

Kansas Energy and Environmental Policy Advisory Group (KEEP)



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Energy Supply (ES)
Technical Work Group (TWG)

Meeting #1, July 8, 2008

Kansas Governor's Office
The Center for Climate Strategies

Welcome and Introductions

- KEEP TWG Members
- Kansas State Agencies
- Members of the Public
- Center for Climate Strategies

Agenda

1. Welcome and Introductions
2. Purpose and Goals of ES TWG Meeting #1
3. Review of the KEEP and Technical Work Group (TWG) process
4. Role of the TWGs
5. Review of Draft Kansas GHG Emissions Inventory & Forecast
6. Development of the Kansas Catalog of Potential State Actions
7. Next Steps for the TWG
8. Agenda, Date, and Time for Next Meetings
9. Public Comments
10. Announcements
11. Adjourn

Goals for TWG Meeting #1

- Introduction to KEEP Climate Action Plan Development Process
- Introduction to the draft KS GHG Emissions Inventory and Forecast
- Introduction to the draft Catalog of Potential State Actions
- Summarize TWG Roles and Initiate TWG Activities

Governor Sebelius Executive Orders

- **Governor Sebelius' Executive Orders** - In 2008, Governor Sebelius has issued four Executive Orders addressing various aspects of climate change and energy policy.
- **March 27, 2008** Executive Order 08-04
 - Reformulates the composition of the Kansas Energy Council
- **March 21, 2008** Executive Order 08-03
 - Establishes the Kansas Energy and Environmental Policy Advisory Group (“KEEP”)
- **February 7, 2008** Executive Order 08-02
 - Establishes the Kansas Innovation Consortium (“KIC”)
- **January 7, 2008** Executive Order 08-01
 - Establishes the Governor's Wind Working Group

Executive Order 08-03

- Establishes the Kansas Energy and Environmental Policy Advisory Group (KEEP) - 25 Members
- KS GHG Emissions Inventory and Forecast
- Include Proposed GHG Reduction Goals
- Include Plan to Achieve the Proposed Goals
- Final Report by January 2010

KEEP Purpose and Goals

- Facilitation of six or more structured climate action planning meetings of the KEEP and a series of interim meetings of five Technical Work Groups (TWGs) to identify, prioritize, develop, and quantify final recommendations to be brought forward in the KEEP's comprehensive Climate Action Plan.
- Development of a comprehensive set of specific policy recommendations by the KEEP in the form of a strategic implementation plan to reduce GHG emissions and enhance energy and economic opportunity in Kansas by 2025 and beyond.

KEEP Purpose and Goals...

- Facilitate and provide technical support to the KEEP process to establish a recommended statewide global warming pollutant (or GHG) reduction goal to be met by implementation of the comprehensive climate action plan developed by the KEEP.
- Issuance by January 2009 of a Preliminary Report to the Governor
- Issuance by January 2010, of recommendations in the form of a final report from the KEEP to the Governor.

Final Work Products

- Inventory and Forecast of Kansas Emissions from 1990 to 2025
- Comprehensive Climate Mitigation Actions in All Sectors
- Statewide Goals for Greenhouse Gas (GHG) Emissions Reductions
- Final Report with Recommendations to Governor Sebelius

Timing – KEEP Meetings

Date	Action
May 20, 2008	1 st KEEP meeting
August 5, 2008	2 nd KEEP meeting
December 2008	3 rd KEEP meeting
April 2009	4 th KEEP meeting
August 2009	5 th KEEP meeting
November 2009	6 th KEEP meeting
January 2010	Final Report due
Between KEEP Meetings	TWG conference calls and meetings (1-2 per month)

KEEP and TWG Process

Building Consensus

- Deliberative Democracy
 - Comprehensive
 - Stepwise
 - Fact based
 - Transparent
 - Inclusive
 - Collaborative
 - Consensus driven



Coverage of Issues



- All 6 major GHGs
- All sectors
- All potential implementation mechanisms
- State and multi-state actions
- Short- and long-term actions
- Key externalities

Fact Finding

- Preliminary fact finding
 - Inventory and forecast of GHG emissions
 - Inventory and results of state actions
- Joint fact finding and policy development
 - Inventory and forecast of emissions
 - Climate mitigation action recommendations

Transparency



- Policy Design
 - Timing, goals, coverage, implementation methods
- Economic analysis
 - Data sources
 - Quantification methods
 - Key assumptions
 - Key uncertainties

Decision Criteria

- GHG Reduction Potential (MMtCO₂e)
- Cost or Cost Saved Per Ton GHG Removed
- Externalities (Co-benefits, etc.)
- Feasibility Issues

Voting

- Votes included in meeting agendas
 - Presentation of draft decision suggested by TWG
 - KEEP reviews and approves with modifications if/as needed
- Identify objections to final approval
 - Silence = assent
 - Consider alternatives based on discussion, move to final vote
- Levels of final support
 - Unanimous consent (no objections)
 - Super majority (less than five objections)
 - Simple majority (less than half object)
 - Not approved (more than half object)

Roles & Responsibilities

- Process convened by Governor Sebelius
- Technical Work Groups (TWGs) provide advice and guidance to KEEP
- TWGs make recommendations to KEEP
- Governors Office ensures timely and full completion of KEEP duties, etc.
- Public input and review for stakeholders
- CCS provides facilitation, technical support, final report

KEEP Technical Work Groups

- Energy Supply (ES) TWG
- Residential, Commercial and Industrial (RCI) TWG
- Agriculture, Forestry and Waste (AFW) TWG
- Transportation and Land Use (TLU) TWG
- Cross-Cutting Issues (CCI) TWG

Ground Rules

- Supportive of the process
- Attendance at meetings
- Equal footing
- Stay current with information
- No backsliding
- Do not represent the KEEP or TWGs
- Make objective contributions

Stepwise Planning Process

1. Get organized
2. Identify a full range of possible actions
3. Review and refine inventory & forecast of emissions
4. Identify initial priorities for analysis
5. Develop straw policy design proposals
6. Quantify initial GHG reductions and costs/savings
7. Fully develop policy option templates
8. Develop alternatives to address barriers as needed
9. Aggregate and integrate results
10. Finalize and report recommendations

Step 1: Get Organized

- Review process and timelines
- Review preliminary fact finding
 - Inventory and forecast
 - Inventory of recent actions
- Form Technical Work Groups (TWGs)
- Plan next steps

Step 2: Expand the Catalog of States Actions

- Over 300 actions taken by U.S. states
 - Existing, planned and proposed state and multistate actions
 - Many U.S. states
 - All sectors
 - Variety of implementation mechanisms
 - Includes key KS actions
- KEEP adds missing potential actions
 - Starting place for identification of priorities for analysis

Step 3: Review and Refine Inventory and Forecast

- Scope of coverage
- Data sources
- Methods
- Assumptions
- Key Uncertainties

Step 4: Identify Initial Priorities for Analysis

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Other Considerations: Jobs, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes / Related Actions in KS
AFW-1	AGRICULTURE – PRODUCTION OF ENERGY AND MATERIALS					
1.1	Expanded Use of Biomass Feedstocks for Electricity, Heat, or Steam Production					
1.2	In-state Liquid Biofuels Production					
1.3	Manure Digesters/Other Waste Energy Utilization					
1.4	Improving Energy Capture from Biomass Heat					
1.5	Expand Use of Bio-based Materials					

- KEEP identifies about 50 initial potential options for further analysis and development

Step 5: Craft Straw Policy Design Proposals

- TWGs propose initial policy option design (“straw proposals”) with key parameters of analysis
 - Timing
 - Goals (numerical level of effort)
 - Parties involved in implementation
- CCS works with TWGs to set up quantification
- Options are quantified and fleshed out for review and revision by the KEEP
- KEEP revisits list of potential priorities, as needed

Step 6: Prepare First Round of Quantification

- CCS prepares quantification memo, TWG assumptions memos, options for analysis of draft actions
 - U.S. EPA Economic Guidelines, other standard references applied to climate actions
- Quantification includes
 - GHG reduction potential (mitigation)
 - Cost per ton of GHG removed
- Externalities if/as needed
- Aggregate/Integrative impacts


Step 7: Develop Full Policy Option Template

- Policy Description (Concept)
- Policy Design (Goals, Timing, Coverage)
- Potential Implementation Methods
- Related Programs and Policies (Business-As-Usual Case)
- Quantification of costs, results
 - Data Sources, Methods, and Assumptions
 - Key Uncertainties
- Externalities, as Needed
- Feasibility Issues, as Needed
- Status of Group Approval
- Level of Group Support
- Barriers to Consensus, if any

Step 8: Identify Alternatives to Resolve Barriers to Consensus

- Clarification, expanded information, or policy design modification:
 - Policy Design (goals, timing, coverage)
 - Implementation methods
 - Analysis (data sources, methods, assumptions)
 - List of options

A “Portfolio” of Policy Options...

 <small>CENTER FOR CLIMATE STRATEGIES</small>	Codes & Standards	Market Mechanisms	Funding Mechanisms	Voluntary Agreements	Technical & Financial Assistance	Information & Education	Pilots & Demo Projects	Reporting & Disclosure
Agriculture Forestry & Waste								
Energy Supply & Demand								
Cap and Trade								
Transportation & Land Use								
Adaptation								
Government Policy								

Implementation Methods - Not One Size Fits All

- Voluntary Agreements
- Technical Assistance
- Financial Incentives
- Targeted Spending
- Codes and Standards
- Market-Based Approaches
- Pilots and Demos
- Information and Education
- Research and Development
- Reporting and Disclosure

Step 9: Conduct Aggregate Analysis and Compare to Goals

- Integrate measures within TWGs
- Integrate measures across TWGs
- Remove double counting
- Assess supply and demand interactions
- Assess other interactions, externalities, if/as needed
- Assess needs for margin of safety, etc.

Step 10: Develop Final Report

- KEEP Recommendations & Results
 - Executive Summary
 - Potential Impacts of Climate Change on Kansas
 - History and Status of State Actions Related to GHG Emissions
 - Inventory and Forecast of Kansas GHG Emissions
 - Recommended Policy Actions by Sector:
 - Energy Supply
 - Residential, Commercial, and Industrial
 - Transportation and Land Use
 - Agriculture, Forestry, and Waste Management
 - Cross-Cutting Issues
 - Technical Appendixes

Technical Work Group (TWG) Roles

- Assist KEEP
 - Identify potential state actions
 - Identify potential priorities for analysis
 - Suggest straw policy designs
 - Assist with analysis and review of options
 - Assist with development of policy alternatives
 - Assist with input to and review of KEEP reports
 - Review and assist with the state GHG inventory and forecast

Kansas Draft GHG Emissions Inventory and Forecast

Inventory Approach

- Standard U.S. Environmental Protection Agency (EPA), United Nations, Intergovernmental Panel on Climate Change (IPCC) methodologies, guidelines, and tools
- Emphasis on transparency, consistency, and significance
- Preference for Kansas or regional data, where available
- Consumption- and production-basis emissions from electricity generation
 - Very simplified approach used for initial analysis

Projection Approach

- Reference case assumes no major changes from business-as-usual (BAU)
 - Includes approved policies and actions to the extent possible (e.g., Energy Efficiency, Renewable Energy)
- Growth assumptions from existing sources
 - State population
 - U.S. Census
 - U.S. Energy Information Administration

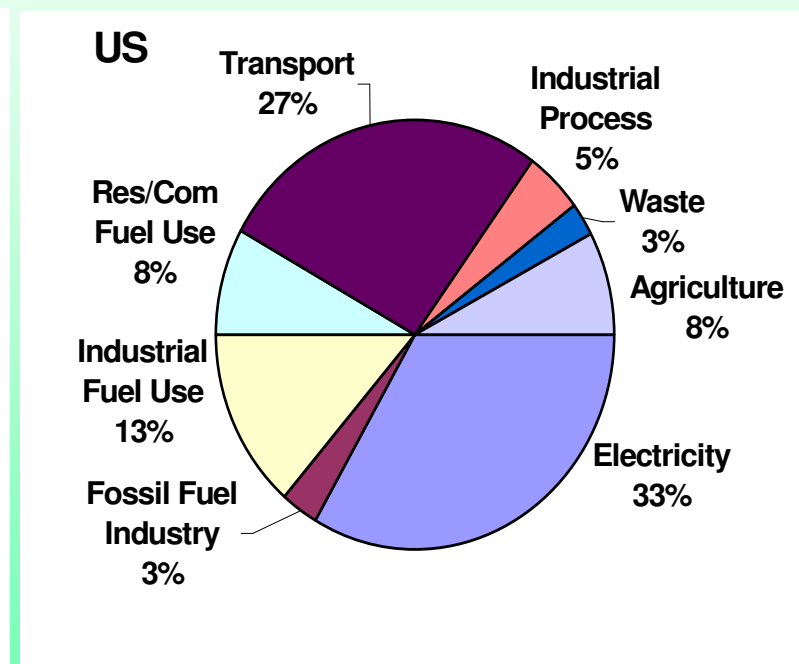
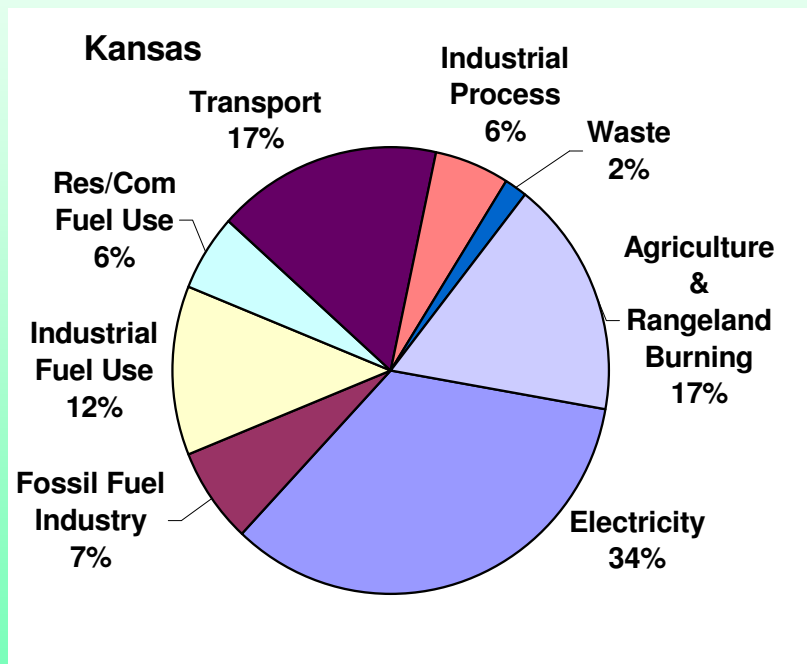
Coverage

- Six gases per USEPA and UNFCCC guidelines
 - Carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆)
- All major emitting sectors
 - Electricity Supply & Demand (Consumption-Based)
 - Residential, Commercial, Industrial (RCI) Fuel Use and Non-fuel Use Processes
 - Transportation (onroad and nonroad)
 - Fossil Fuel Industry
 - Agriculture, Forestry, and Waste Management
- Emissions expressed as CO₂ equivalent
 - 100-year global warming potentials
 - CO₂ = 1; CH₄ = 21; N₂O = 310; HFC-23 = 11,700; SF₆ = 23,900

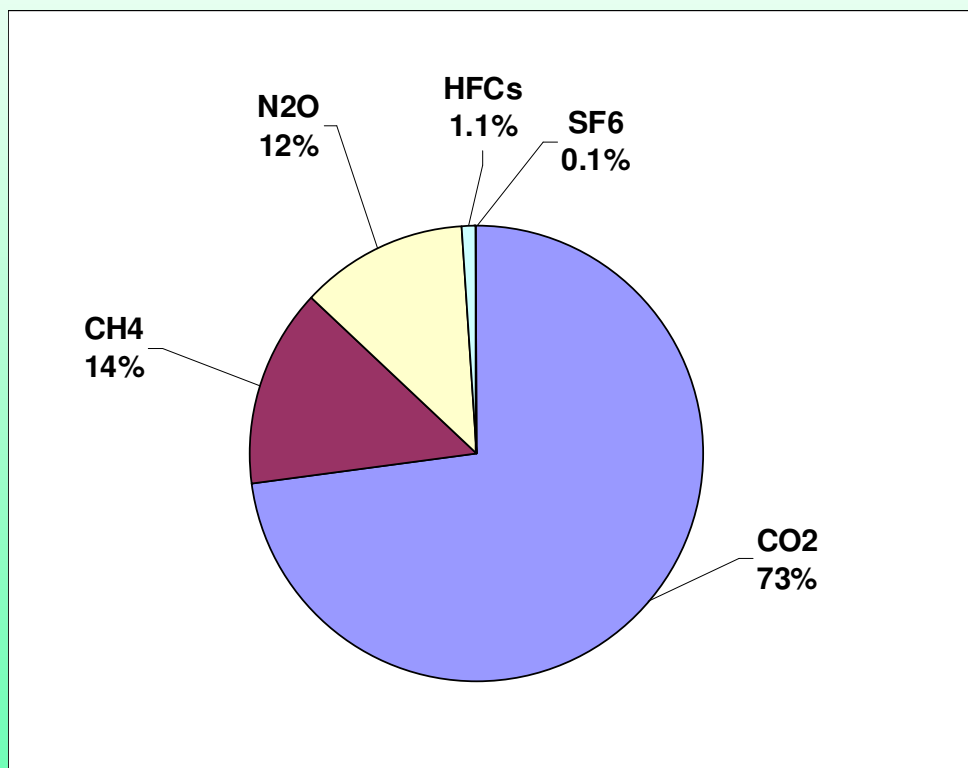
Key Points

- Preliminary draft for KEEP and TWGs; review and revision, as needed
 - http://www.ksclimatechange.us/Inventory_Forecast_Report.cfm
- Helpful for diagnosis of GHG emissions, but not a baseline for modeling or compliance for individual options
- Consumption and Production methods
- Gross and Net methods

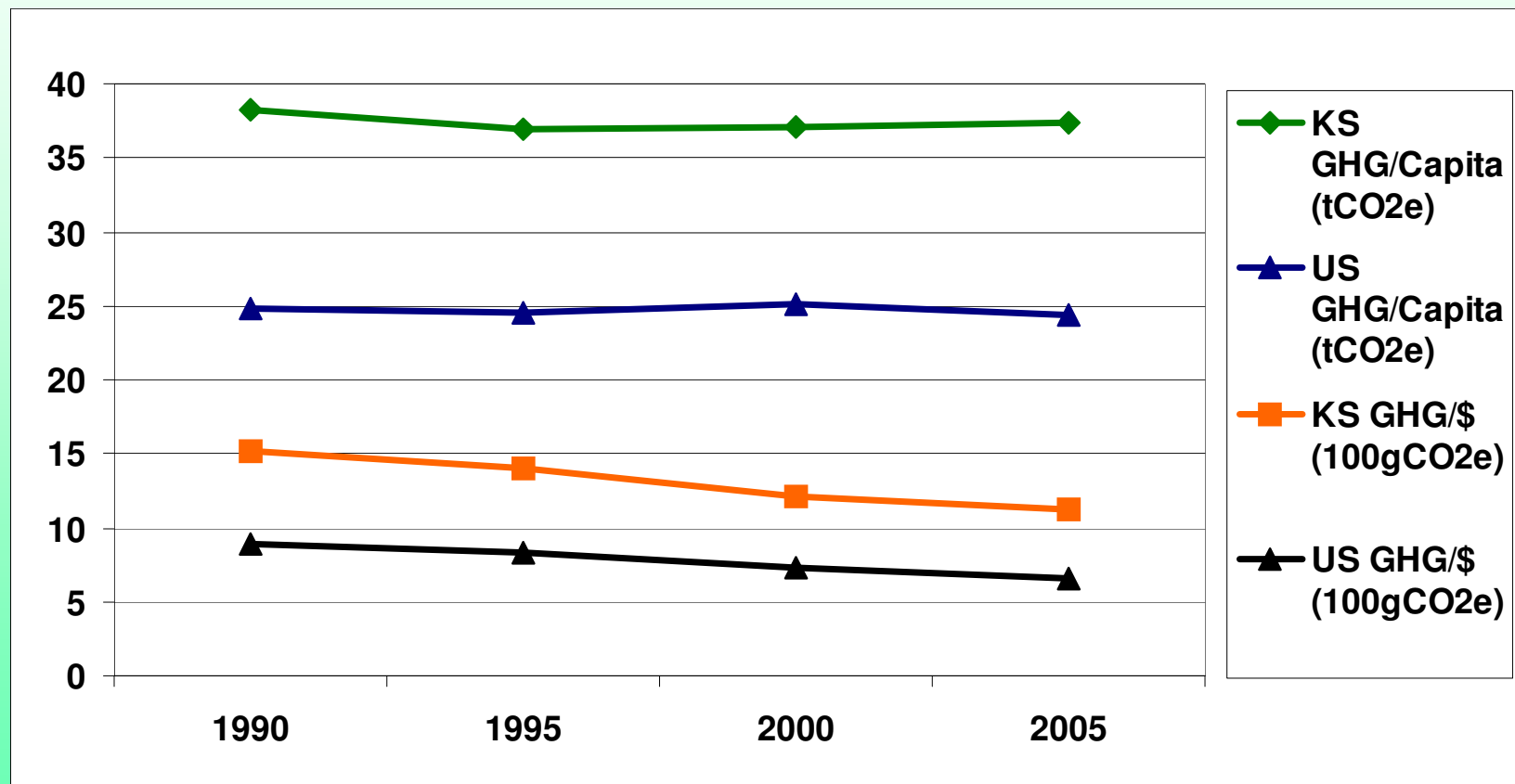
Kansas & U.S. Gross Emissions By Sector, 2005 (Consumption Based)



Kansas Gross Emissions By GHG, 2005 (Consumption Based)

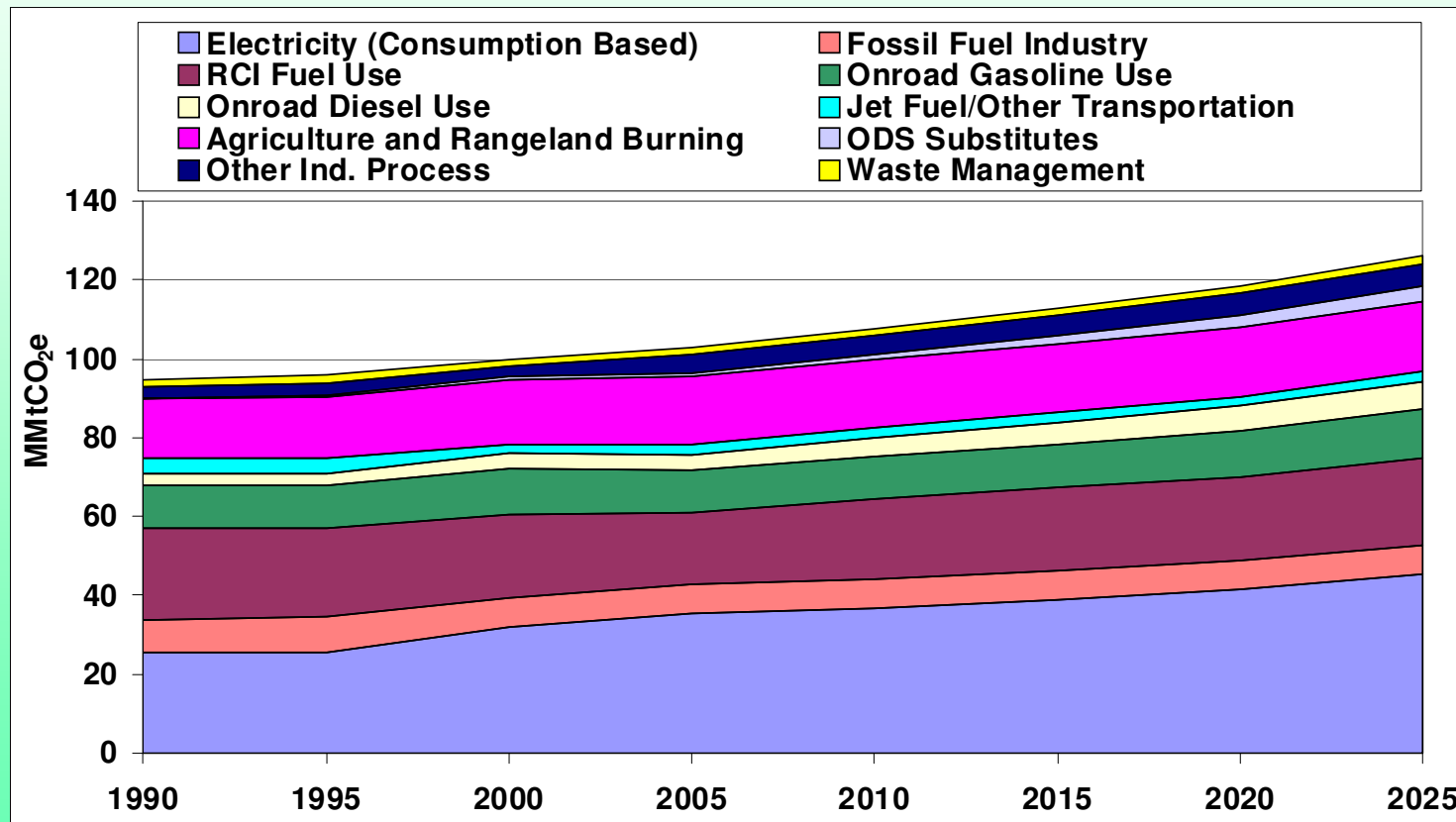


Per Capita and GSP/GDP Gross GHG Emissions, 1990-2005

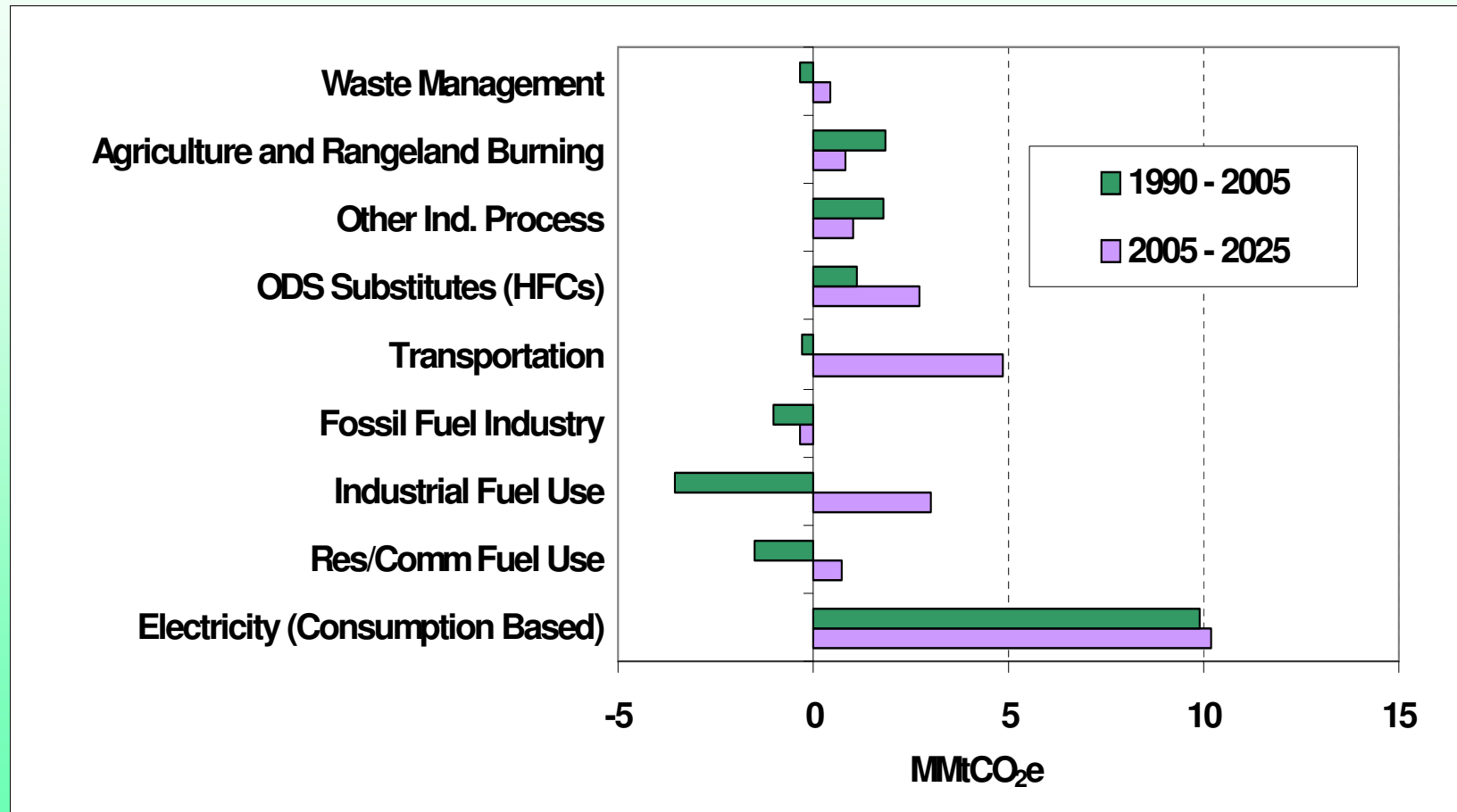


Kansas Gross GHG Emissions By Sector, 1990-2025

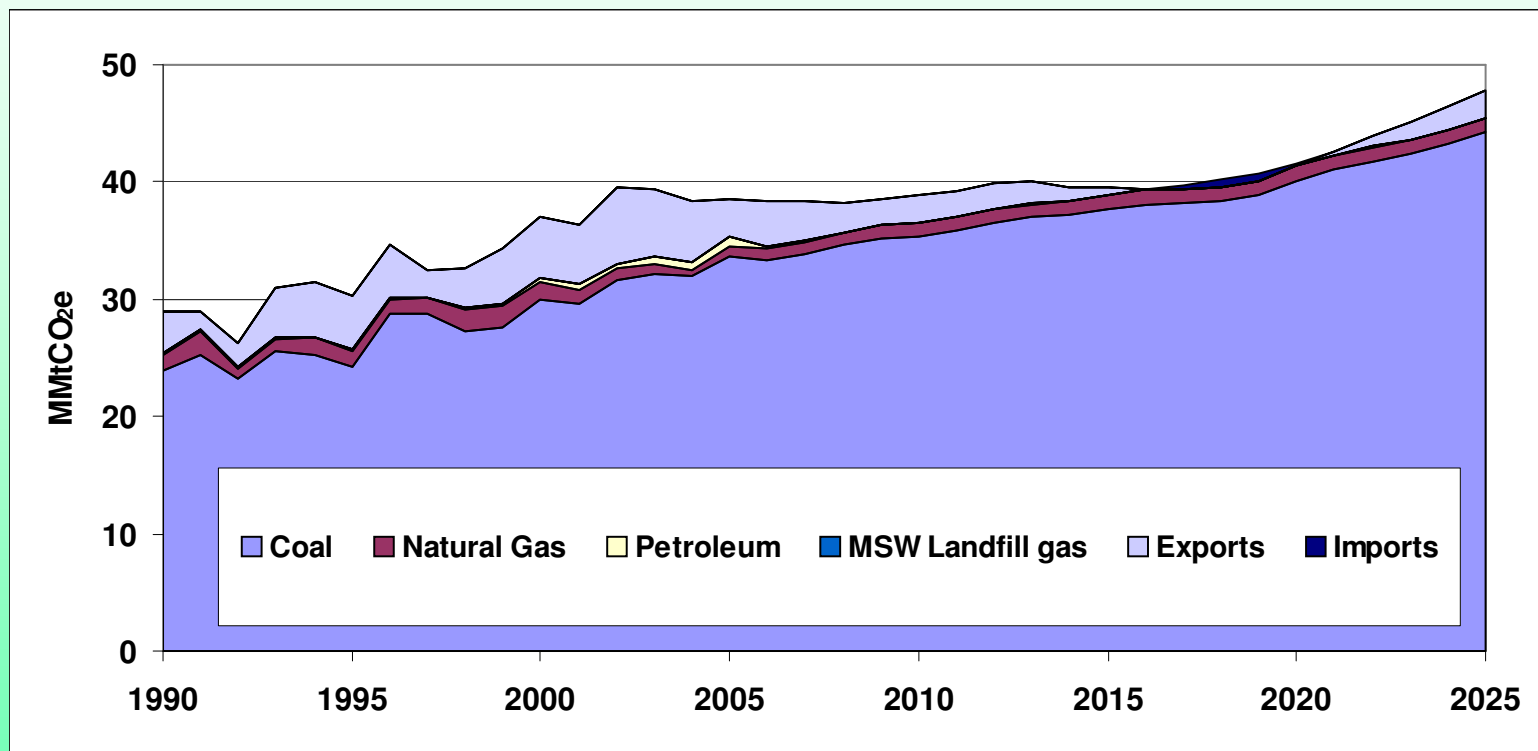
(Consumption Based)



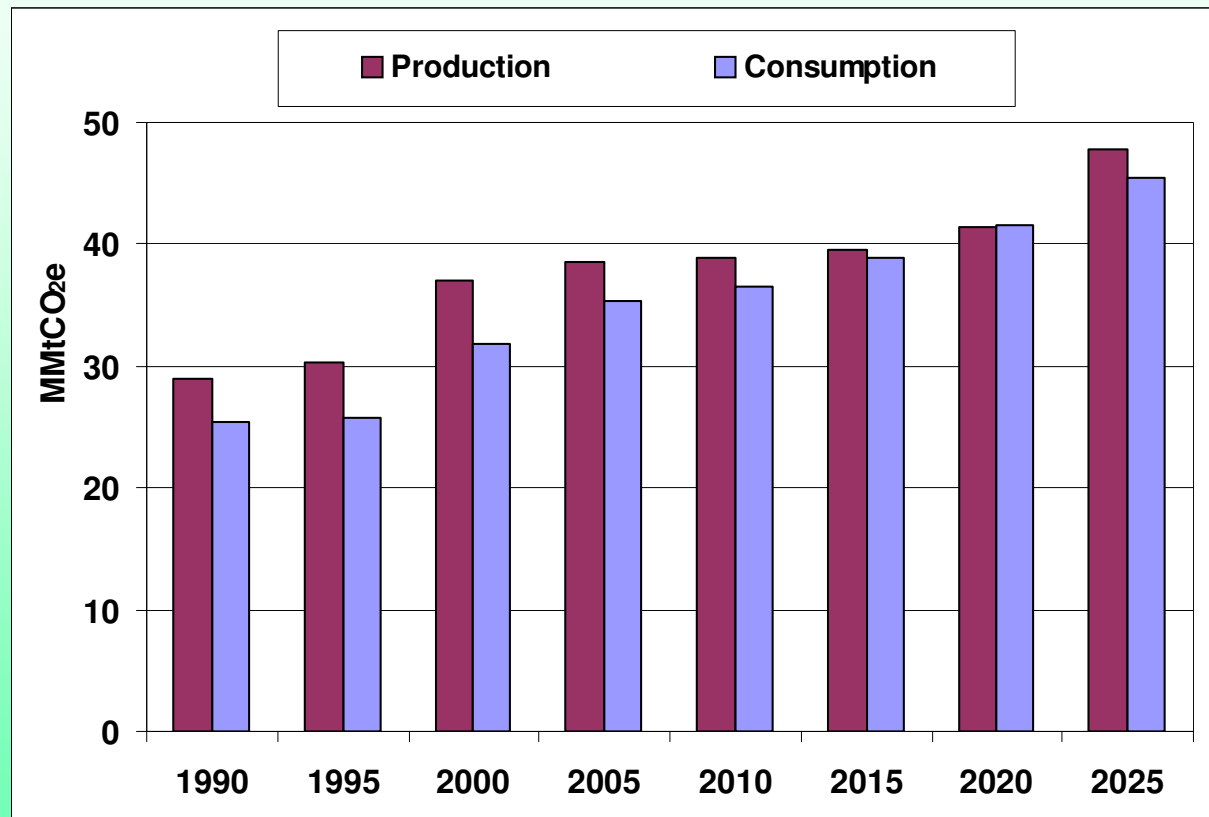
Kansas Gross Emissions Growth (MMtCO₂e, Consumption Based)



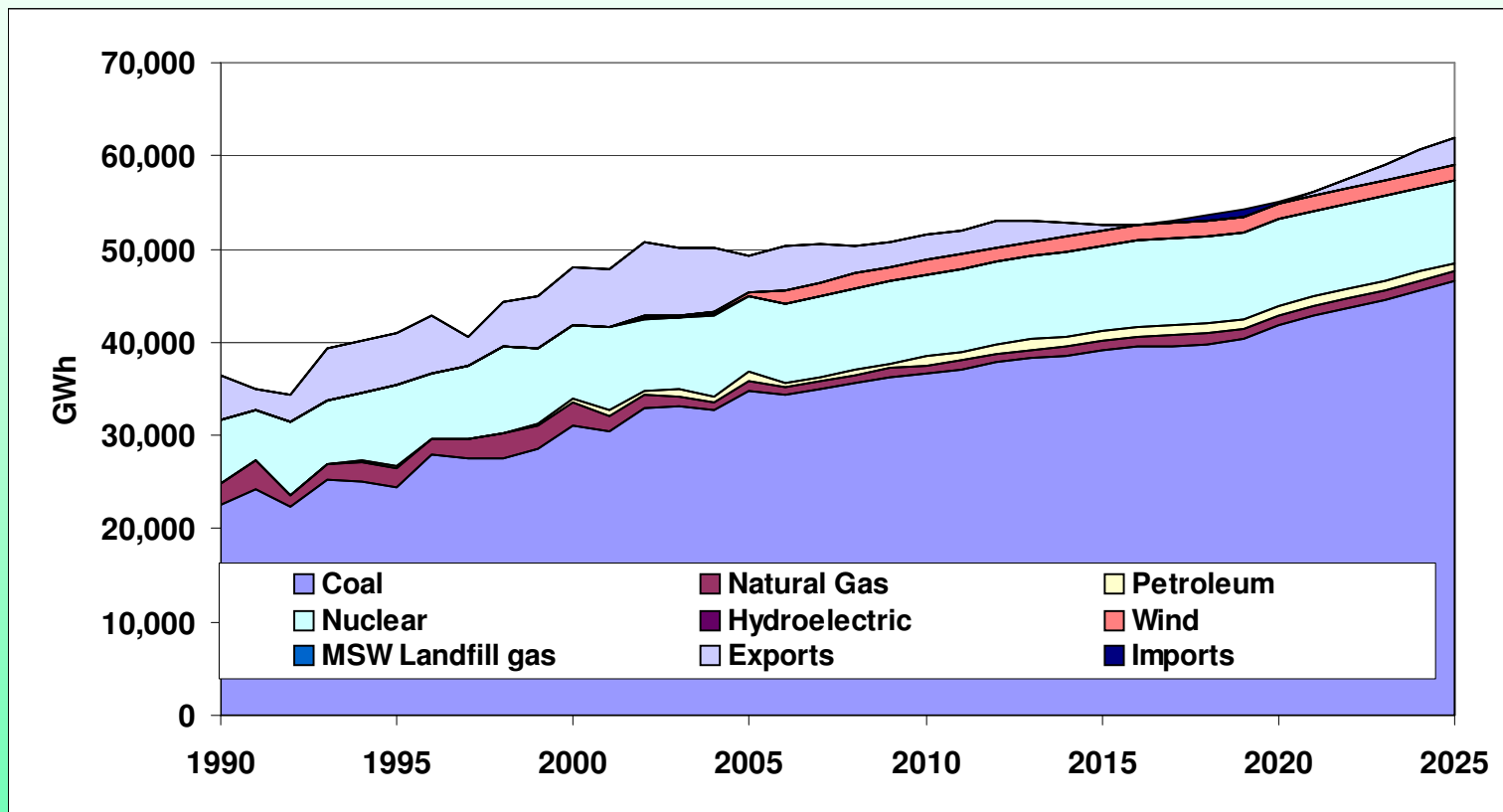
Electricity - Emissions



Electricity - Emissions



Electricity – Gross Generation



Electricity

- Data Sources

- Historical

- Generation and fuel consumption for 1990-2005
 - 906/920 Monthly Time Series data (EIA)
 - Monthly Cost and Quality of Fuels for Electric Plants (EIA) – coal-type data

- Forecast

- EIA/Annual Energy Outlook 2007 for Southwest Power Pool (SPP) region
 - Projected electricity sales and generation for 2006-2025
 - Projected trends in combustion efficiency improvement and transmission & distribution losses for 2006–2025

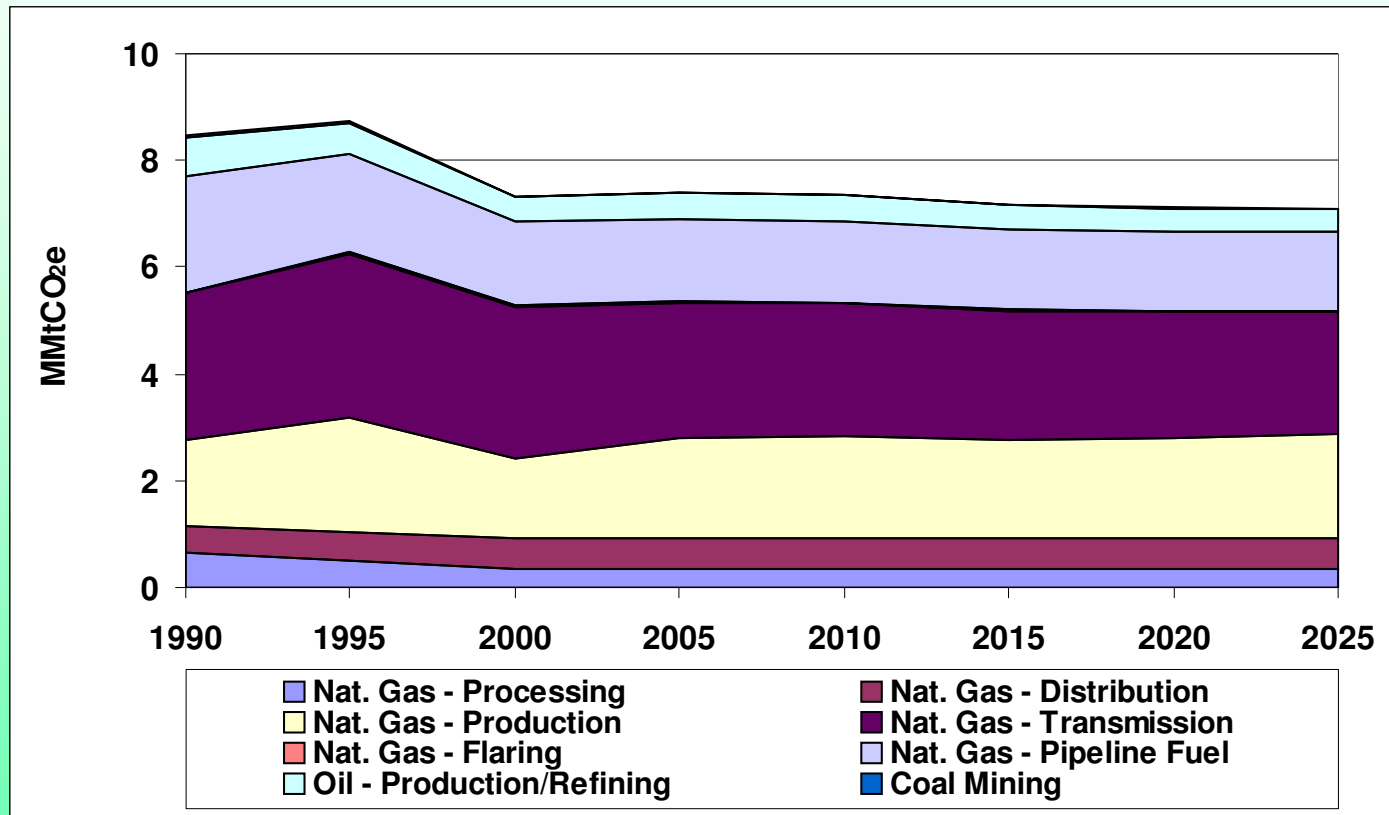
Electricity

- Methodology
 - Key Inputs
 - Coal quality used in KS power stations
 - Gross annual primary energy consumption by KS power stations by fuel type
 - Gross annual generation to meet KS demand
 - Multiply gross annual primary energy consumption by KS power stations by CO₂e emission factors
 - Assign the portion of CO₂e emissions not associated with KS demand to imports/exports

Electricity

- Key Uncertainties
 - Top-down approach
 - Assumes KS electric systems evolve consistently with the surrounding SPP region
 - Does not capture all state-specific system characteristics
 - Source of electricity imports and exports
 - Coal quality over time
 - Coal quality for 2005 assumed for forecast period

Fossil Fuel Industry



Fossil Fuel Industry

- Data Sources
 - Historic (1990-2005)
 - Natural Gas
 - Production – number of KS gas wells from EIA
 - Processing
 - Number of gas processing plants in KS from *Oil and Gas Journal*
 - Volume of gas flared in KS computed from volume of gas flared/vented in KS from EIA and EIIP percentage flared assumption
 - Miles of gathering pipeline
 - Kansas Corporation Commission (2005)
 - Back-cast to 1990 using KS natural gas production from EIA
 - Miles of transmission/distribution pipeline and number of services
 - Pipeline and Hazardous Materials Safety Administration/Office of Pipeline Safety data (transmission: 2001-2005; distribution: 2004-2005)
 - Transmission and distribution pipeline mileage/service counts back-cast to 1990 using EIA data
 - » Transmission: volume of natural gas transported into/out of KS
 - » Distribution: number of natural gas consumers in KS
 - Compressor stations – EIIP default number of stations per pipeline mile
 - Pipeline fuel use – EIA volume of natural gas consumed in KS pipelines

Fossil Fuel Industry

- Data Sources
 - Historic (1990-2005)
 - Oil
 - Production – volume of oil produced in KS from University of Kansas, Kansas Geological Survey
 - Transport – EIIP default assumption (volume produced = volume transported)
 - Refining – volume of oil refined in KS – EIA regional crude oil input x ratio of KS refining capacity to regional refining capacity
 - Coal Mining – EPA *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005*.
 - Forecast (2006-2025)
 - Growth rates based on state historical emissions trends and *Annual Energy Outlook 2007* projections
- Methods
 - Based on EPA State Greenhouse Gas Inventory Tool (SIT)
 - Activity multiplied by emission factors

Fossil Fuel Industry

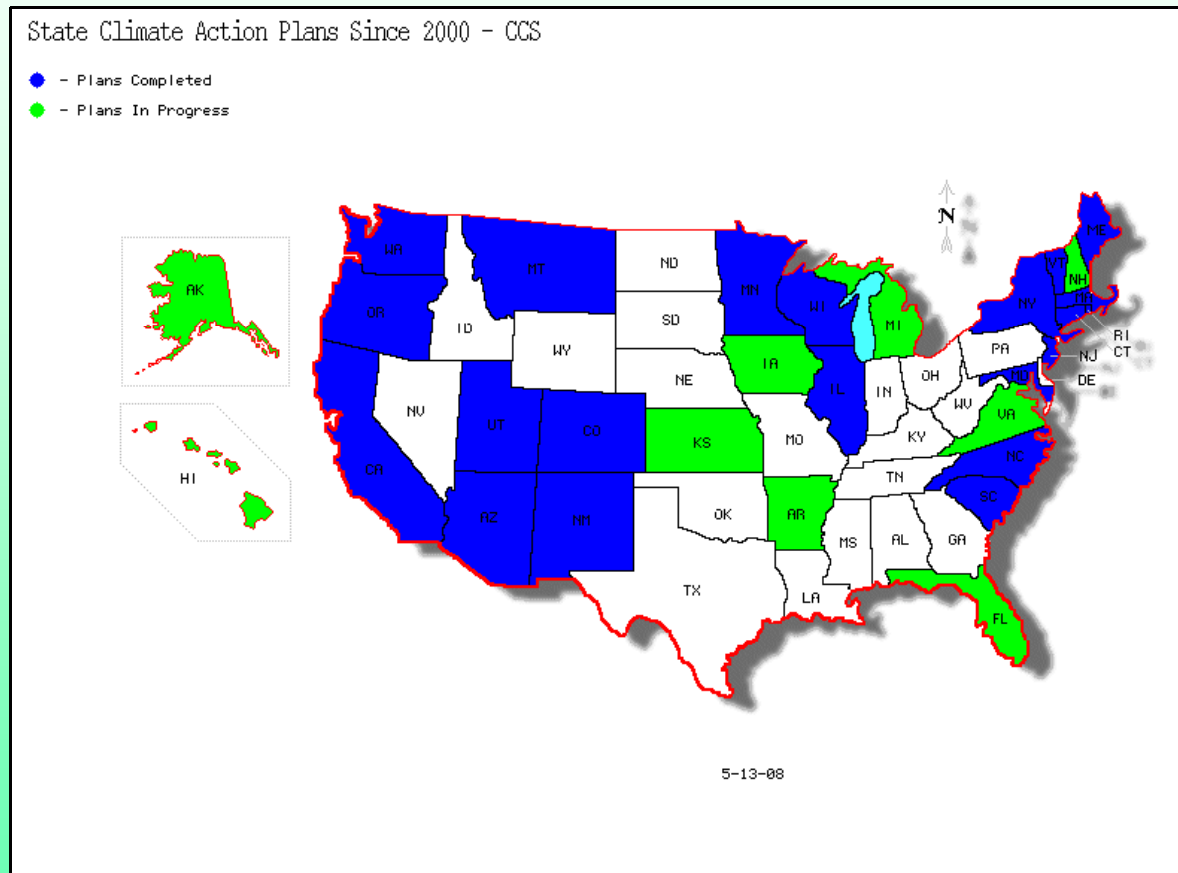
- Key Assumptions
 - For natural gas gathering/transmission/distribution pipelines—surrogates trend with emissions activity
 - EPA EIIP defaults for number of compressor stations per mile of pipeline
 - Growth rates are process-specific, vary by activity
 - Used state historical trend unless Annual Energy Outlook regional forecast was in-line with historical state trend
- Key Uncertainties
 - Transmission Pipeline (highest-emitting category)
 - Pre-2001 mileage
 - Annual growth rate for forecast period (-0.5%) based on average annual 1990-2005 growth
 - Natural Gas Production (second highest-emitting category)
 - Annual growth rates for forecast period based on Annual Energy Outlook regional natural gas production forecast

Kansas Catalog of Potential State Actions

Catalog of Potential Actions

- Start with draft Catalog of potential actions drawn by CCS from State experiences across the US
- Expand catalog to ensure full coverage of potential actions relevant to consideration for Kansas
- Identify existing action, policies, and programs
- The expanded, KEEP-approved catalog will serve as the starting point for future prioritization, quantification, and analysis

U.S. State Climate Action Plans Completed and In Progress



National Actions

- US EPA activities related to climate change are increasing

<http://www.epa.gov/climatechange/>

- Significant US legislative action on climate change and energy policy
 - Energy Independence and Security Act of 2007
 - Lieberman-Warner Climate Security Act and other proposals

Midwestern Governor's Association

- Midwestern Governors Greenhouse Gas (GHG) Reduction Accord (2007)
- Midwestern Governors Energy Security and Climate Stewardship Platform (2007)
- <http://www.midwesterngovernors.org/>
- <http://midwesternaccord.org/>

Existing Activity in Kansas

- KS Department of Health and Environment (KDHE)
- KS Corporation Commission (KCC)
- Kansas Energy Council (KEC)
- Kansas Geological Survey (KGS)
- Universities
- Utilities
- Kansas Wind Working Group
- Local government initiatives
- Others

Energy Supply Catalog

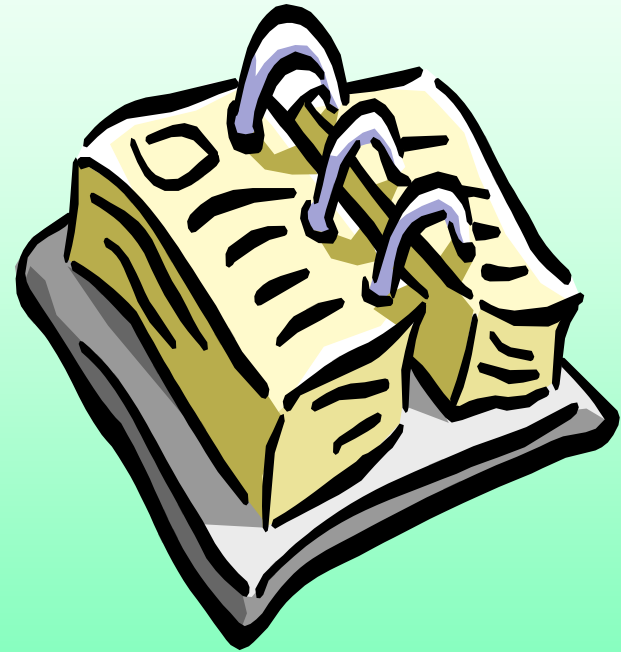
1. Emissions Policies and Overarching Items
2. Renewable Energy and Energy Efficiency
3. Fossil Fuel and Nuclear Electricity
4. Fuel Production, Processing and Delivery
5. Carbon Capture and Storage or Reuse
6. Other Energy Supply Options

Next Steps for KEEP & TWG

- One more ES TWG meeting before next KEEP meeting –
Friday, July 18, 10:00-11:30 AM CDT
 - Review and expand Catalogs of potential state actions relevant to Kansas
 - Identify existing action
 - Review and comment on inventory and forecast
- KEEP Meeting #2
 - August 5 in Lawrence, KS

Next KEEP Meeting

- Agenda:
 - Review and approve catalog of potential additional state actions
 - Review and approve TWG suggested updates to the draft KS GHG emissions inventory and forecast
 - Prepare for next steps (identification of priorities for analysis)
- Location and Date:
 - Lawrence, Kansas
 - August 5, 2008



Public Input, Announcements

July 8, 2008

www.ksclimatechange.us

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Adjourn