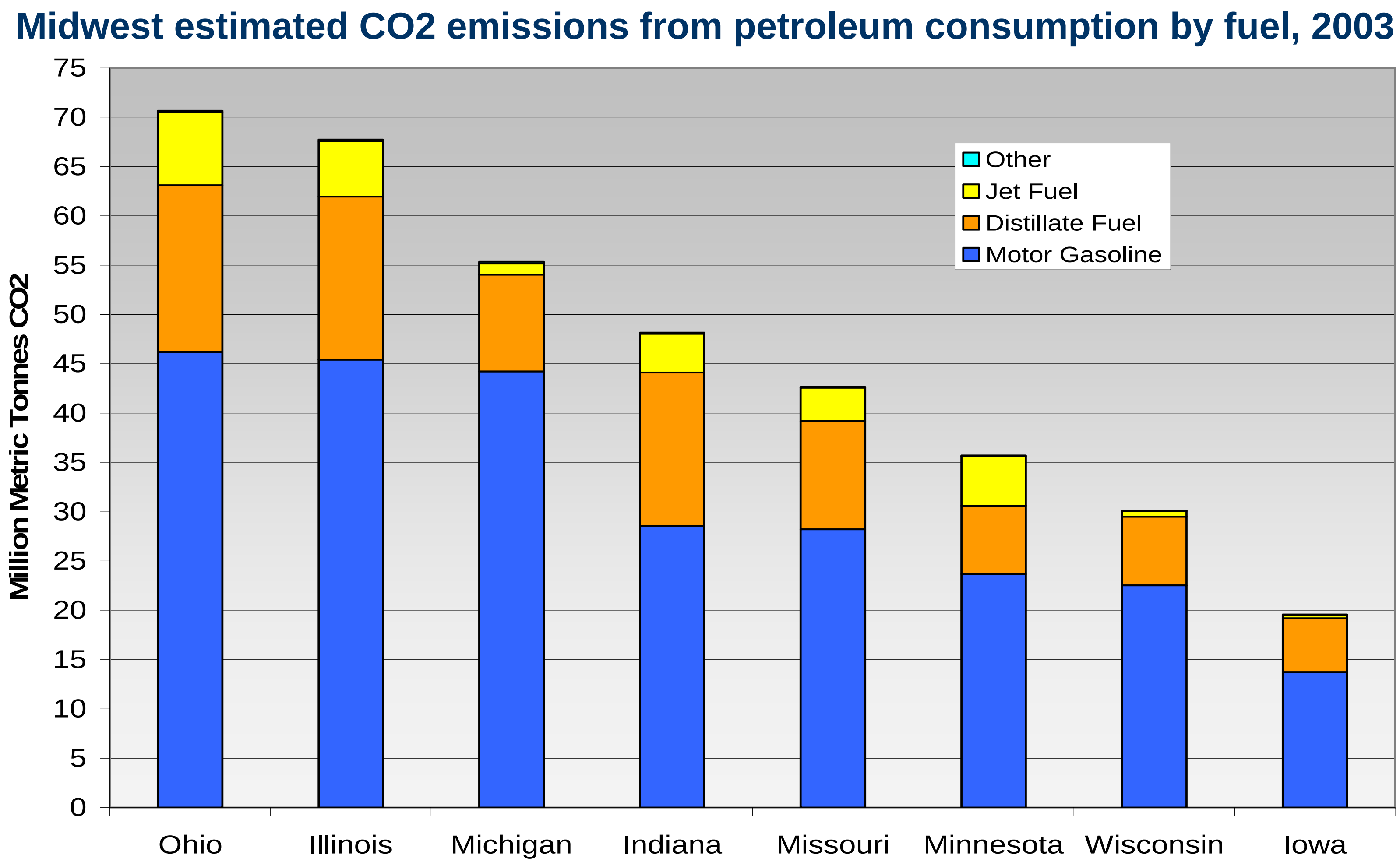
WI fuel mix similar to regional fuel mix



MN, OH, MO lead region in transportation emissions growth

US and Midwest GHGs from transportation 2003				
	2003 (MtCO2e)	**% of U.S.**	**US Rank**	**1990-2003 % Change**
Ohio	70.5	3.6%	6	23.0%
Illinois	66.2	3.4%	7	19.3%
Michigan	56.2	2.9%	10	14.5%
Indiana	47.7	2.5%	14	14.9%
Missouri	42.4	2.2%	16	22.9%
Minnesota	35.2	1.8%	19	44.9%
Wisconsin	**29.9**	**1.5%**	**25**	**20.1%**
Iowa	19.6	1.0%	32	18.1%
Midwest	***367.5***	***18.9%***	***---***	***21.0%***
United States	***1,941.1***	***100.0%***	***---***	***20.0%***
Source: WRI, CAIT 2007				

Gasoline dominates WI and Midwest transport emissions



Source: EIA 2006. State Energy Consumption, Price, and Expenditure Estimates (SEDS). Note: fuel consumption of jet fuel is based on sales and may not accurately assign emissions to each state. For example, a large amount of jet fuel used at Chicago airports is purchased in Indiana.

WI industry is becoming less GHG and energy intensive

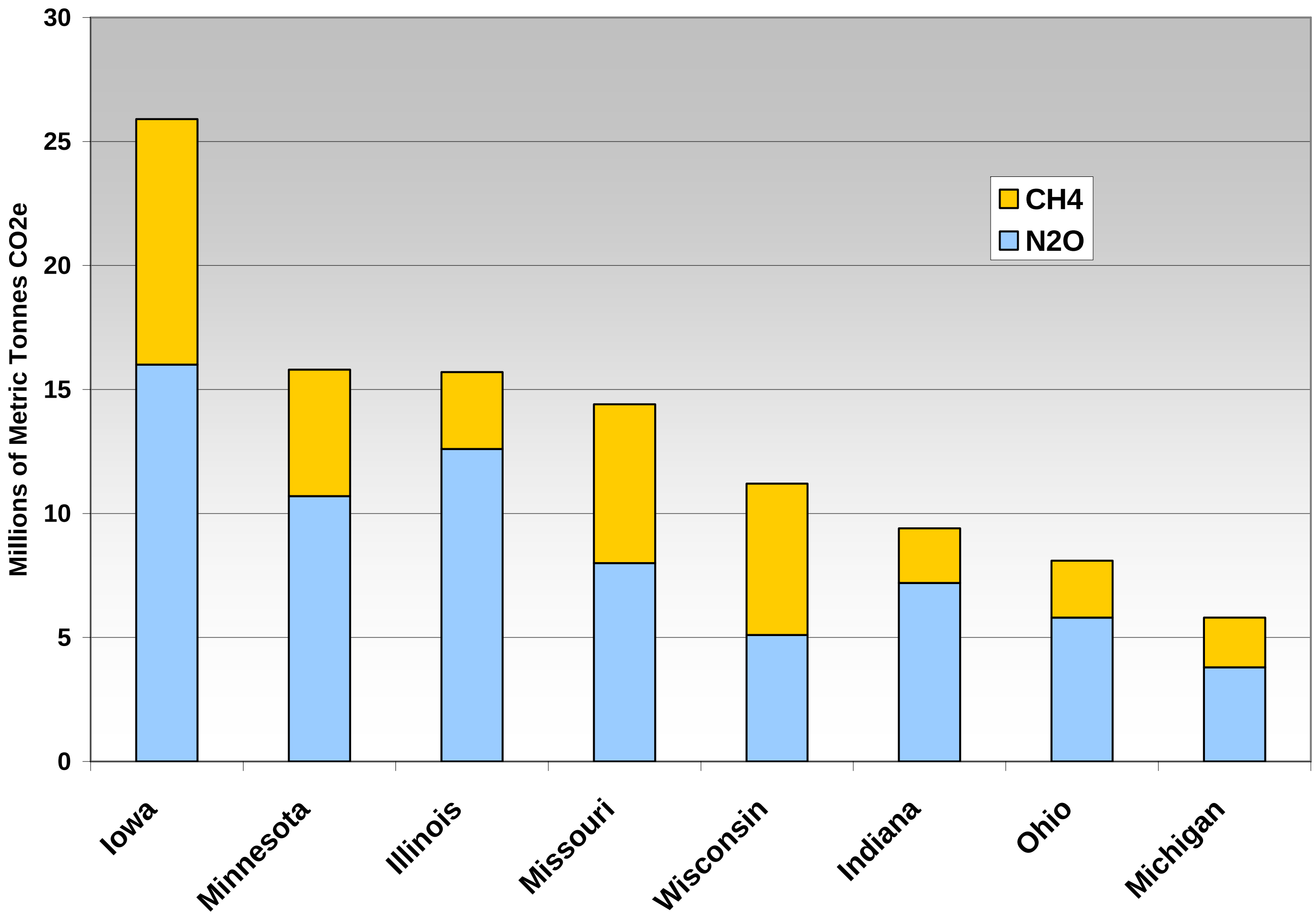
State and Regional Industrial GHG Emissions, Net Energy Consumption and Economic Output (2003) and trends (1997-2003)

		GHG Emissions		Net Energy Consumption		State GDP from Manufacturing	
State	**Rank**	**2003 (MtCO2e)**	**% Change 1997-2003**	**2003 (Billion btu)**	**% Change 1997-2003**	**2003 (millions of $)**	**% change 1997-2003**
Indiana	4	53.9	6.5%	982,701	3.6%	62,039	28.3%
Illinois	6	39.5	-20.8%	880,674	-14.3%	66,177	1.7%
Ohio	7	36.8	-17.6%	900,534	-18.3%	79,983	-0.1%
Michigan	8	25.2	-18.1%	623,363	-15.2%	78,535	15.1%
Wisconsin	**19**	**15.9**	**-16.4%**	**460,675**	**-14.1%**	**41,978**	**12.9%**
Iowa	21	14.7	-9.1%	333,570	-4.6%	21,479	16.0%
Minnesota	26	13.9	-9.9%	363,068	-13.3%	28,591	12.5%
Missouri	29	10.6	-0.4%	253,680	2.5%	30,852	-0.3%
Midwest		***210.5***	***-11.3%***	**4,798,264**	**-10.6%**	***409,634***	***9.6%***
US		***1,082.4***	***-9.2%***	**25,127,165**	**-8.2%**	***1,369,234***	***7.0%***

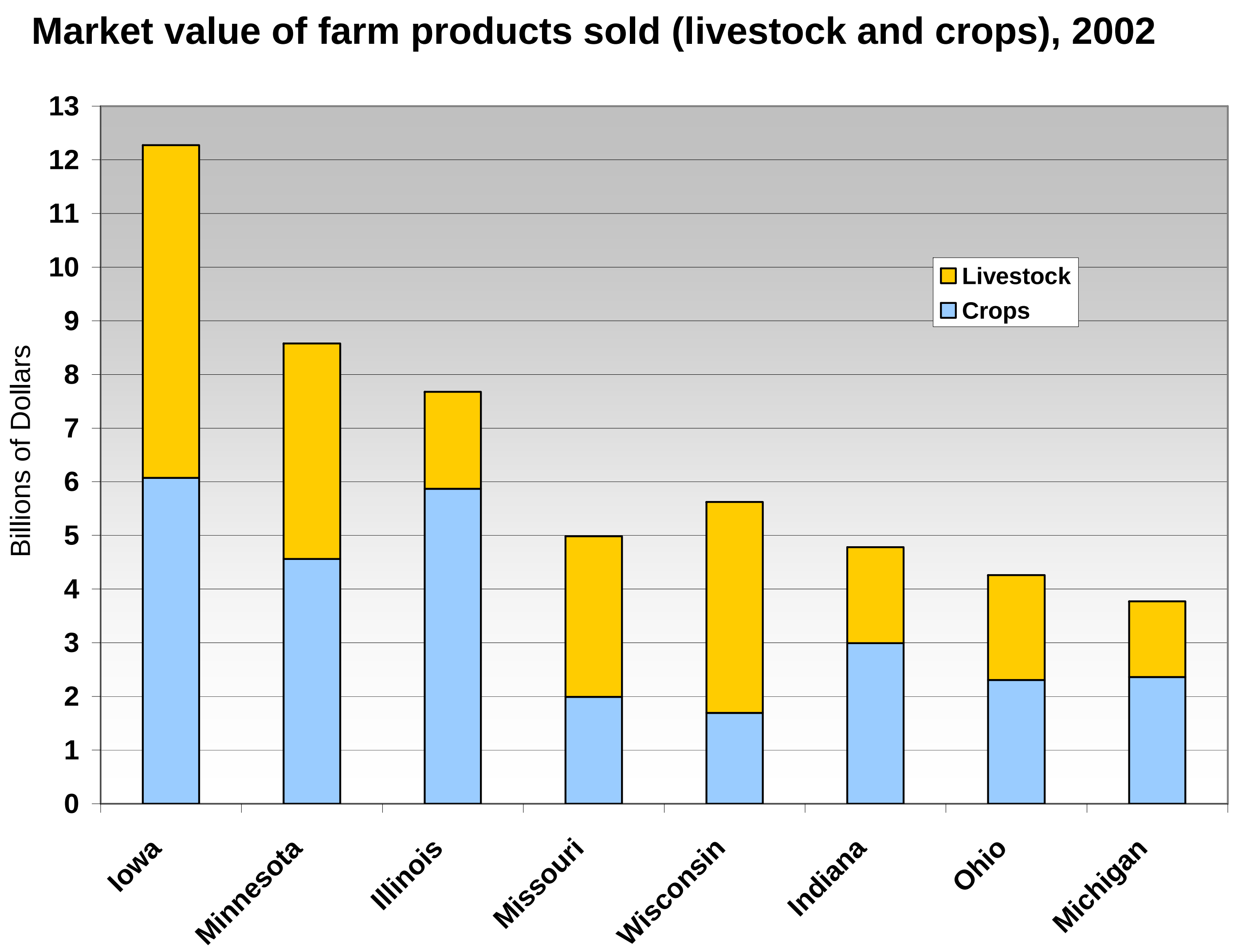
Note: Trends are from 1997 to 2003 due to inconsistent economic data for 1990 to 1996. Source: WRI, CAIT 2007; Energy Information Administration SEDS 2007; Bureau of Economic Analysis 2007

Agriculture emissions profiles differ across the region…

Midwest agricultural GHG emissions by gas, 2002



…but closely mirror agricultural activity



Discussion

Questions and Comments