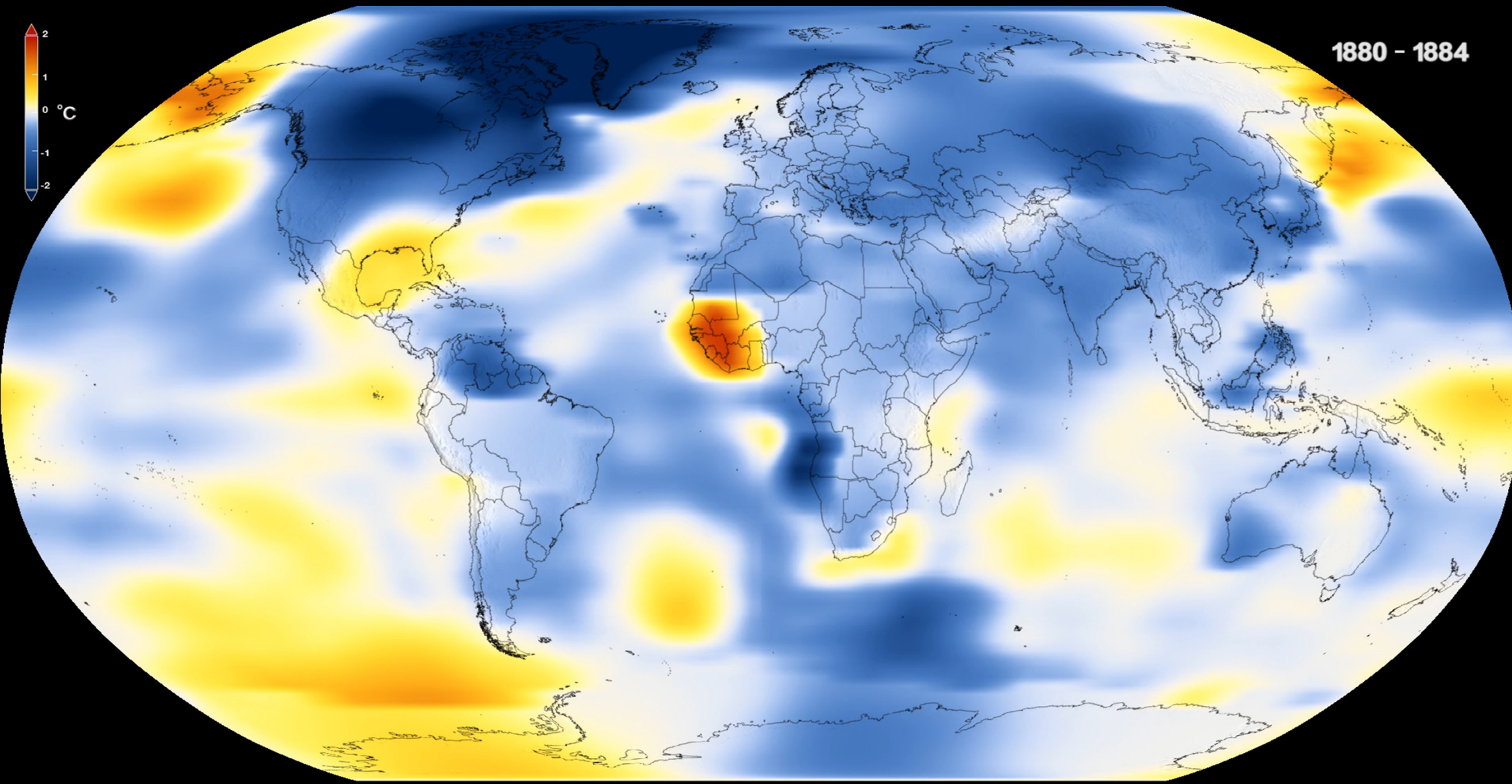
Transitions in knowledge for knowledge in transitions: Towards a paradigm shift in higher education?

Future Forward Conference
Dr Hans Bruyninckx, 17 October 2018

European Environment Agency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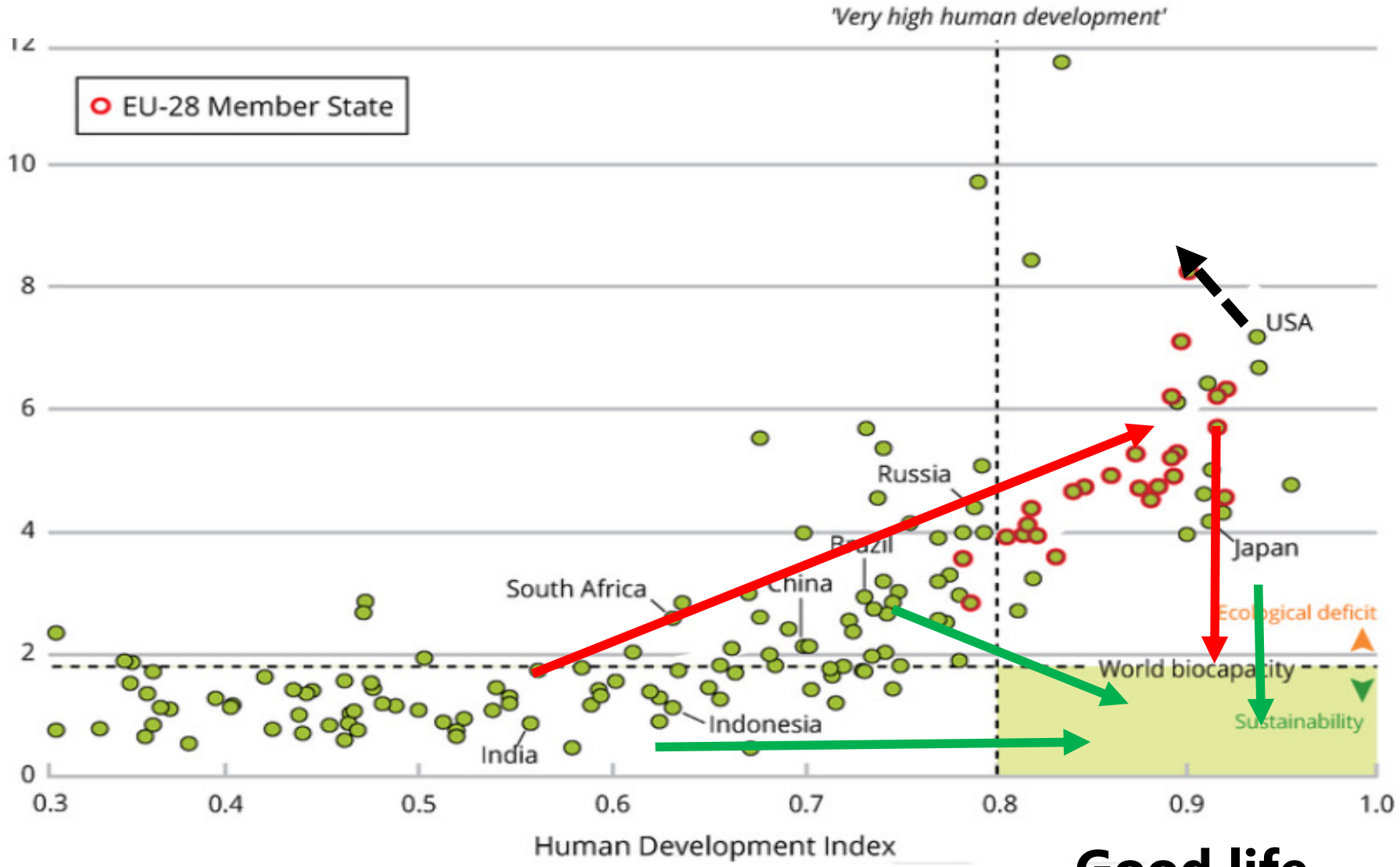
Challenge of 21st century: 10 billion people, 1 planet



Water, forests, oceans, biodiversity climate, resources

Within limits of the planet

Good life

Education, health, food, housing, safety

European Environment Agency

(Global Footprint Network, 2012; UNDP, 2014)

Global response: Sustainable Development Goals

EU Policy framework – 7th Environment Action Programme

Living well, within the limits of our planet

7th Environment Action Programme

European Environment Agency

Vision of the 7th Environment Action Programme

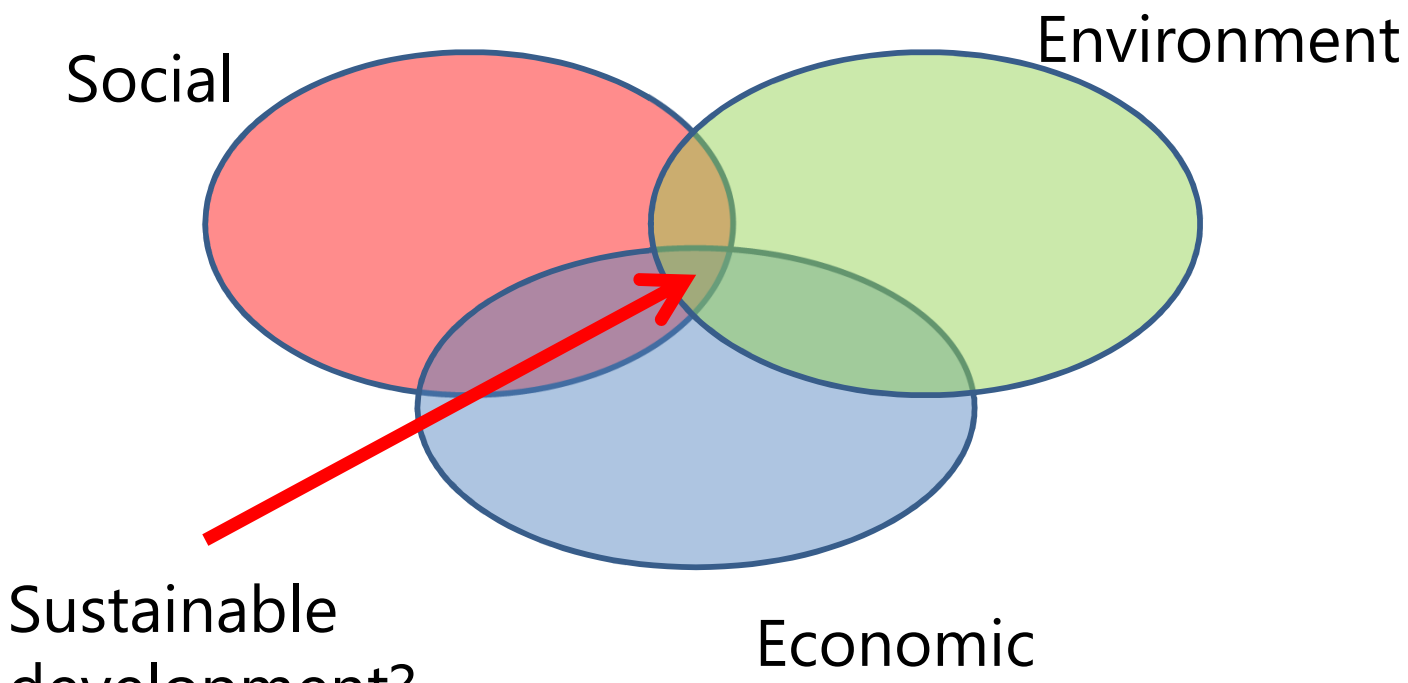
'In 2050, we live well, within the planet's ecological limits.

Our prosperity and healthy environment stem from an innovative, **circular economy** where nothing is wasted and where natural resources are managed sustainably, and **biodiversity is protected**, valued and restored in ways that enhance our society's resilience.

Our **low-carbon growth** has long been decoupled from resource use, setting the pace for a global safe and sustainable society.'

Source: 7th Environment Action Programme, European Commission, 2013

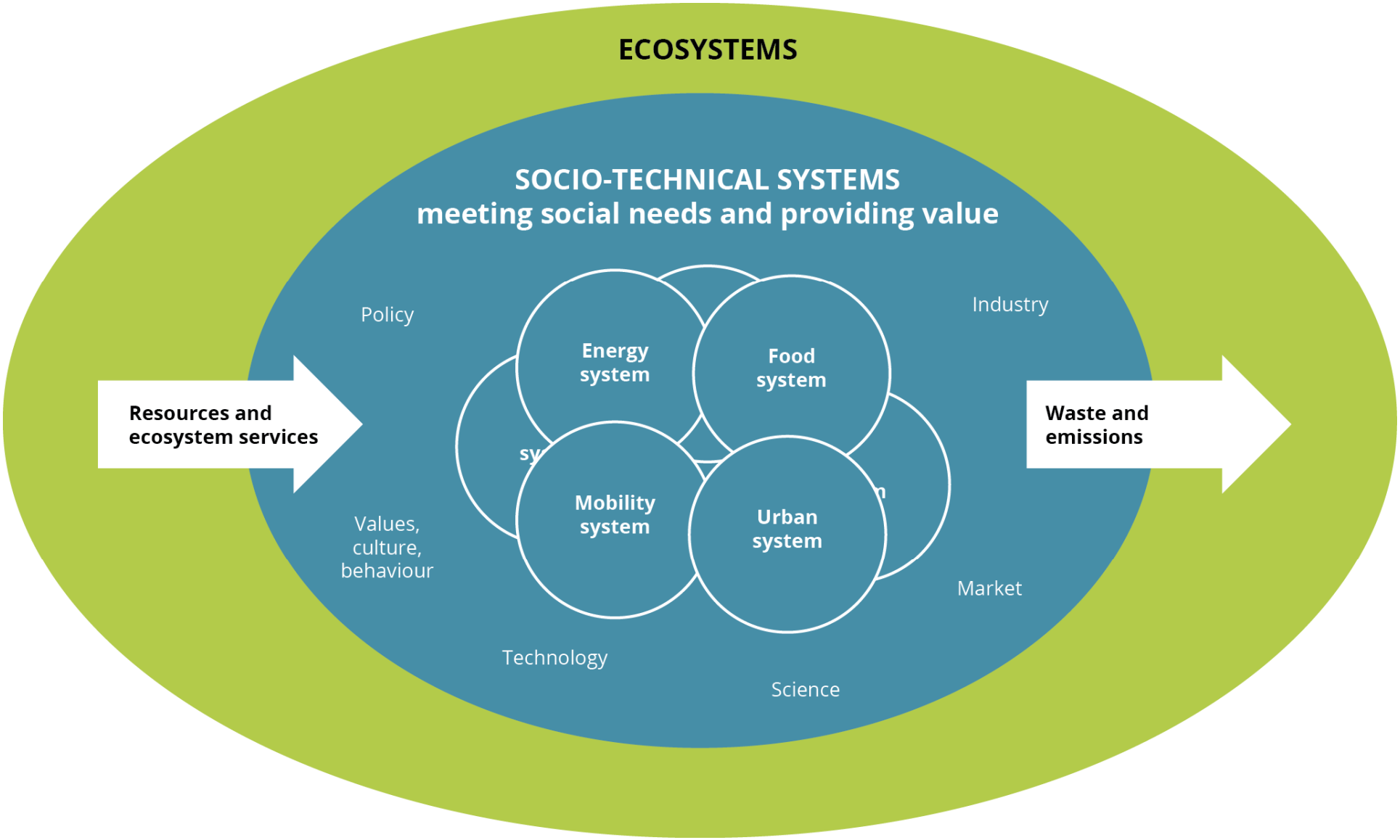
Rethinking sustainable development?



Sustainable development?

Of course not!

Living well, within the limits of the planet



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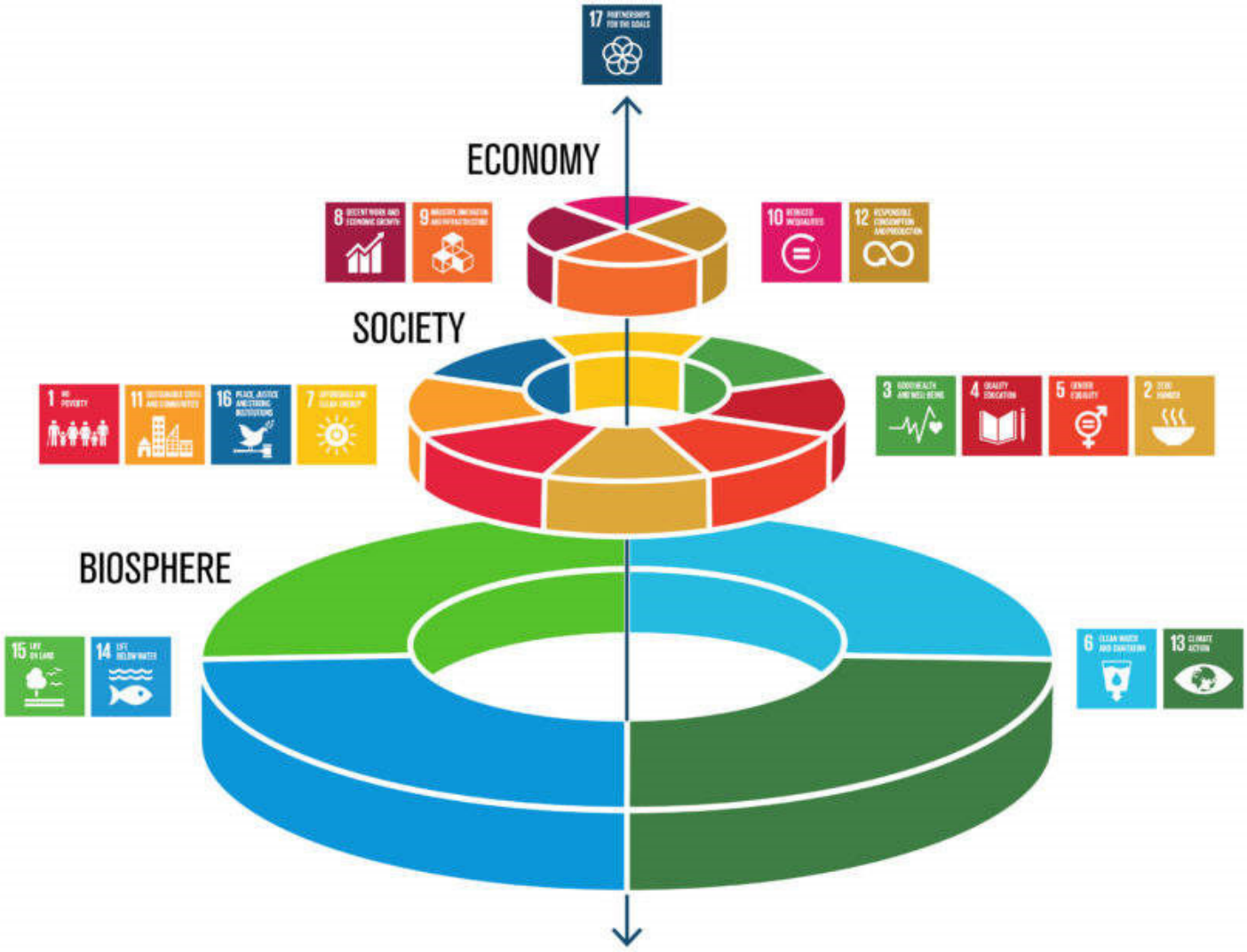
Implicit order?



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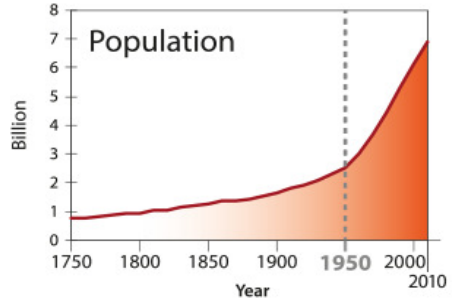
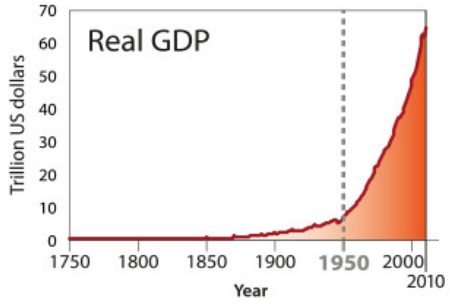
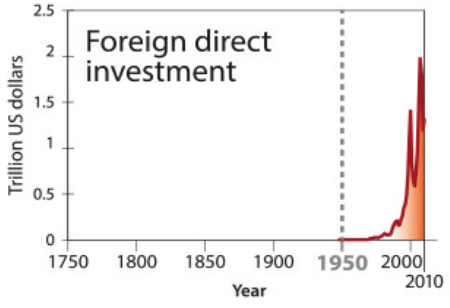
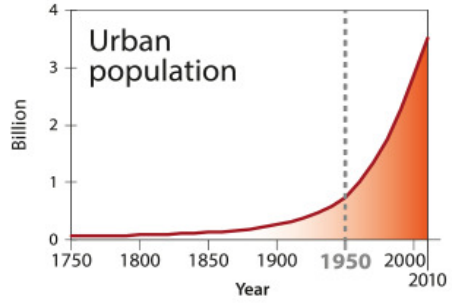
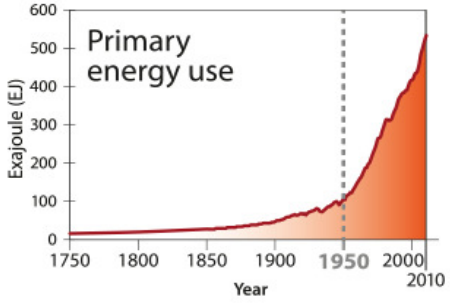
Socio-economic trends

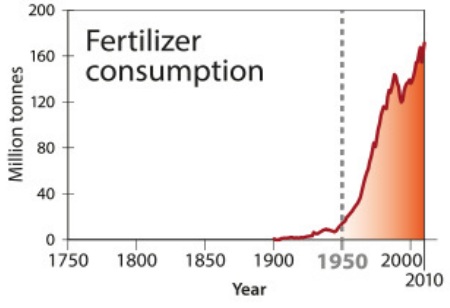


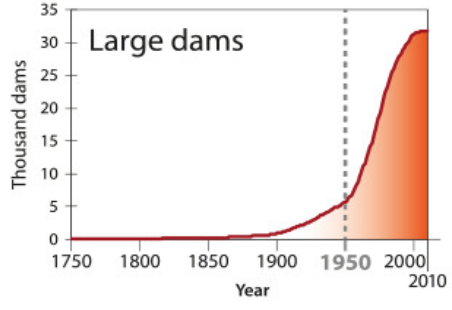


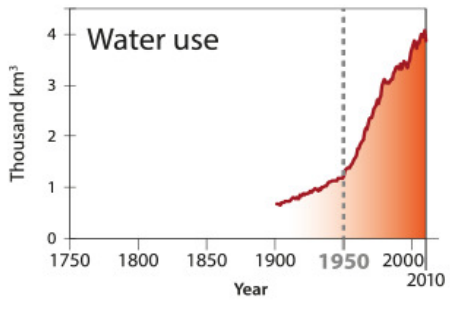


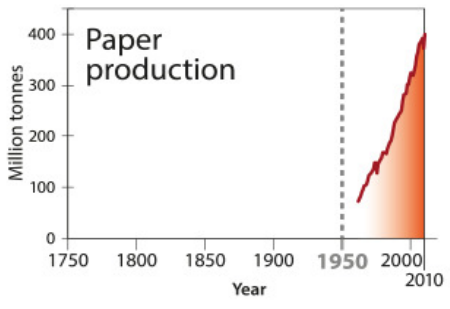


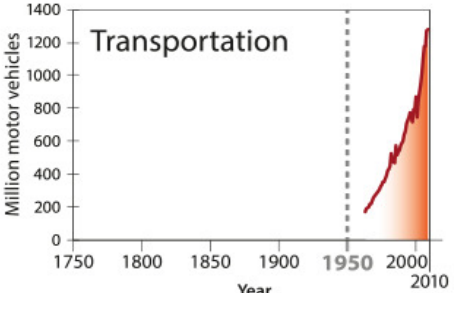


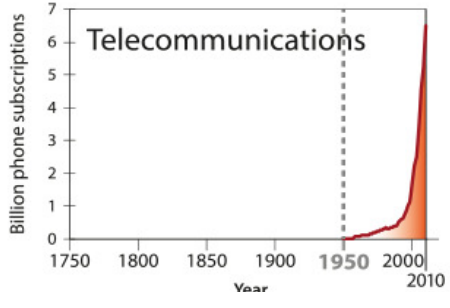


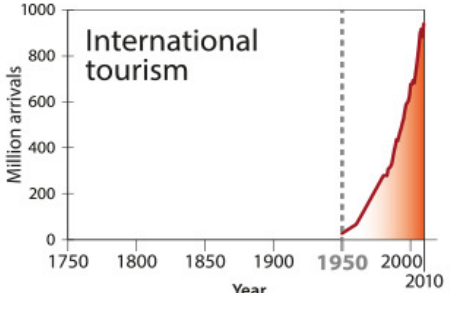












Global trends1

Globalisation of unsustainable systems of production and consumption

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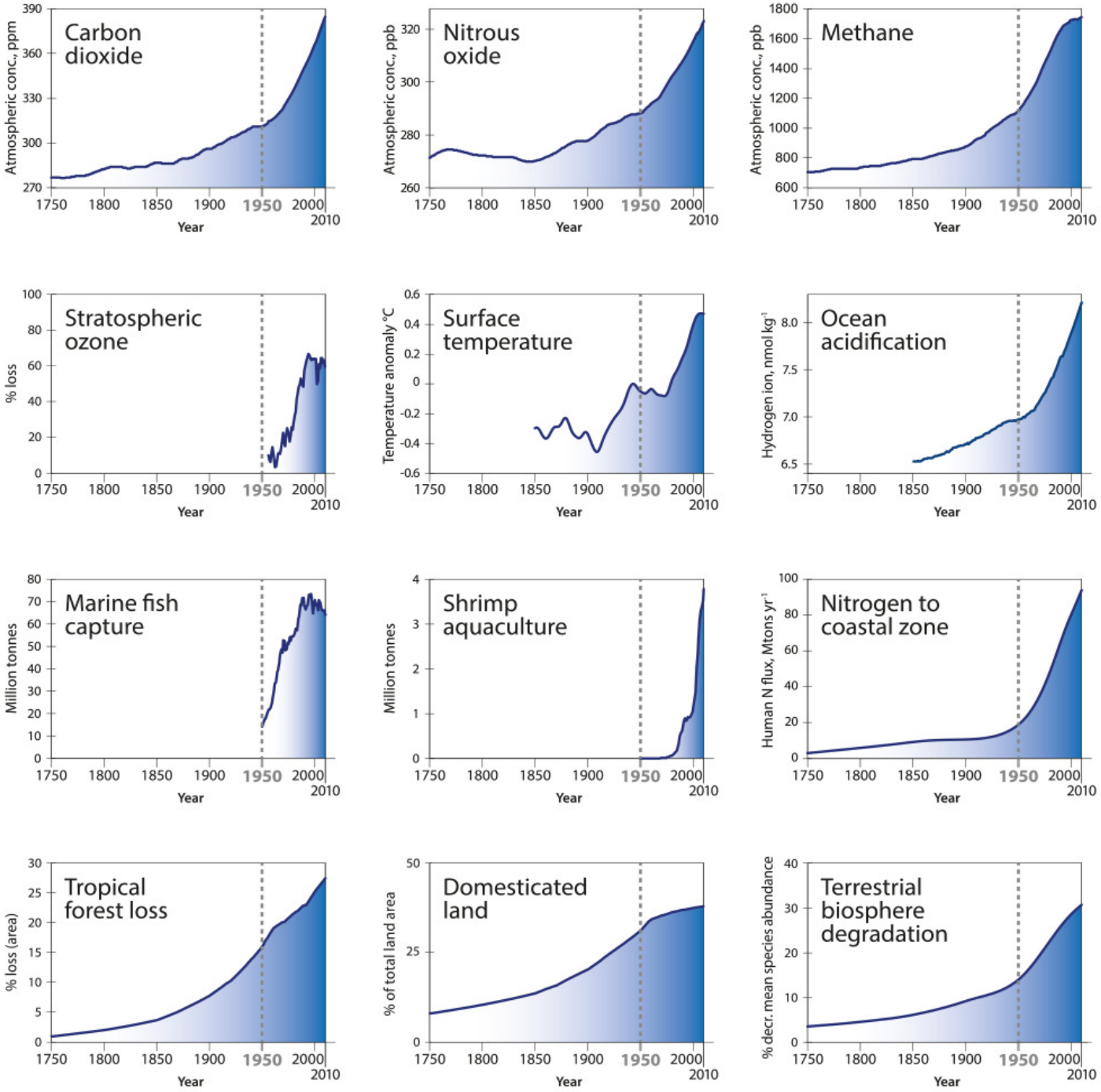
Earth system trends



Global trends2

Expectations/ policy promises

OR

How feasible?
How credible?
What sort of knowledge?

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This could be our best century ever, or our worst

Dr James Martin, founder Oxford Martin School

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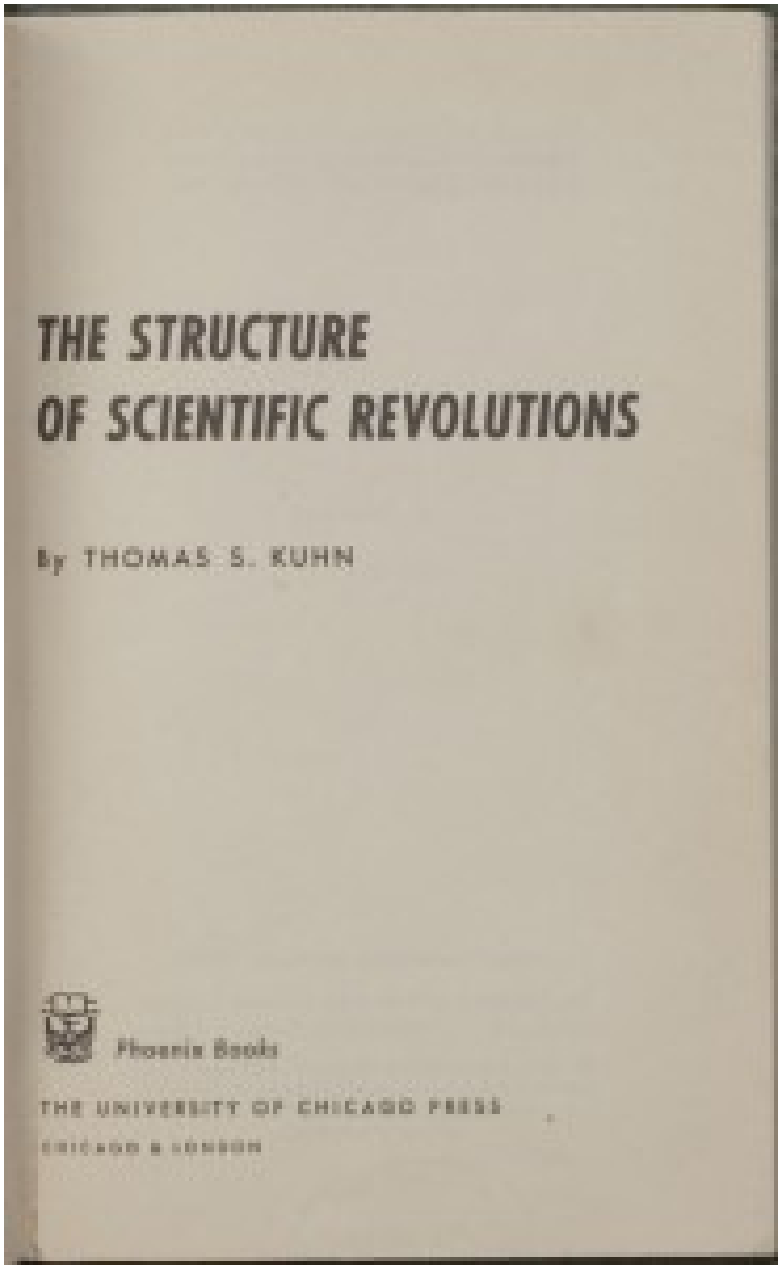
Paradigm shift in knowledge and policies?



Normal Science
Puzzle solving stage
Scientists share common paradigm
-make measurements
-articulate theory
-make predictions

Anomaly
Blame apparatus
Set aside problem
Modify paradigm

Crisis
Anomaly too problematic
Faith in paradigm shaken

Change in World View
Gestalt shift
Problem seen from different perspective
New paradigms explored

Pre-paradigm phase
Alternative concepts compete
Anarchic period
Fact gathering appears unguided

New Paradigm
Scientists return to routine
Revolution becomes invisible

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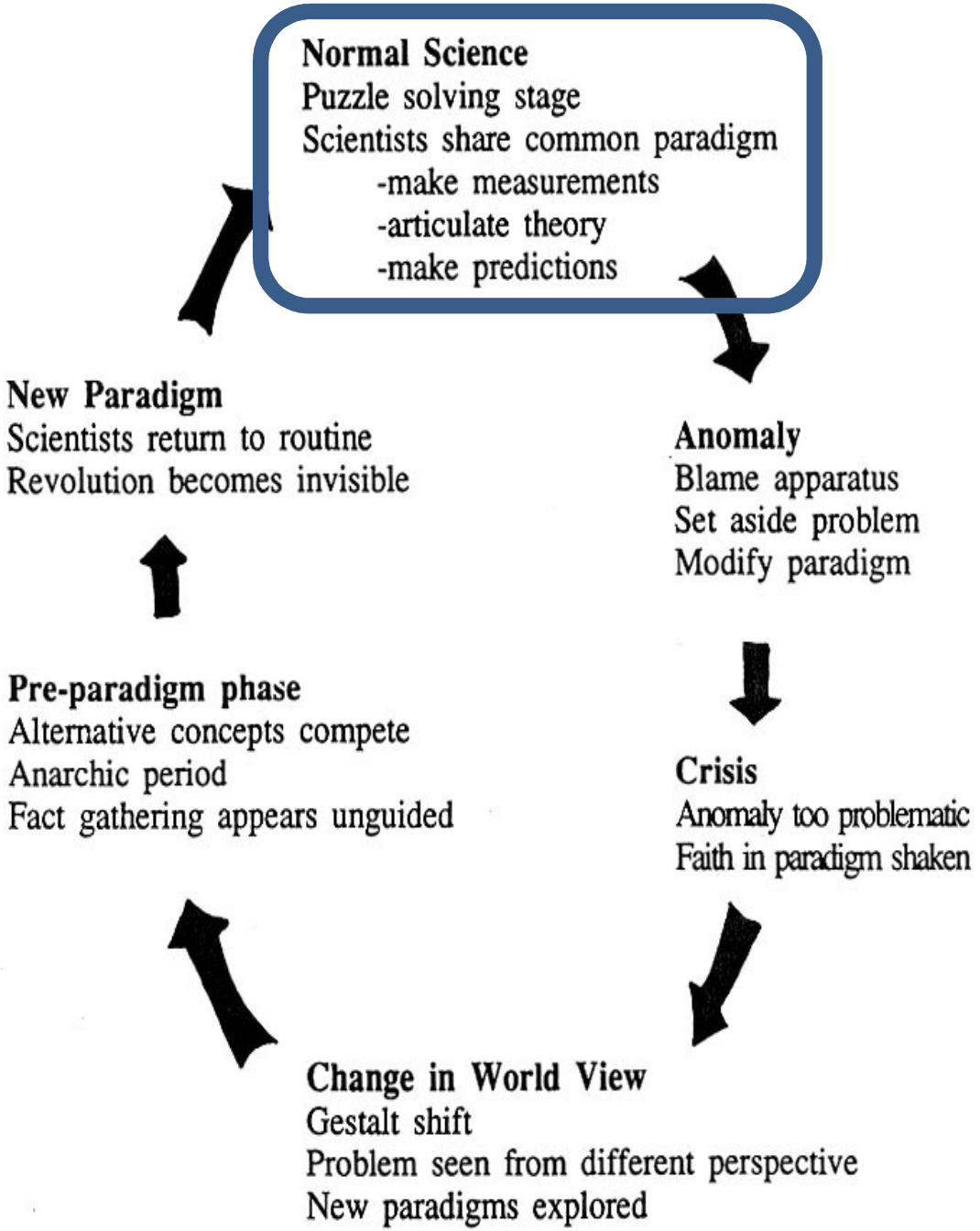
Normal

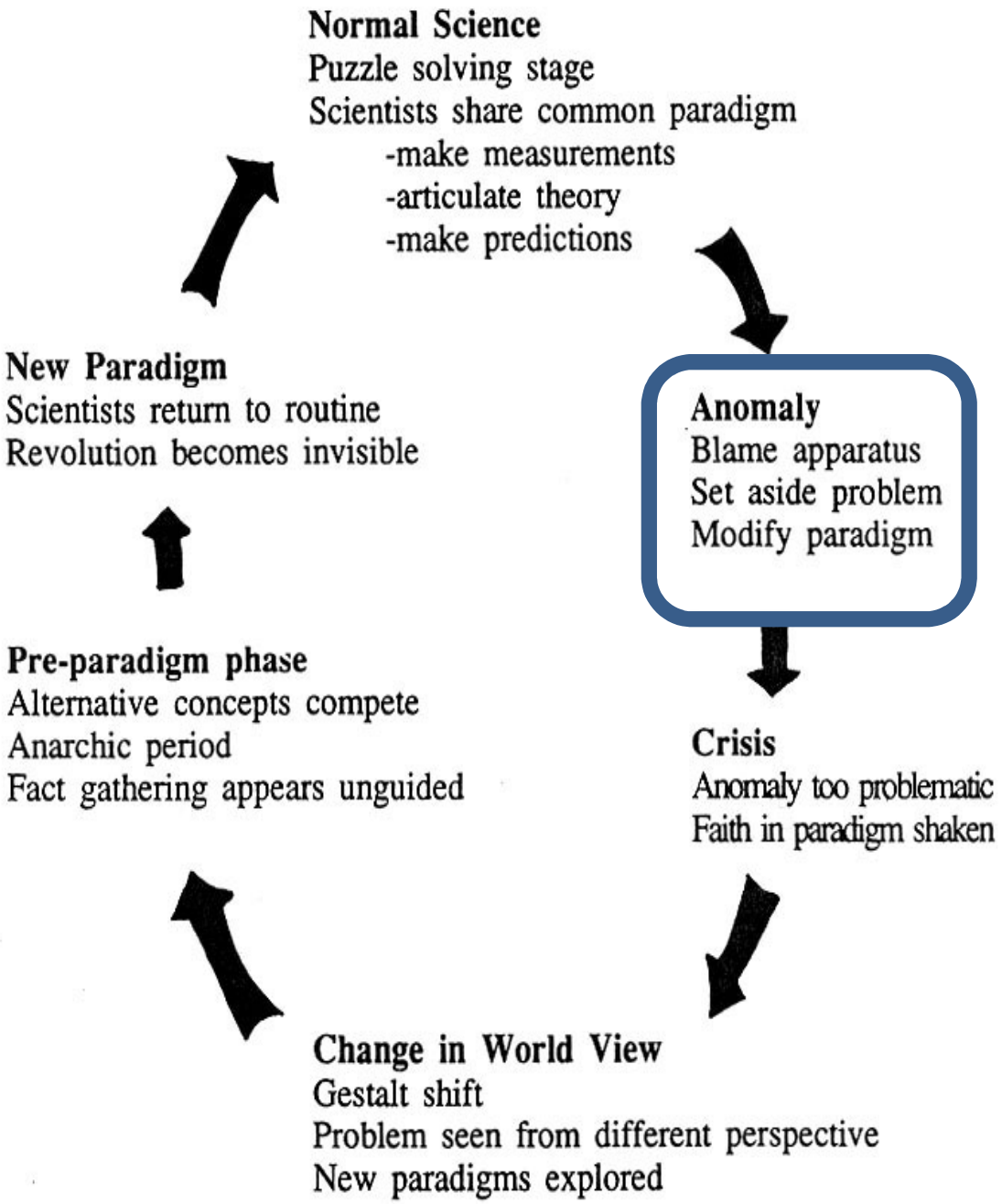


"Over the past 40 years, a broad range of environment legislation has been put in place, amounting to the most comprehensive modern standards in the world. This has helped to address some of the most serious environmental concerns." (7EAP)

Policy theory: initially 'fighting pollution'

Knowledge paradigm: "Union environment policy is based on environmental monitoring, data, indicators and assessments linked to the implementation of Union legislation, as well as formal scientific research...." (7EAP)

Anomalies occur



"However, many environmental trends in the Union continue to be a cause for concern, not least due to insufficient implementation of existing Union environment legislation." (7EAP)

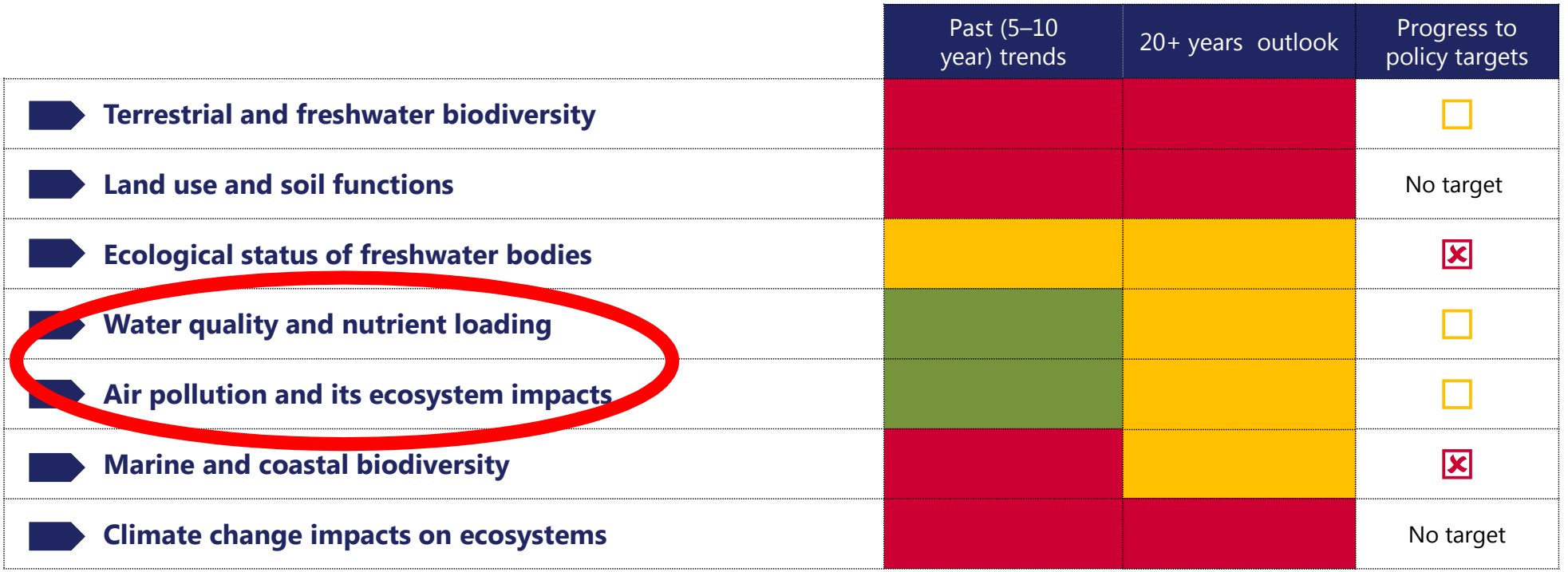
"Addressing some of those complex issues requires tapping into the full potential of existing environmental technology […], as well as increased use of market-based instruments." (7EAP)

Modify policy theory: Efficiency thinking

Modify knowledge: Efficiency; market-based instruments; BAT studies; voluntary instruments

Thematic priority objective 1:
Protecting, conserving and enhancing natural capital

SYNTHESIS REPORT | GLOBAL MEGATRENDS | EUROPEAN BRIEFINGS | COUNTRY COMPARISONS | COUNTRIES & REGIONS



Improving trends dominate
Trends show mixed picture
Deteriorating trends dominate

Largely on track
Partially on track
Largely not on track

Source: EEA. SOER 2015 Synthesis report.

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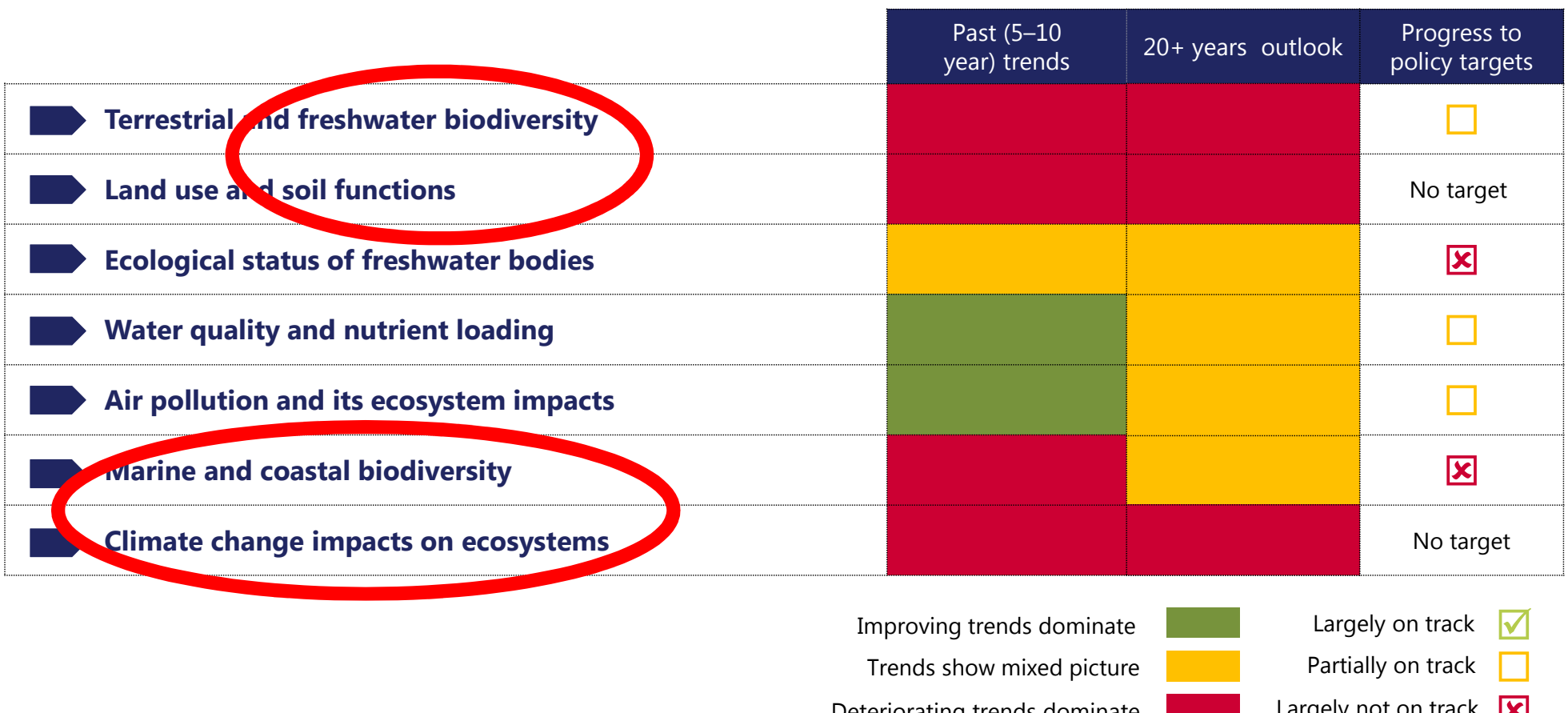
Thematic priority objective 1:
Protecting, conserving and enhancing natural capital

SYNTHESIS REPORT | GLOBAL MEGATRENDS | EUROPEAN BRIEFINGS | COUNTRY COMPARISONS | COUNTRIES & REGIONS



Source: EEA. SOER 2015 Synthesis report.

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Thematic priority objective 3: Safeguarding from environmental risks to health

SYNTHESIS REPORT | GLOBAL MEGATRENDS | EUROPEAN BRIEFINGS | COUNTRY COMPARISONS | COUNTRIES & REGIONS

	Past (5–10 year) trends	20+ years outlook	Progress to policy targets
Water pollution and related environmental health risks			☑ / ☐
Air pollution and related environmental health risks			☐
Noise pollution (especially in urban areas)		/	☐
Urban systems and grey infrastructure			No target
Climate change and related environmental health risks			No target
Chemicals and related environmental health risks			☐ / ☒

Improving trends dominate
Trends show mixed picture
Deteriorating trends dominate

Largely on track ☑
Partially on track ☐
Largely not on track ☒

Source: EEA. SOER 2015 Synthesis report.

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Challenges for established governance approaches

Are they addressing the underlying drivers of environmental degradation?

In 2001, the EU set itself the target to halt biodiversity loss in the EU by 2010.

In 2011, the EU set the target to 'halt loss of biodiversity and degradation of ecosystem services in the EU by 2020'.

EU Biodiversity Targets (2020)	Progress at mid-term (201
2020 Headline Target	No significant pr
Halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restore them in so far as feasible, while stepping EU contribution to a global biodiversity los	Overall, bi EU system services in the eline, as confirmed by *report*. This is consistent ons for the capacity of e future. While many local successes ground delivers positive outcomes, these up to have a measurable impact on the overall

Source: *Mid-term review of the EU biodiversity*

Next? '2030'? Or, addressing the fundamental drivers?

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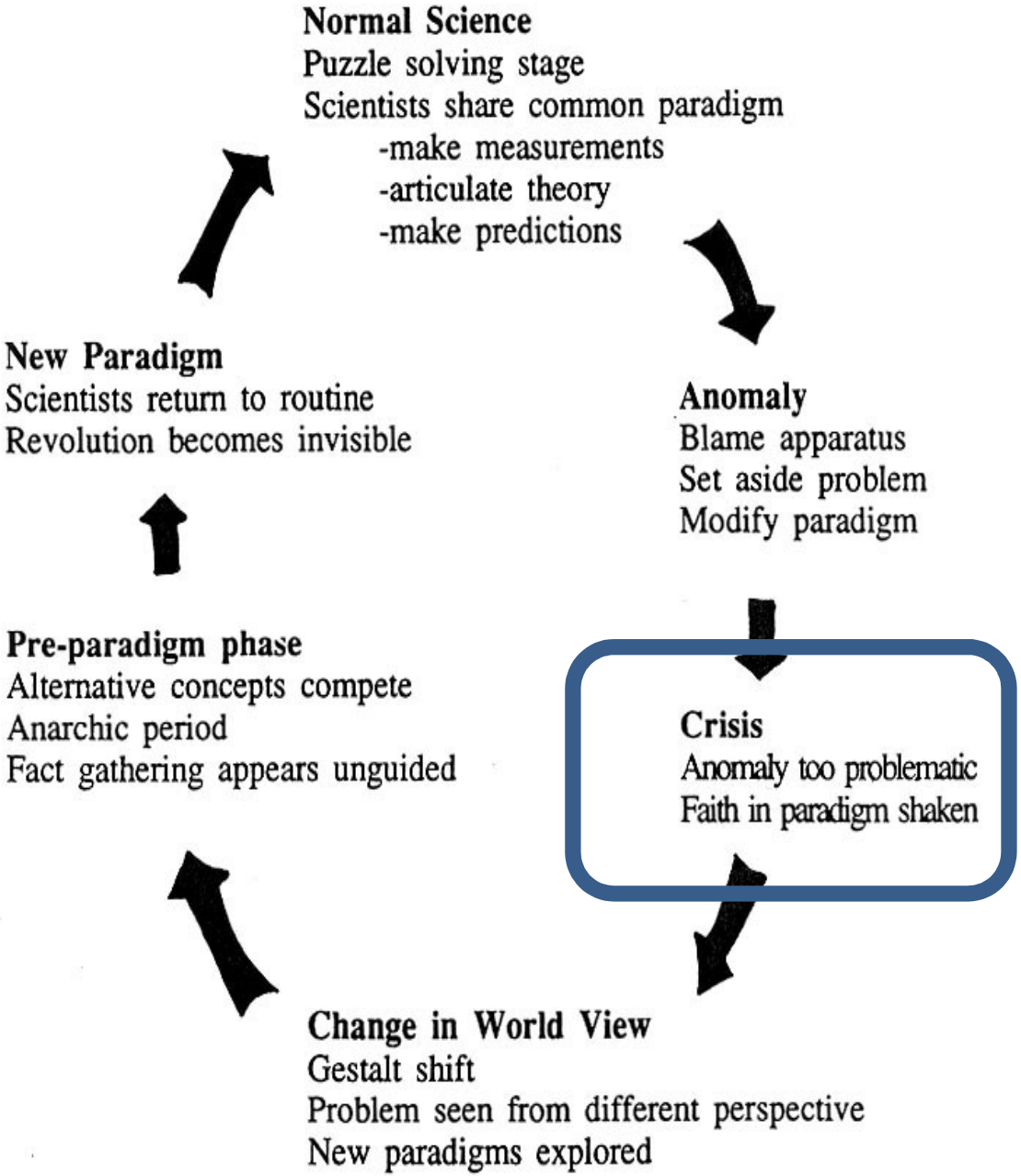
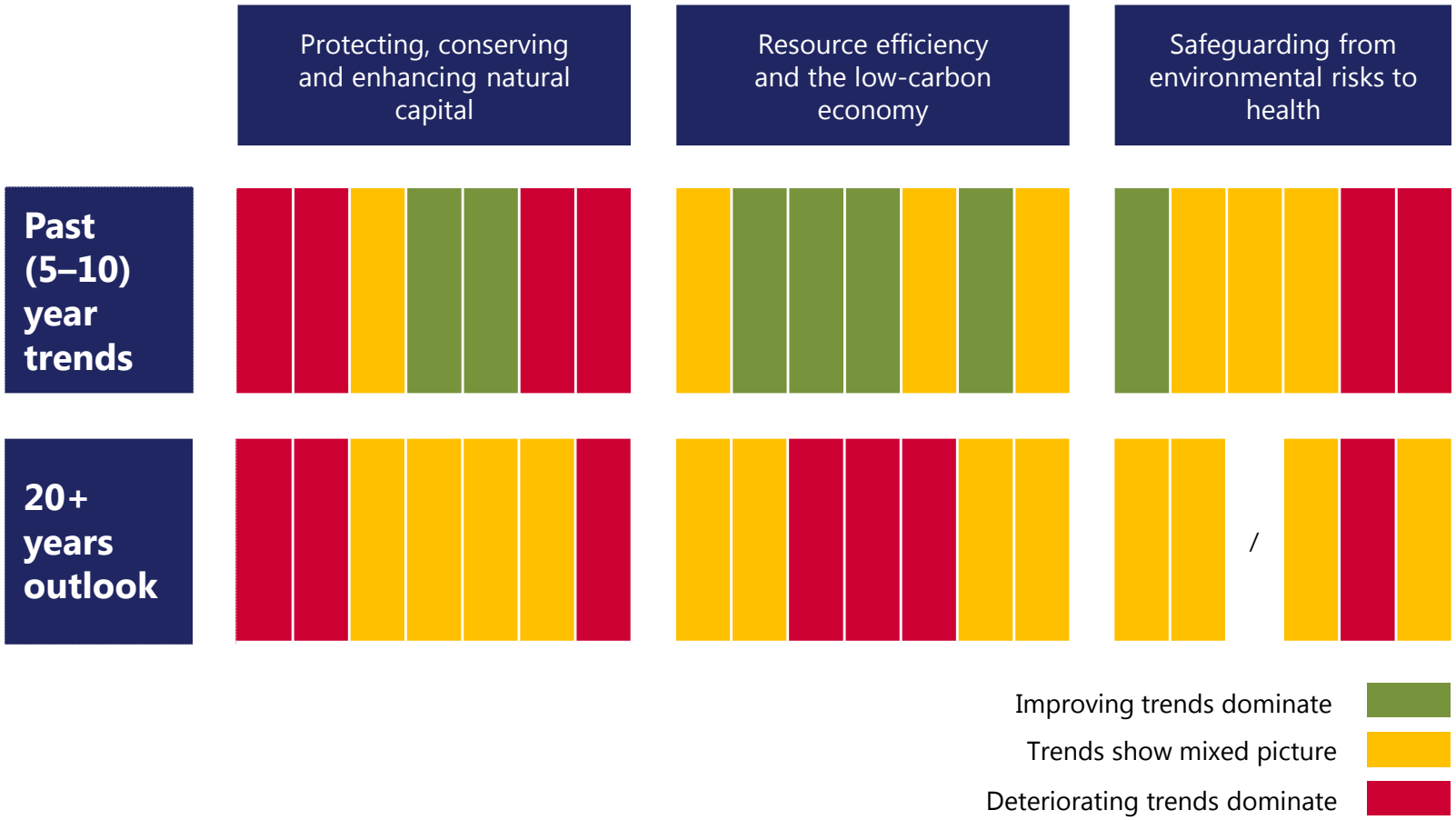
Science/knowledge/policy in 'crisis'?



"Together with current wasteful production and consumption systems in the world economy, […] depletion of resources […], generating more pollution and waste, increasing global GHG emissions and exacerbating land degradation, deforestation and biodiversity loss." (7EAP)

"This report has come to the conclusion that traditional incremental approaches based on the efficiency approach will not suffice. Rather, unsustainable systems of production and consumption require fundamental rethinking in the light of European and global realities." (SOER2015)

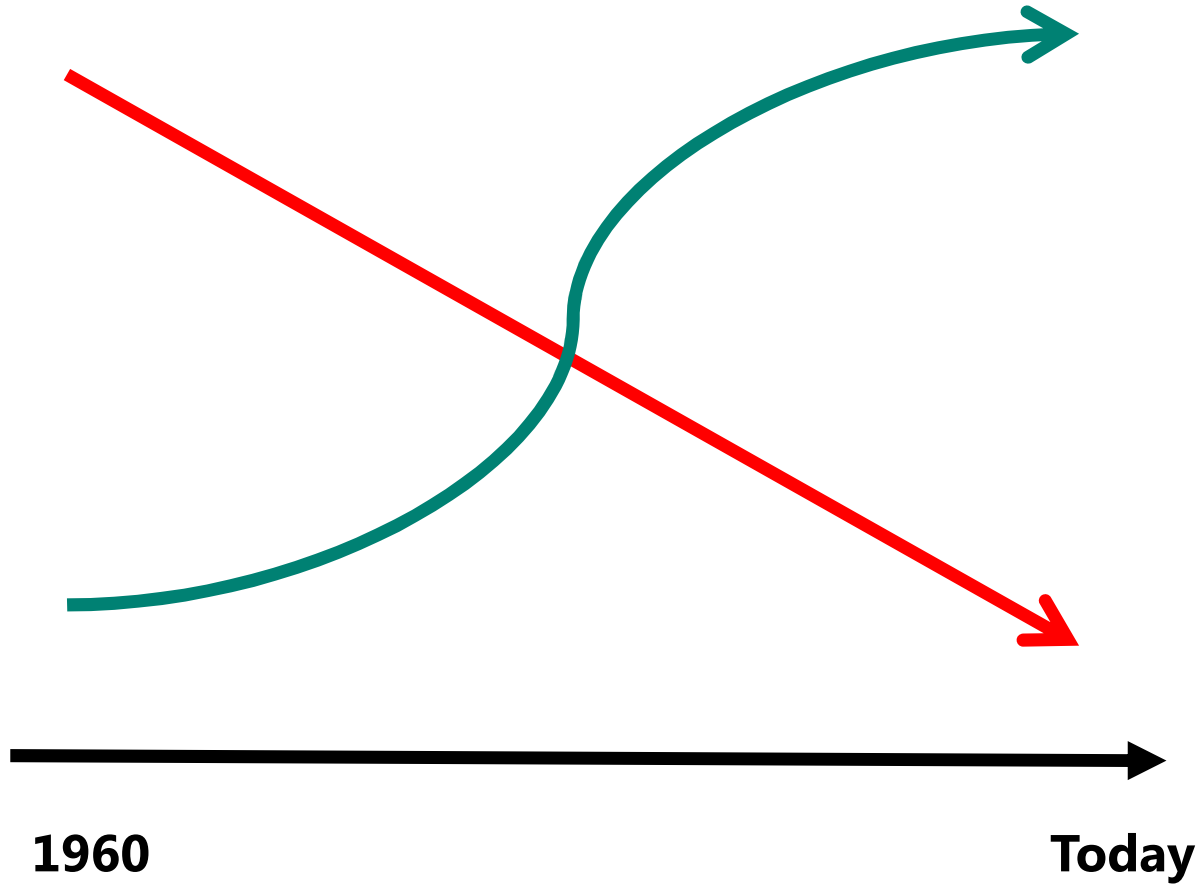
The overall picture:
Efficiency improvements have not secured long-term resilience



Source: EEA. SOER 2015 Synthesis report.

Core anomaly

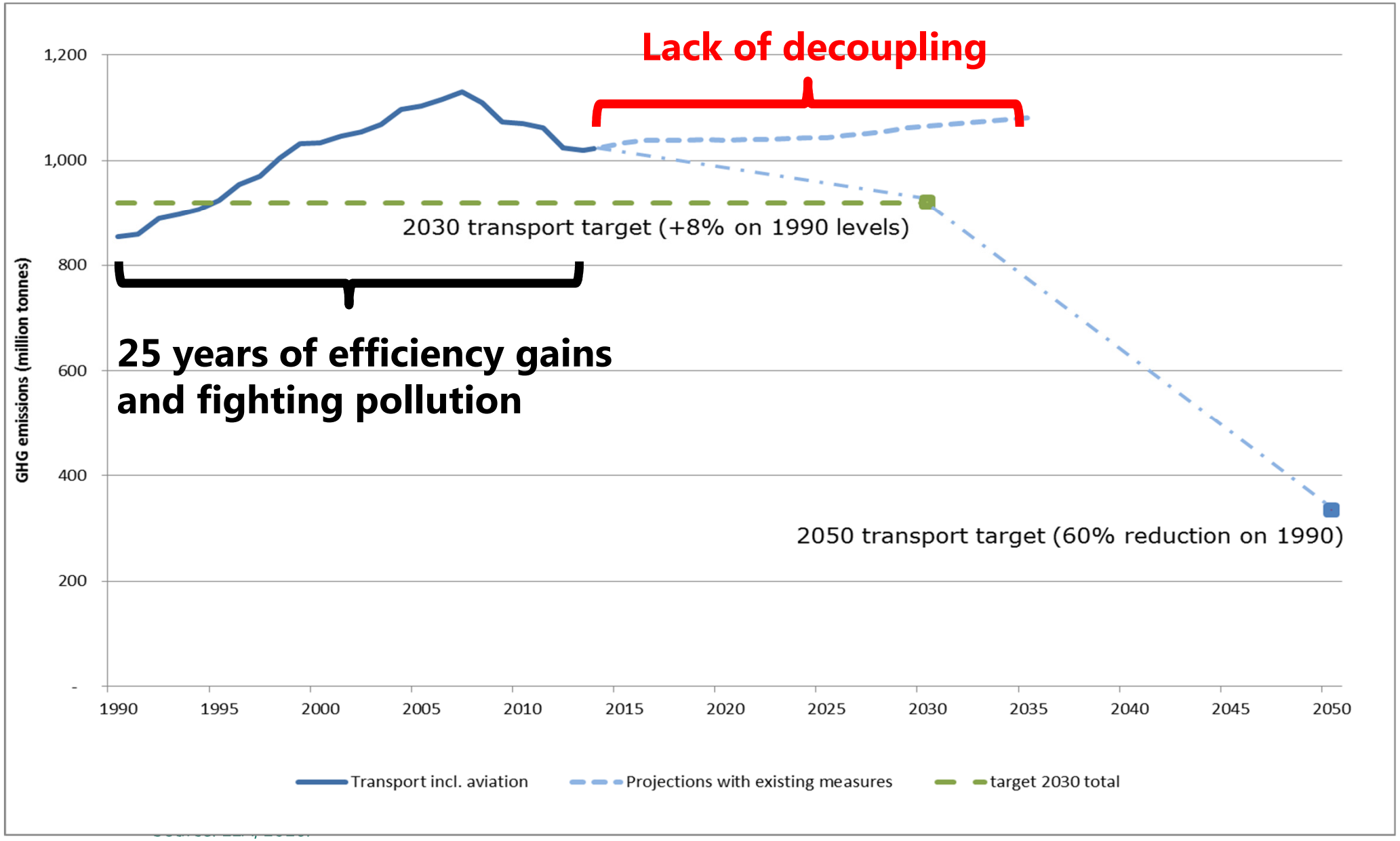
Institutional vs ecosystem developments



Different explanations:

- Counterfactual
- Implementation GAP
- Better regulation
- Time-lag effect
- **Institutional solutions don't address the core issues!**

EU GHG emissions from transport



Source: EEA, 2016.

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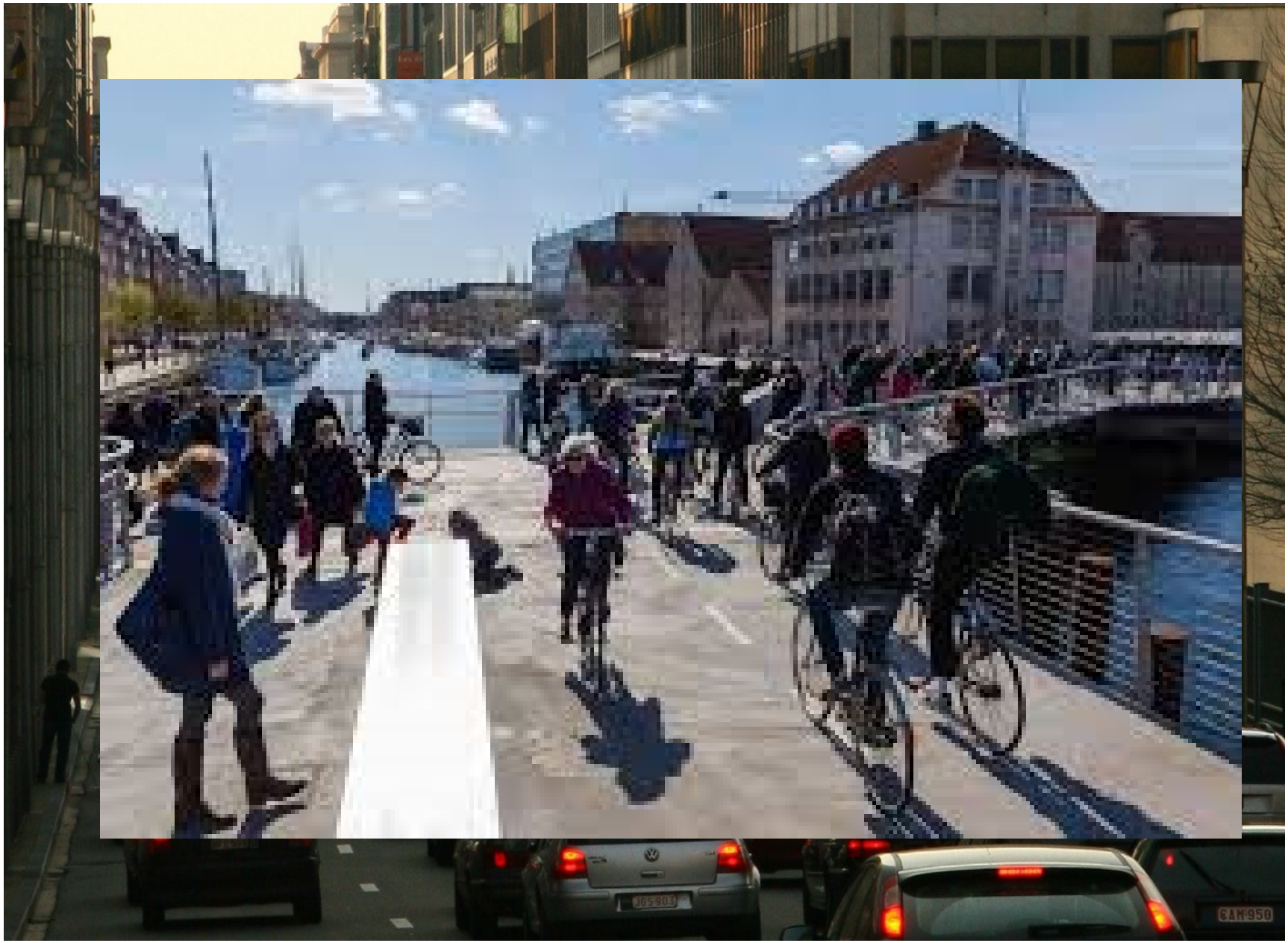
Limits of the current techno-efficiency paradigm



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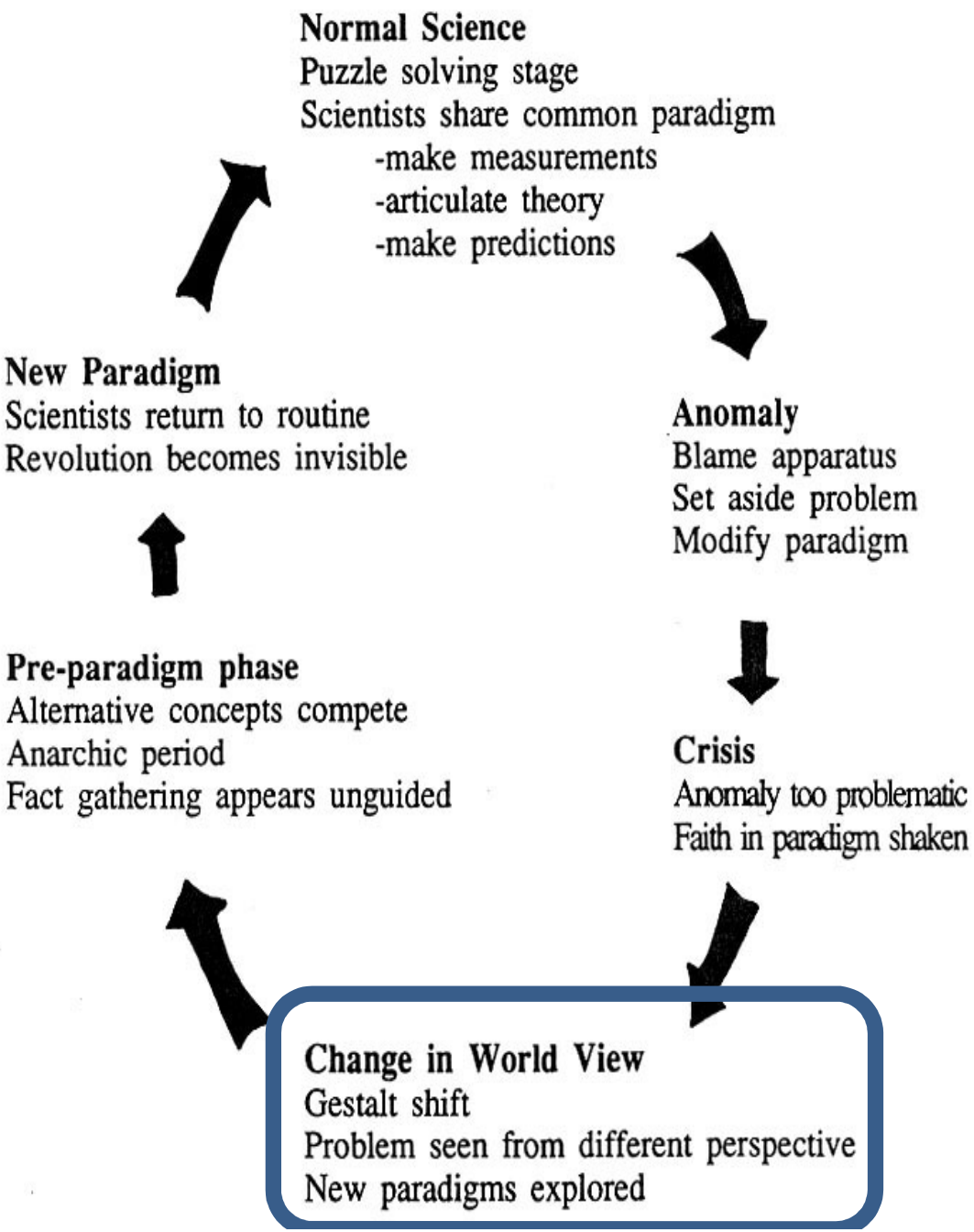
Change in world view/understanding

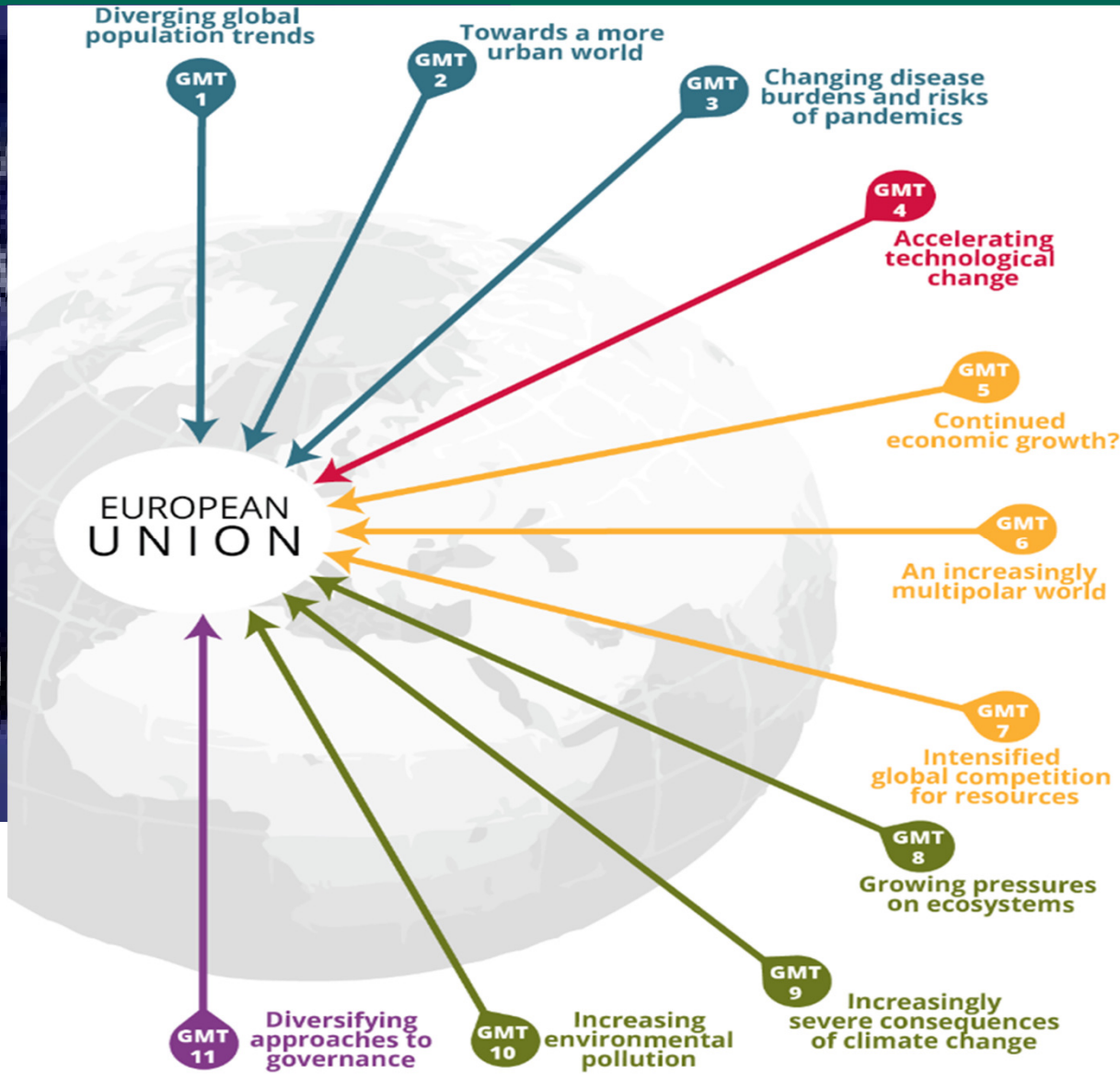


"Biodiversity, including the ecosystem services it provides (natural capital), for its intrinsic value and for its essential contribution to human well-being and economic prosperity."

"The current knowledge base [...] has gaps [...] required to meet emerging policy demands. These gaps call for actions to widen the knowledge base [...] in the coming decade. "... systems science; complex environmental change and systemic risks; global megatrends; interplay between socio-economic and environmental factors; transitions in production-consumption systems; environmental risks to health; and the inter-relationships between economic development, environmental change and human well-being." (7EAP)

Changes in understanding

Changing global context: impact and role for Europe?



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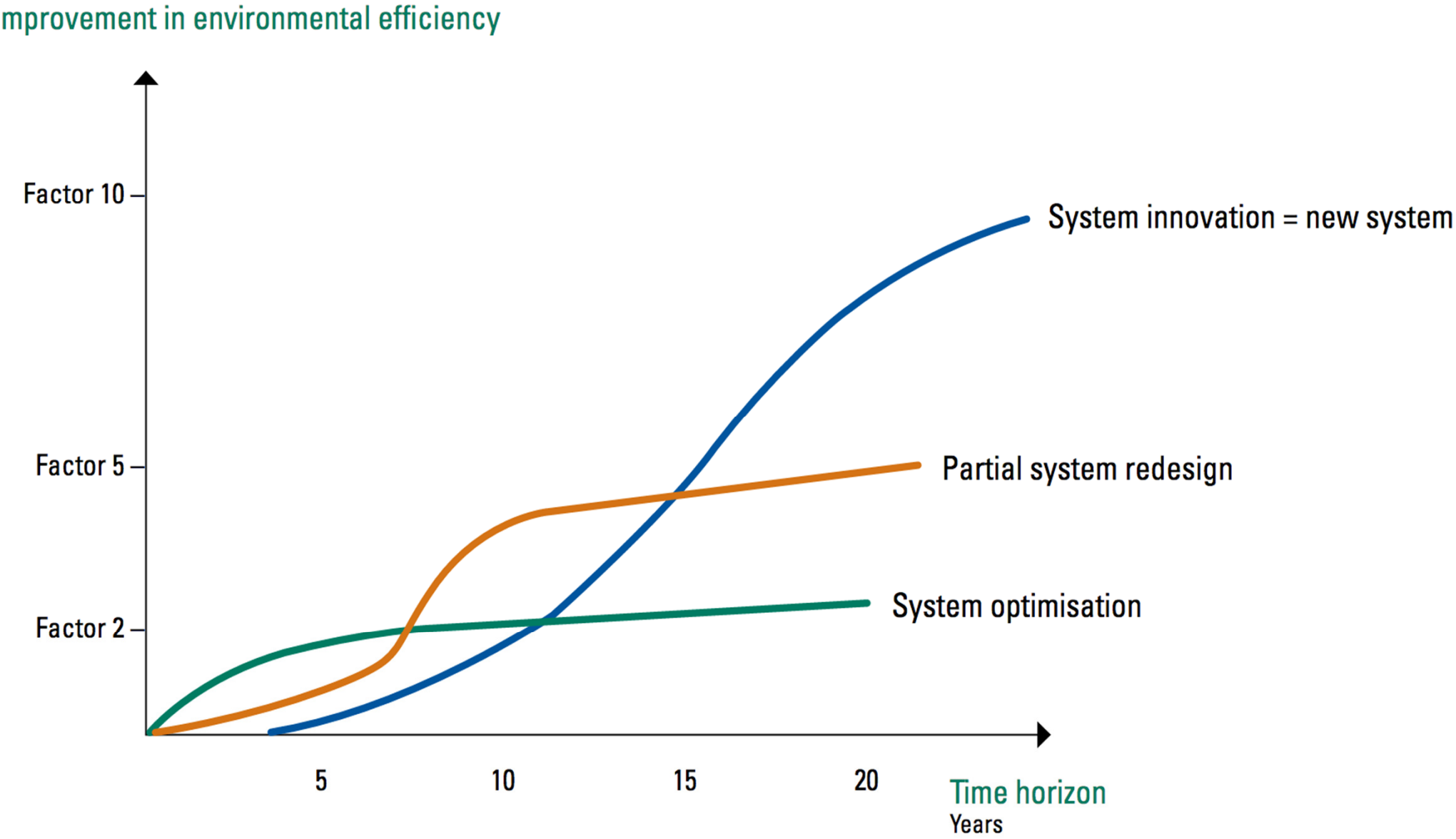
Gestalt Schift in problem analysis and responses?

Transitions

= **fundamental shifts** in the **systems** that fulfill societal needs, through profound changes in *dominant* **structures, practices, technologies, policies, lifestyles, thinking** …

… in line with the sustainable development ambitions and objectives embedded in the Sustainable Development Goals

Achieving needed change requires system innovation



Source: UNEP (from Wetering et al., 1997)

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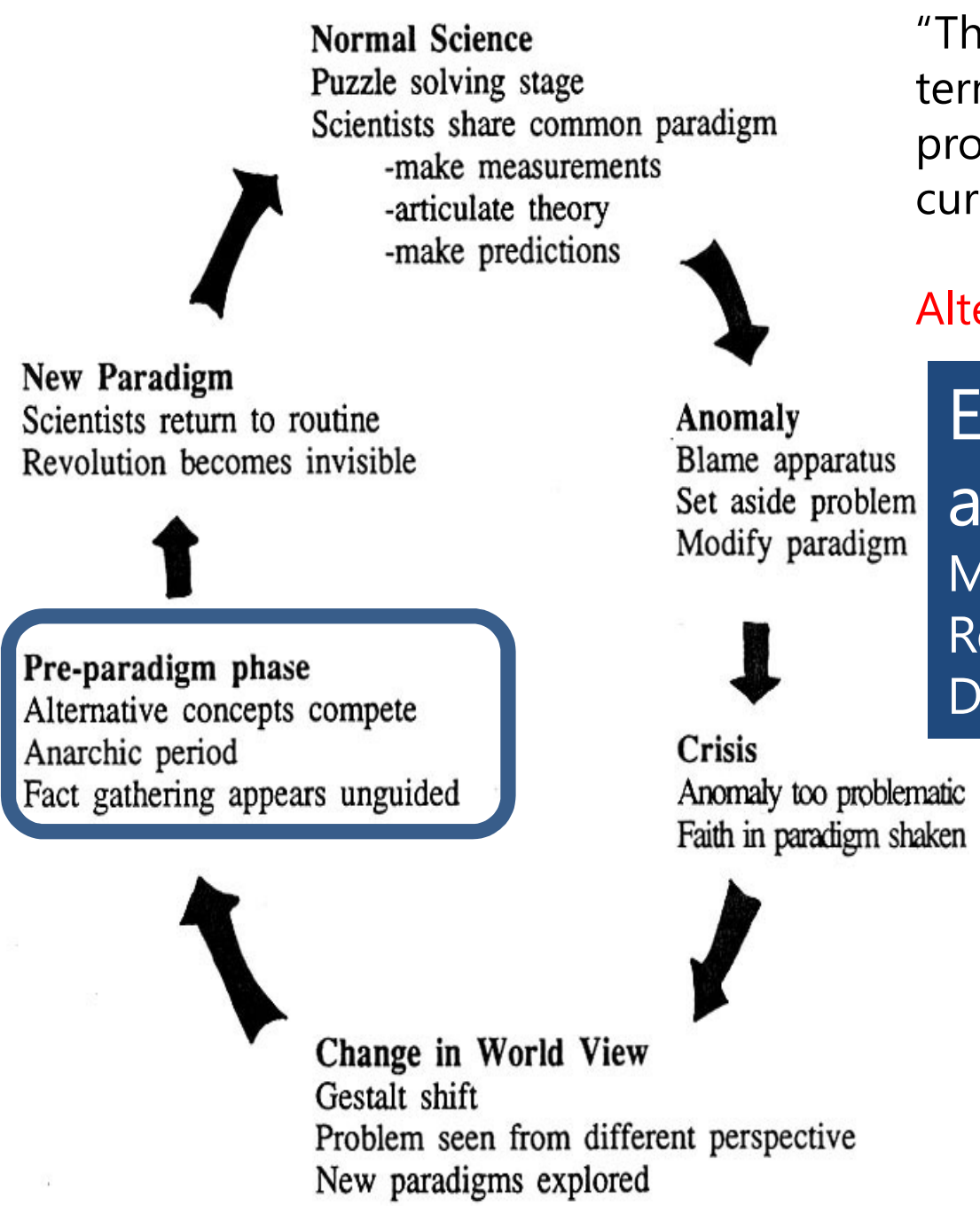
Evolving policy responses: macro-integrated approach

- **Long-term**: 2030-2050-2100
- **Integrated**: e.g. Common Agricultural Policy
- **Systemic**: e.g. Decarbonisation of transport
- **Developing/iterative**: e.g. Circular Economy; Climate and Energy
- Require a **different governance** approach
- Thus, complex, uncertain, **lacking knowledge** (of a certain type)

In the direction of a new paradigm



"The transition to a green economy is a long-term, multi-dimensional and fundamental process that will require a move away from the current linear economic model..." (SOER2015)

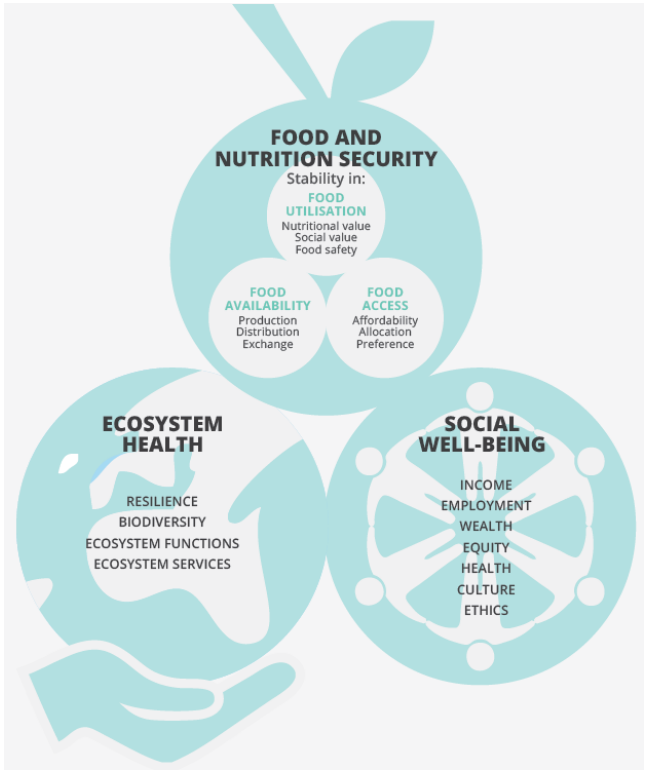
Alternative concepts:

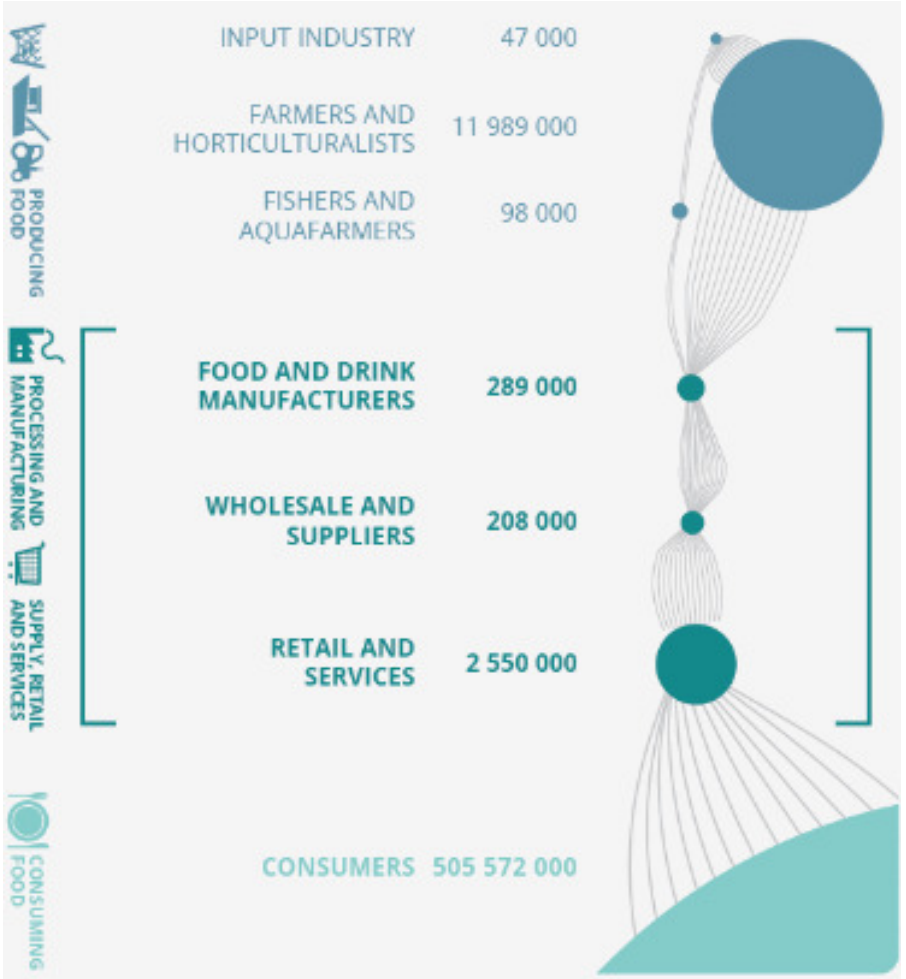
Europe's emerging transition agenda

Making sense of the Green, Blue, Circular, Resource Efficient, Low Carbon, Bio, Smart, Digital Economy?

Unguided fact gathering: e.g. green economy; green investments; green finance; circular economy; green jobs; smart cities; ...

Taking a fundamental systems perspective





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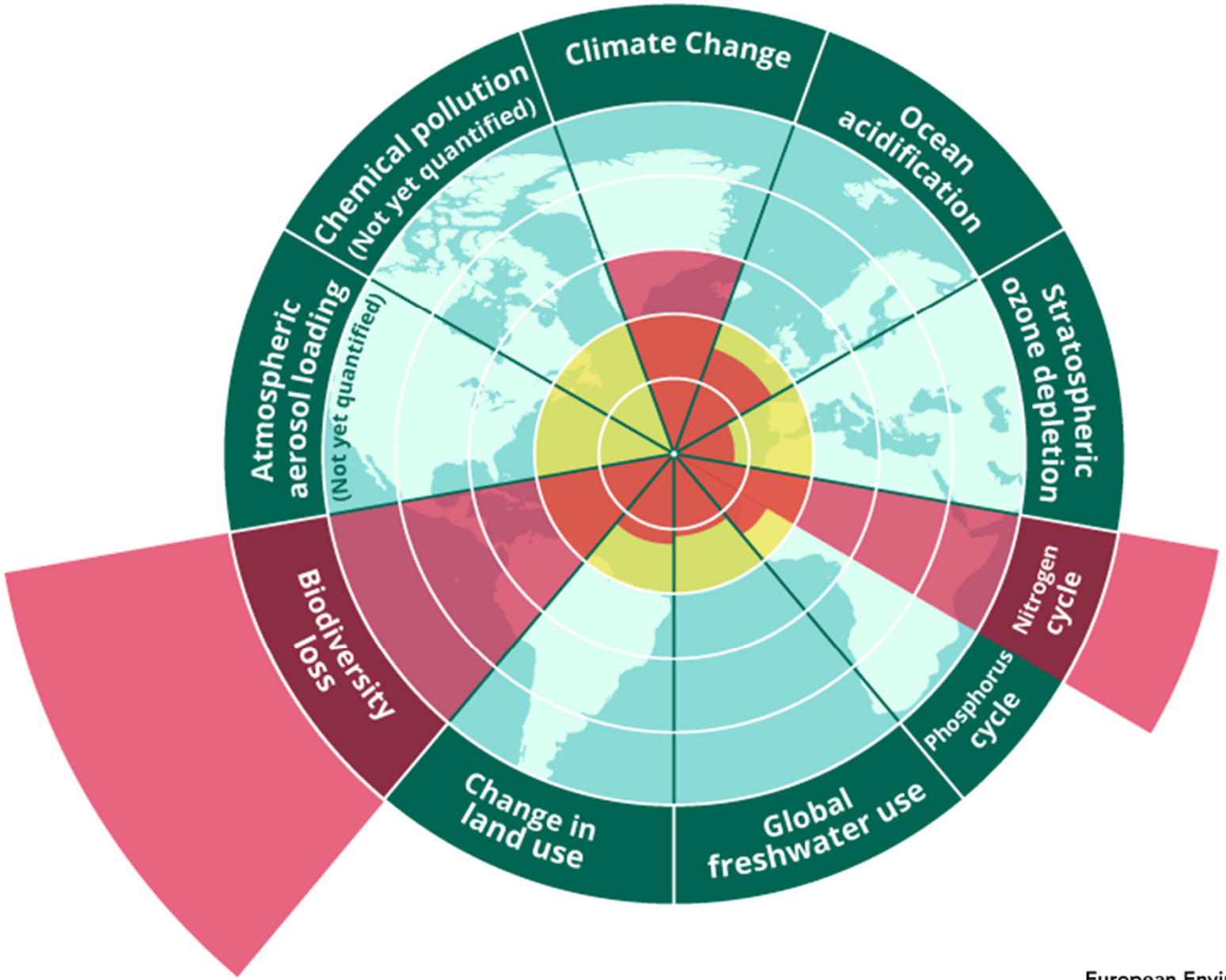
Serious reflection on policy implications?



Source: 2017 EEA elaboration on Stockholm Resilience Center's original image

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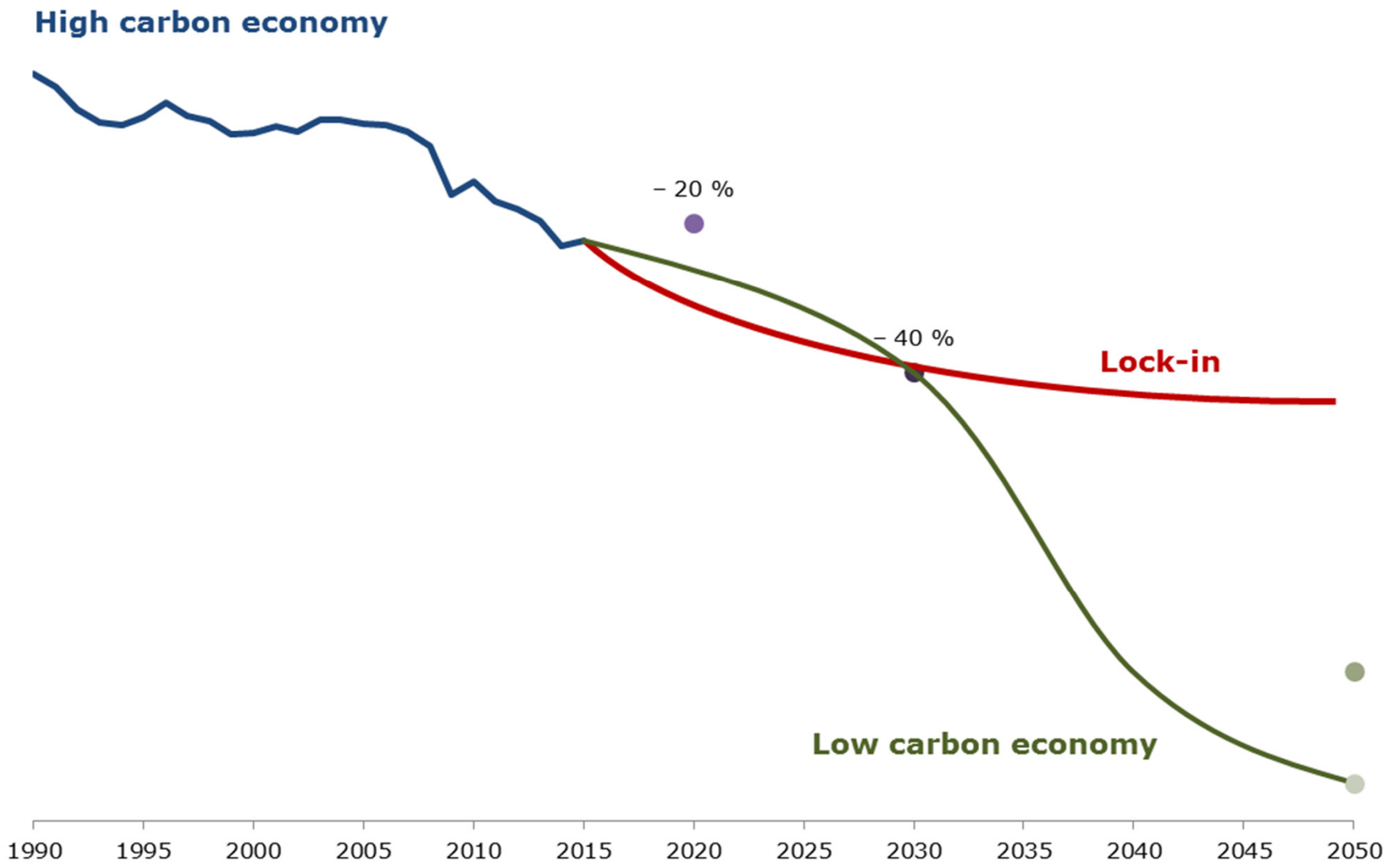
Creating pathways to sustainability



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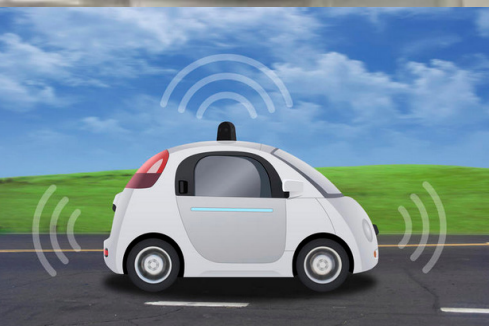
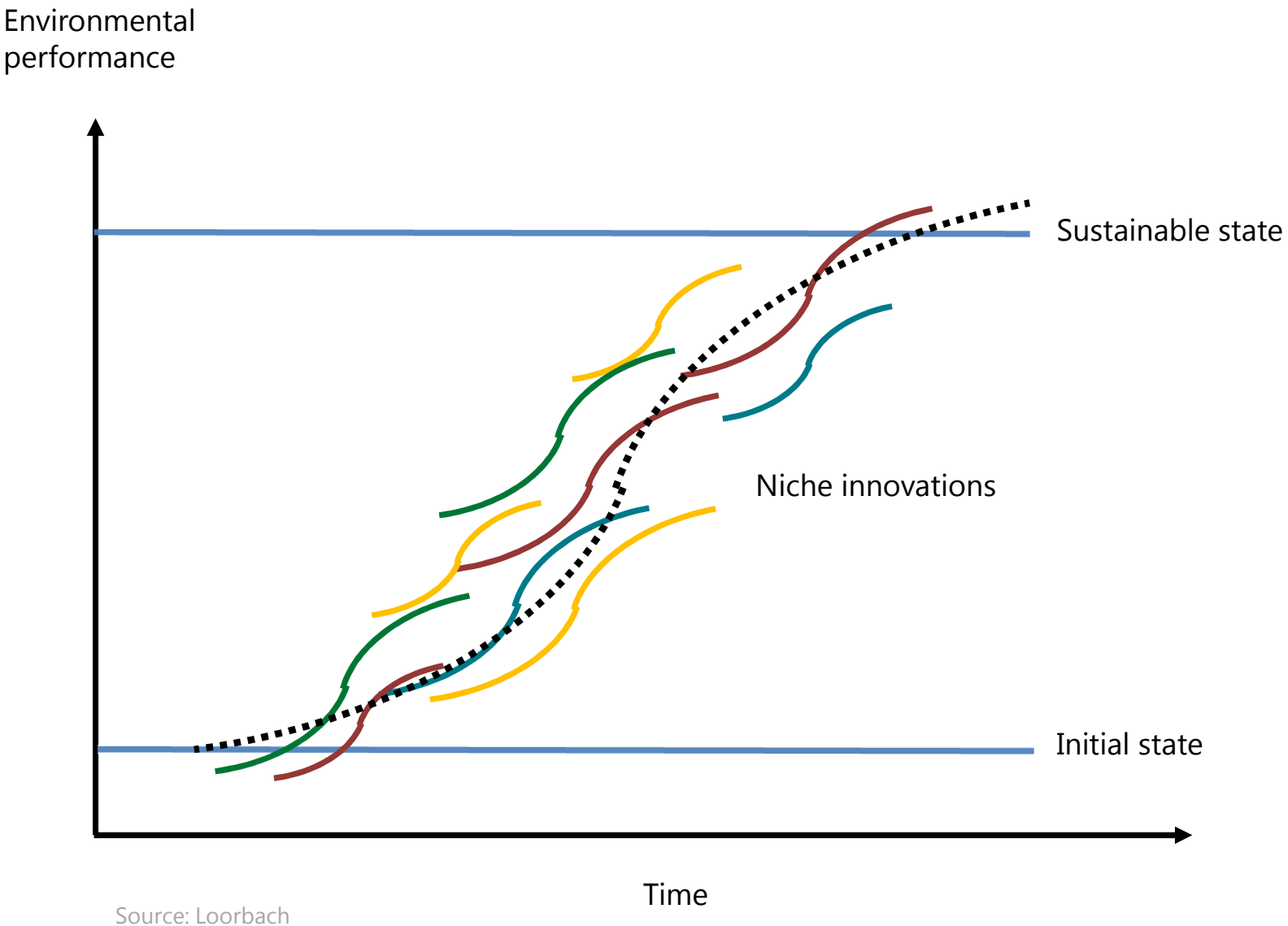


Systemic change combines multiple innovations



Source: Loorbach

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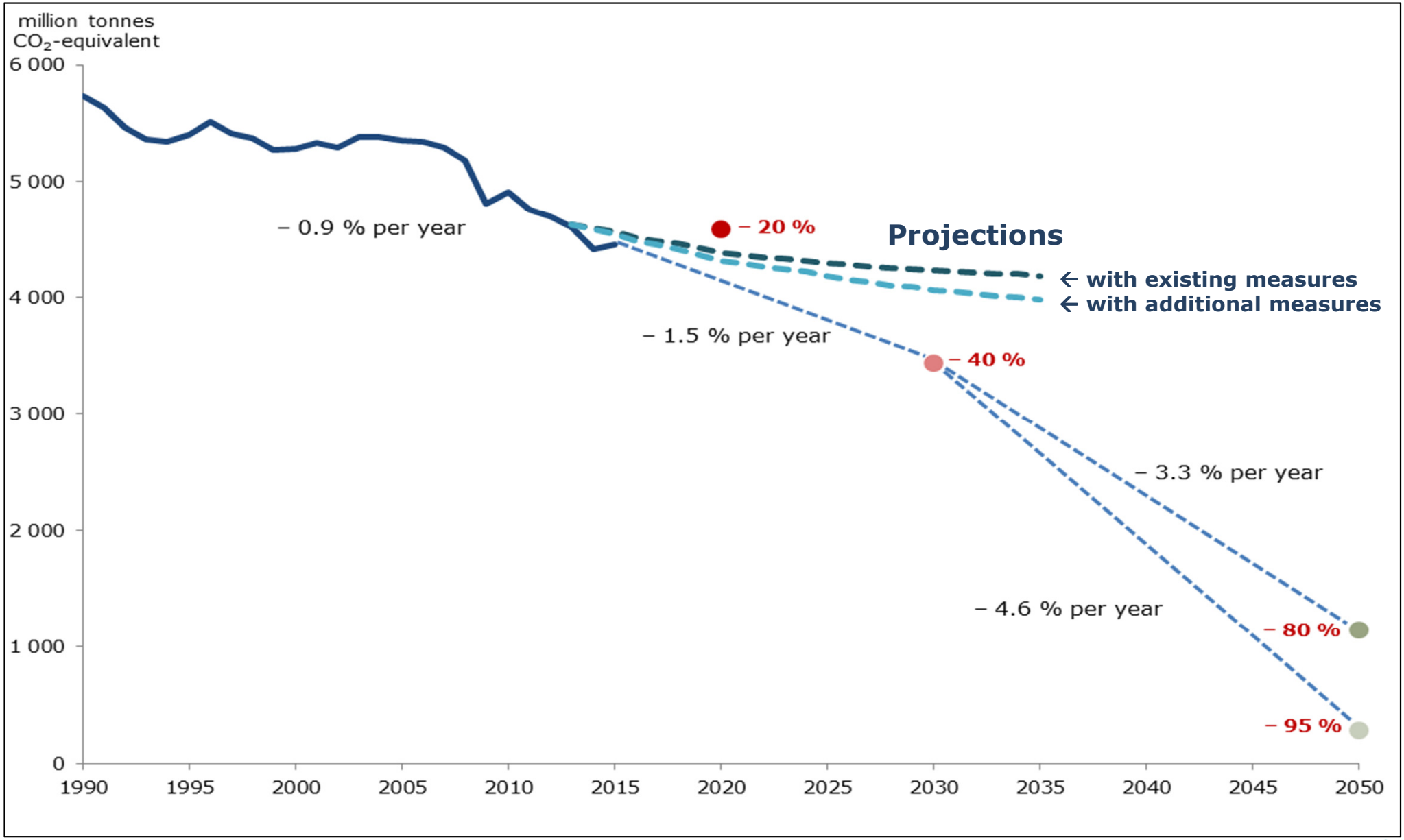
Long-term challenge: speeding-up GHG reductions



Source: EEA, Trends and projections in Europe 2016 — Tracking progress towards Europe's climate and energy targets.

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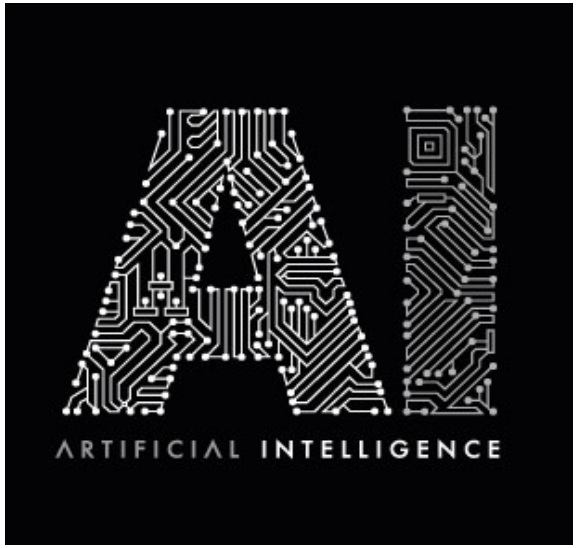
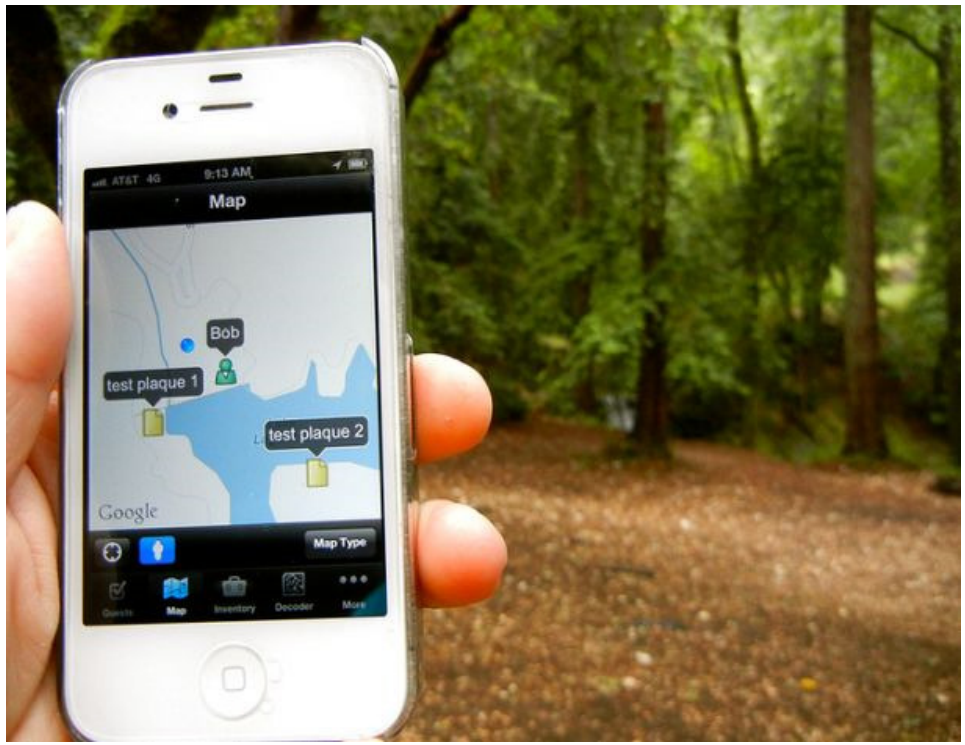
Magic potions?





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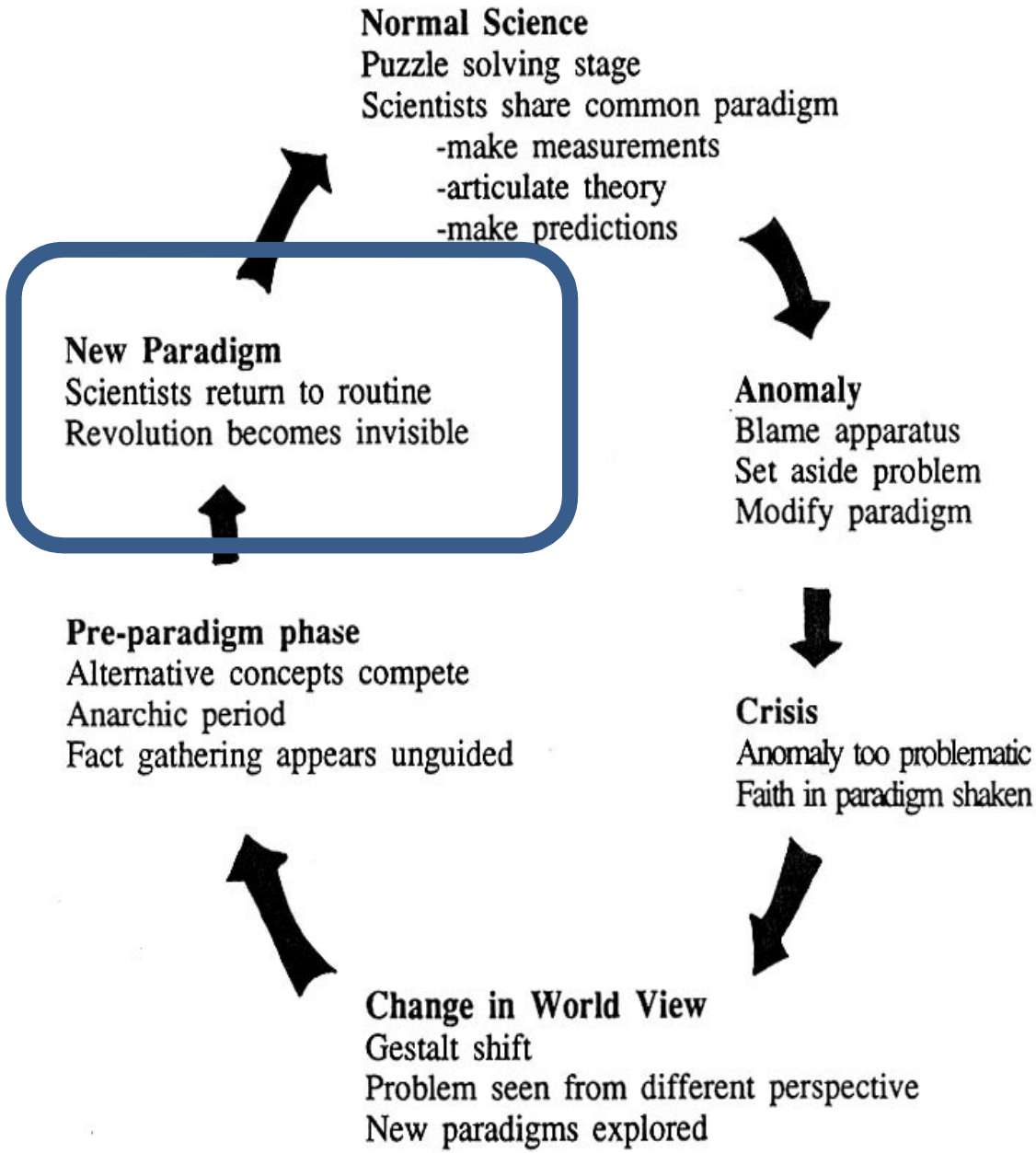
New paradigm-new normal



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Knowledge at the ‘half-way point’?

Is the current knowledge (system) adequate?

Where do we stand on critical knowledge developments?

- Systems theory; complexity theory
- Forward looking knowledge
- Meaning of ‘limits’ in conceptual understanding, research and practices?
- Re-inventing economics?
- Methodological innovation: Scenario’s, futures studies, for-casting, back-casting, distance to target, gap analysis, cost/benefit analysis 2.0, systems analysis
- Uncertainty, non-linearity, tipping points, …
- Understanding of lock-ins, backlash, break-down risks

Are current academic education and research adapted, responsive, reflexive?

Research and societal relevance in a changing context

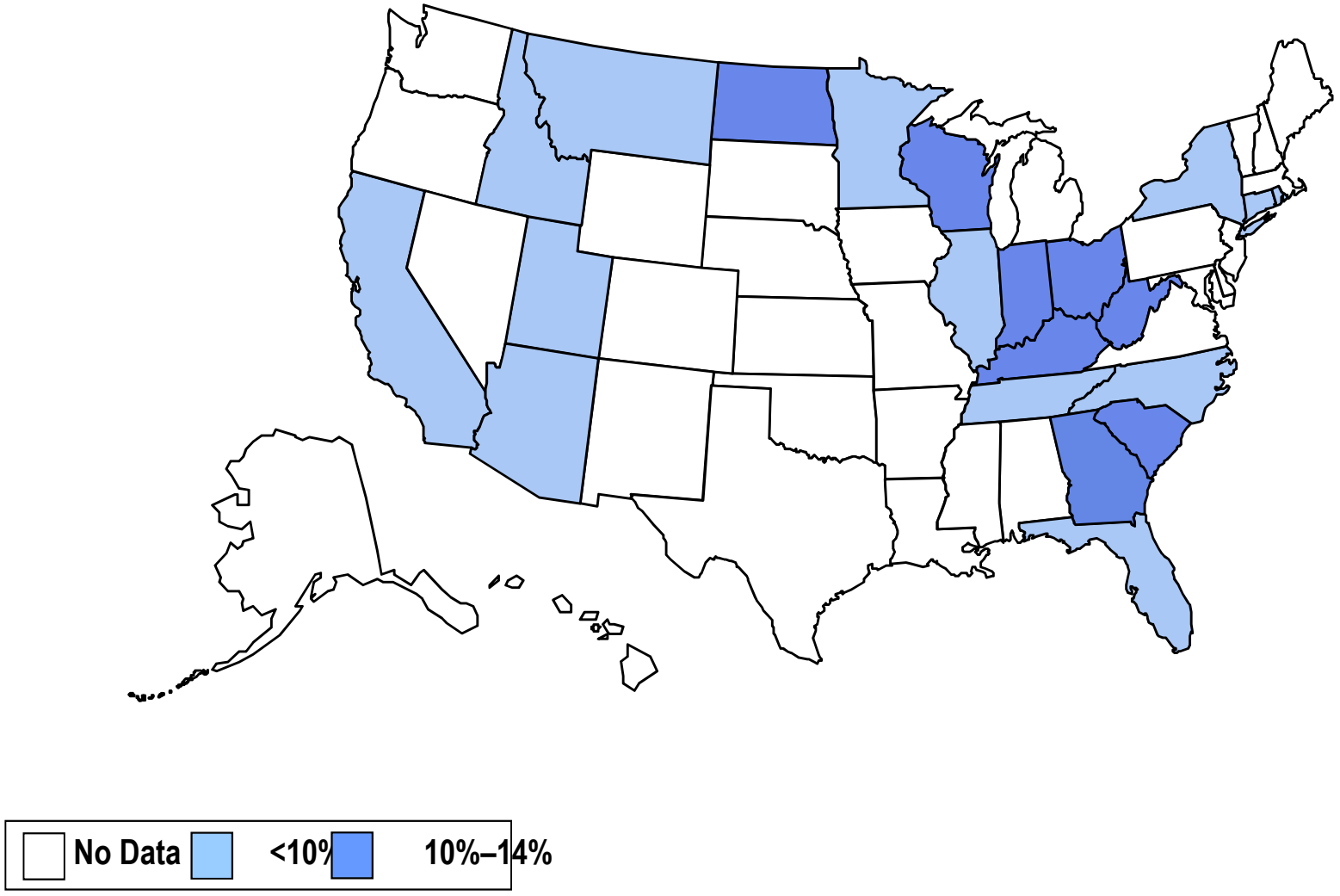
- Inter-, multi-, trans-disciplinary:
  - from academic (ir)relevance to standard practice?
  - transitional shifts in academic and research organisation
- Other type of innovations?
  - citizen science
  - empowerment, citizenship, actionable knowledge
  - co-creation, co-design
- Democratisation of science and knowledge?

Understanding rapid (systemic?) change?

Obesity Trends* Among U.S. Adults

BRFSS, 1985

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



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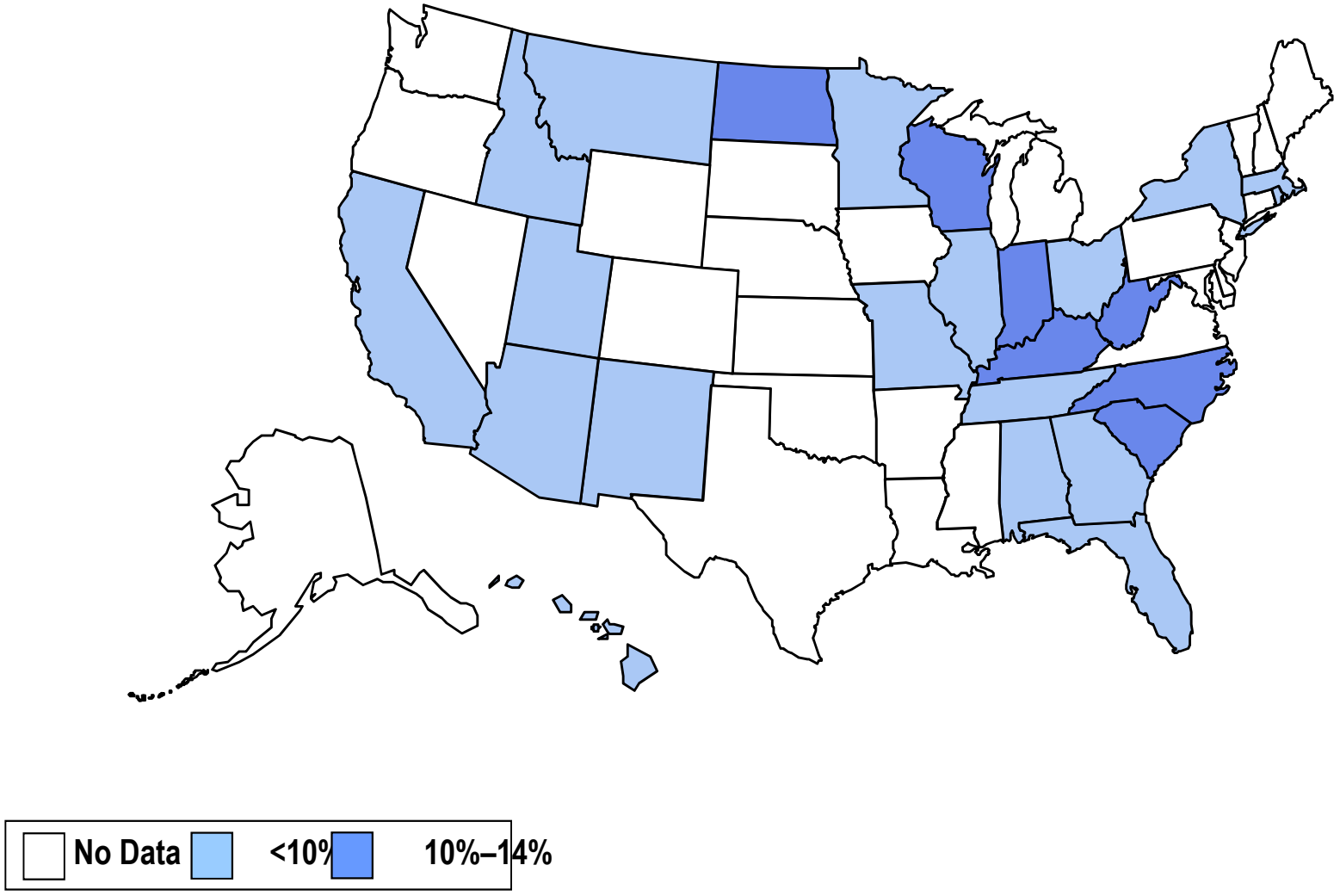
BRFSS, 1986

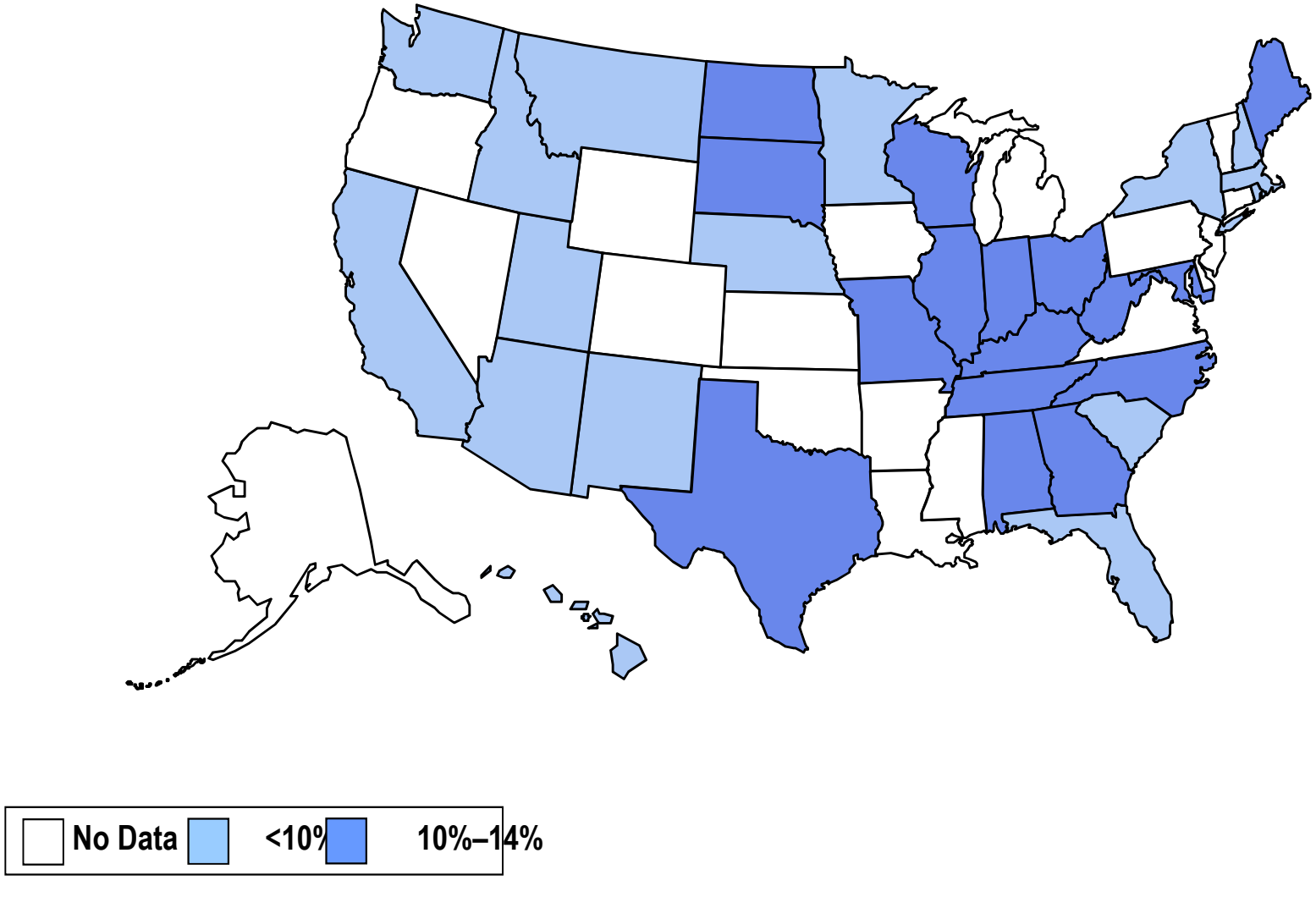
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



Obesity Trends* Among U.S. Adults

BRFSS, 1987

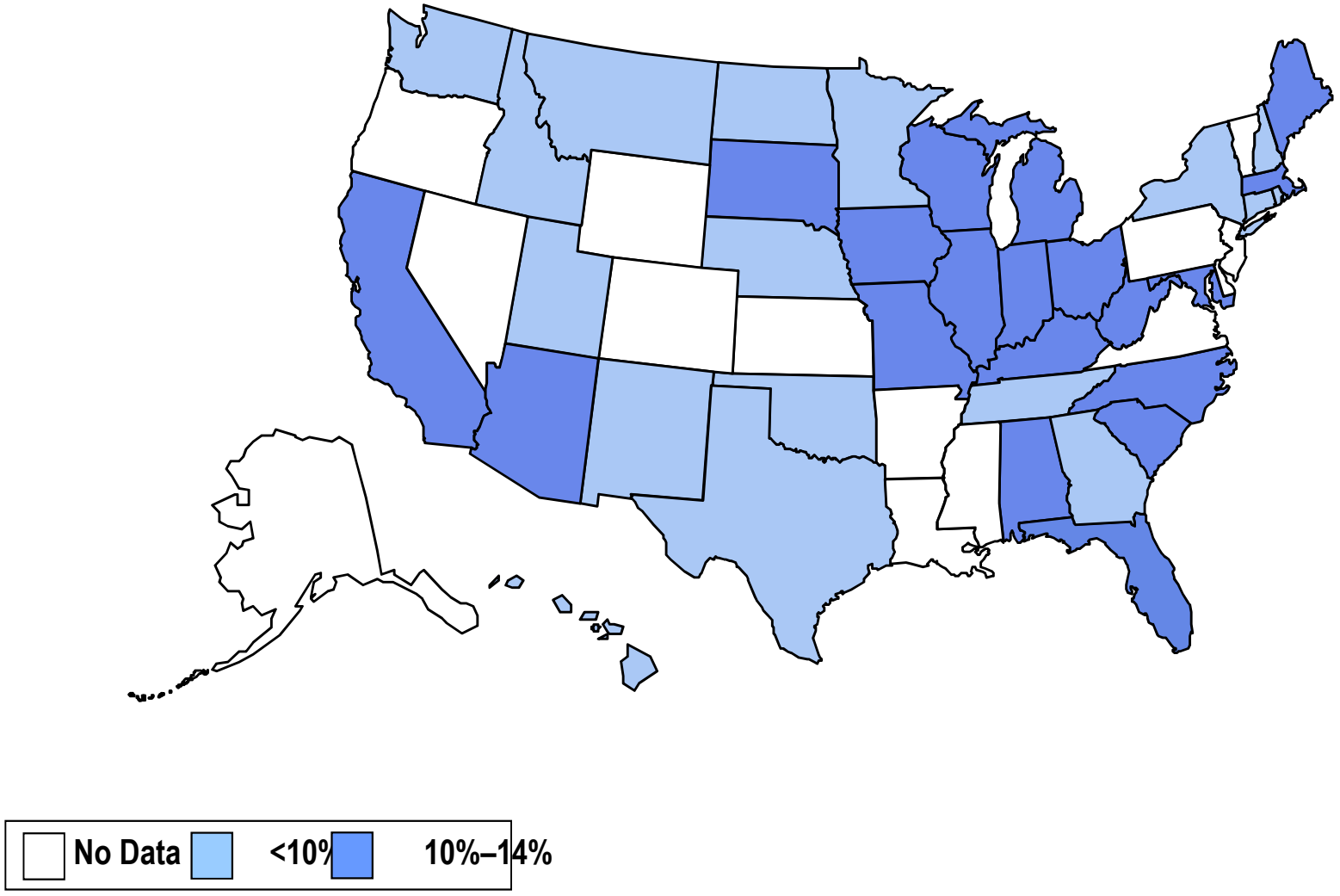
(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)



Obesity Trends* Among U.S. Adults

BRFSS, 1988

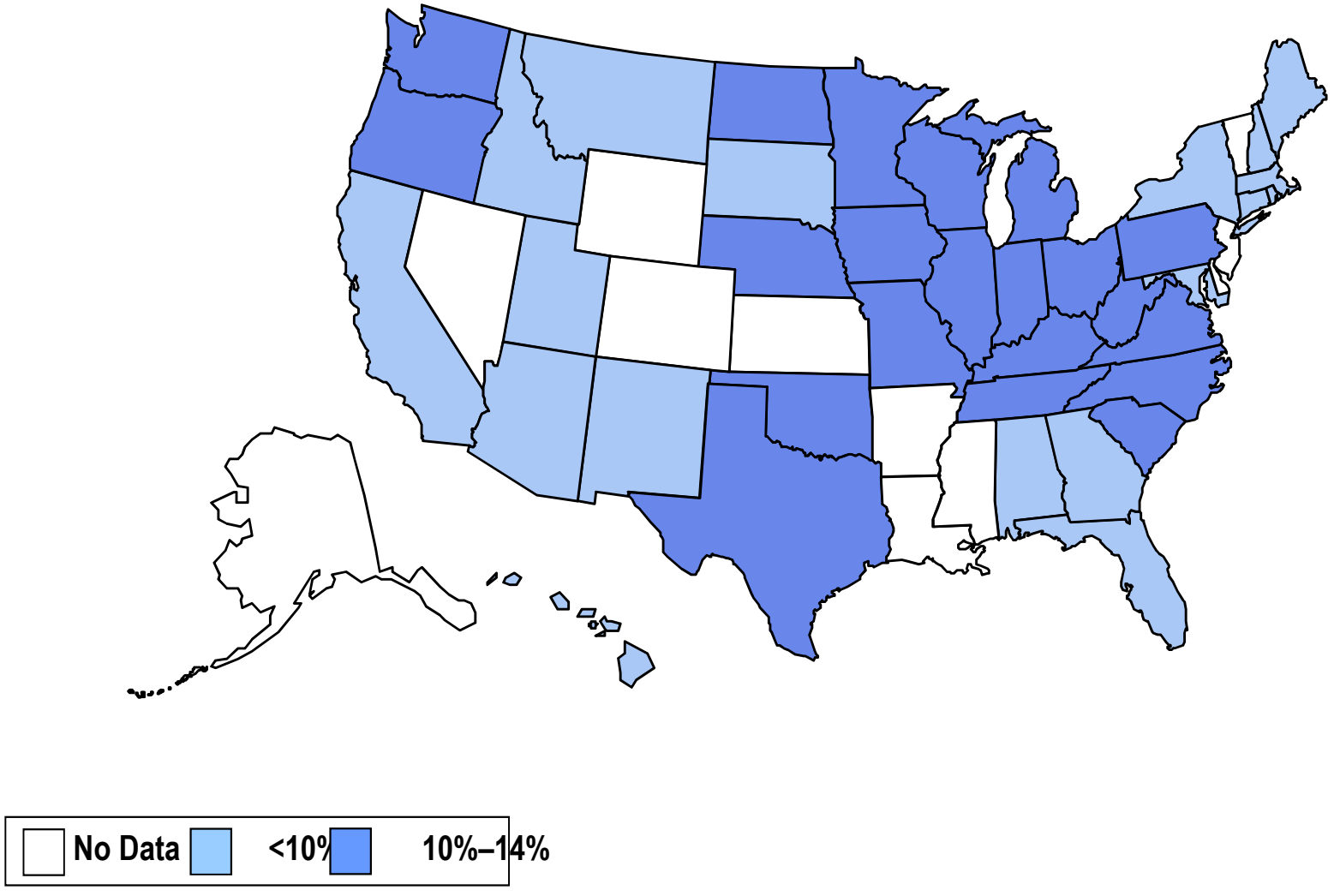
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



Obesity Trends* Among U.S. Adults

BRFSS, 1989

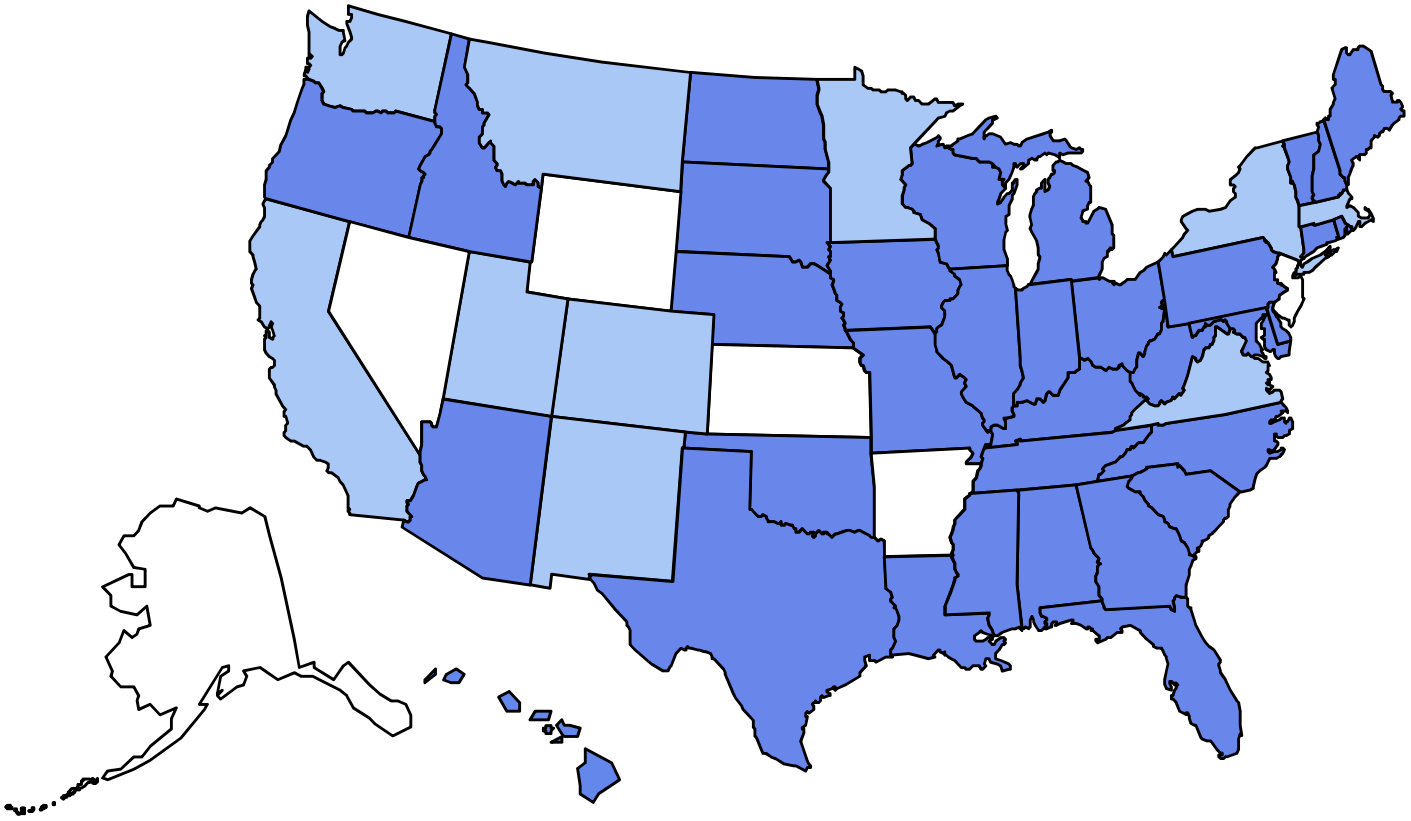
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)

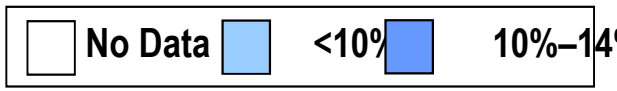


Obesity Trends* Among U.S. Adults

BRFSS, 1990

(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)

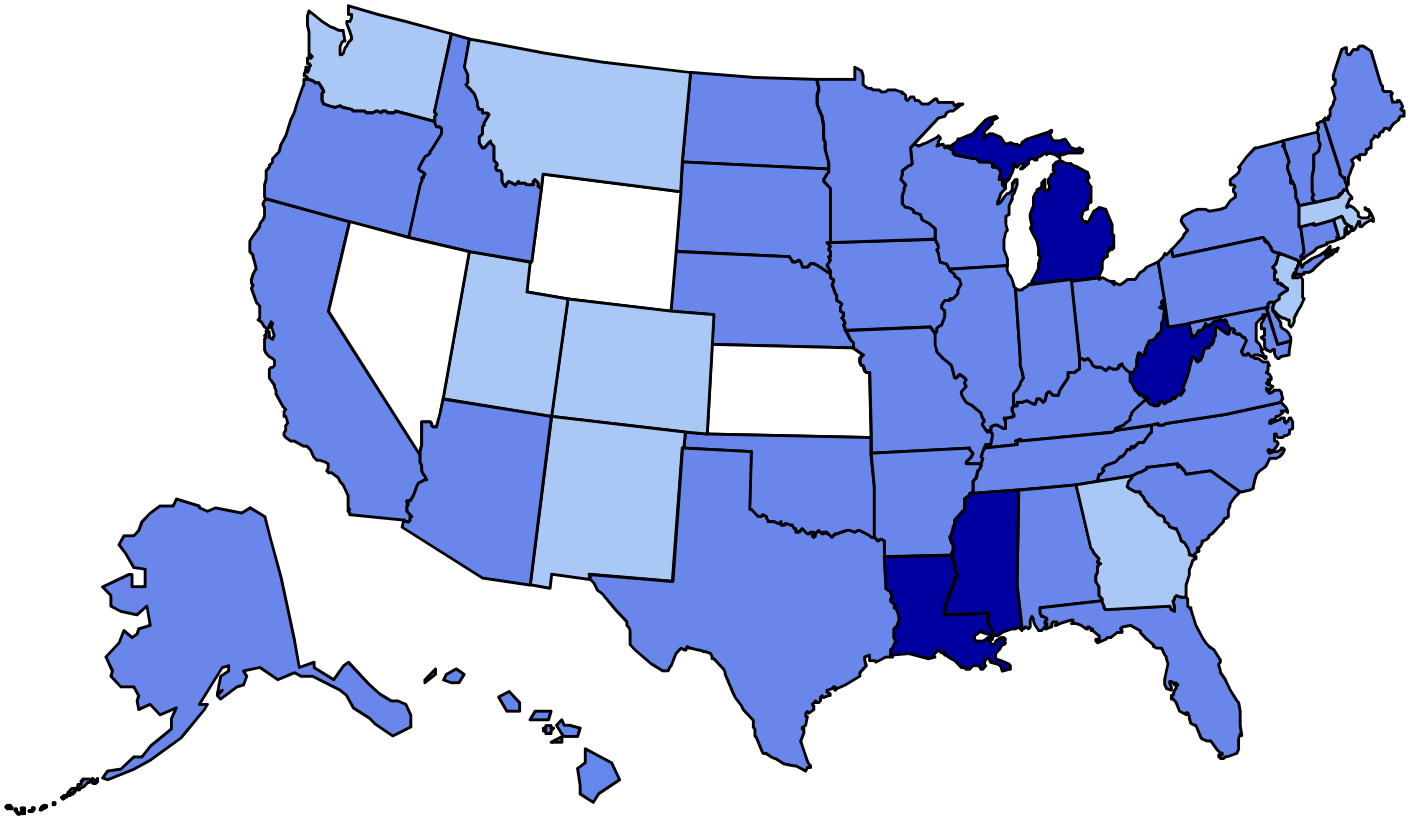


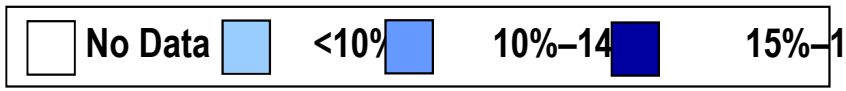


Obesity Trends* Among U.S. Adults

BRFSS, 1991

(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)

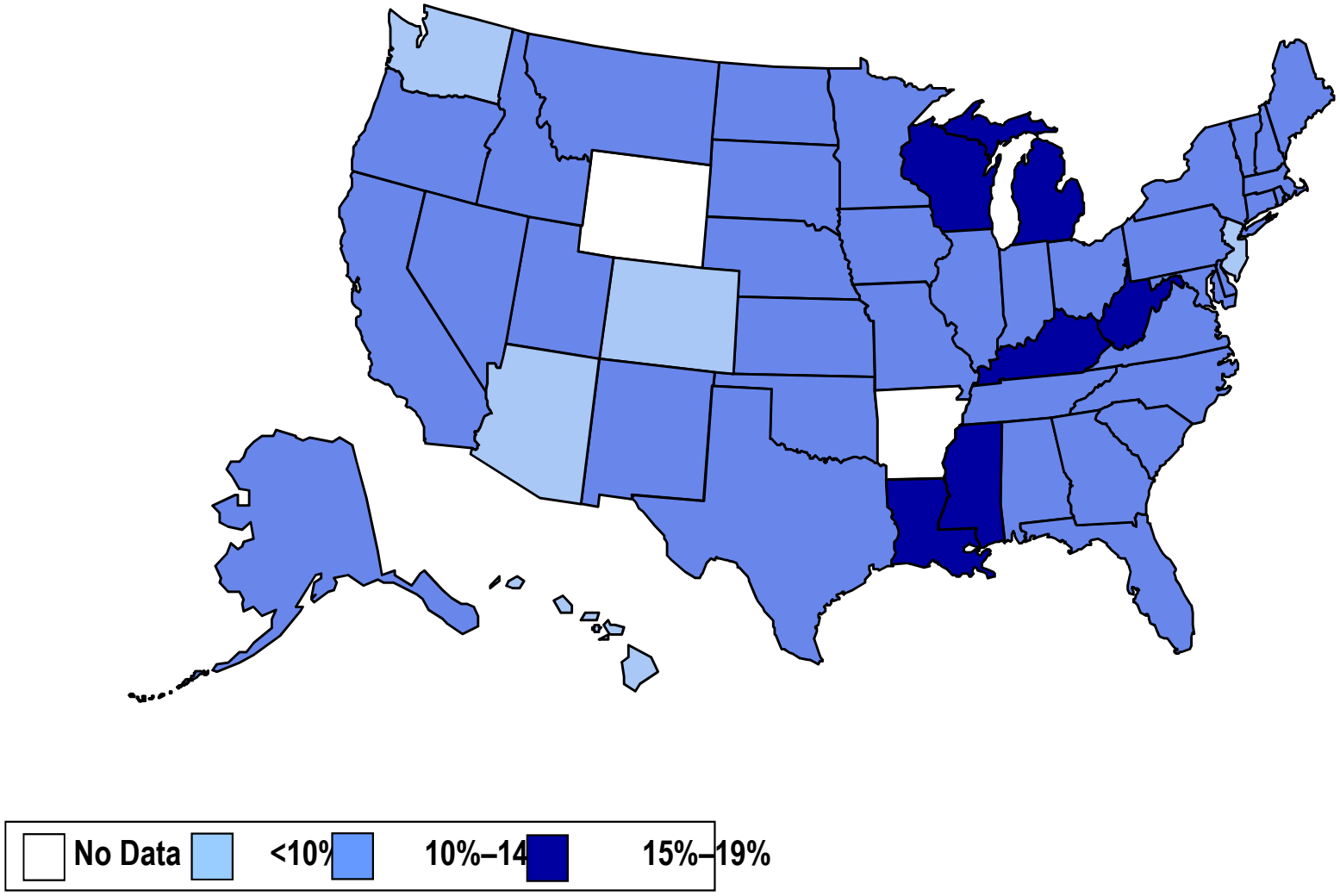




Obesity Trends* Among U.S. Adults

BRFSS, 1992

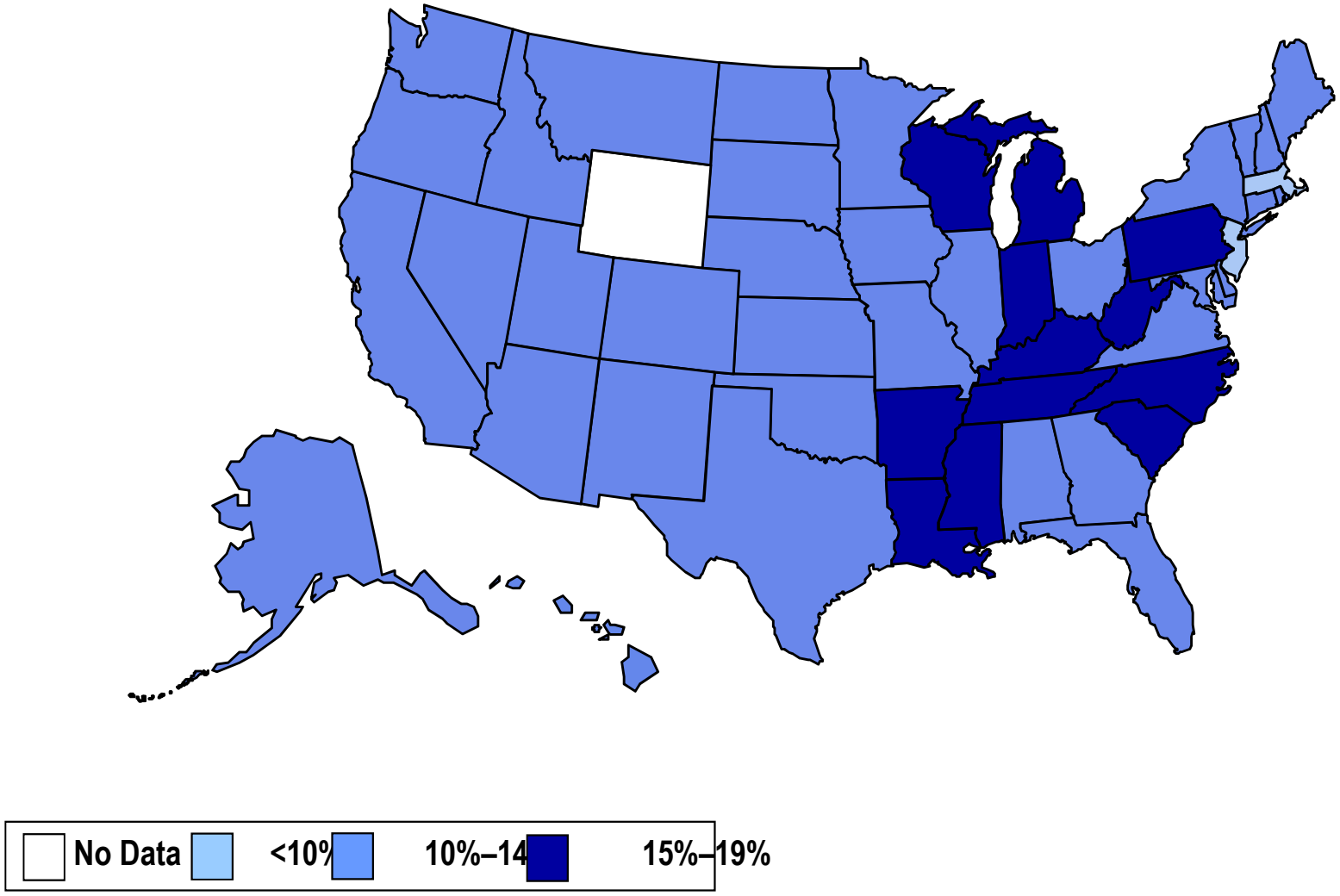
(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)



Obesity Trends* Among U.S. Adults

BRFSS, 1993

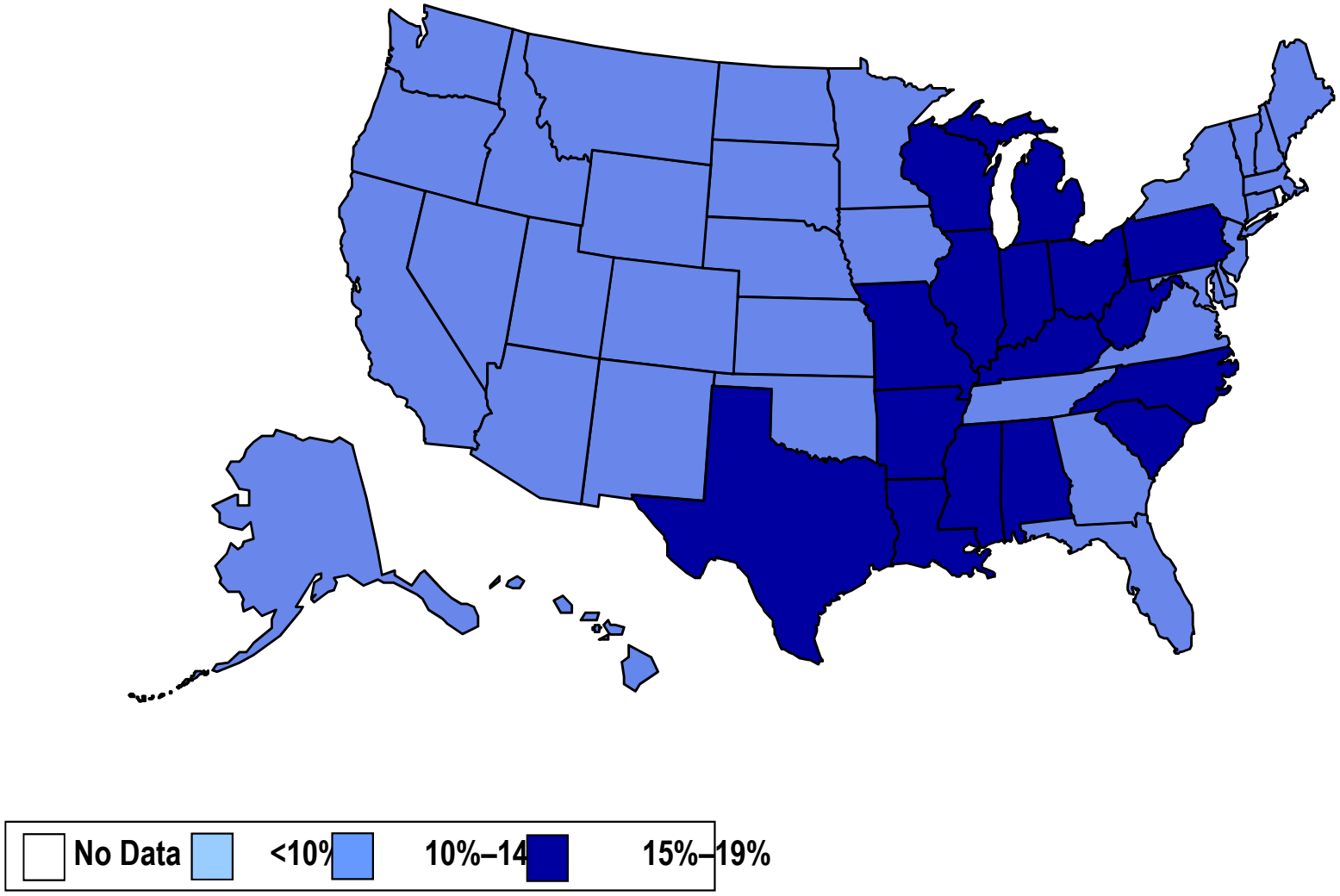
(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)



Obesity Trends* Among U.S. Adults

BRFSS, 1994

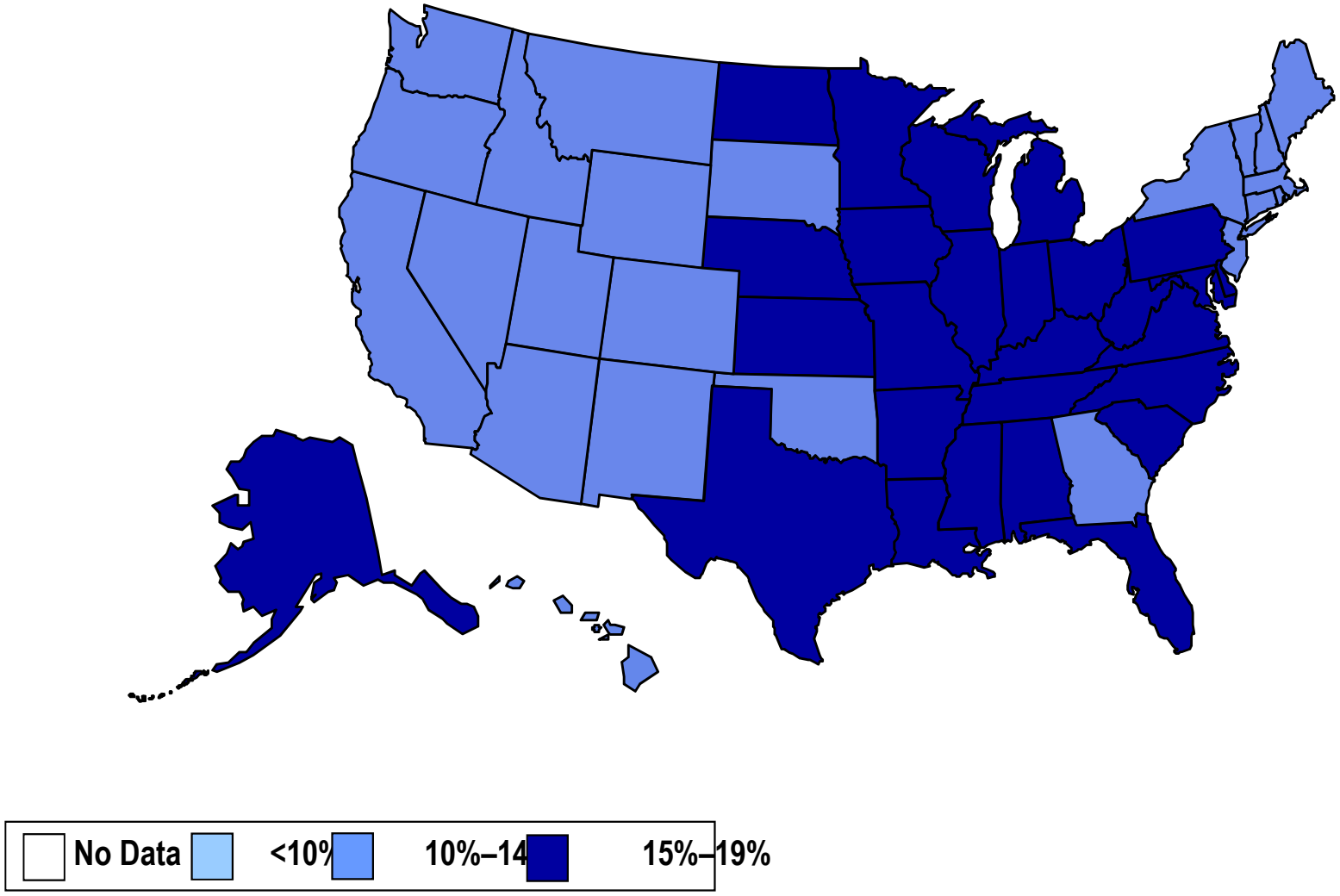
(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)



Obesity Trends* Among U.S. Adults

BRFSS, 1995

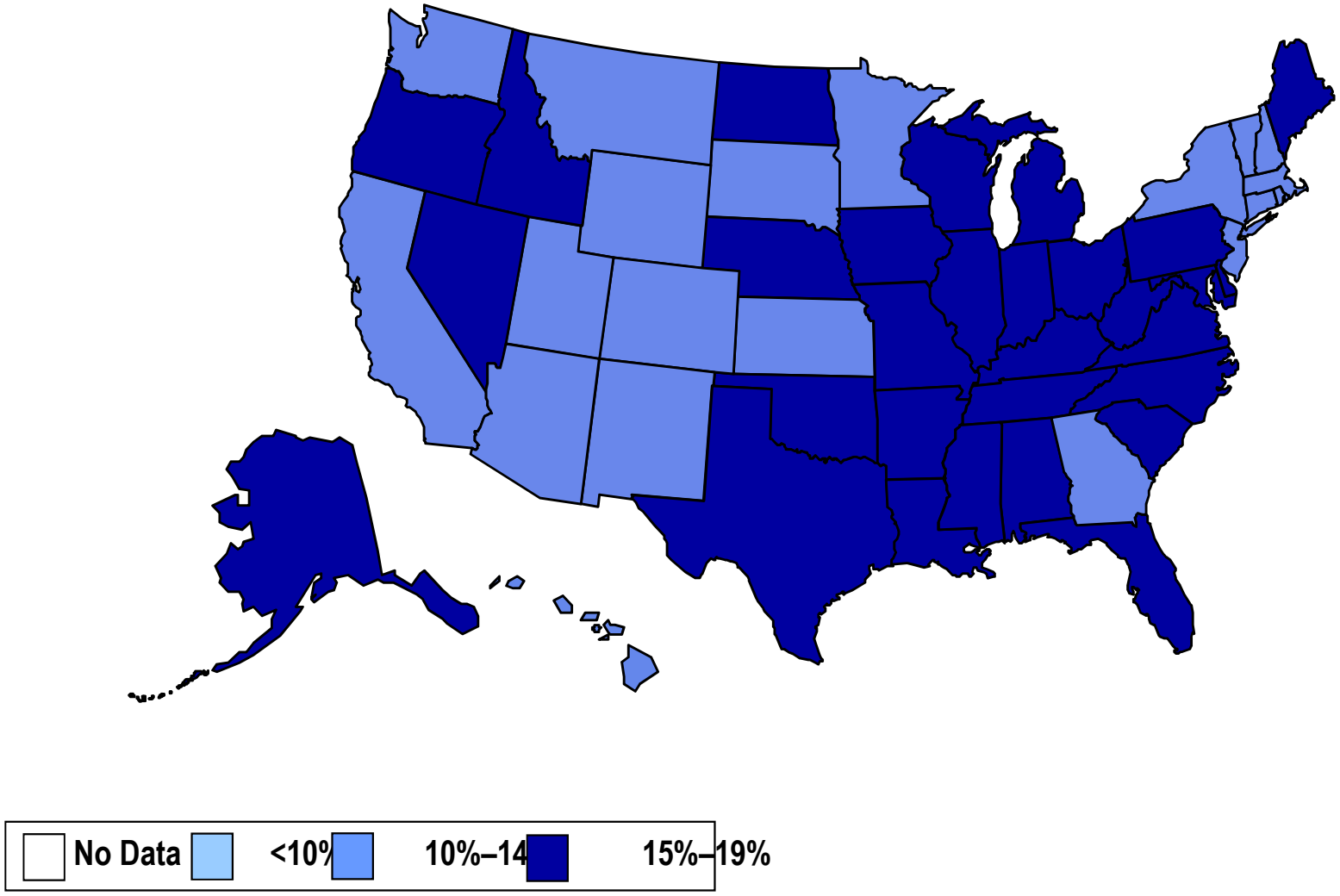
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



Obesity Trends* Among U.S. Adults

BRFSS, 1996

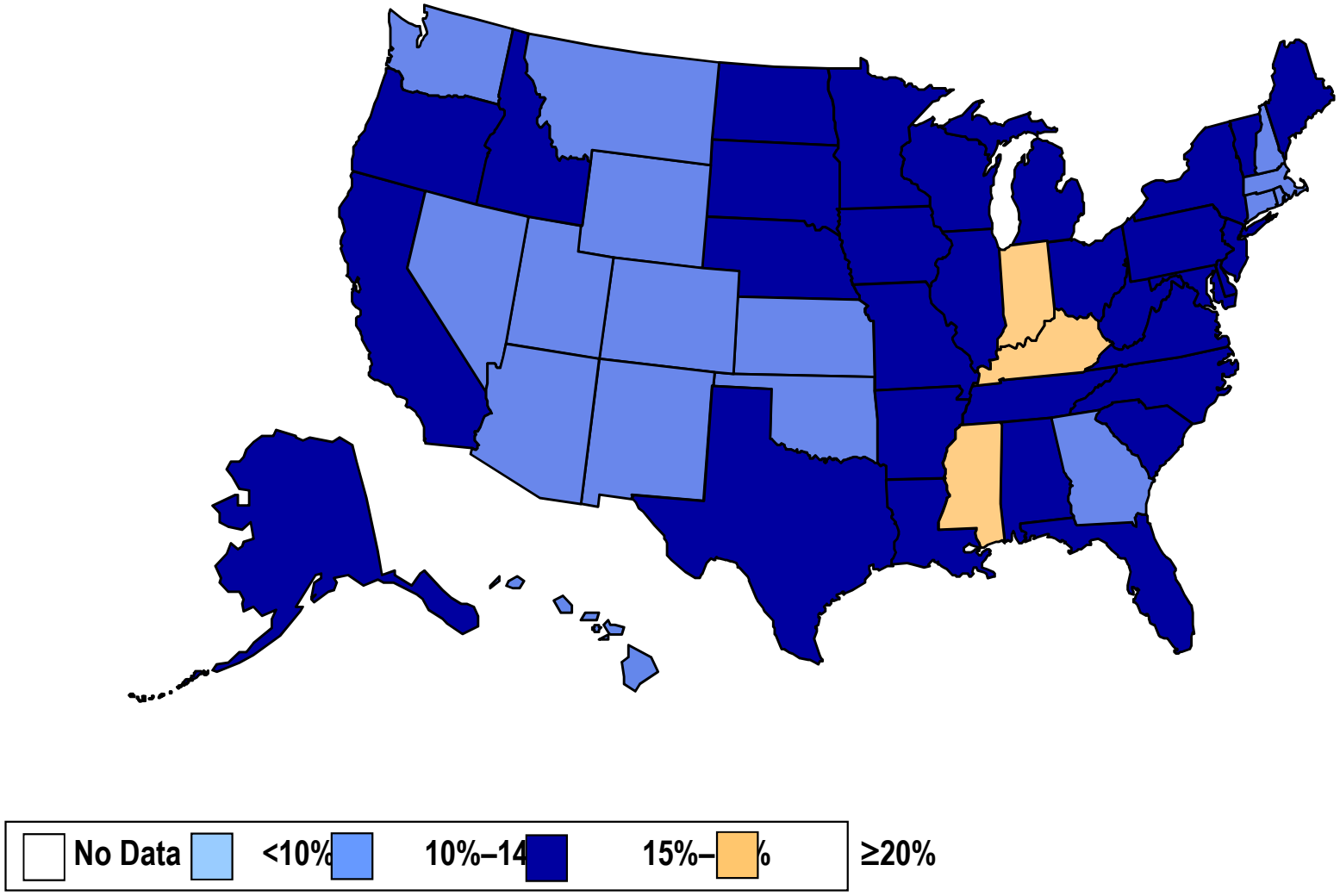
(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)



Obesity Trends* Among U.S. Adults

BRFSS, 1997

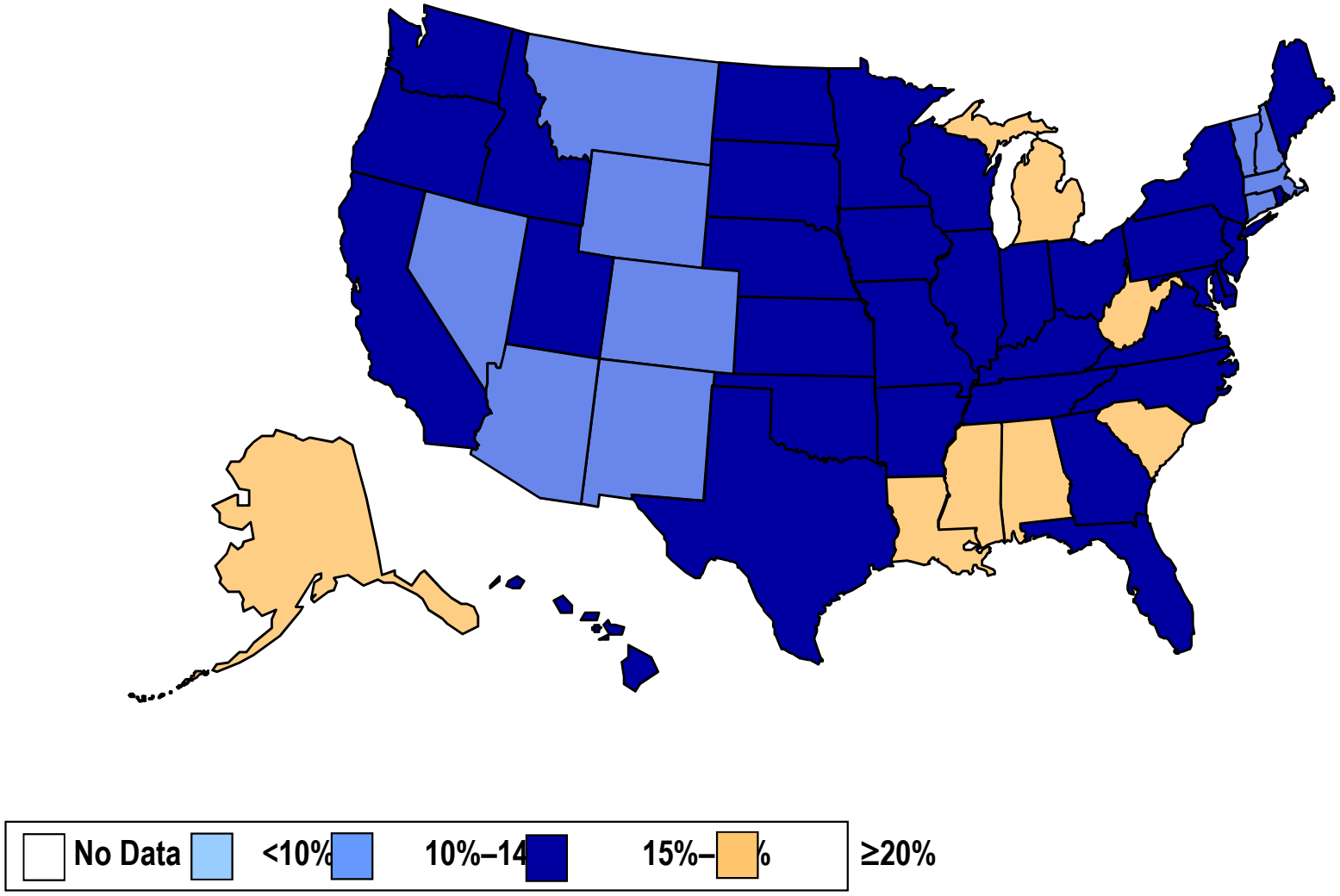
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



Obesity Trends* Among U.S. Adults

BRFSS, 1998

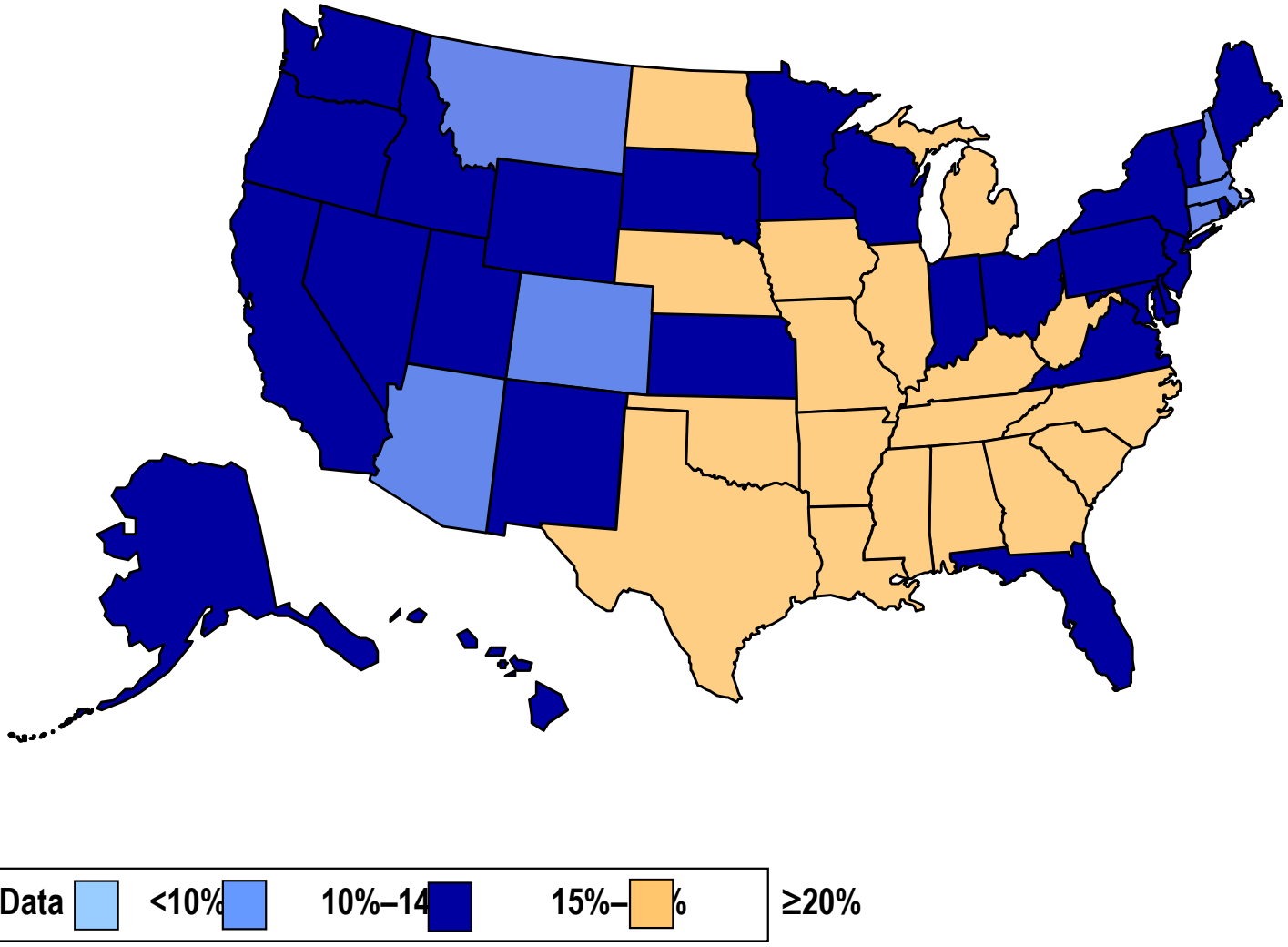
(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)



Obesity Trends* Among U.S. Adults

BRFSS, 1999

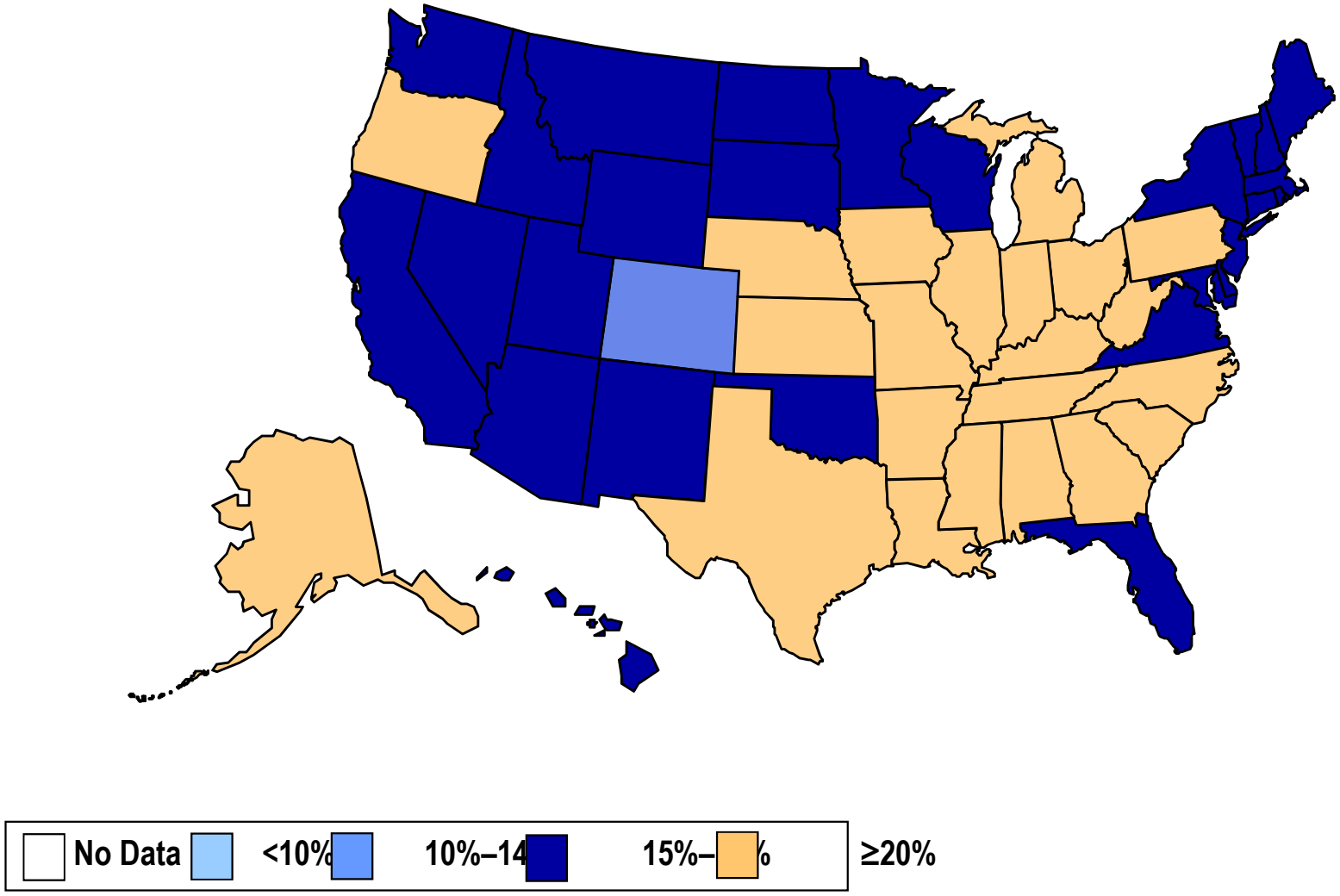
(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)



Obesity Trends* Among U.S. Adults

BRFSS, 2000

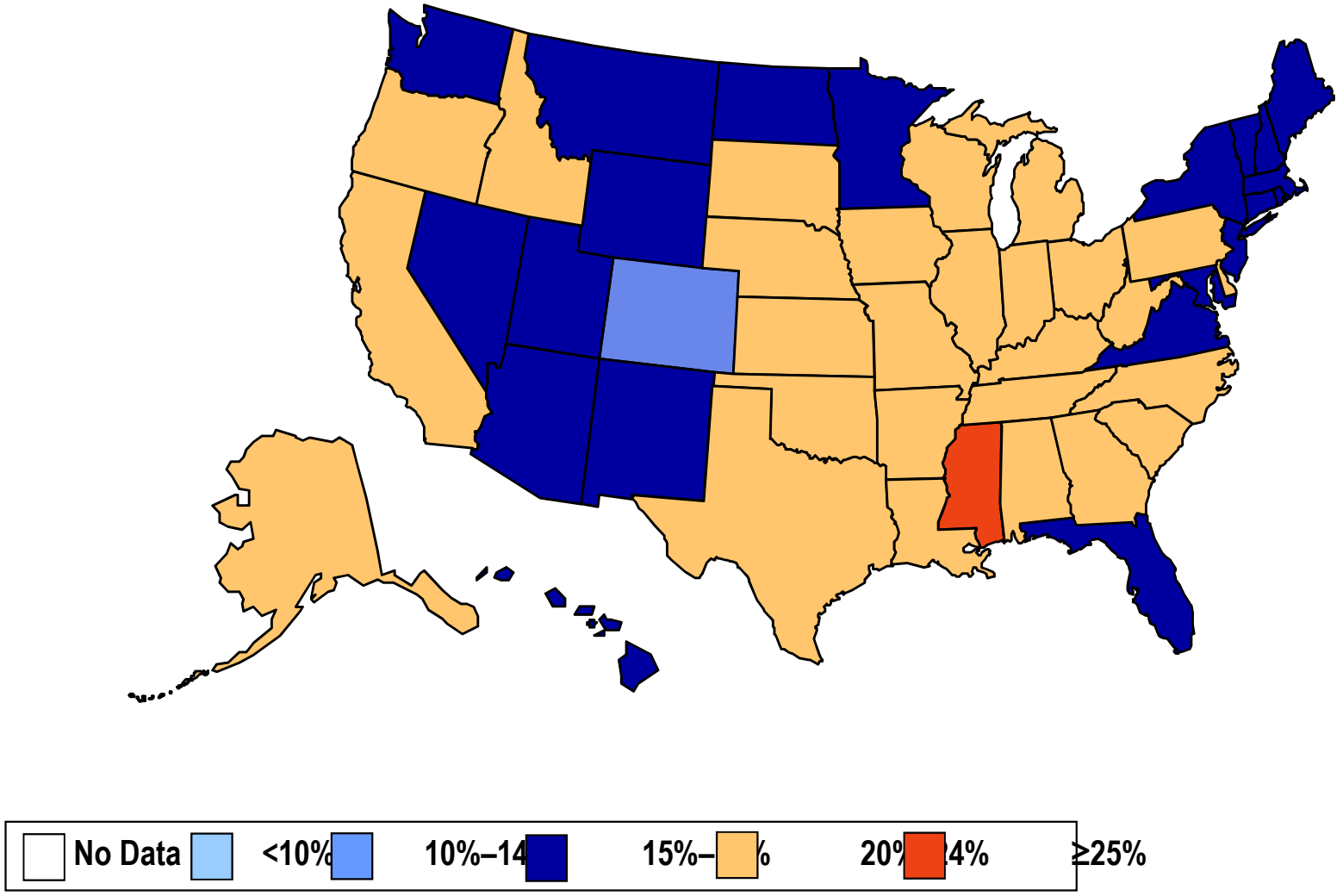
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



Obesity Trends* Among U.S. Adults

BRFSS, 2001

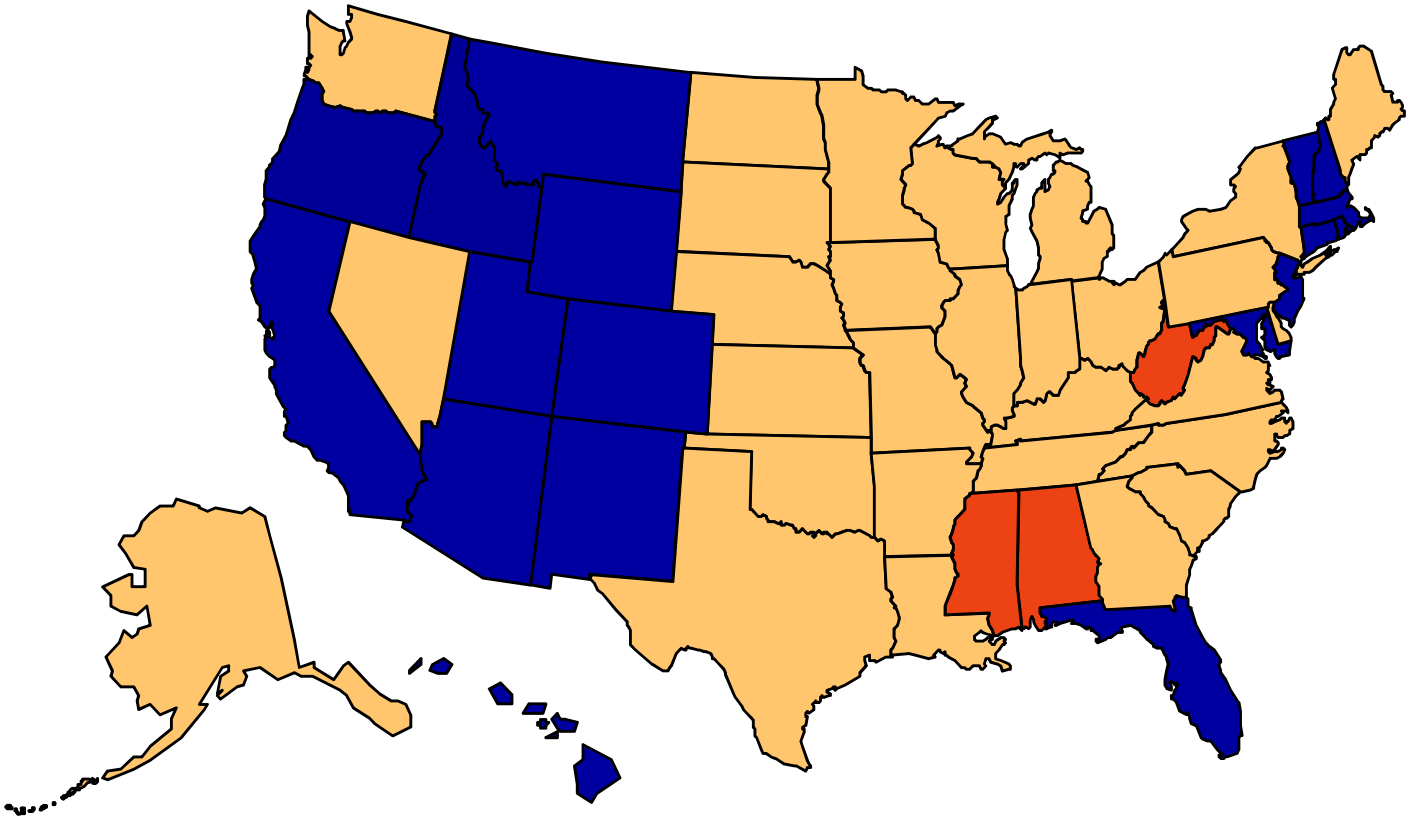
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



Obesity Trends* Among U.S. Adults

BRFSS, 2002

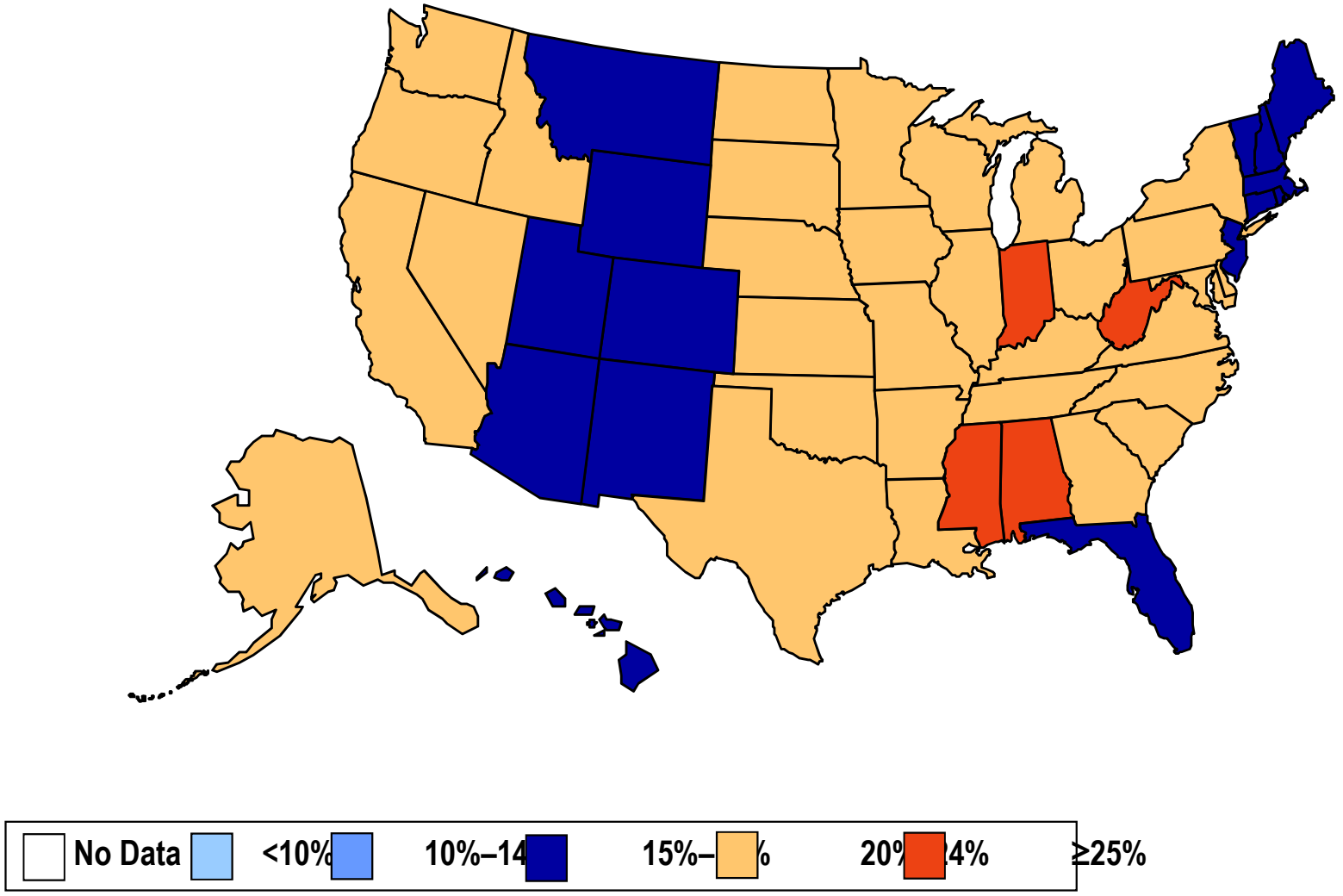
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



Obesity Trends* Among U.S. Adults

BRFSS, 2003

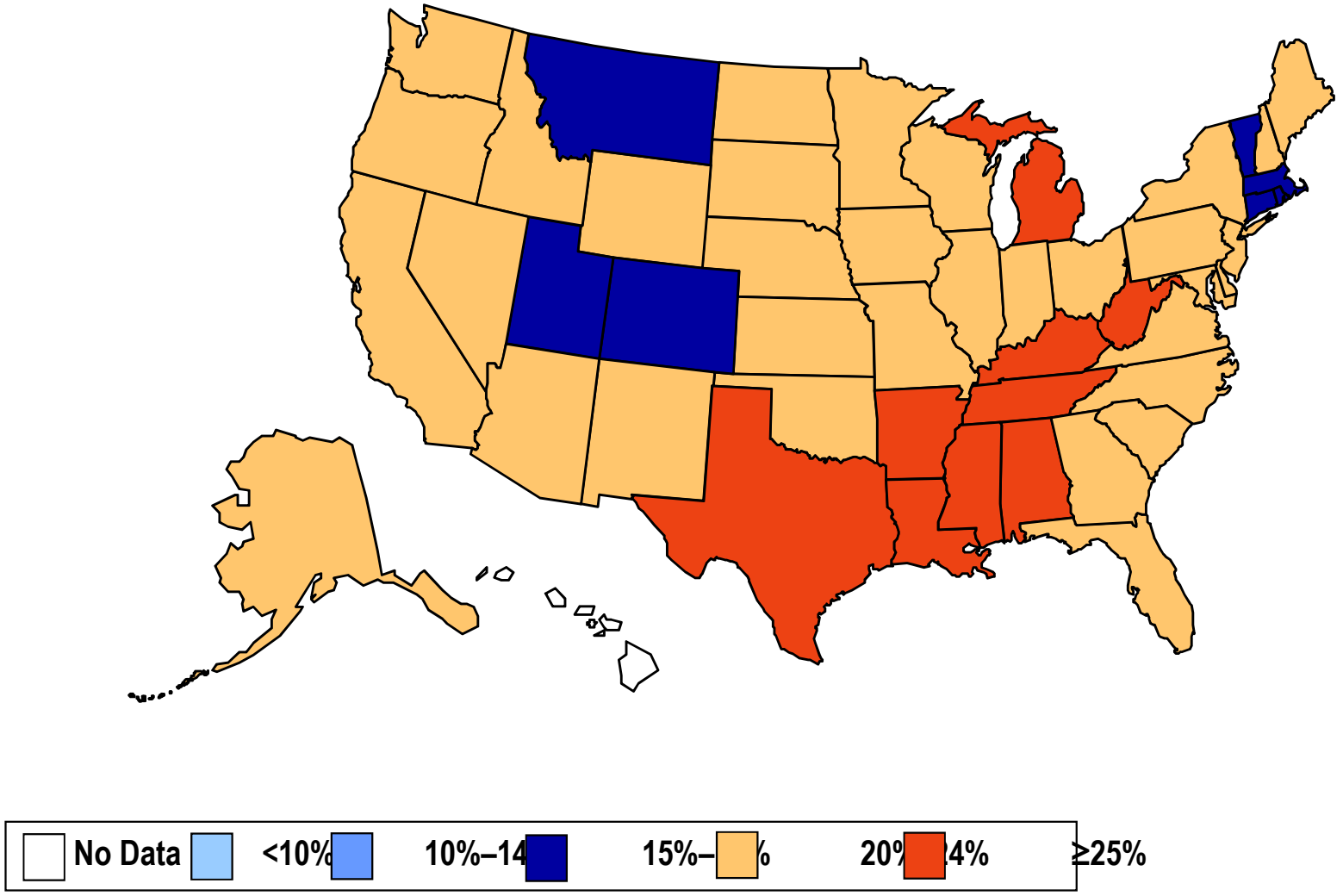
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



Obesity Trends* Among U.S. Adults

BRFSS, 2004

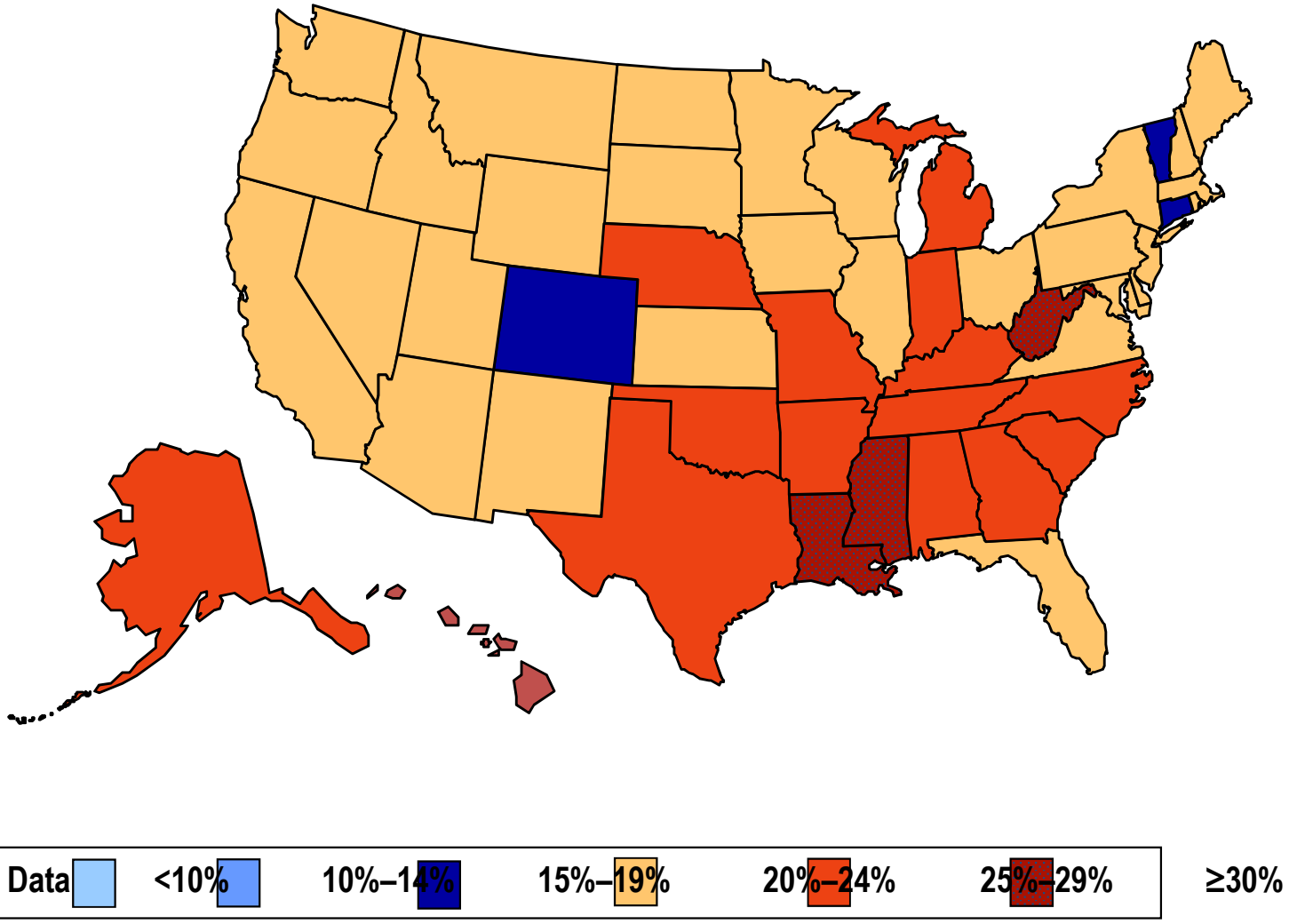
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



Obesity Trends* Among U.S. Adults

BRFSS, 2005

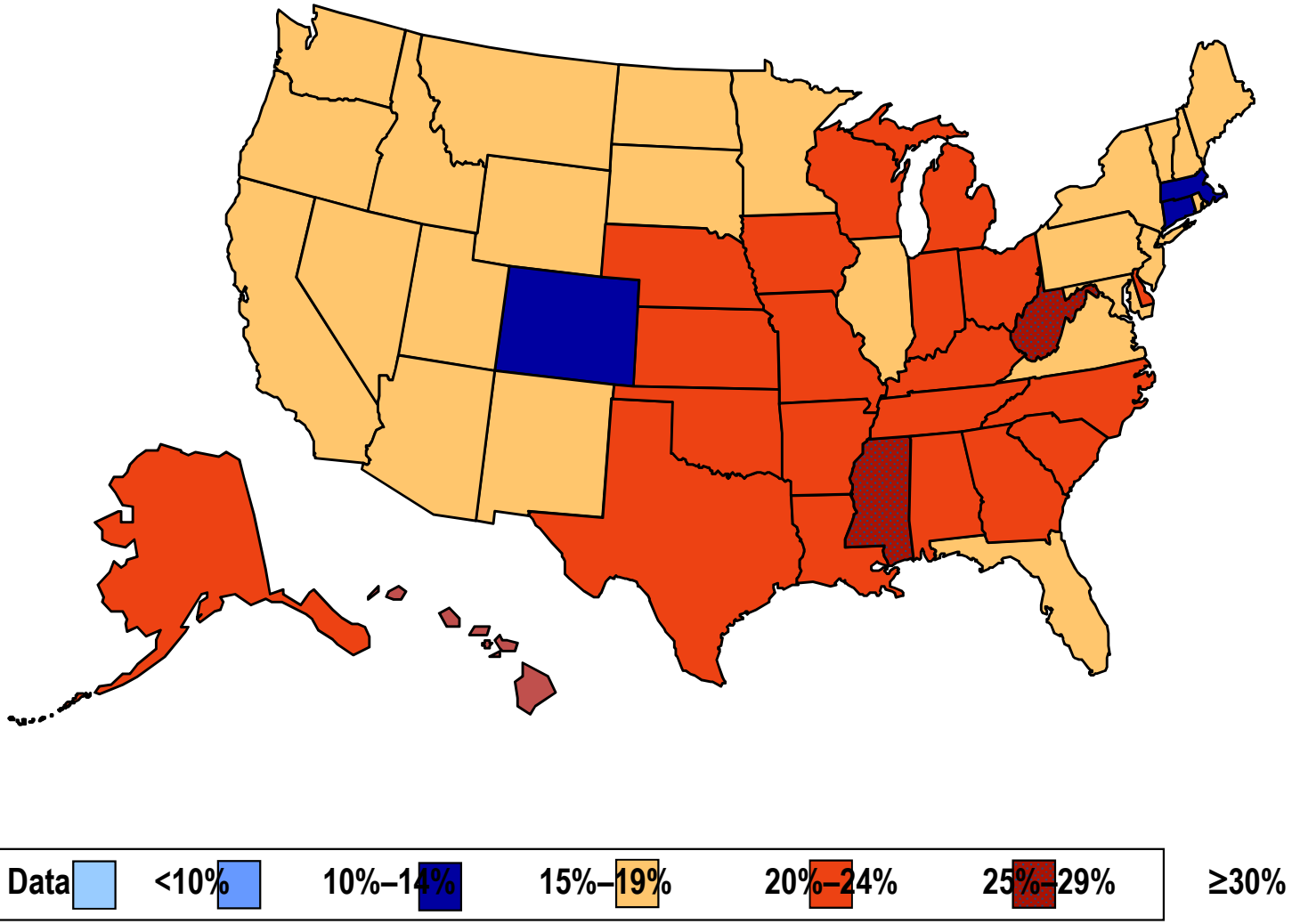
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



Obesity Trends* Among U.S. Adults

BRFSS, 2006

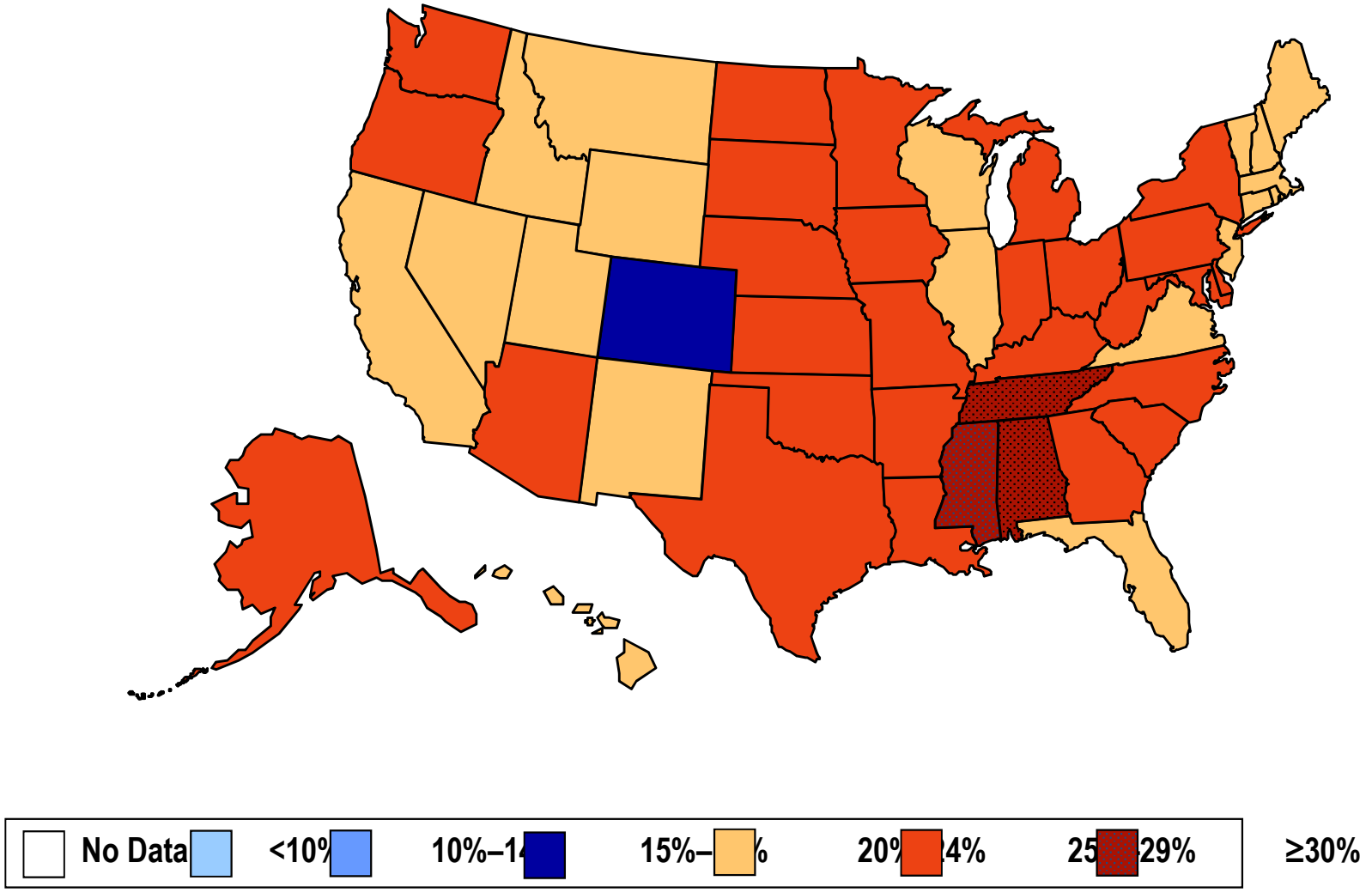
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



Obesity Trends* Among U.S. Adults

BRFSS, 2007

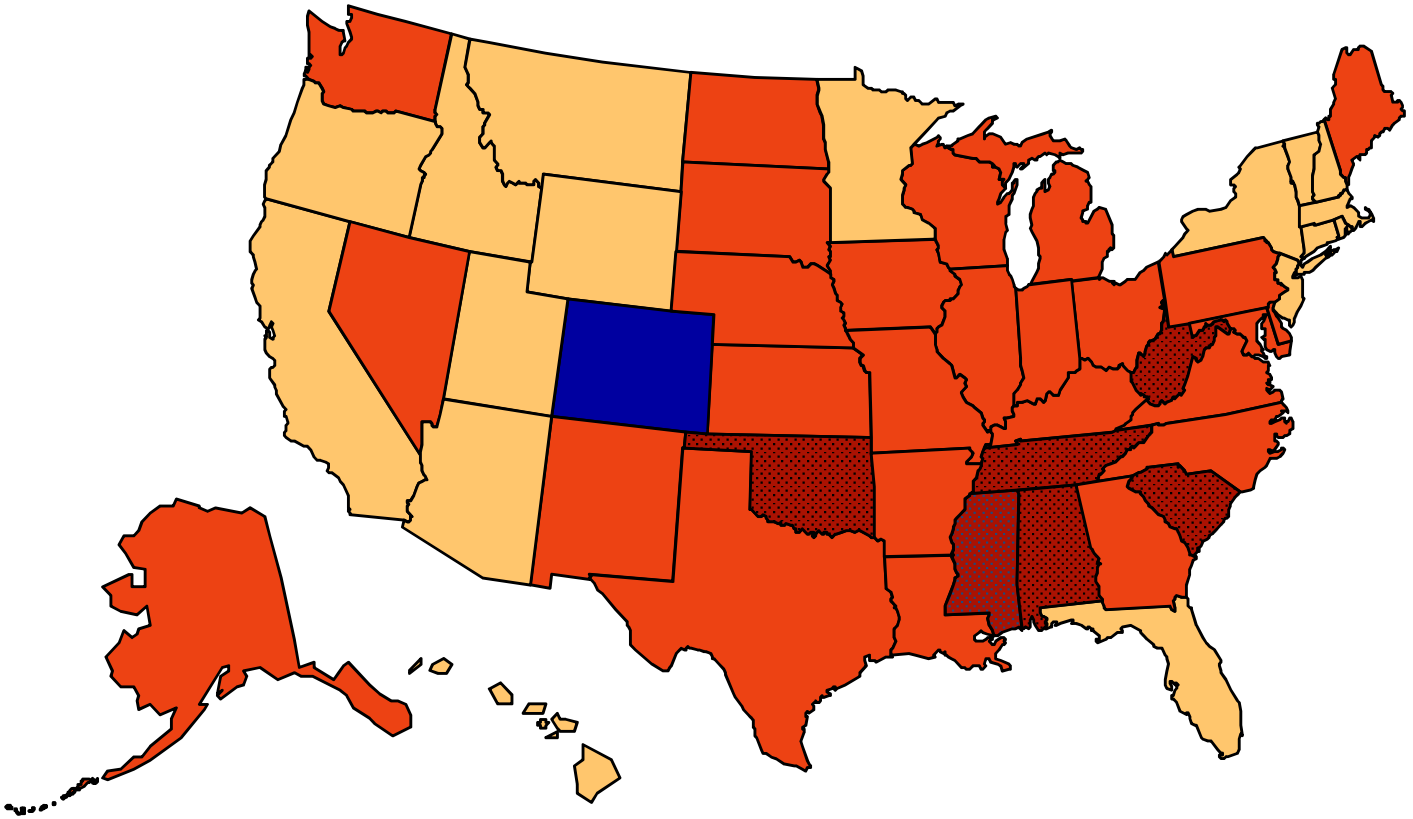
(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)



Obesity Trends* Among U.S. Adults

BRFSS, 2008

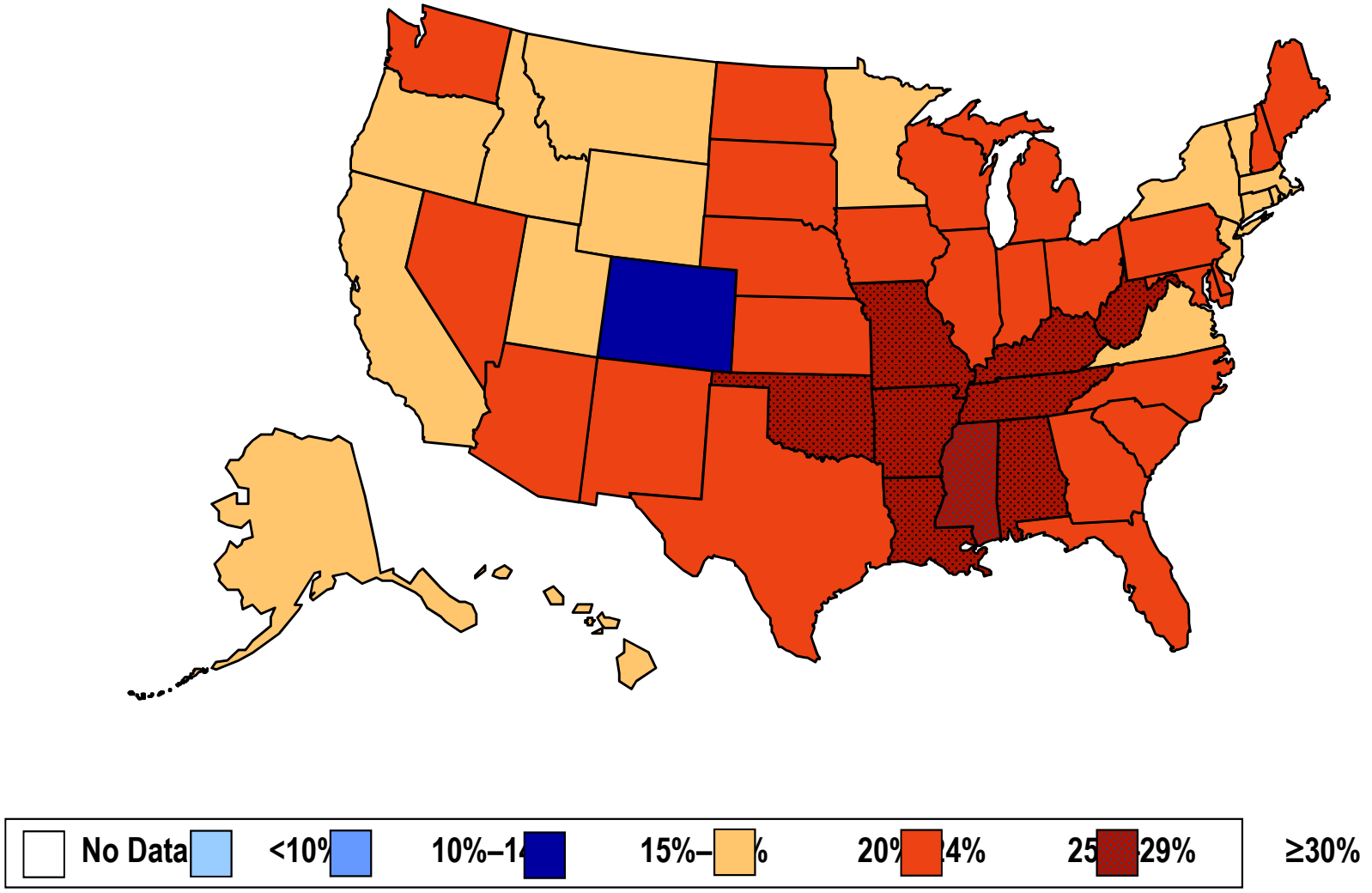
(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)



Obesity Trends* Among U.S. Adults

BRFSS, 2009

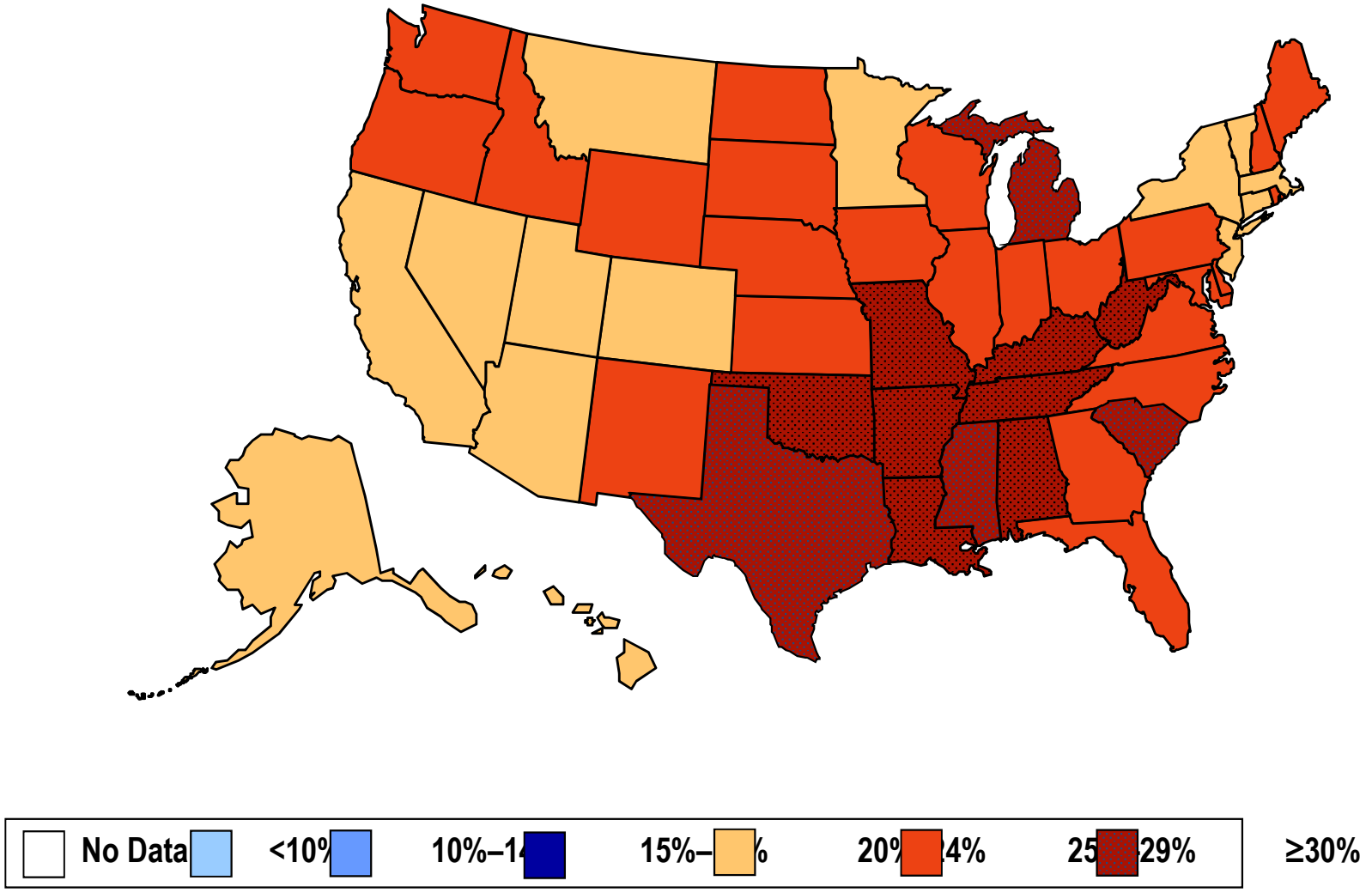
(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)



Obesity Trends* Among U.S. Adults

BRFSS, 2010

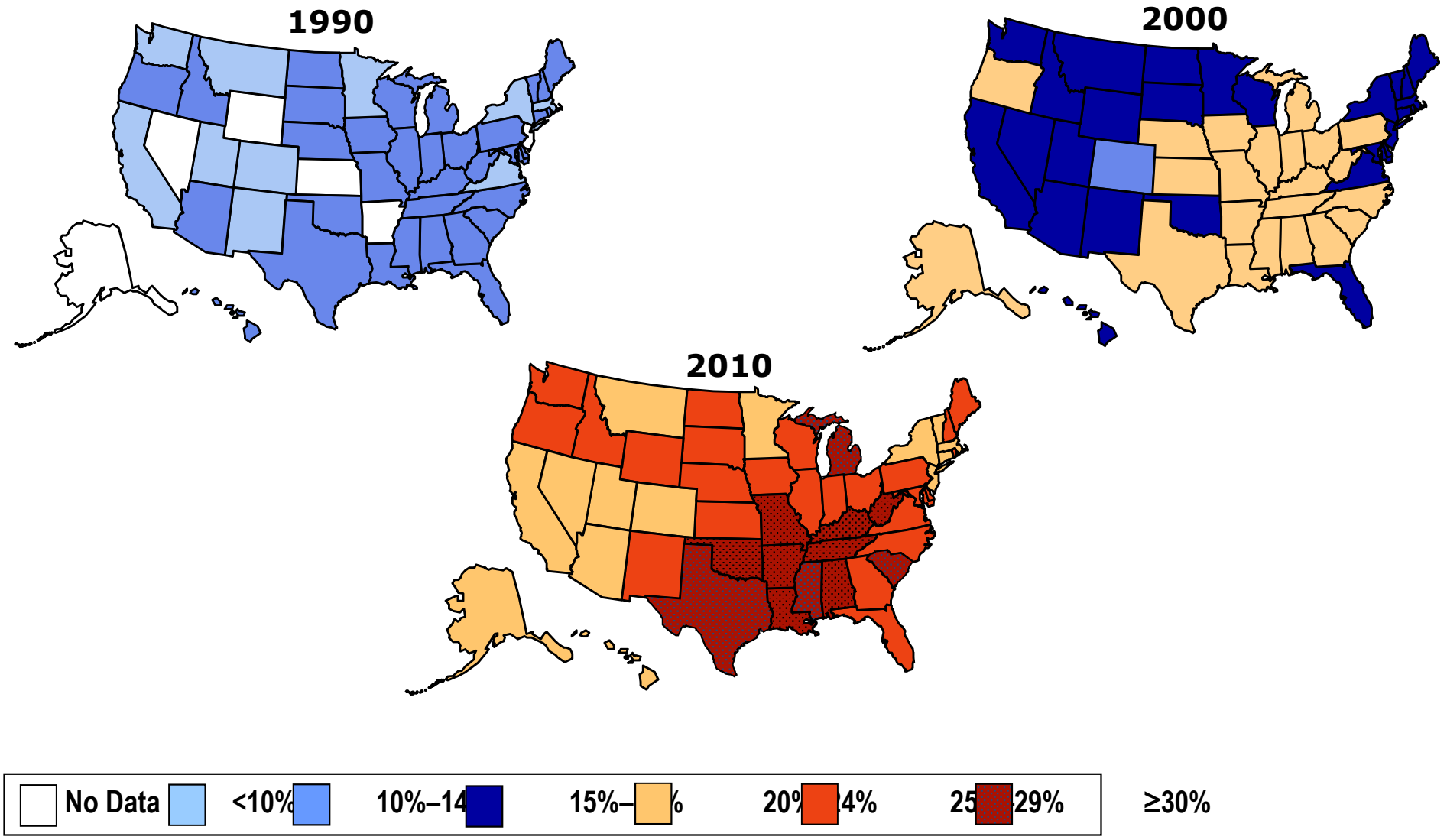
(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)



Obesity Trends* Among U.S. Adults

BRFSS, 1990, 2000, 2010

(*BMI ≥30, or about 30 lbs. overweight for 5'4" person)



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Hans.Bruyninckx@eea.europa.eu

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