THE WATER INSTITUTE

LOUISIANA CLIMATE ACTION PLAN: INITIAL DEVELOPMENT USING STRUCTURED DECISION-MAKING

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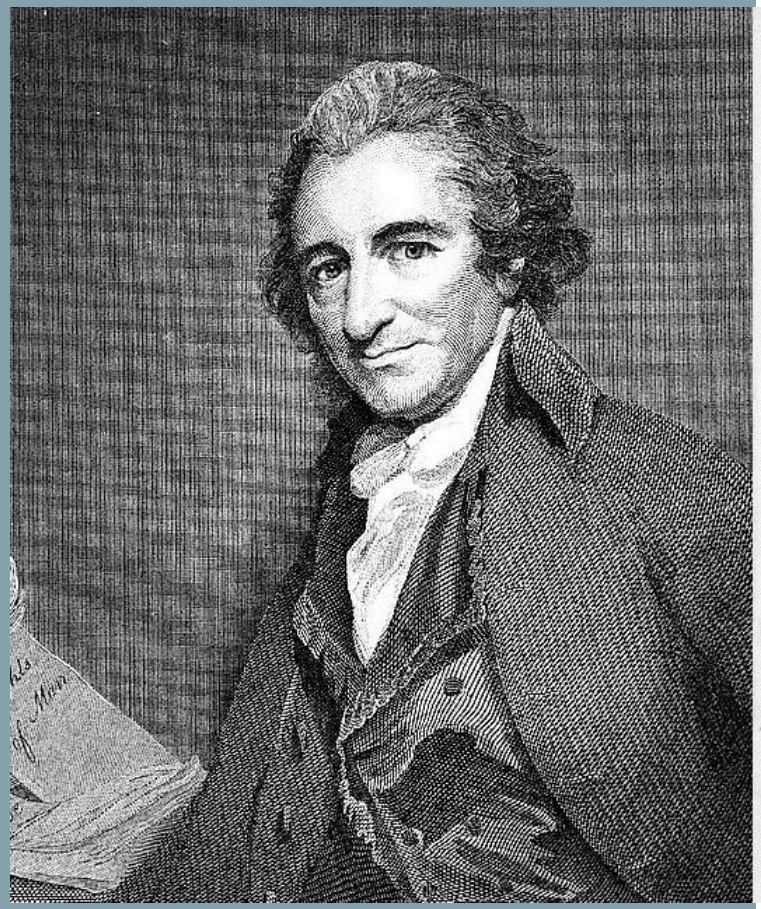
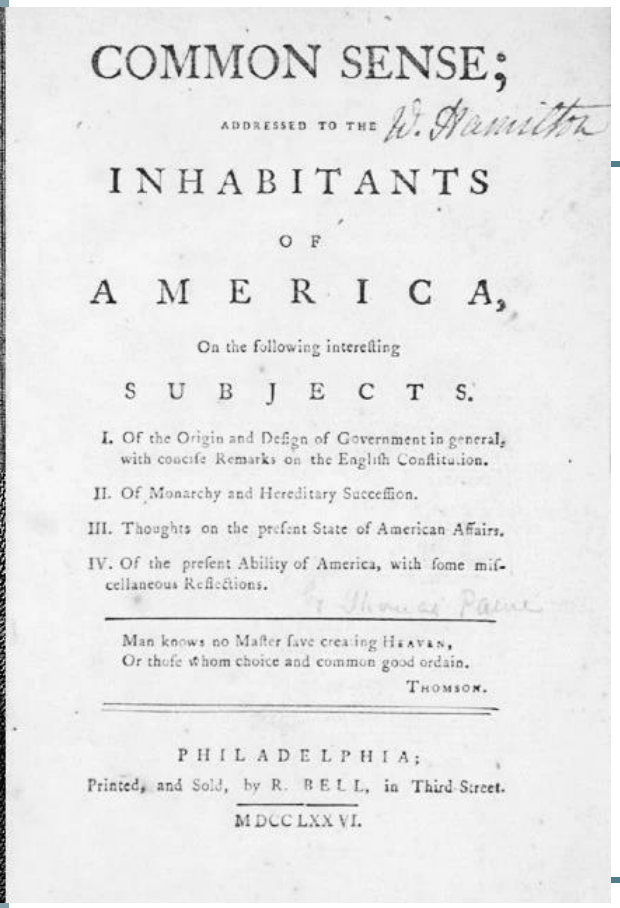
May 2025

Utilizing data and models to formulate policy is the “ideal” many strive towards, but doing so in practice can be quite challenging, and may leave important partners out of the process.

UTILIZING STRUCTURED DECISION MAKING





COMMON SENSE;

ADDRESSED TO THE W. Hamilton

INHABITANTS

OF

AMERICA,

On the following interesting

SUBJECTS.

I. Of the Origin and Design of Government in general, with concise Remarks on the English Constitution.

II. Of Monarchy and Hereditary Succession.

III. Thoughts on the present State of American Affairs.

IV. Of the present Ability of America, with some miscellaneous Reflections.

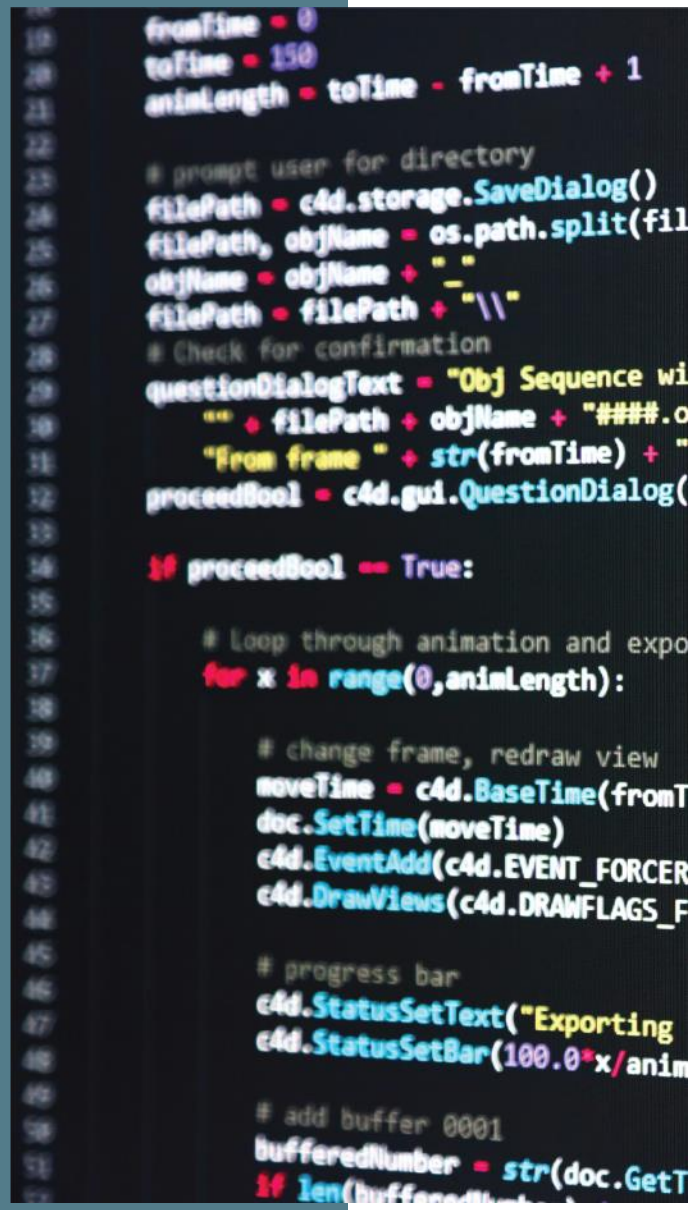
Man knows no Master save creating HEAVEN,
Or those whom choice and common good ordain.
THOMSON.

PHILADELPHIA:
Printed, and Sold, by R. BELL, in Third-Street.
MDCCLXXVI.

"A formalization of common sense for decision problems which are too complex for informal use of common sense."

– Keeny, 1982

STRUCTURED DECISION MAKING



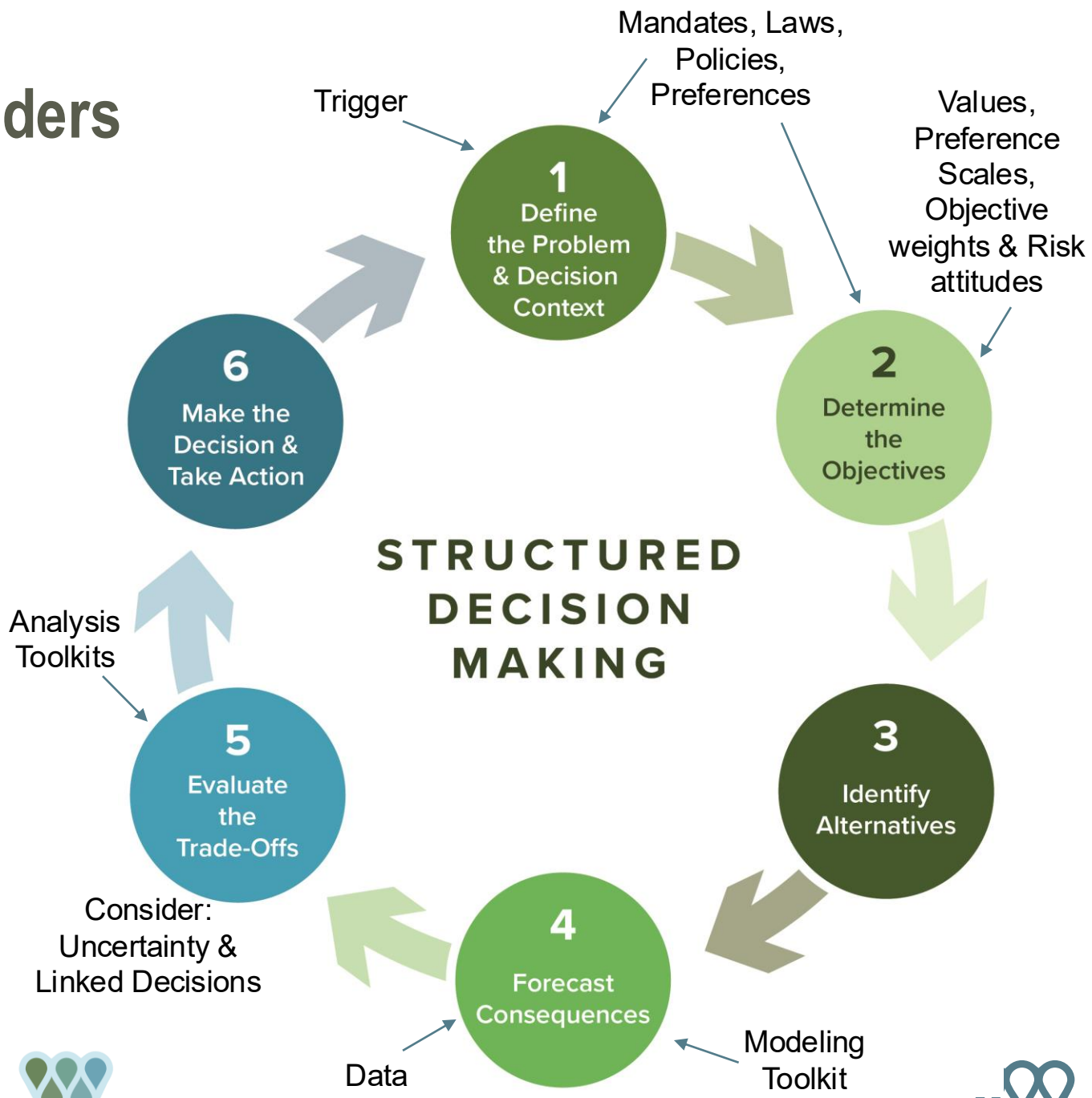
- Analyzes decisions to identify solutions that achieve desired outcomes— explicit and transparent
- Encompasses a broad set of methods and tools
  (drawing from the fields of decision analysis, operations research, economics, human dimensions, management science, behavioral psychology, expert judgment)
- Supports decisions based on clearly articulated fundamental objectives
- Responds transparently to legal mandates and public preferences (or values) in decision making
- Integrates science and policy

(Runge, 2016)

Work through decision-making in a collaborative process with stakeholders

PrOACT Framework for Structuring Decisions:

1. Defining the Problem (Decision Context)
2. Determining the Objectives
3. Identifying Alternatives
4. Evaluating alternatives and forecasting the Consequences
5. Evaluating the Trade-offs
6. Making the decision and taking action

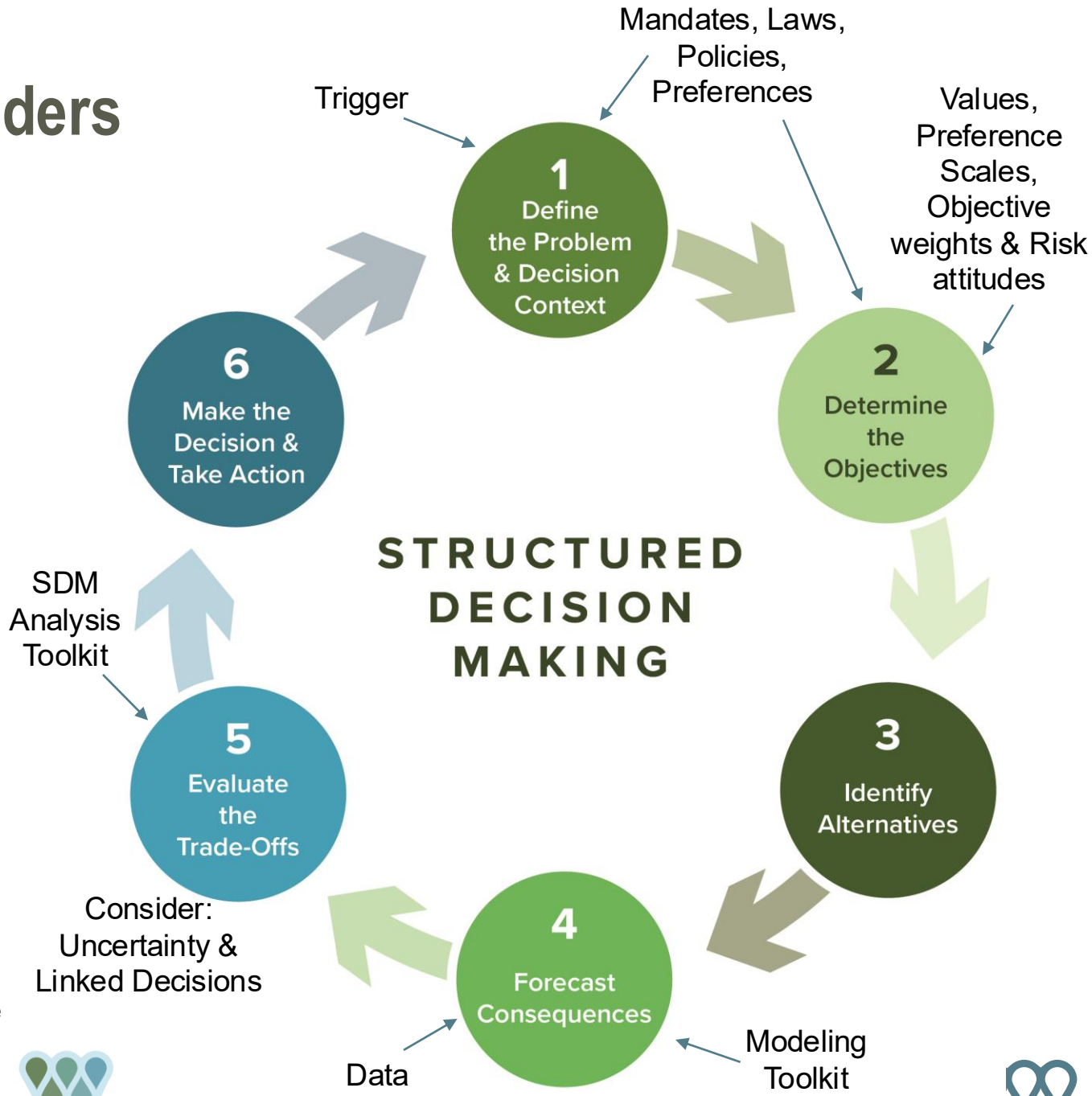


Source: Jean Fits Cochrane

Work through decision-making in a collaborative process with stakeholders

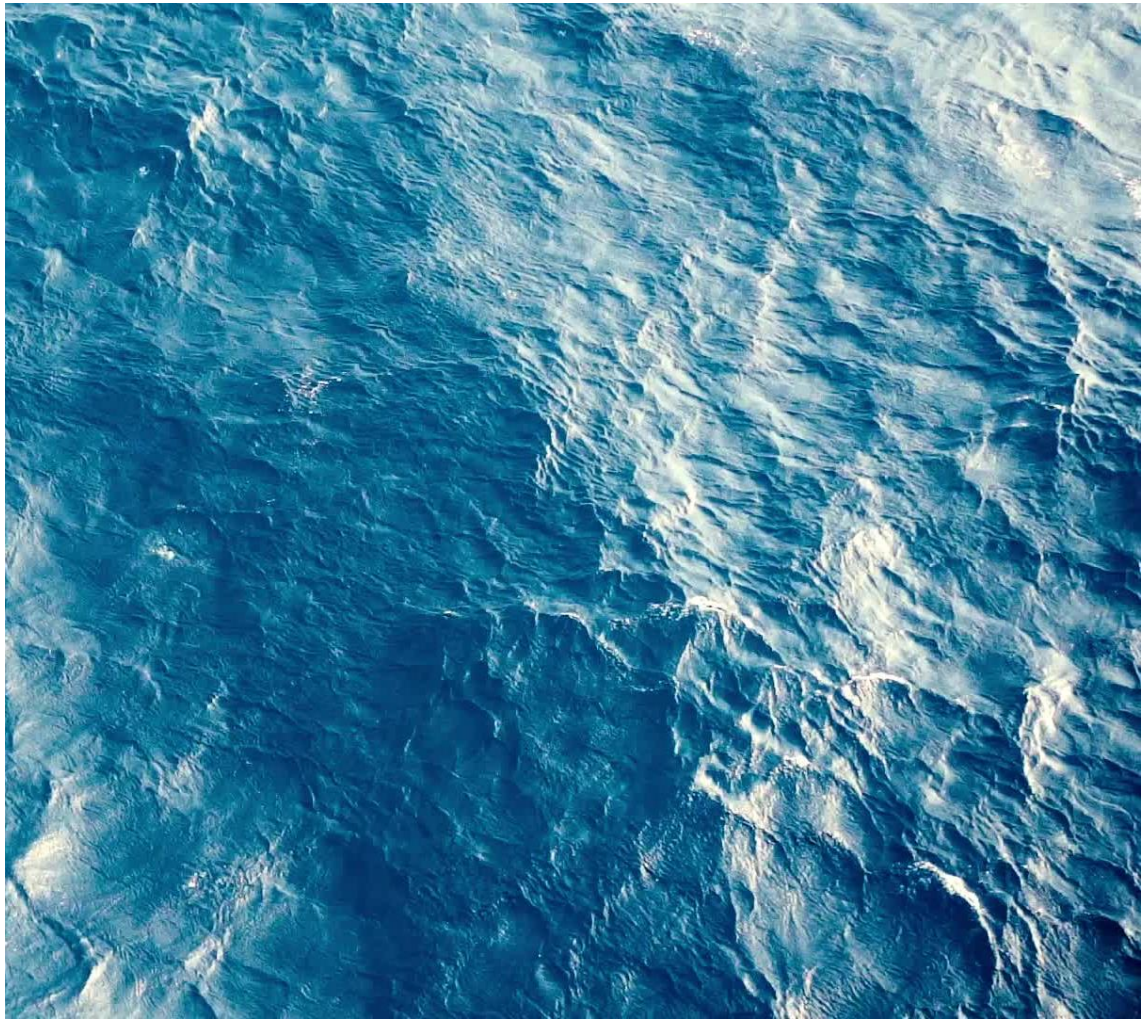
A key benefit is to help *structure conversations* about complex decisions

- Legal mandates
- Problem decomposition
- Values-focused thinking
- Key stakeholders engaged in a transparent process



Source: Jean Fits Cochrane

PUTTING SDM INTO PRACTICE IN THE GULF OF AMERICA



Example: Climate Mitigation Planning

CLIMATE EXECUTIVE ORDER FOR LOUISIANA

By 2025

26 - 28%

Of 2005 levels

By 2030

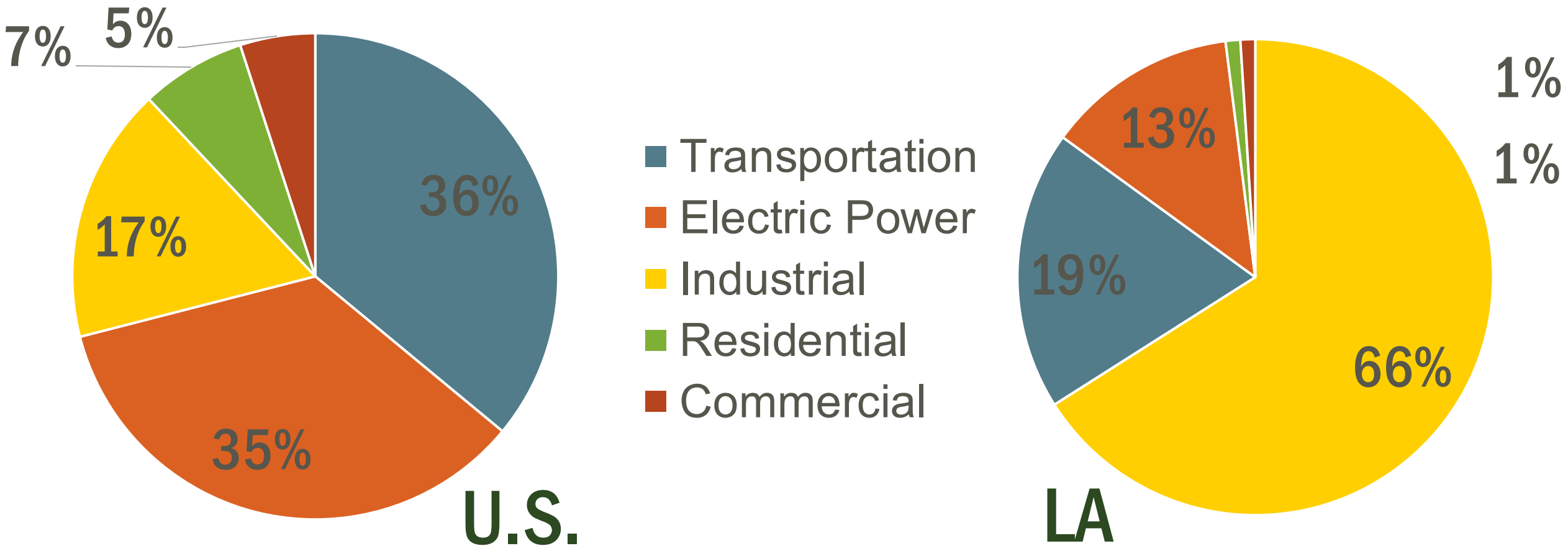
40 - 50%

Of 2005 levels

By 2050

Net Zero

U.S. AND LA CO_2 EMISSIONS PER SECTOR, 2018



PLANNING PROCESS & METHODOLOGY

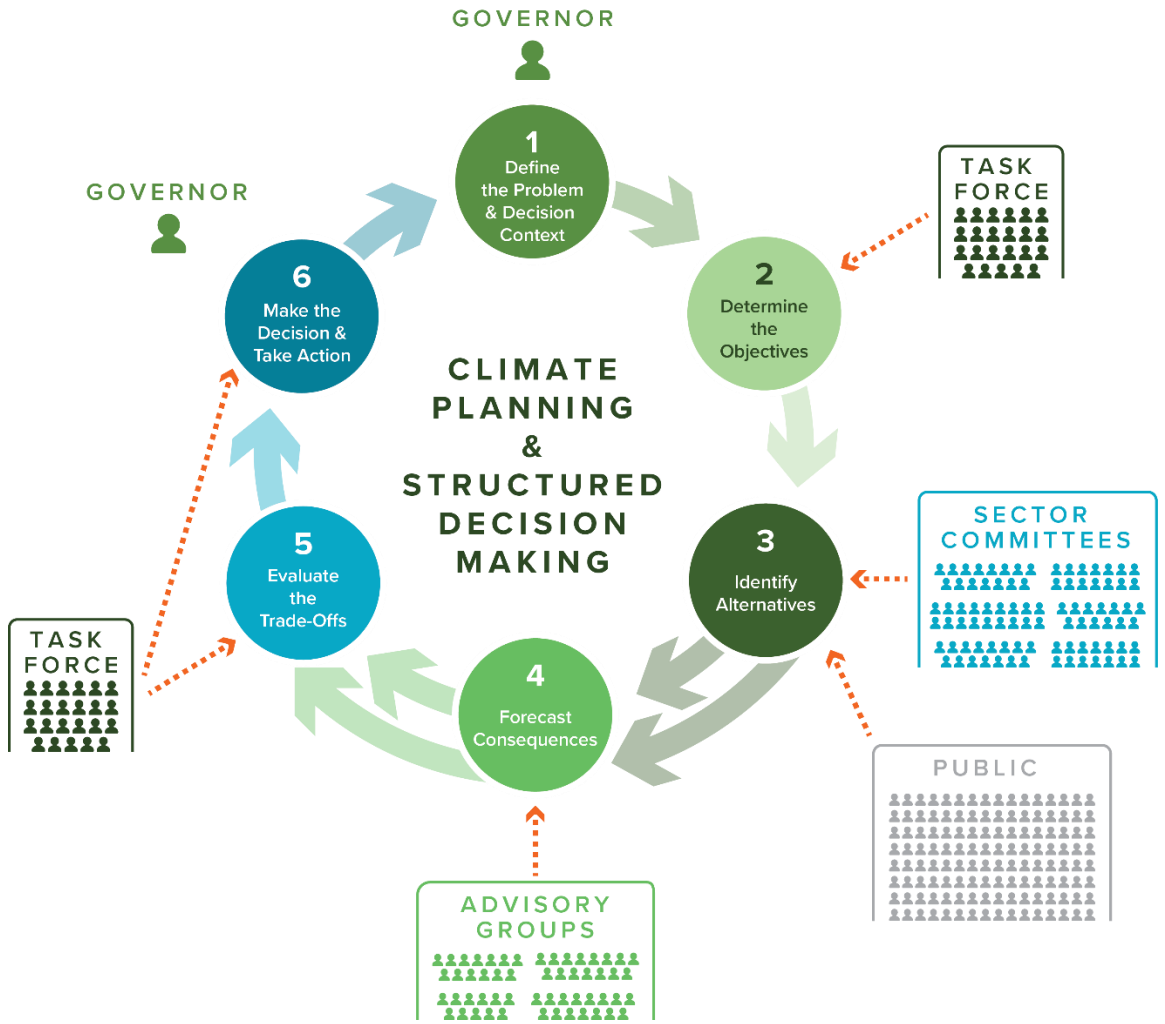
CLIMATE INITIATIVES
TASK FORCE

SECTOR COMMITTEES

- AGRICULTURE, FORESTRY, CONSERVATION, & WASTE
- LAND USE, BUILDINGS, & HOUSING
- POWER PRODUCTION, DISTRIBUTION, AND USE
- MINING AND OIL & GAS
- TRANSPORTATION
- MANUFACTURING & INDUSTRY

ADVISORY GROUPS

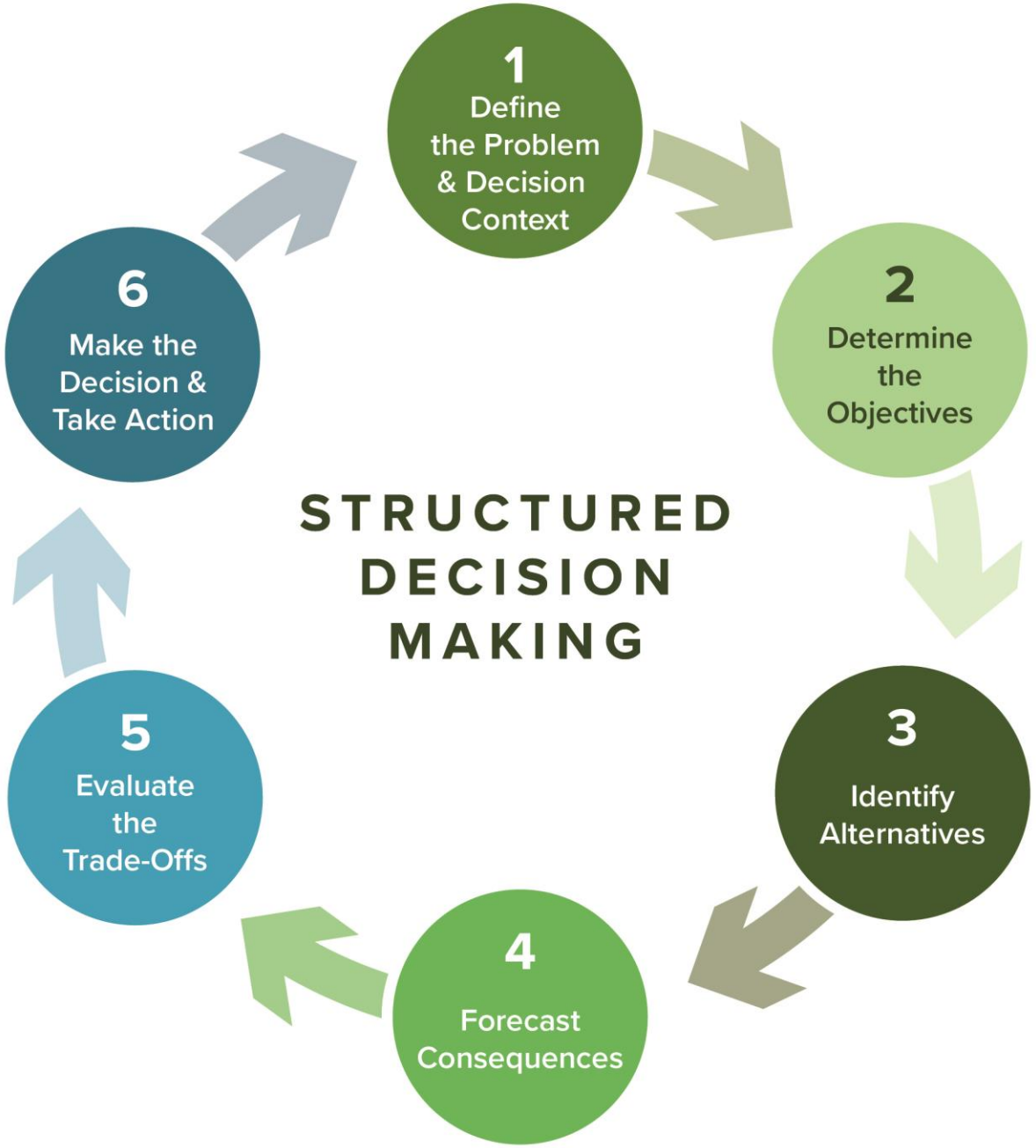
- EQUITY
- SCIENCE
- FINANCE
- LEGAL

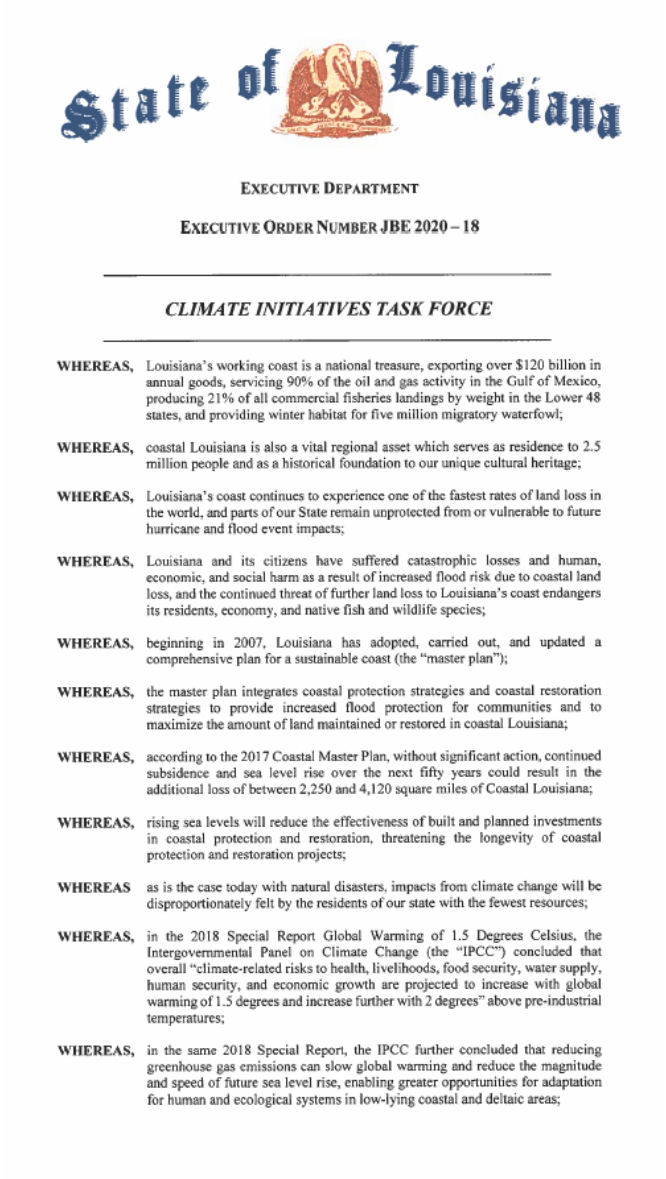


16-month collaborative process that included ***49 public meetings*** of the Task Force, sector committees, and advisory groups as well as opportunities for the public to share their ideas for climate actions and provide feedback on the draft plan components.

1.

Defining the Problem & Decision Context





State of Louisiana

EXECUTIVE DEPARTMENT

EXECUTIVE ORDER NUMBER JBE 2020 – 18

CLIMATE INITIATIVES TASK FORCE

WHEREAS, Louisiana's working coast is a national treasure, exporting over $120 billion in annual goods, servicing 90% of the oil and gas activity in the Gulf of Mexico, producing 21% of all commercial fisheries landings by weight in the Lower 48 states, and providing winter habitat for five million migratory waterfowl;

WHEREAS, coastal Louisiana is also a vital regional asset which serves as residence to 2.5 million people and as a historical foundation to our unique cultural heritage;

WHEREAS, Louisiana's coast continues to experience one of the fastest rates of land loss in the world, and parts of our State remain unprotected from or vulnerable to future hurricane and flood event impacts;

WHEREAS, Louisiana and its citizens have suffered catastrophic losses and human, economic, and social harm as a result of increased flood risk due to coastal land loss, and the continued threat of further land loss to Louisiana's coast endangers its residents, economy, and native fish and wildlife species;

WHEREAS, beginning in 2007, Louisiana has adopted, carried out, and updated a comprehensive plan for a sustainable coast (the "master plan");

WHEREAS, the master plan integrates coastal protection strategies and coastal restoration strategies to provide increased flood protection for communities and to maximize the amount of land maintained or restored in coastal Louisiana;

WHEREAS, according to the 2017 Coastal Master Plan, without significant action, continued subsidence and sea level rise over the next fifty years could result in the additional loss of between 2,250 and 4,120 square miles of Coastal Louisiana;

WHEREAS, rising sea levels will reduce the effectiveness of built and planned investments in coastal protection and restoration, threatening the longevity of coastal protection and restoration projects;

WHEREAS as is the case today with natural disasters, impacts from climate change will be disproportionately felt by the residents of our state with the fewest resources;

WHEREAS, in the 2018 Special Report Global Warming of 1.5 Degrees Celsius, the Intergovernmental Panel on Climate Change (the "IPCC") concluded that overall "climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5 degrees and increase further with 2 degrees" above pre-industrial temperatures;

WHEREAS, in the same 2018 Special Report, the IPCC further concluded that reducing greenhouse gas emissions can slow global warming and reduce the magnitude and speed of future sea level rise, enabling greater opportunities for adaptation for human and ecological systems in low-lying coastal and deltaic areas;

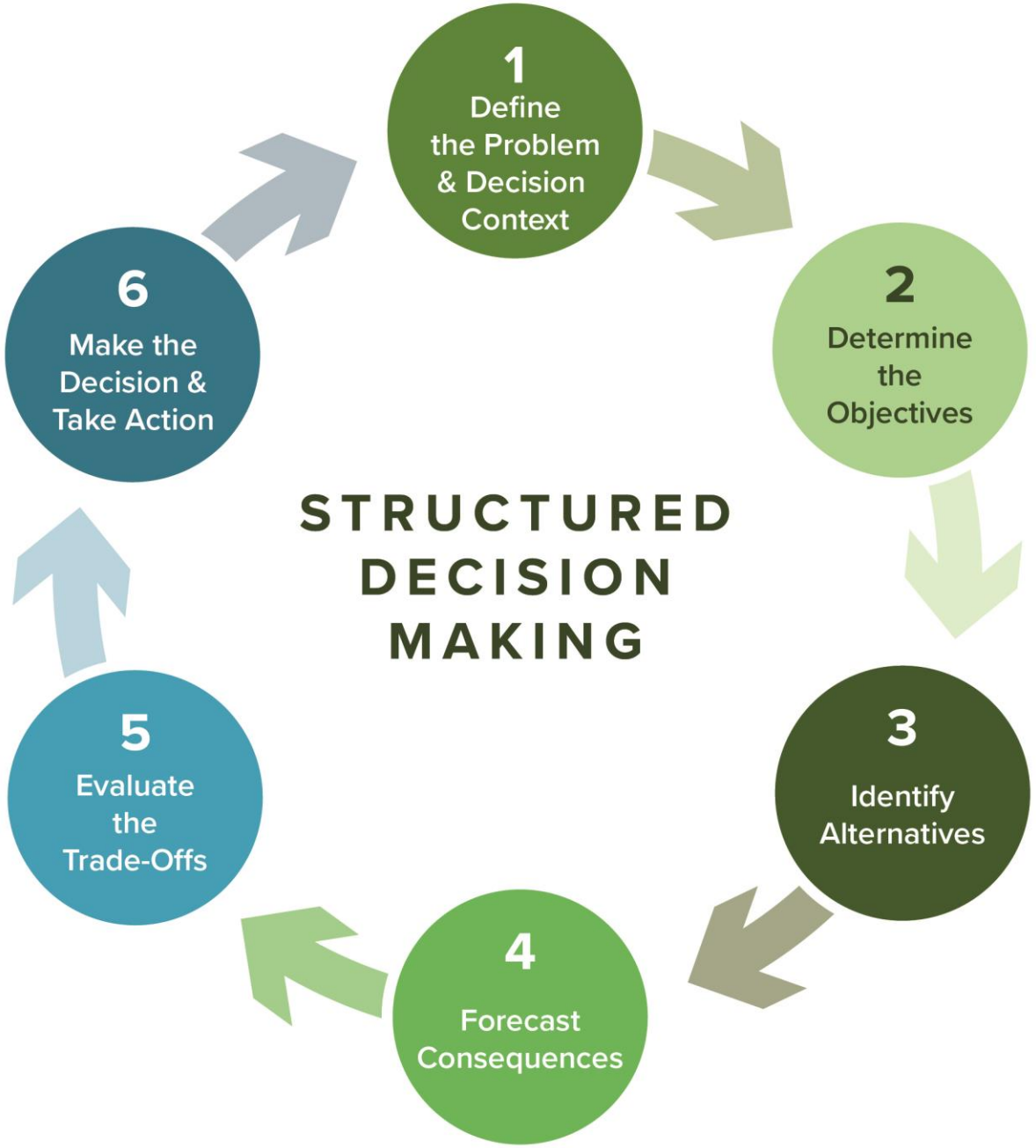
PROBLEM/DECISION CONTEXT: FROM EXECUTIVE ORDER

…to improve our resilience, sustain our coast, and help avoid the worst impacts of climate change, Louisiana must proactively work to reduce the greenhouse gas emissions that are driving up global temperatures, raising sea levels, and increasing risks that threaten our health and safety, quality of life, economic growth, and vital habitats and ecosystems…

…Louisiana is committed to working with Louisiana businesses, industries, local communities, and civil society to reduce emissions through a suite of balanced policy solutions…

….by following the science and welcoming all stakeholders to limit the impacts of climate change that harm the state's natural and cultural heritage, while adapting to maintain its position as a world leader in energy, industry, agriculture, and transportation…

2. Determining the Objectives

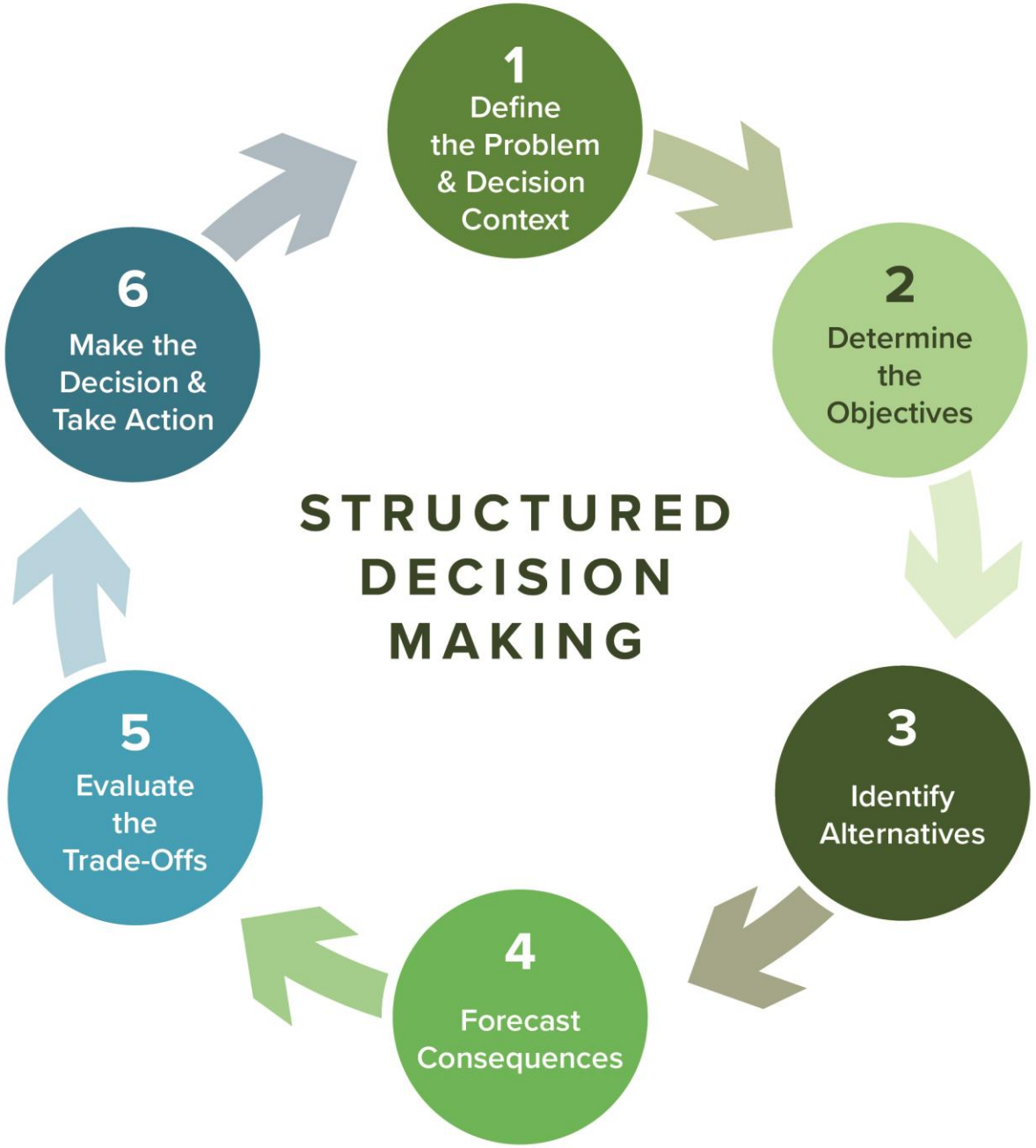


Fundamental Objectives: What we are evaluating against

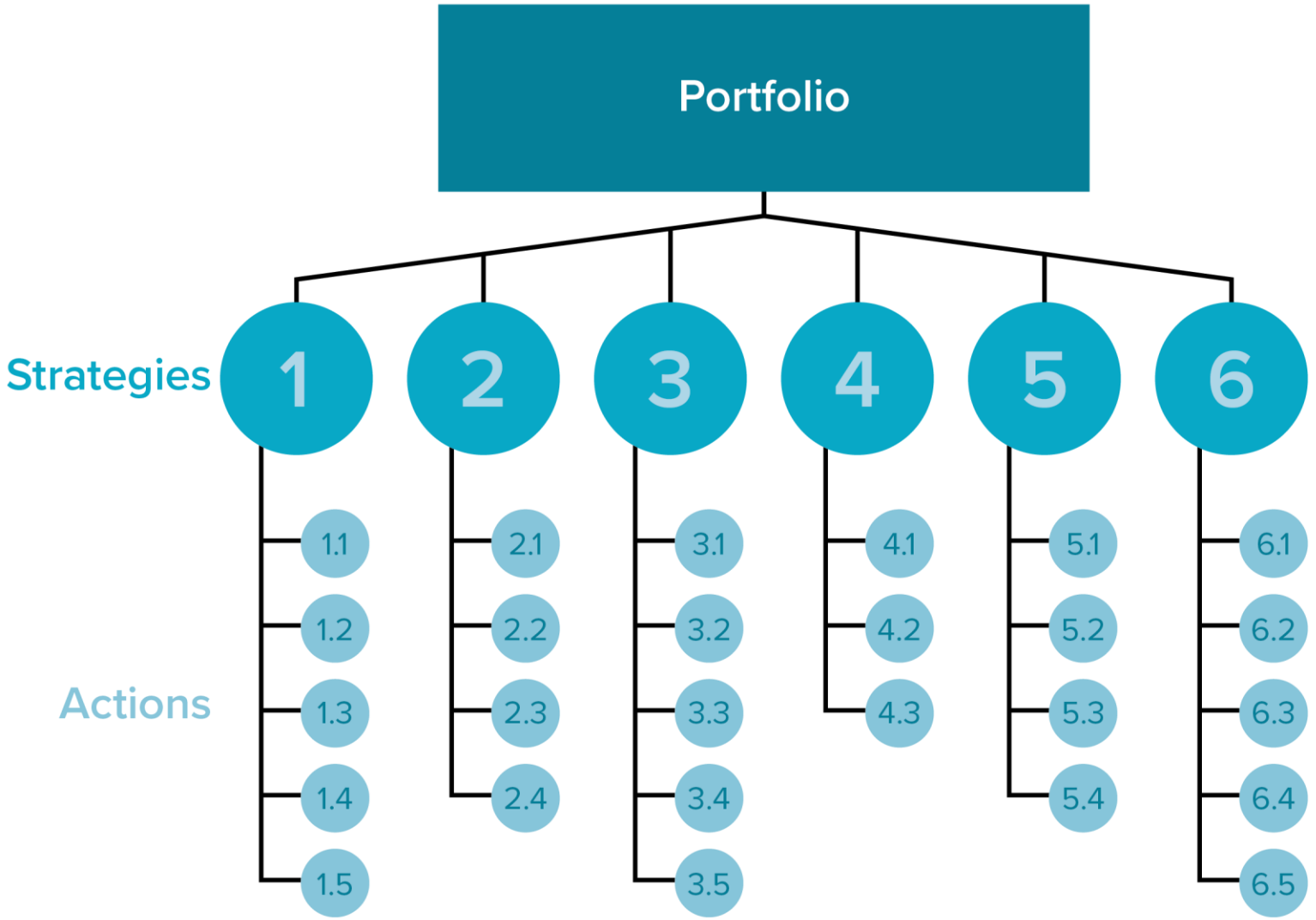
Reducing Net Greenhouse Gas (GHG) Emissions	• Minimize net greenhouse gas emissions
Improving Quality of Life for Residents and Communities	• Maximize quality of, and access to, essential goods, services, and infrastructure for residents • Maximize positive public health outcomes and public safety • Maximize preservation of cultural heritage
Creating a More Equitable Society	• Reduce socioeconomic, demographic, and geographic disparities in future opportunities and outcomes • Maximize reduction and mitigation of historical and structural inequities and their impacts for underserved and marginalized communities, including communities of color and Indigenous peoples • Maximize engagement with and participation of communities in decision-making and implementation
Managing for Short- and Long-Term Success	• Maximize confidence of the public and stakeholders in the outcome of emissions-reduction strategies to increase support for their implementation • Maximize the efficiency and effectiveness of emissions-reduction strategies • Maximize timely implementation of emissions-reduction strategies • Maximize the durability of emissions-reduction strategies in an uncertain future
Strengthening the Economy and Workforce	• Maximize employment, economic opportunity, and support for Louisiana workers • Maximize economic growth
Conserving Natural Resources and Protecting the Environment	• Maximize preservation of natural resources and ecosystem services • Maximize environmental stewardship and support of healthy ecosystems
Adapting to a Changing Climate	• Increase resilience of the built and natural environment to climate change • Increase the resilience of communities to climate change

What matters to us in how we reduce GHG emissions?

3. Identifying Alternatives



IDENTIFYING ALTERNATIVES AT MULTIPLE SCALES



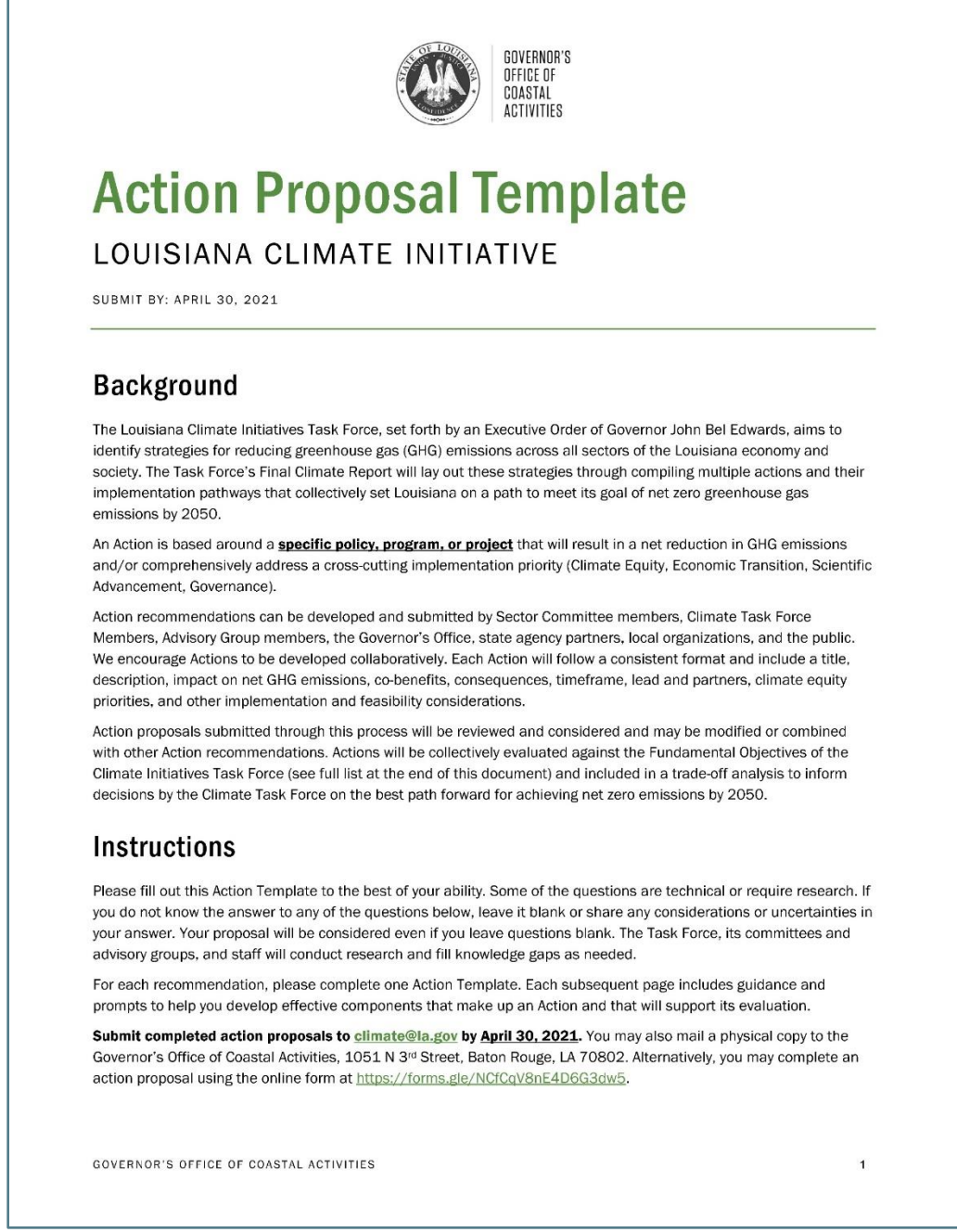
A **Portfolio** is a comprehensive set of strategies and actions towards achieving the GHG reduction targets and other fundamental objectives.

A **Strategy** is high-level path to reduce GHG emissions.

An **Action** is based around a **specific policy, program, or project** that can be directly implemented.

ACTION PROPOSALS

Solicited actions from the public with a detailed template



GOVERNOR'S OFFICE OF COASTAL ACTIVITIES

Action Proposal Template

LOUISIANA CLIMATE INITIATIVE

SUBMIT BY: APRIL 30, 2021

Background

The Louisiana Climate Initiatives Task Force, set forth by an Executive Order of Governor John Bel Edwards, aims to identify strategies for reducing greenhouse gas (GHG) emissions across all sectors of the Louisiana economy and society. The Task Force's Final Climate Report will lay out these strategies through compiling multiple actions and their implementation pathways that collectively set Louisiana on a path to meet its goal of net zero greenhouse gas emissions by 2050.

An Action is based around a **specific policy, program, or project** that will result in a net reduction in GHG emissions and/or comprehensively address a cross-cutting implementation priority (Climate Equity, Economic Transition, Scientific Advancement, Governance).

Action recommendations can be developed and submitted by Sector Committee members, Climate Task Force Members, Advisory Group members, the Governor's Office, state agency partners, local organizations, and the public. We encourage Actions to be developed collaboratively. Each Action will follow a consistent format and include a title, description, impact on net GHG emissions, co-benefits, consequences, timeframe, lead and partners, climate equity priorities, and other implementation and feasibility considerations.

Action proposals submitted through this process will be reviewed and considered and may be modified or combined with other Action recommendations. Actions will be collectively evaluated against the Fundamental Objectives of the Climate Initiatives Task Force (see full list at the end of this document) and included in a trade-off analysis to inform decisions by the Climate Task Force on the best path forward for achieving net zero emissions by 2050.

Instructions

Please fill out this Action Template to the best of your ability. Some of the questions are technical or require research. If you do not know the answer to any of the questions below, leave it blank or share any considerations or uncertainties in your answer. Your proposal will be considered even if you leave questions blank. The Task Force, its committees and advisory groups, and staff will conduct research and fill knowledge gaps as needed.

For each recommendation, please complete one Action Template. Each subsequent page includes guidance and prompts to help you develop effective components that make up an Action and that will support its evaluation.

Submit completed action proposals to climate@la.gov by April 30, 2021. You may also mail a physical copy to the Governor's Office of Coastal Activities, 1051 N 3rd Street, Baton Rouge, LA 70802. Alternatively, you may complete an action proposal using the online form at https://forms.gle/NCfCqV8nE4D6G3dw5.

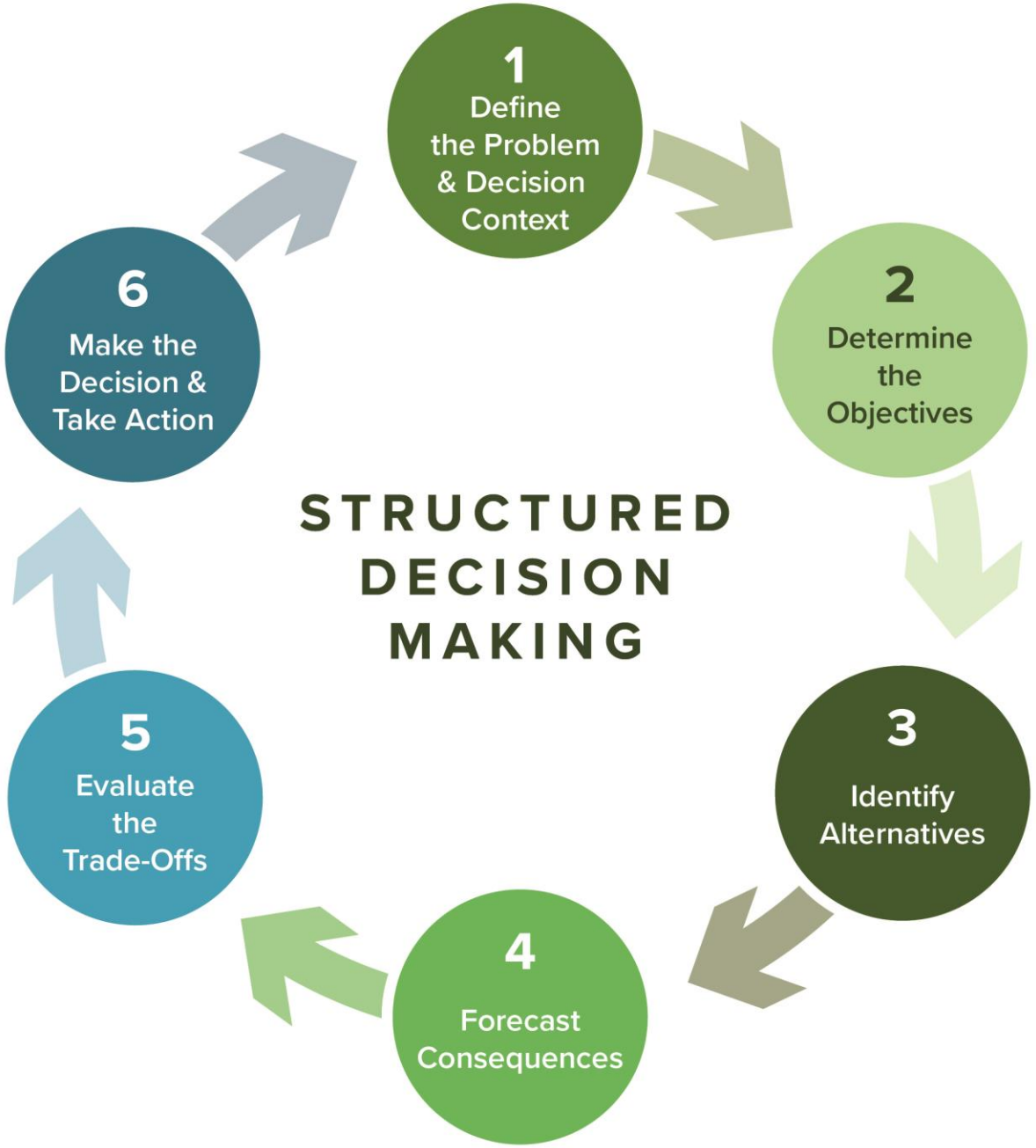
GOVERNOR'S OFFICE OF COASTAL ACTIVITIES 1

171 Action Ideas Received

- **63:** Power
- **49:** Manufacturing and Industry
- **40:** Agriculture, Forestry, Conservation, Waste
- **36:** Land Use, Buildings, Housing
- **36:** Transportation
- **31:** Mining and Oil & Gas
- **23:** Cross-Sector

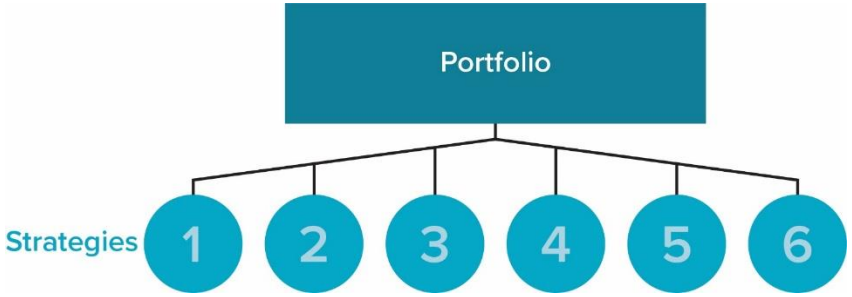
	Action Name	Sector Emissions Addressed	Sector Committee	GHG Targeted	Action Timeframe
7	Curtail and capture agricultural GHG emissions through voluntary, ...	Agriculture, Conservation, Fore	AFCW	Carbon Dioxide, Methane	Long Term (>10 years)
8	Support Composting and gardening efforts to reduce GHG	Agriculture, Waste	AFCW	Carbon Dioxide, Methane	Short Term (0-5 years)
9	Conversion of CO2 into stable, marketable compounds	Land Use, Manufacturing & Indus	MI, MOG	Carbon Dioxide	Short Term (0-5 years)
10	Conversion of CO2 into green Methane	Manufacturing & Industry, Minin	MI, MOG, POWER	Carbon Dioxide	Short Term (0-5 years)
11	Clearing up regulatory barriers that govern carbon capture and seq...	Oil & Gas	MI, MOG	Carbon Dioxide	Short Term (0-5 years)
12	Support a National Carbon Price Policy	Agriculture, Buildings & Housing	Cross	Carbon Dioxide	Short Term (0-5 years)
13	Develop a Plan and Partners for Modular Nuclear Power Pilot Progra...	Buildings & Housing, Land Use	POWER, LUBH	Carbon Dioxide, Methane	Medium Term (5-10 years)
14	Cover the Superdome roof in solar panels	Power	POWER, LUBH	Carbon Dioxide, Methane	Short Term (0-5 years)
15	Equal Opportunity for Landowners of Louisiana and Government Ac...	Agriculture, Land Use, Manufac	POWER, LUBH, AFCW	Carbon Dioxide, Methane	Short Term (0-5 years)
16	Increase the Development and Use of Renewable Natural Gas (RNG)	Agriculture, Buildings & Housing	AFCW, TR, MOG, MI	Carbon Dioxide, Methane	Short Term (0-5 years)
17	An alternative for reducing climate change emissions for diesel and ...	Oil & Gas, Transportation	TR	Carbon Dioxide	Short Term (0-5 years)
18	Banning Gas powered vehicles to be sold by 2030	Power, Transportation	TR	Carbon Dioxide, Nitrous O	Medium Term (5-10 years)
19	Reduction of Agricultural Methane Emissions through Ruminant Fee...	Agriculture	AFCW	Methane	Medium Term (5-10 years)
20	1. Increased energy efficiency programs in state. 2. Example of majo...	Buildings & Housing	LUBH, POWER	Carbon Dioxide	Short Term (0-5 years)
21	Elimination of tax exemptions for petrochemical industry	Manufacturing & Industry	MI	Carbon Dioxide, Methane	Short Term (0-5 years)
22	Create a statewide framework and authority to guide land use practi...	Agriculture, Buildings & Housing	LUBH, AFCW, TR	Carbon Dioxide, Methane	Short Term (0-5 years)
23	Reduce greenhouse gas (GHG) emissions and create economic activ...	Agriculture, Buildings & Housing	LUBH, Cross	Carbon Dioxide, Methane	Medium Term (5-10 years)
24	Develop a model solar ordinance for adoption by local government...	Land Use, Manufacturing & Indus	LUBH, POWER	Carbon Dioxide, Methane	Short Term (0-5 years)
25	Cargo hold wash water disposal	Transportation, Waste	TR, MI, AFCW	Carbon Dioxide, Methane	Short Term (0-5 years)
26	Fuel Additive: increases efficiency reduces emissions	Agriculture, Buildings & Housing	TR	Carbon Dioxide, Nitrous O	Short Term (0-5 years)
27	Provide the Training Necessary to Support the Growth of the Local ...	This Action does not directly re...	POWER, Cross	N/A	Short Term (0-5 years)
28	Biocarbon Distribution for Increased Crop Yield and Permanent Car...	Agriculture, Manufacturing & Ind	AFCW	Carbon Dioxide, Methane	Short Term (0-5 years)
29	Expand Broadband Access to Reduce Travel	Transportation	TR, LUBH	Carbon Dioxide, Nitrous O	Long Term (>10 years)
30	Utilization of low-value forest based fiber to effect positive carbon o...	Forestry, Land Use, Power	POWER, AFCW	Carbon Dioxide	Short Term (0-5 years)
31	Expand Availability of Alternative Fuels	Land Use, Oil & Gas, Power	TR, POWER	Carbon Dioxide, Methane	Short Term (0-5 years)
32	Convert State vehicles to electric	Transportation	TR	Carbon Dioxide, Methane	Short Term (0-5 years)
33	Decarbonizing Louisiana Through Electrification	Buildings & Housing, Conservatic	TR, MI, POWER, LUBH	Carbon Dioxide, Methane	Long Term (>10 years)
34	Reviewing expansion of extractive industries in the state. Moving to ...	Land Use, Oil & Gas, Waste	MI, MOG	N/A	Short Term (0-5 years)
35	Provide market driven strategies to keep forest land forested and e...	Buildings & Housing, Conservatic	AFCW	Carbon Dioxide	Short Term (0-5 years)
36	Reduce Idling and Poor Driving of Publicly Owned Vehicles	Transportation	TR	Carbon Dioxide	Short Term (0-5 years)
37	Provide outreach and education on GHG mitigation to timberland o...	Agriculture, Conservation, Fore	AFCW	Carbon Dioxide	Short Term (0-5 years)
38	Poultry Litter Distribution	Agriculture, Conservation, Fore	AFCW	Carbon Dioxide, Methane	Short Term (0-5 years)
39	Convert Public Fleet to Alternative Fuels	Land Use, Power, Transportatio	TR	Carbon Dioxide, Methane	Short Term (0-5 years)
40	Green Land/lawn care	Buildings & Housing, Land Use	AFCW	Carbon Dioxide	Short Term (0-5 years)
41	Louisiana Irrigation and Dewatering Pump Conversion for Emissions...	Agriculture, Conservation, Pow	AFCW	Carbon Dioxide, Nitrous O	Long Term (>10 years)
42	Louisiana Conservation Delivery Program	Agriculture, Conservation, Fore	AFCW	Carbon Dioxide, Methane	Short Term (0-5 years)
43	State Climate Mitigation Program for landowners	Agriculture, Buildings & Housing	AFCW	Carbon Dioxide, Methane	Short Term (0-5 years)
44	Promote Transportation-Related Energy Conservation in the Public ...	Transportation	TR	Carbon Dioxide, Nitrous O	Medium Term (5-10 years)

4.
Forecasting Consequences



We did **two rounds** of consequence analyses:

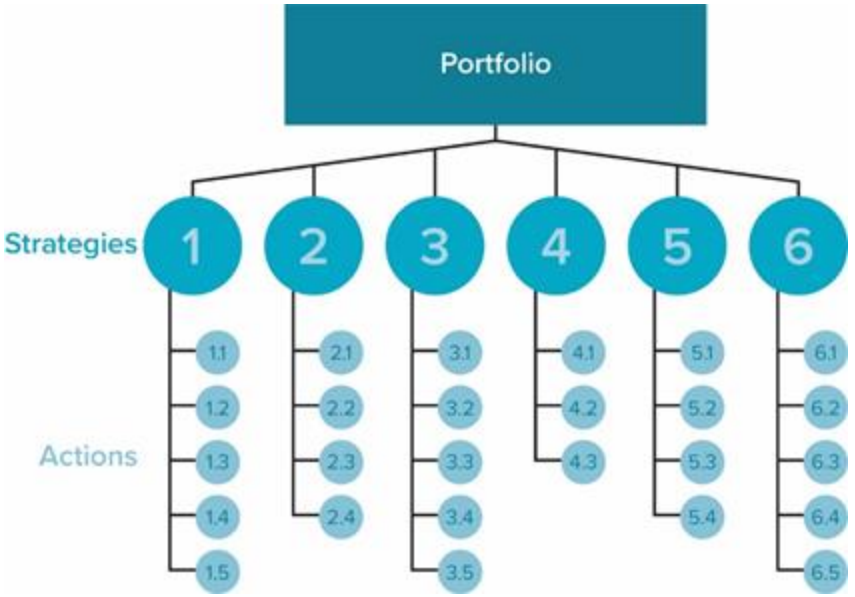
Round 1



Strategy Portfolios

big-picture view of the future through hypothetical emission reduction scenarios

Round 2



Strategy & Action Portfolio

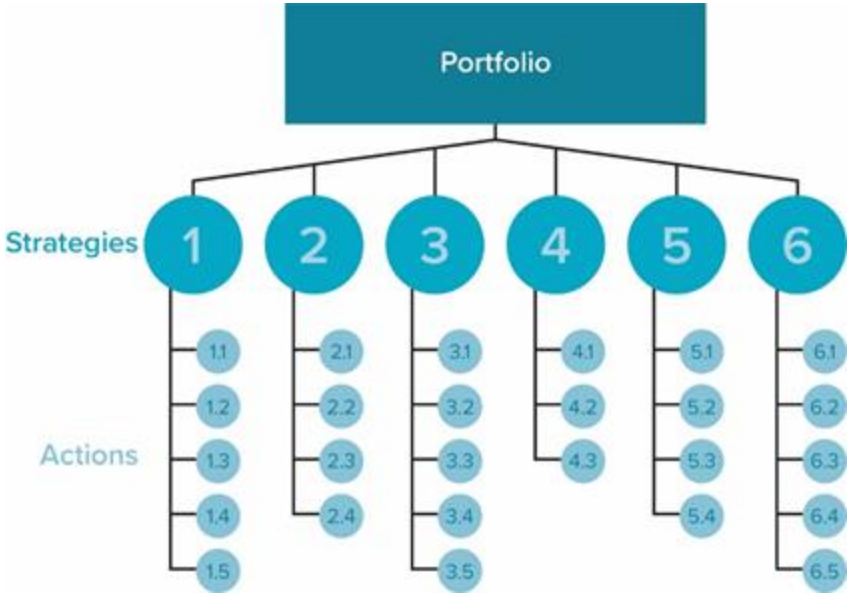
second analyzed consequences of our **best first pass of the draft portfolio of strategies and actions** that will be included in the plan

HYPOTHETICAL PORTFOLIOS OF STRATEGIES

Business as Usual	Intensive Electrification through Zero-Carbon Renewable Energy	Reduced Energy Demand, Consumption & Waste Intensive	Industrial Carbon Removal, Capture, Use and Storage Intensive	Natural Sequestration and Sinks Intensive

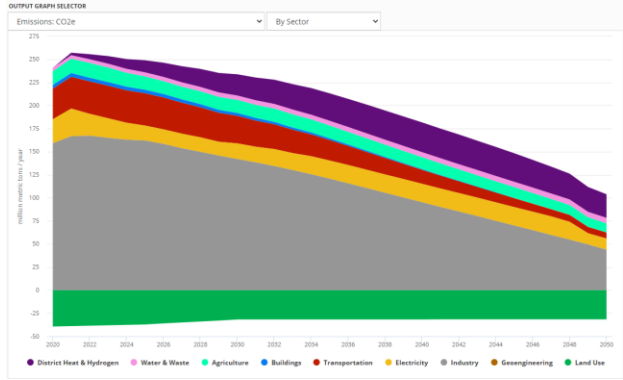
- Each portfolio represents a high-level ***hypothetical*** future scenario, organized around **"turning up the dial"** on specific kinds of strategies
- **Big-picture evaluation** is to understand the benefits or limitations of approaches as well as provide insight into impacts on the people, environment, and economy of Louisiana

Consequence Analysis Components

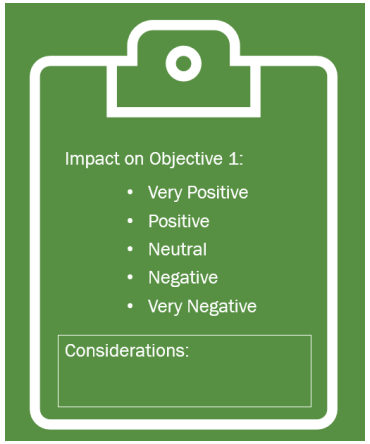


Strategy & Action Portfolio

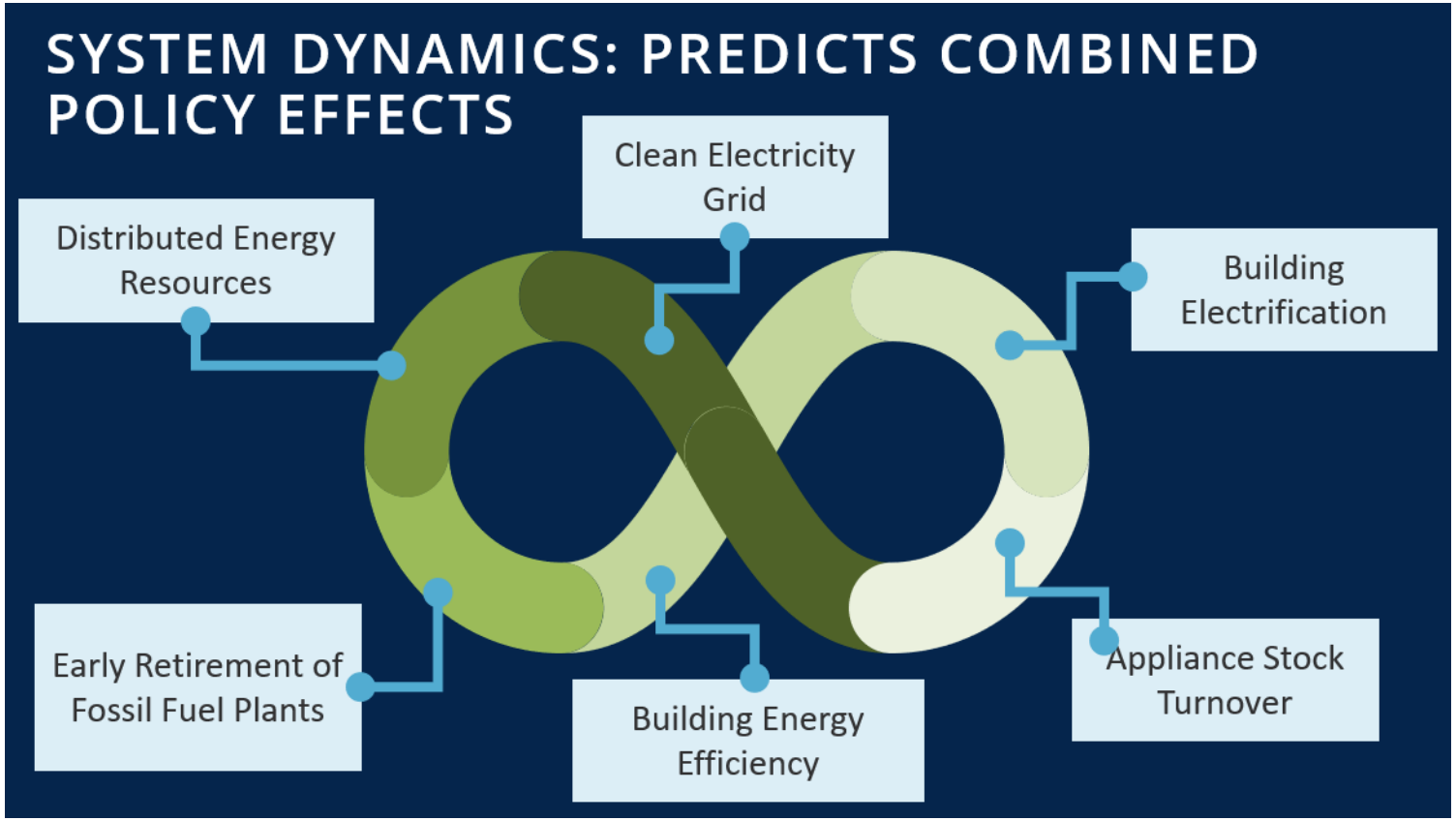
1) GHG Emission Reduction Objective through modeling



2) Societal, Economic, and Other Objectives through expert elicitation



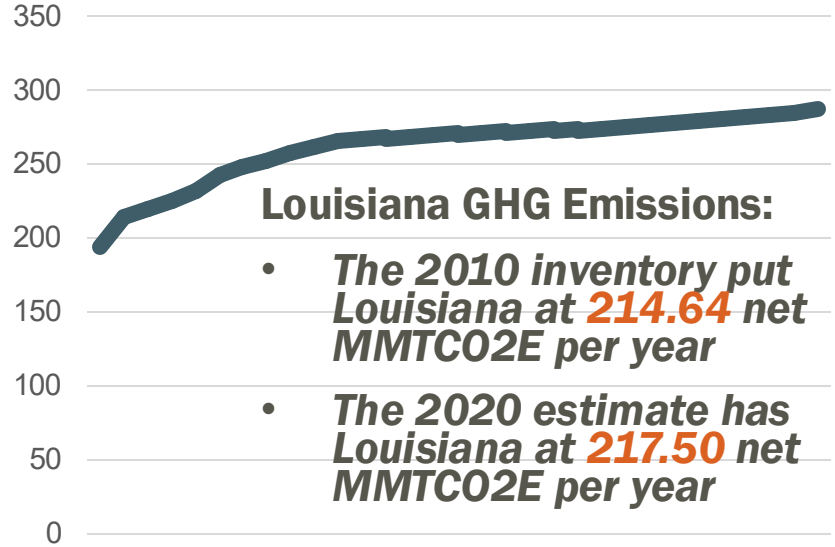
ENERGY POLICY SIMULATOR (EPS) TOOL



- Simulates GHG emissions
- EPS by Energy Innovation, LLC.
- Louisiana version
- Open source and continually updated

GHG Emission Results for Hypothetical Portfolios

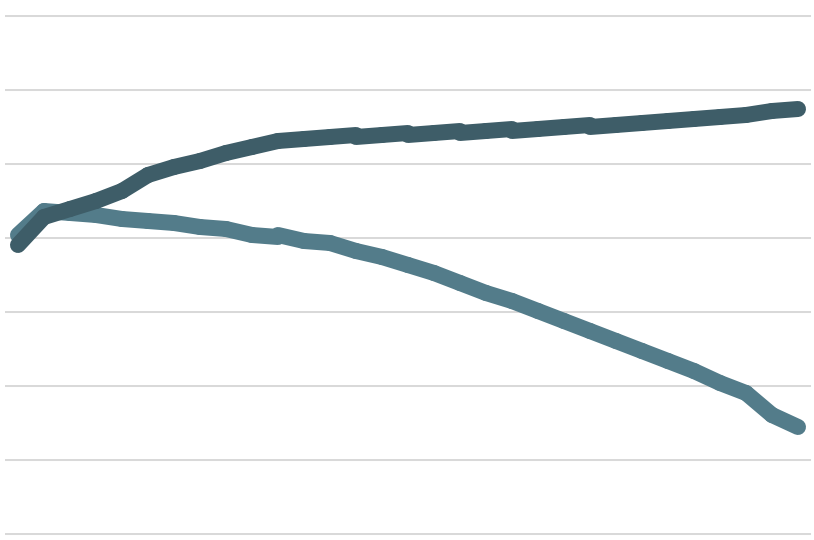
1: BAU



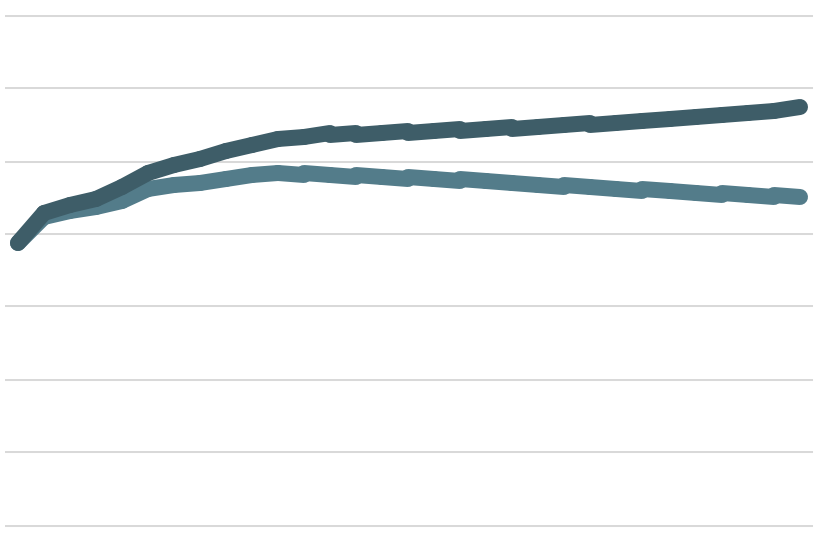
Louisiana GHG Emissions:

- ***The 2010 inventory put Louisiana at 214.64 net MMTCO2E per year***
- ***The 2020 estimate has Louisiana at 217.50 net MMTCO2E per year***

2: Emissions Electrification

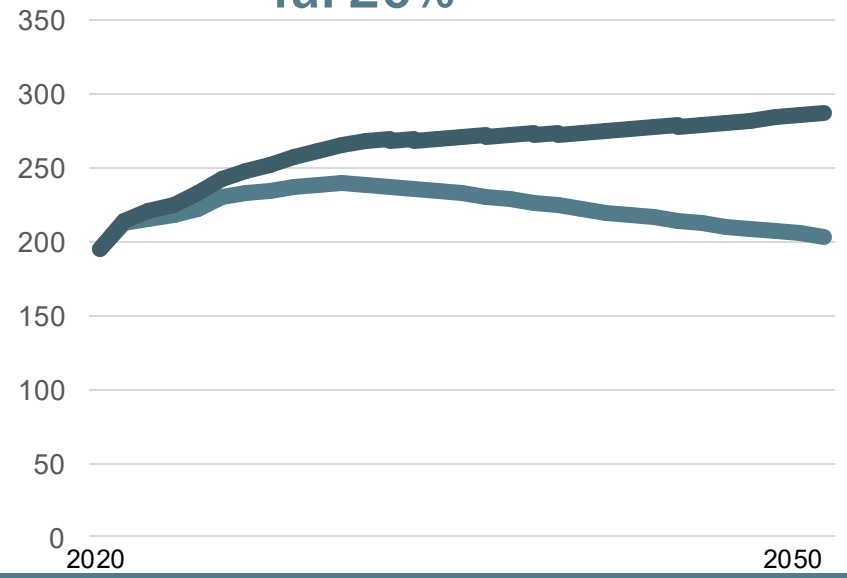


3: Reduced Energy Demand, Consumption, & Waste Intensive

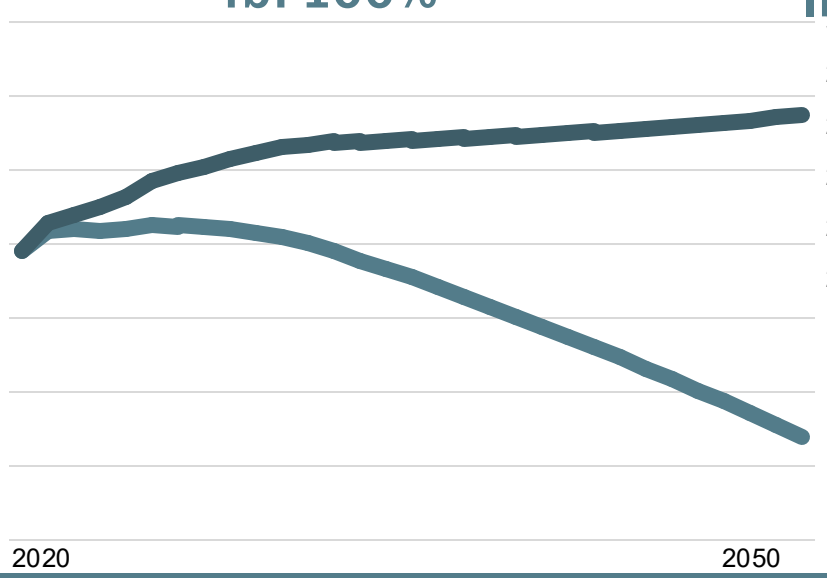


4: Industrial Carbon Removal, Capture, Use, and Storage Intensive

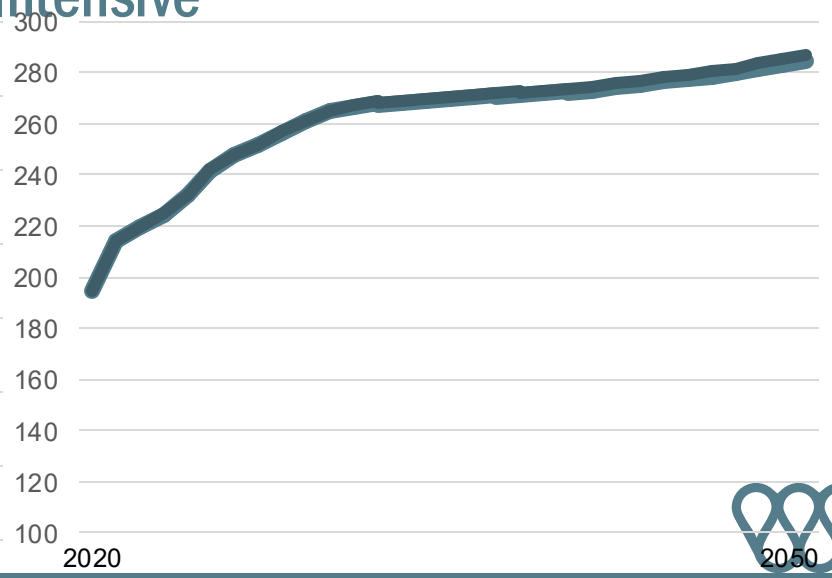
4a: 20%



4b: 100%



5: Natural Sequestration and Sinks Intensive



USING THE FUNDAMENTAL OBJECTIVES TO ANALYZE NON-GHG REDUCTION IMPACTS

Reducing Net Greenhouse Gas (GHG) Emissions

Health and Quality of Life

Creating a More Equitable Society

Strengthening the Economy & Workforce

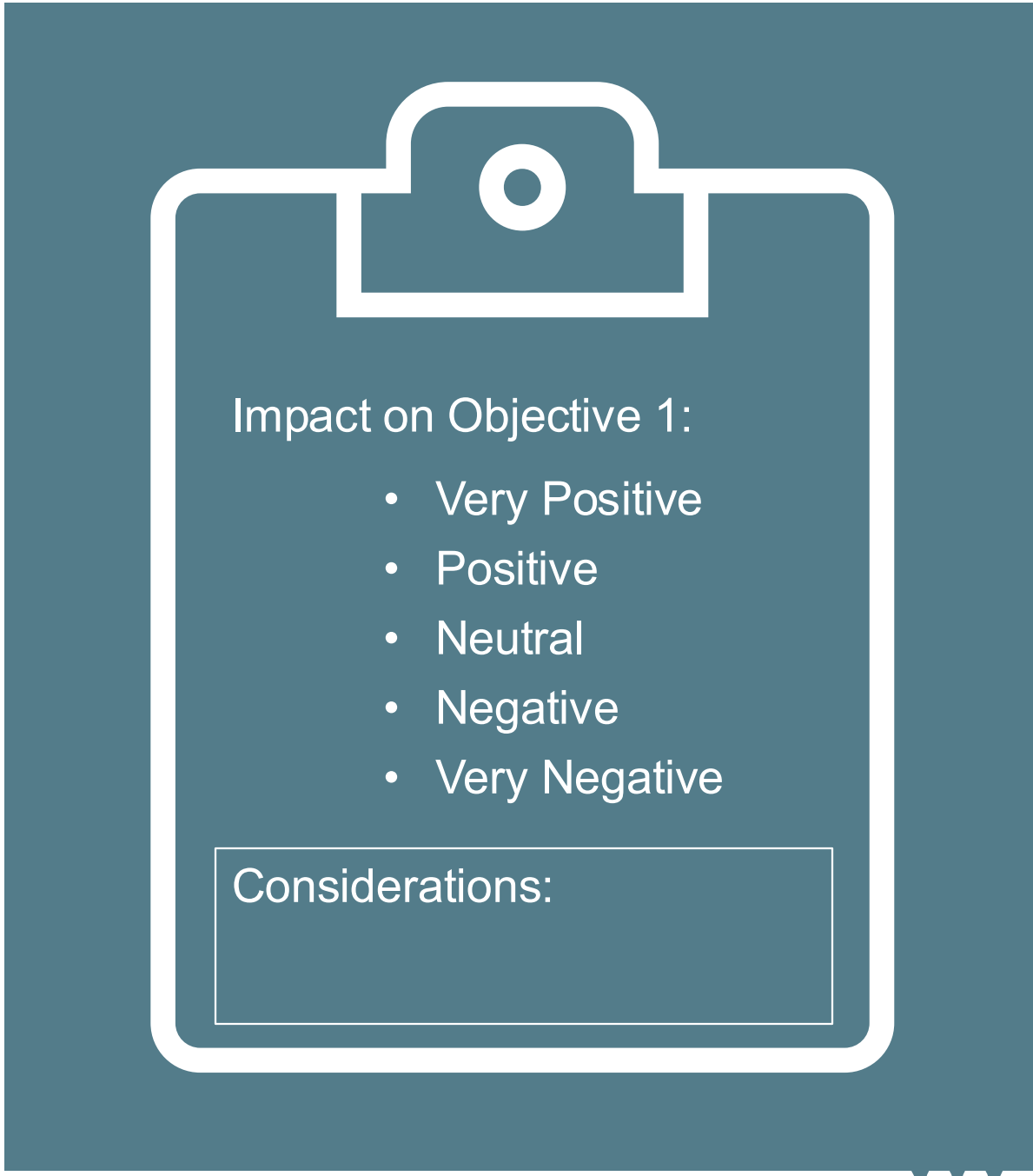
Conserving Natural Resources

Adapting to a Changing Climate

Managing for Short- & Long- Term Success

EXPERT ELICITATION FROM ADVISORY GROUPS

The survey asked members to provide both a **“rank”** for the impact of each portfolio on a given fundamental objective as well a **short narrative of considerations and key concerns**.

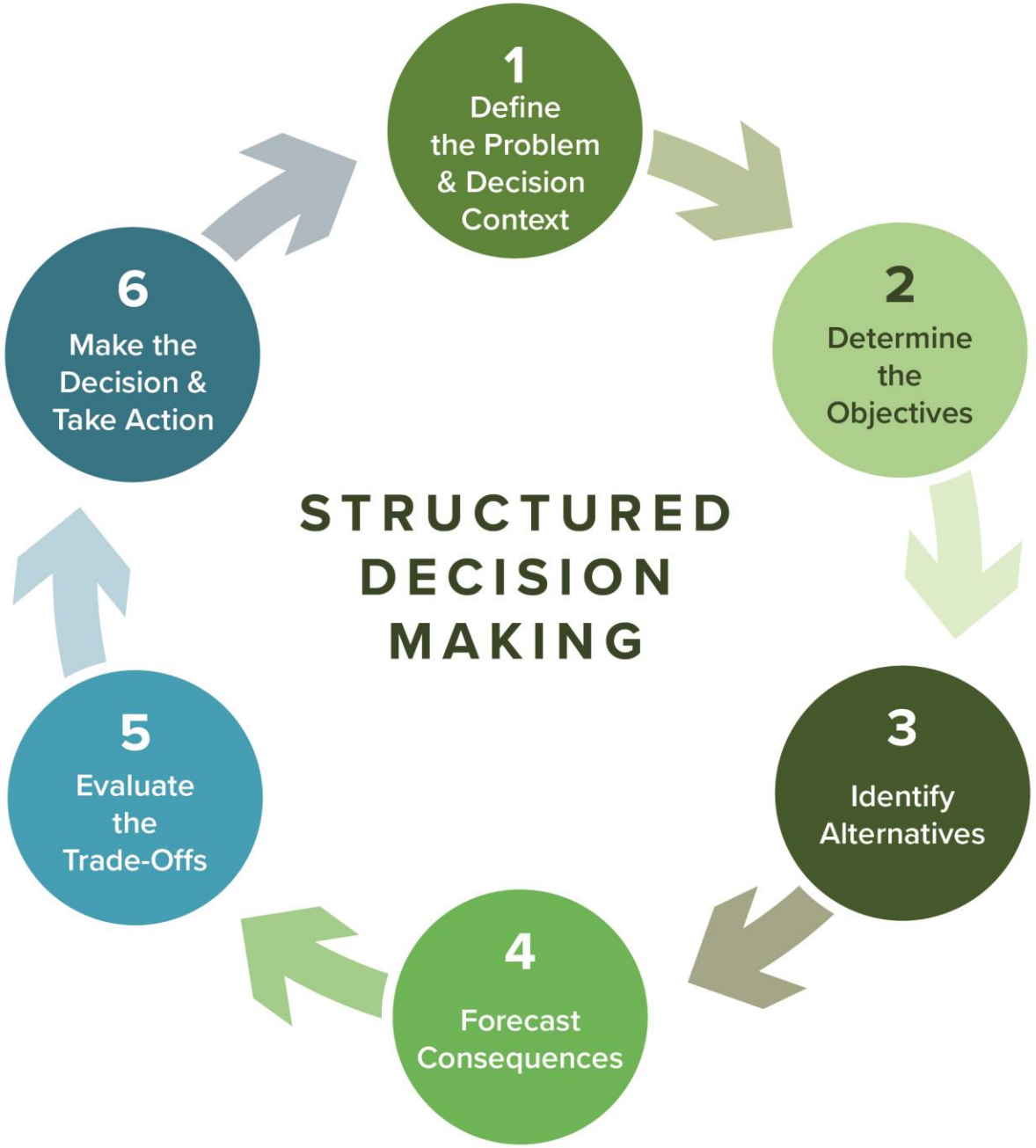


EVALUATION RANKING OVERVIEW OF HYPOTHETICAL SCENARIOS

	Business as Usual	Electrification	Reduce Demand	CCUS	Natural Sequestration	
Essential Goods	17 Responses	15 Responses	14 Responses	15 Responses	14 Responses	Quality of Life
Health	17 Responses	14 Responses	14 Responses	15 Responses	14 Responses	
Cultural Heritage	16 Responses	14 Responses	13 Responses	14 Responses	13 Responses	
Disparity Opportunities	11 Responses	10 Responses	9 Responses	10 Responses	10 Responses	Equity
Institutionalized Harm	11 Responses	10 Responses	9 Responses	9 Responses	10 Responses	
Engagement	11 Responses	10 Responses	9 Responses	10 Responses	10 Responses	
Public Confidence	21 Responses	20 Responses	20 Responses	20 Responses	19 Responses	Short/Long Term Succes
Efficiency/Effectiveness	23 Responses	21 Responses	21 Responses	20 Responses	20 Responses	
Timeliness	23 Responses	19 Responses	21 Responses	20 Responses	20 Responses	
Durability	22 Responses	19 Responses	20 Responses	19 Responses	20 Responses	
Job Creation	12 Responses	11 Responses	10 Responses	11 Responses	10 Responses	Economy
Economy	11 Responses	11 Responses	10 Responses	10 Responses	10 Responses	
Natural Resources	18 Responses	16 Responses	16 Responses	16 Responses	17 Responses	Enivronment
Healthy Ecosystems	17 Responses	16 Responses	15 Responses	14 Responses	16 Responses	
Resilient Nat'l/Built Env.	17 Responses	15 Responses	16 Responses	16 Responses	16 Responses	Climate Adaptation
Resilient Communities	18 Responses	16 Responses	16 Responses	16 Responses	16 Responses	

Very Positive | Positive | Neutral | Negative | Very Negative

5. Evaluate the Trade-Offs



SECOND CONSEQUENCE ANALYSIS BASED ON "TRADE-OFFS" FROM FIRST

- Refine and improve an overall portfolio of strategies and actions in the plan.
- Inform the details of actions and implementation steps to maximize co-benefits across our fundamental objectives.
- Understand where we will need additional focus in the years to come.
- Understand the impacts of the draft portfolio as a whole.

** Developing the strategies and actions for the final plan was an* ***iterative and collaborative process***

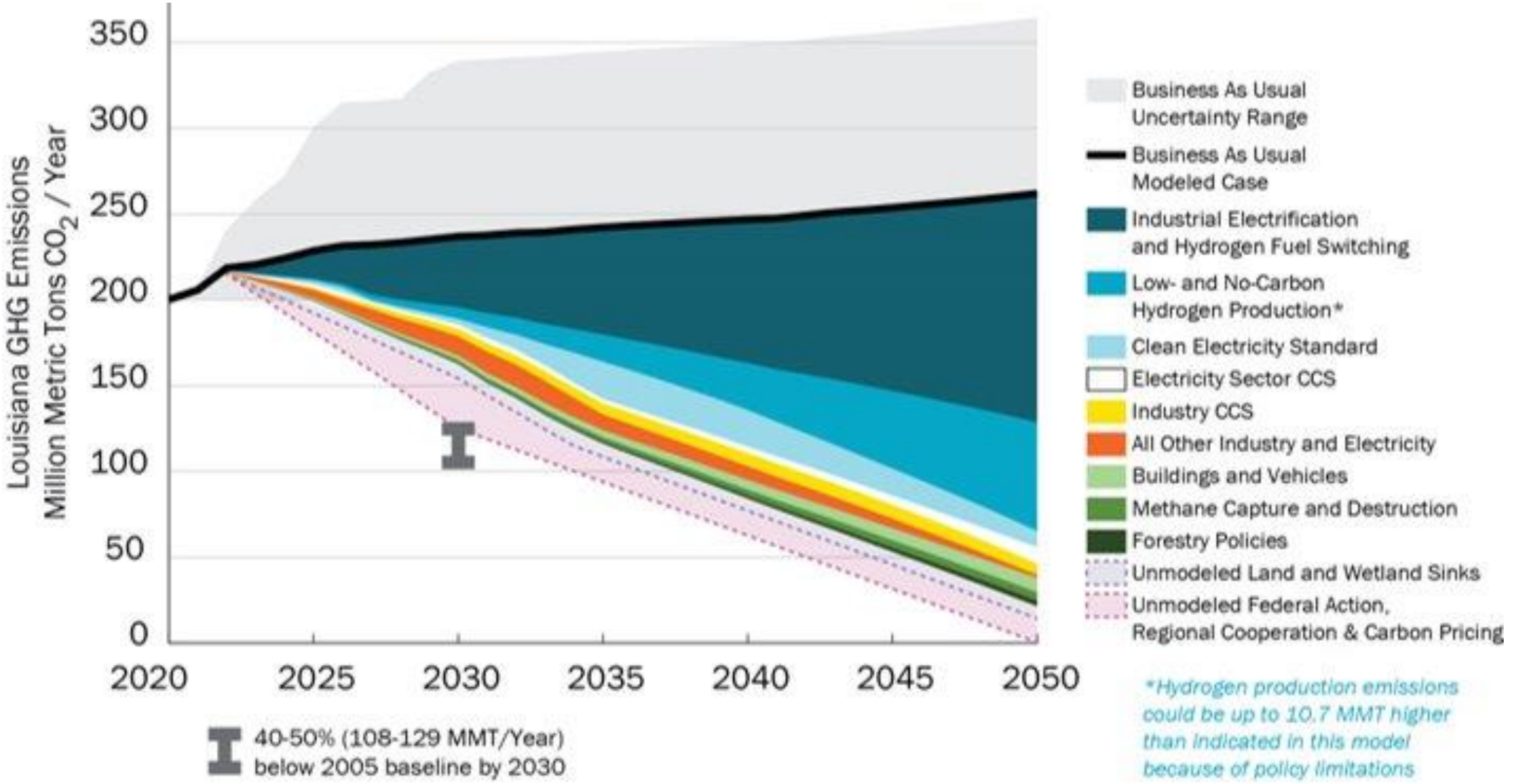
NEW PORTFOLIO DEVELOPED

8 Portfolio Sections

26 Carbon Reduction Strategies

84 Specific Actions

GHG EMISSIONS

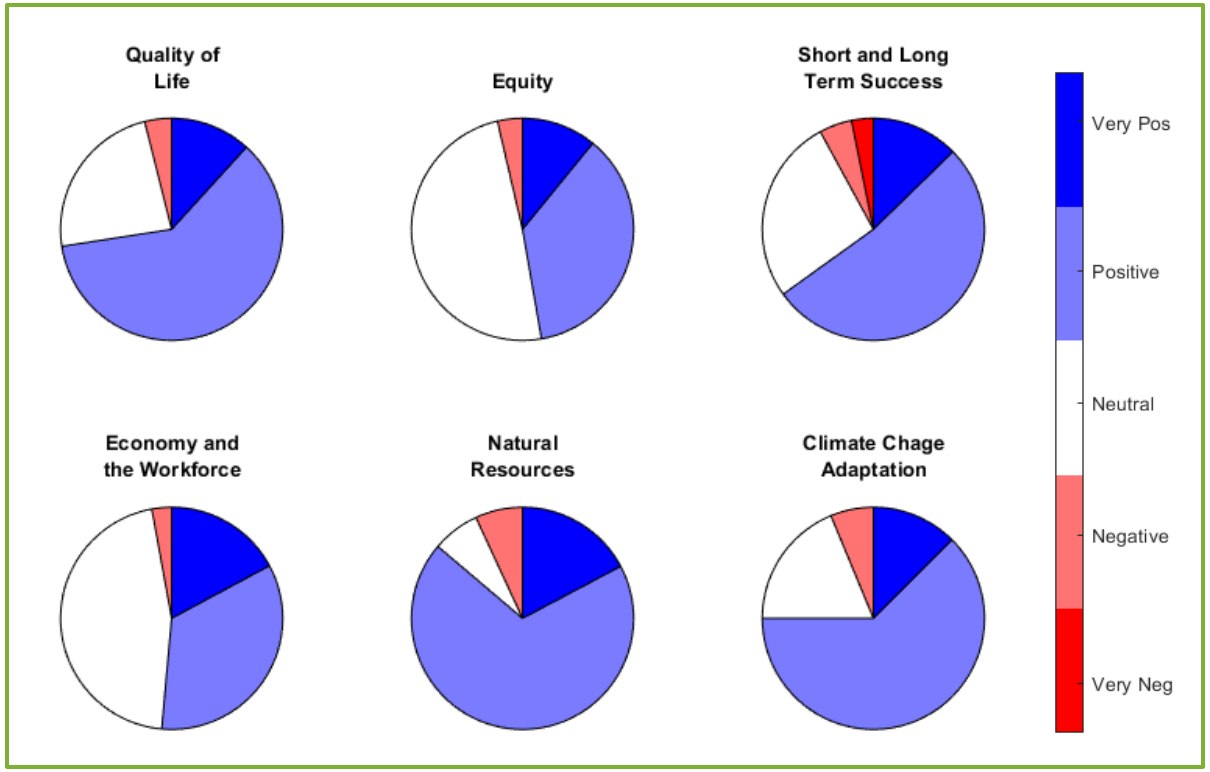


*Hydrogen production emissions could be up to 10.7 MMT higher than indicated in this model because of policy limitations

STRATEGY AND ACTION PORTFOLIO

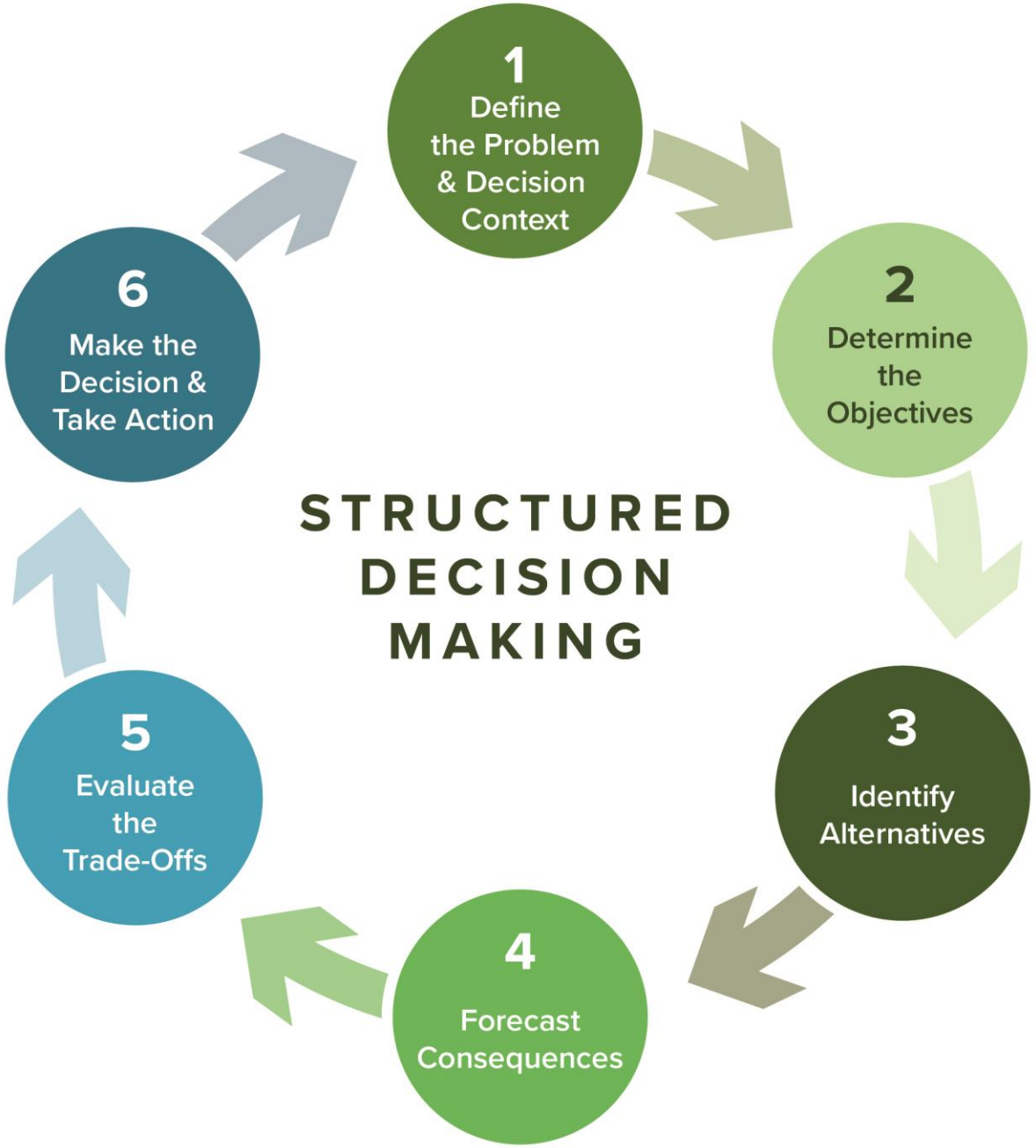
➢ **Predicted outcomes across objectives were *generally positive or neutral***

- Majority predicted positive or very positive outcomes for:
  - *Quality of Life*
  - *Natural Resources*
  - *Short- and Long-Term Success*
  - *Climate Change Adaptation*
- Majority predicted neutral or positive outcomes for:
  - *Equity*
  - *Economy and the Workforce*



Results by Fundamental Objective Category

6. Decide and Take Action



THE THREE WHICH ROSE TO THE TOP…

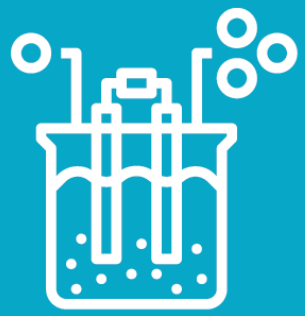
Renewable Electricity Generation

Increasing Louisiana's renewable electricity to meet current and future demand

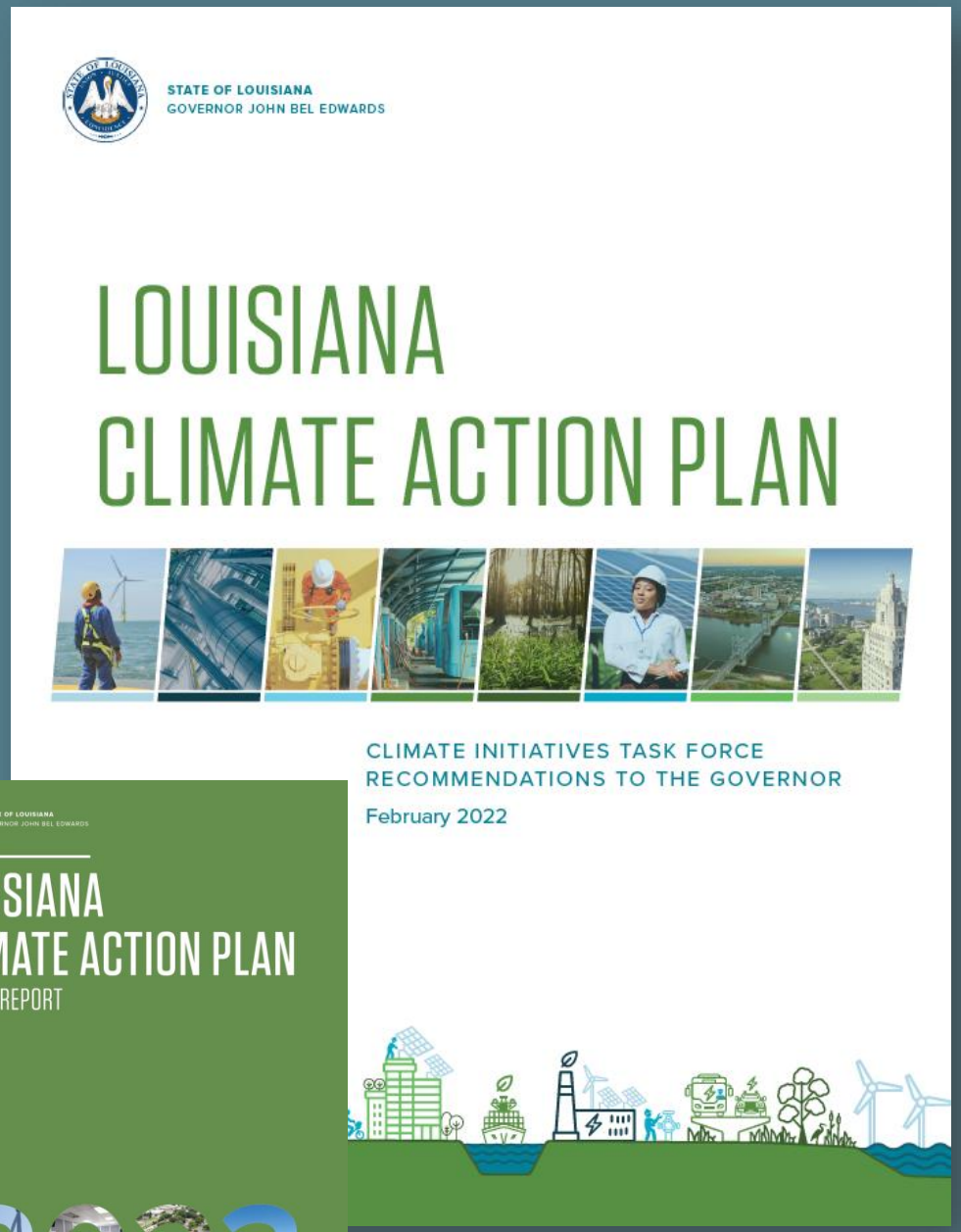
Industrial Electrification

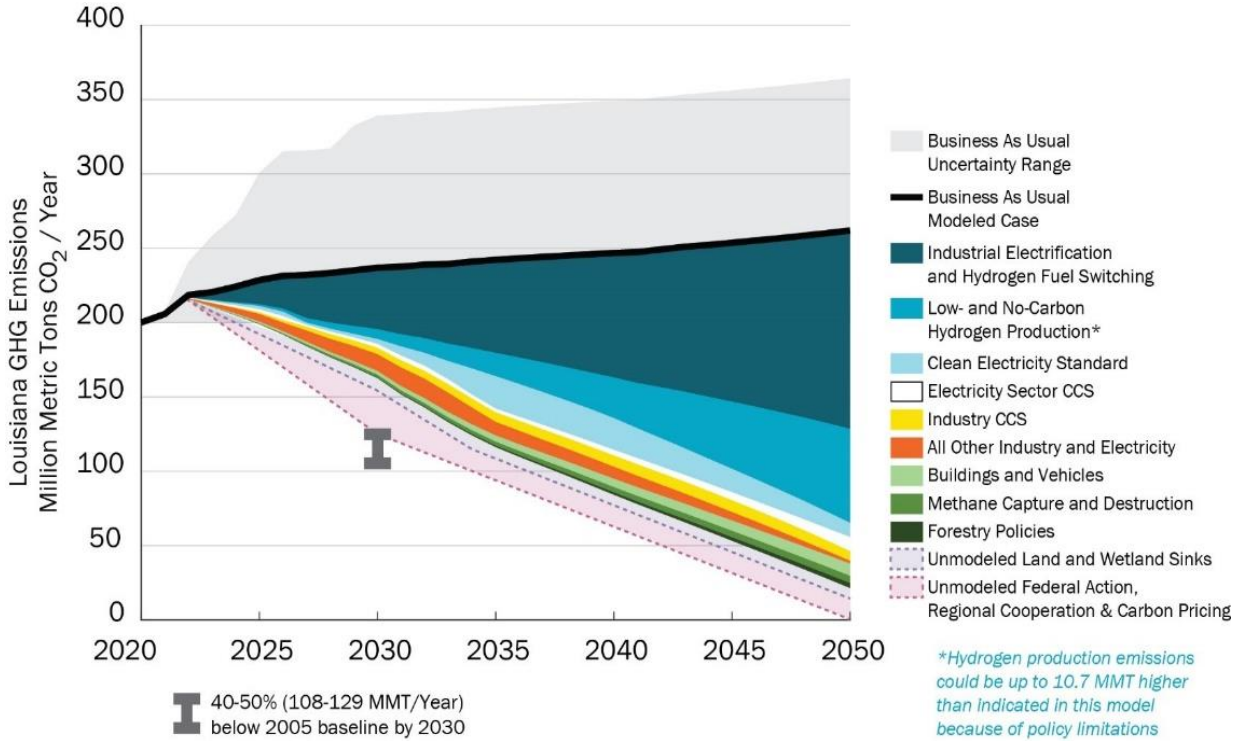
Shifting industrial processes and equipment to electric power instead of fuels

Industrial Fuel Switching to Low- & No-Carbon Hydrogen



Shifting high heat industrial processes to sustainably-produced hydrogen





APPROVED BY UNANIMOUS VOTE

Take Home Thoughts

- Identify the decision-maker(s)
- Build trust with the public through transparency, collaboration, communication
- Listen, understand the decision context and objectives
- Incorporate values and risk preferences
- Consider building multi-disciplinary, equitable teams
- Make all data and models publicly available
- Maintain your integrity

Evaluation of emission reduction and other societal and environmental outcomes: Structured decision making for the Louisiana climate action plan; September 2023; Journal of Environmental Management345:118936; DOI:10.1016/j.jenvman.2023.118936