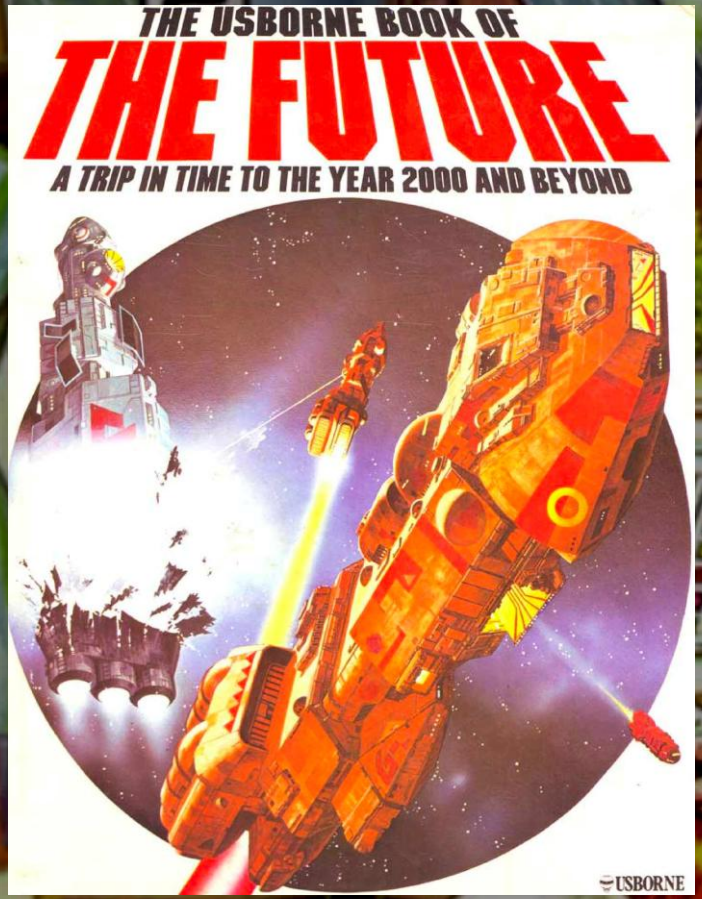
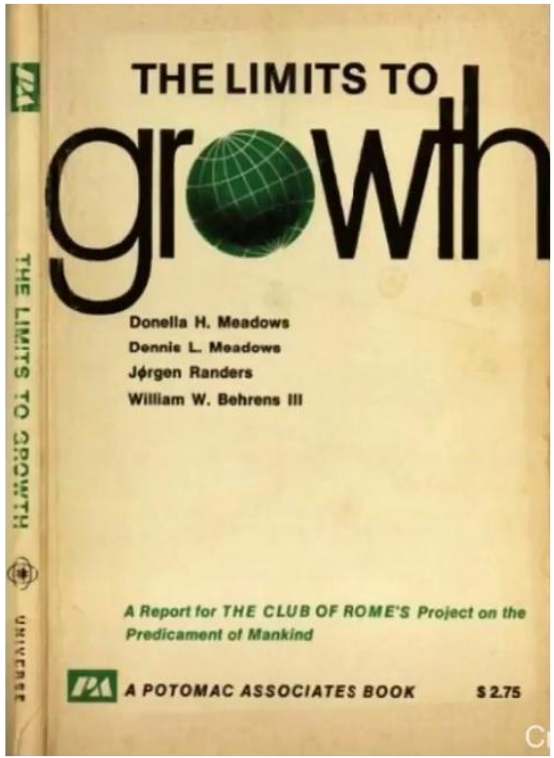
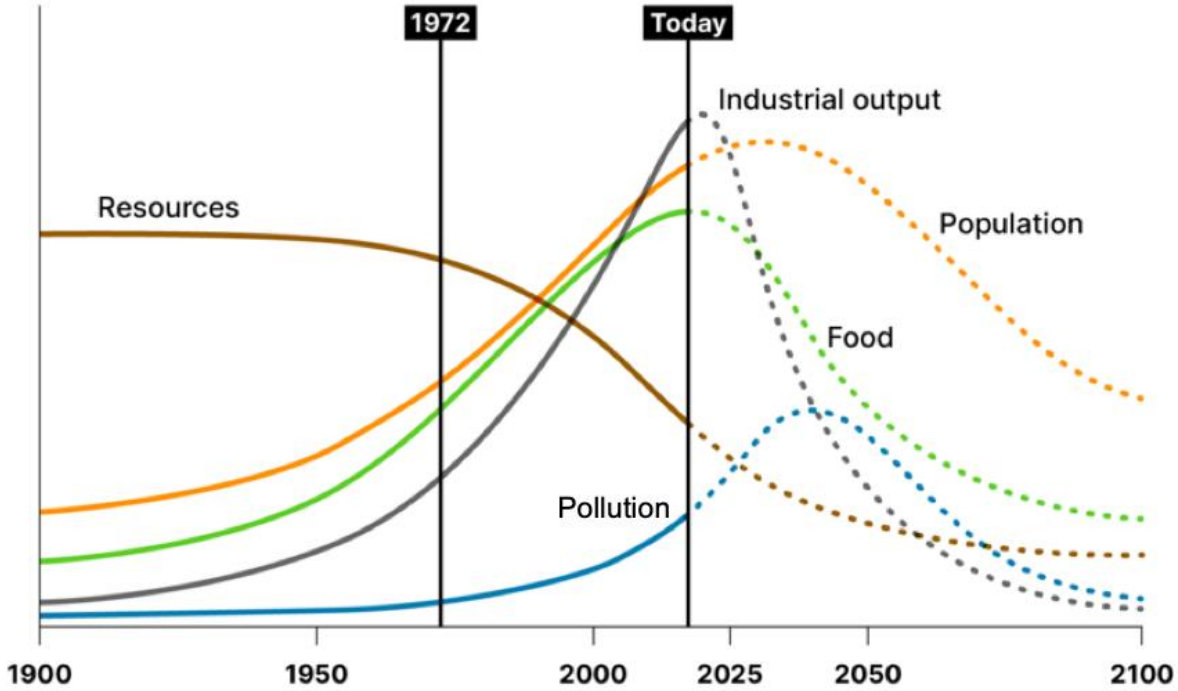
Facing Our Futures

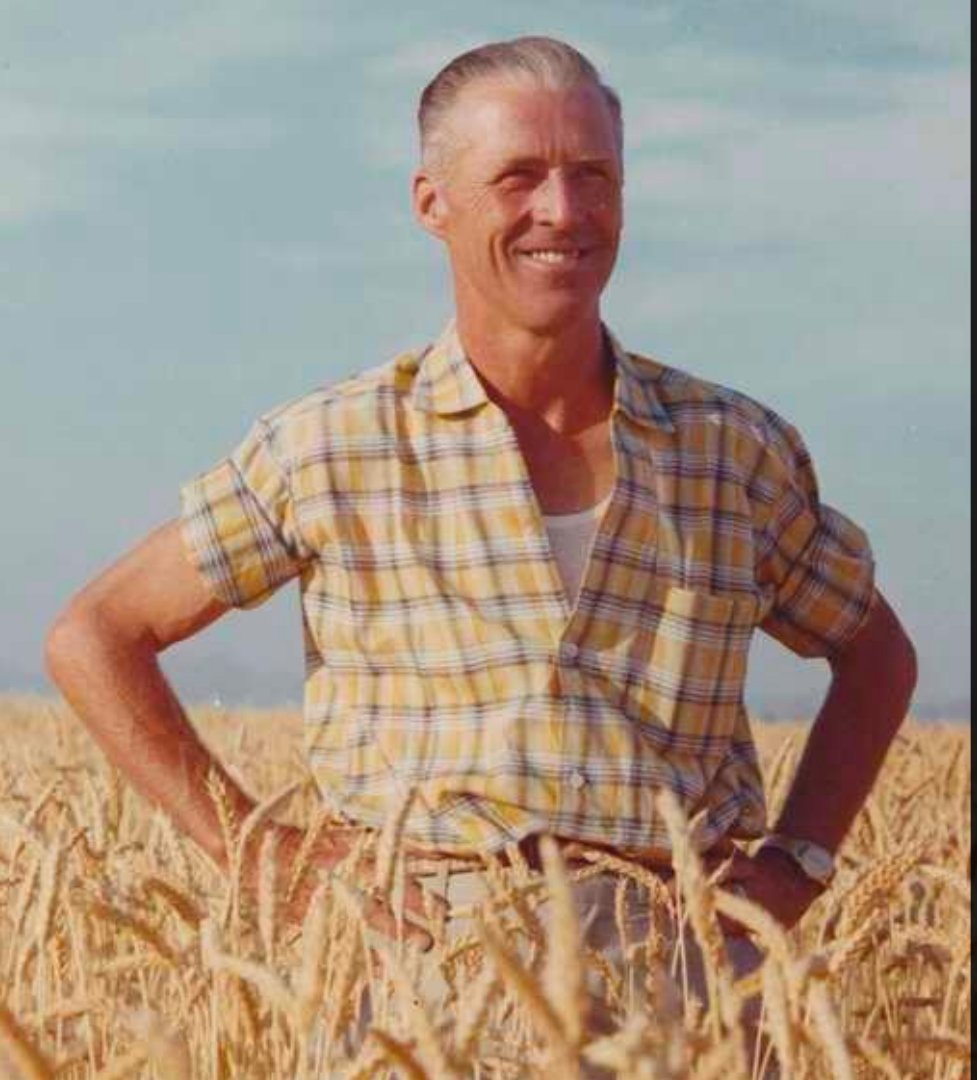
NIKOLAS BADMINTON


THE USBORNE BOOK OF
THE FUTURE
A TRIP IN TIME TO THE YEAR 2000 AND BEYOND
USBORNE

hope


THE LIMITS TO
growth
Donella H. Meadows
Dennis L. Meadows
Jørgen Randers
William W. Behrens III
A Report for THE CLUB OF ROME'S Project on the Predicament of Mankind
A POTOMAC ASSOCIATES BOOK
$ 2.75
THE LIMITS TO GROWTH
UNIVERSE


1972
Today
Industrial output
Resources
Population
Food
Pollution
1900
1950
2000
2025
2050
2100



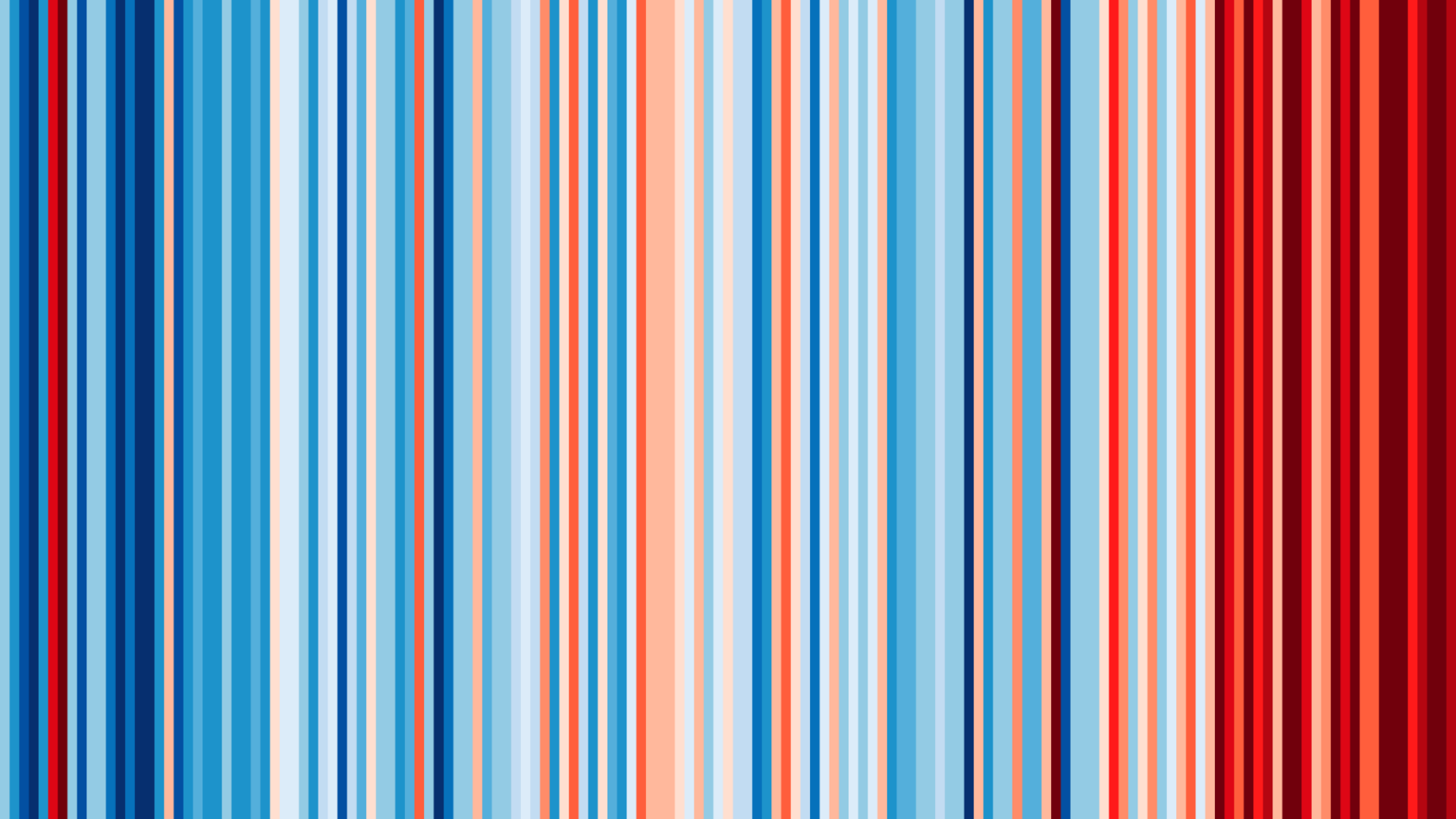

SVALBARD
GLOBAL
SEED VAULT

Image courtesy of
Tom Brown

what if...

Global Megatrends

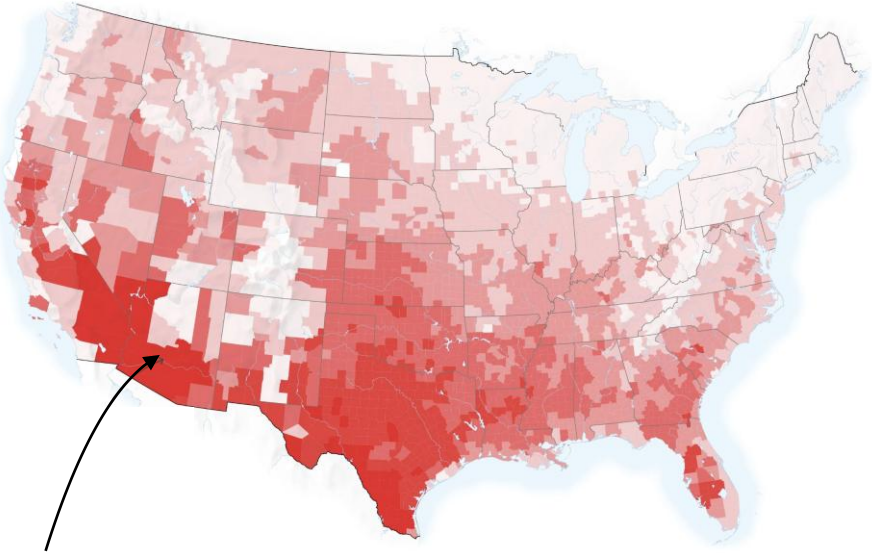
NIKOLAS BADMINTON



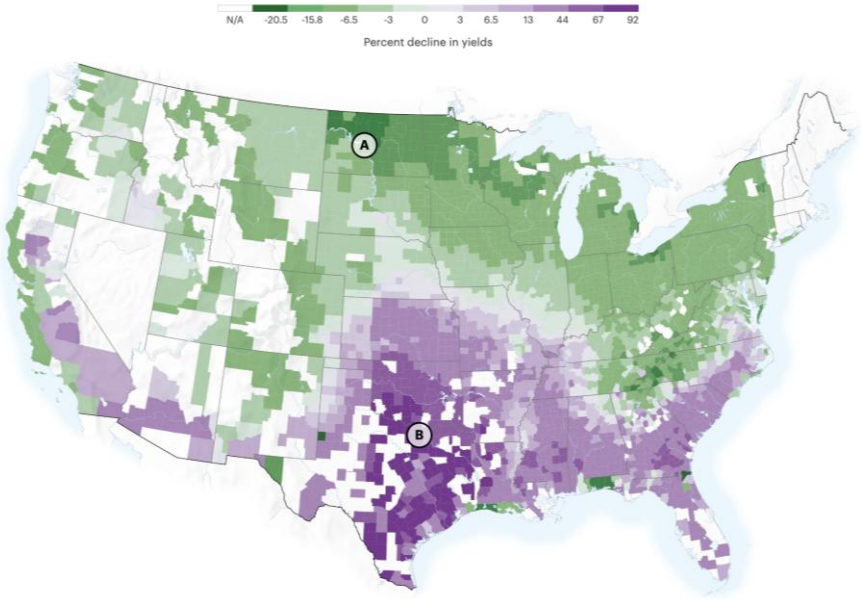
For most of the modern agricultural era, heat was treated as one variable among many — a seasonal stressor managed through irrigation, timing, and crop choice.

That framing is now obsolete.

US climate and crop evolution - 2040 to 2060

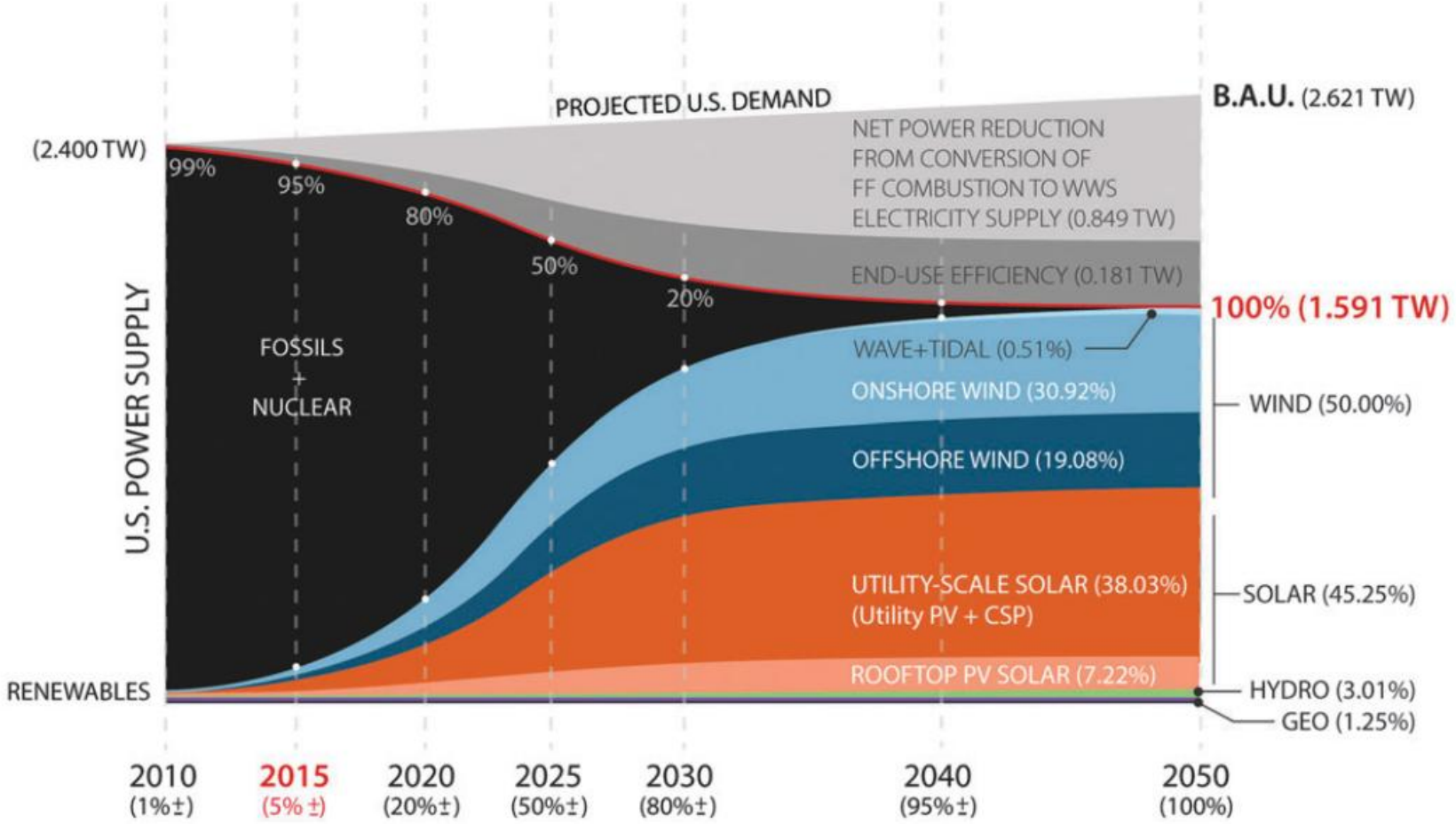


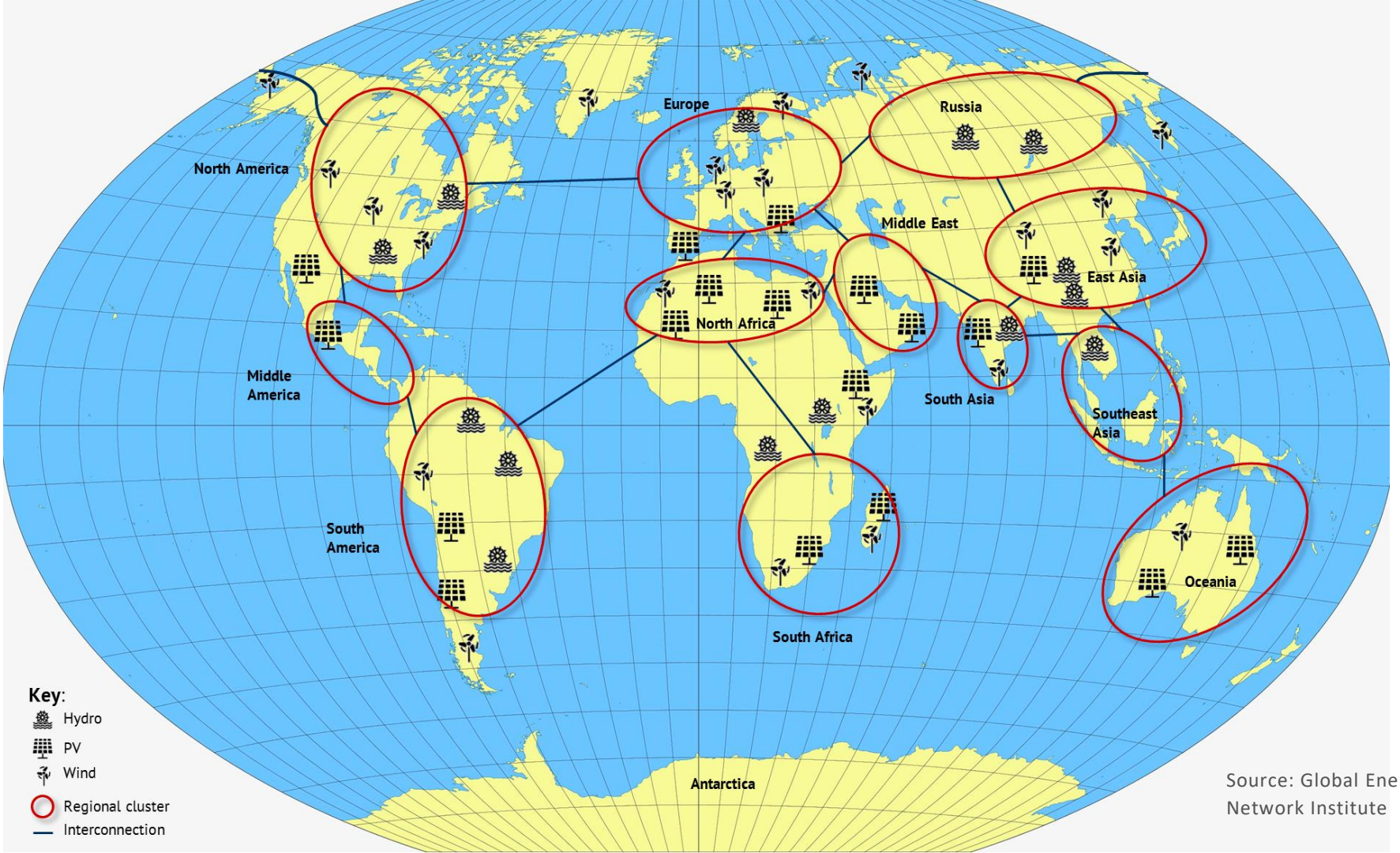
Phoenix's Maricopa County could see 6 months a year >95 degrees.



By midcentury, North Dakota (A), which already harvests millions of acres of corn and soy, will warm enough to allow for more growing days and higher yields. Texas and Oklahoma (B) may see yields drop by more than 70%.

Source: Propublica


PROJECTED U.S. DEMAND
B.A.U. (2.621 TW)
(2.400 TW)
NET POWER REDUCTION FROM CONVERSION OF FF COMBUSTION TO WWS ELECTRICITY SUPPLY (0.849 TW)
END-USE EFFICIENCY (0.181 TW)
100% (1.591 TW)
99%
95%
80%
50%
20%
U.S. POWER SUPPLY
FOSSILS + NUCLEAR
WAVE+TIDAL (0.51%)
ONSHORE WIND (30.92%)
WIND (50.00%)
OFFSHORE WIND (19.08%)
UTILITY-SCALE SOLAR (38.03%) (Utility PV + CSP)
SOLAR (45.25%)
ROOFTOP PV SOLAR (7.22%)
RENEWABLES
HYDRO (3.01%)
GEO (1.25%)
2010 (1%±)
2015 (5% ±)
2020 (20%±)
2025 (50%±)
2030 (80%±)
2040 (95%±)
2050 (100%)



Source: Global Energy Network Institute

What if… we anticipate the global shifts reshaping our world?

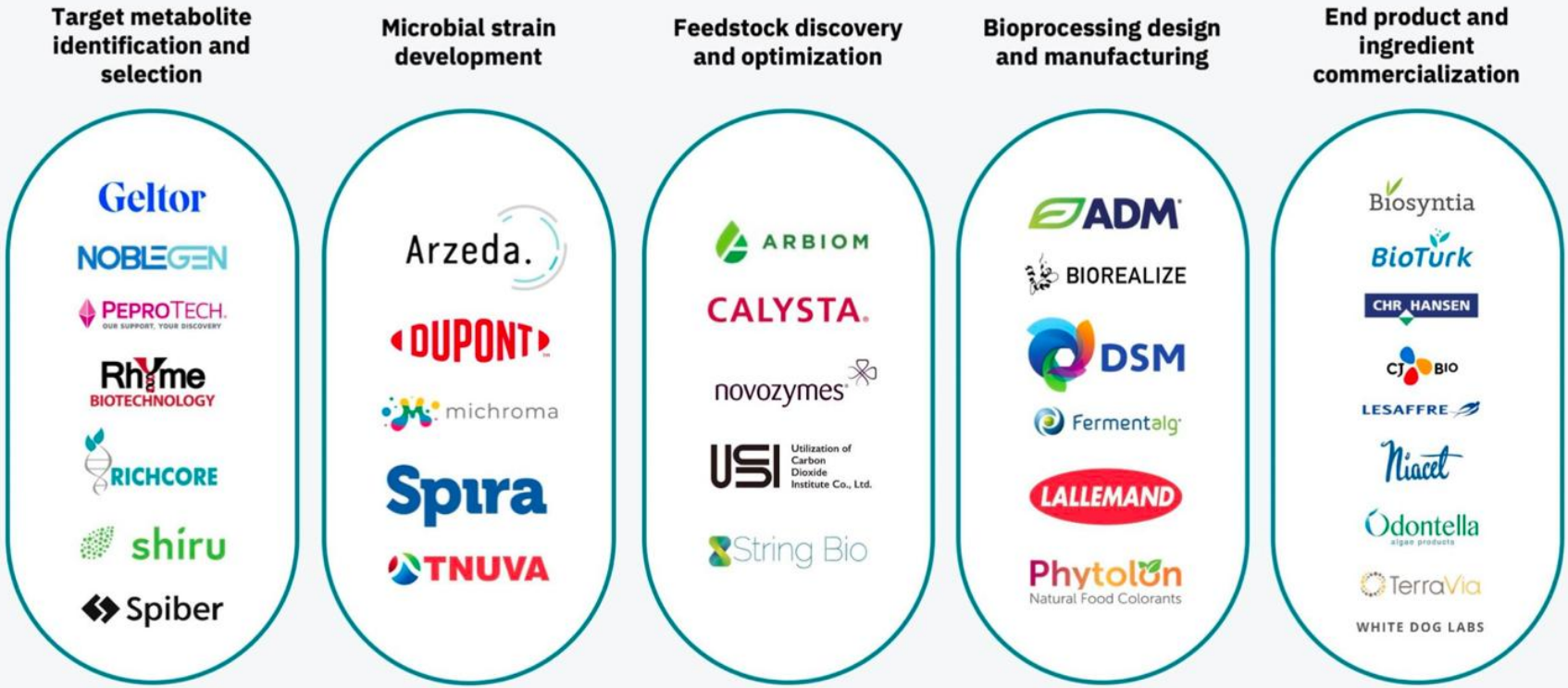
Biologies & Platforms

NIKOLAS BADMINTON


proteins

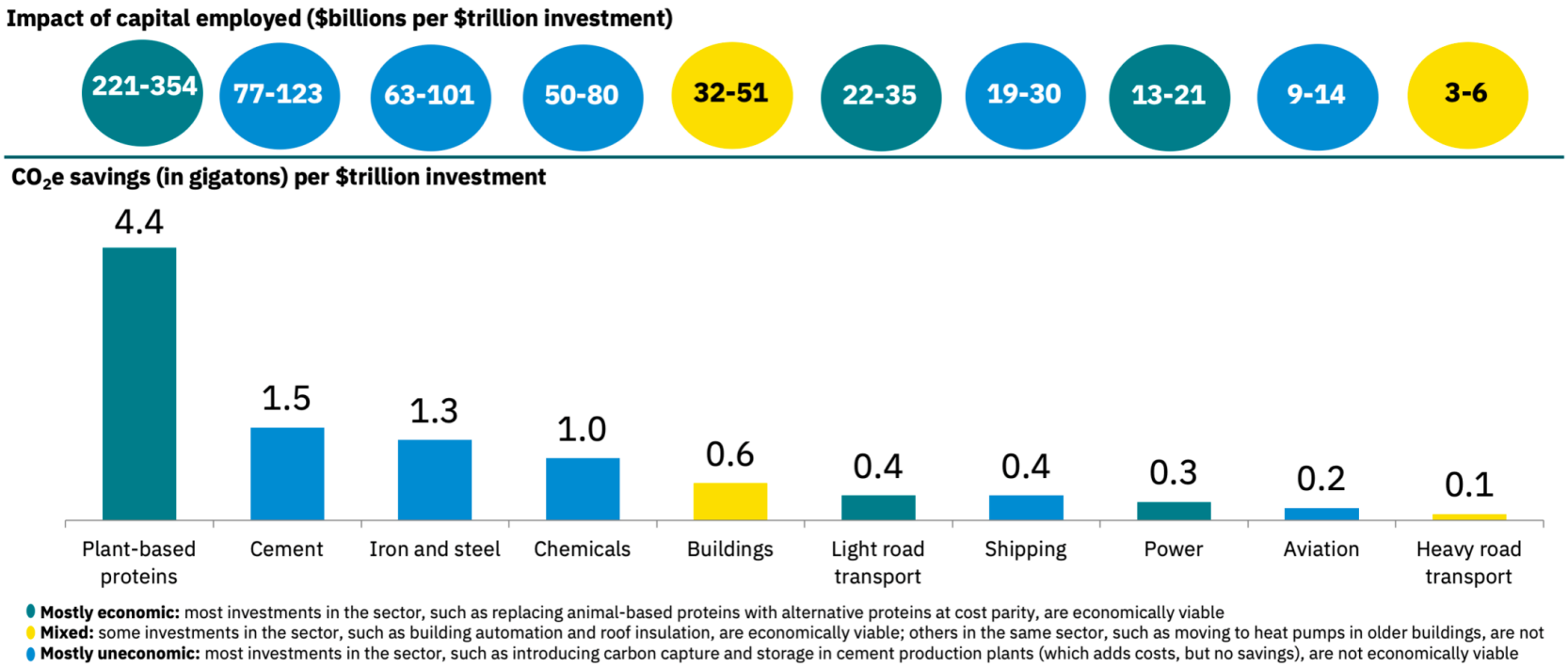

FRESH
NEVER FROZEN
FRAIS JAMAIS CONGELÉ
PORK SAUSAGES UNCOOKED SAUCISSES DE PORC
NISH CHORIZO
RIZO ESPAGNOL
500 g
BEYOND MEAT
BEYOND BEEF
18g
NET 340 g 12 oz
Compliments
balance
équilibre
Lean
Ground Pork
Porc haché
maigre
450 g
BEST BEFORE/MEILLEUR AVANT
Allergy Alert
Products may contain or may have come in contact with food allergens.
Please ask for assistance if you have questions.
Sensatns Sausage SpanishChoriz
500 g
6.49
SAVINGS THIS WEEK
Sensatns Sausage SpanishChoriz
500G
NOW 5.99 each
weekly SAVINGS
Expires Dec 25, 2019
SAVE 50¢ ea
CompBal Lean Ground Pork
450 g
3.99
Johnsonville
ITALIANO
HOT ITALIAN SAUSAGE MEAT
CHAIR À SAUCISSE ITALIENNE ÉPICÉE
375 g

Rice-growing nations could reposition themselves as feedstock suppliers for fermentation industries and a circular “rice-to-protein” bioeconomy



Source: GFI Fermentation State of the Industry Report, 2021

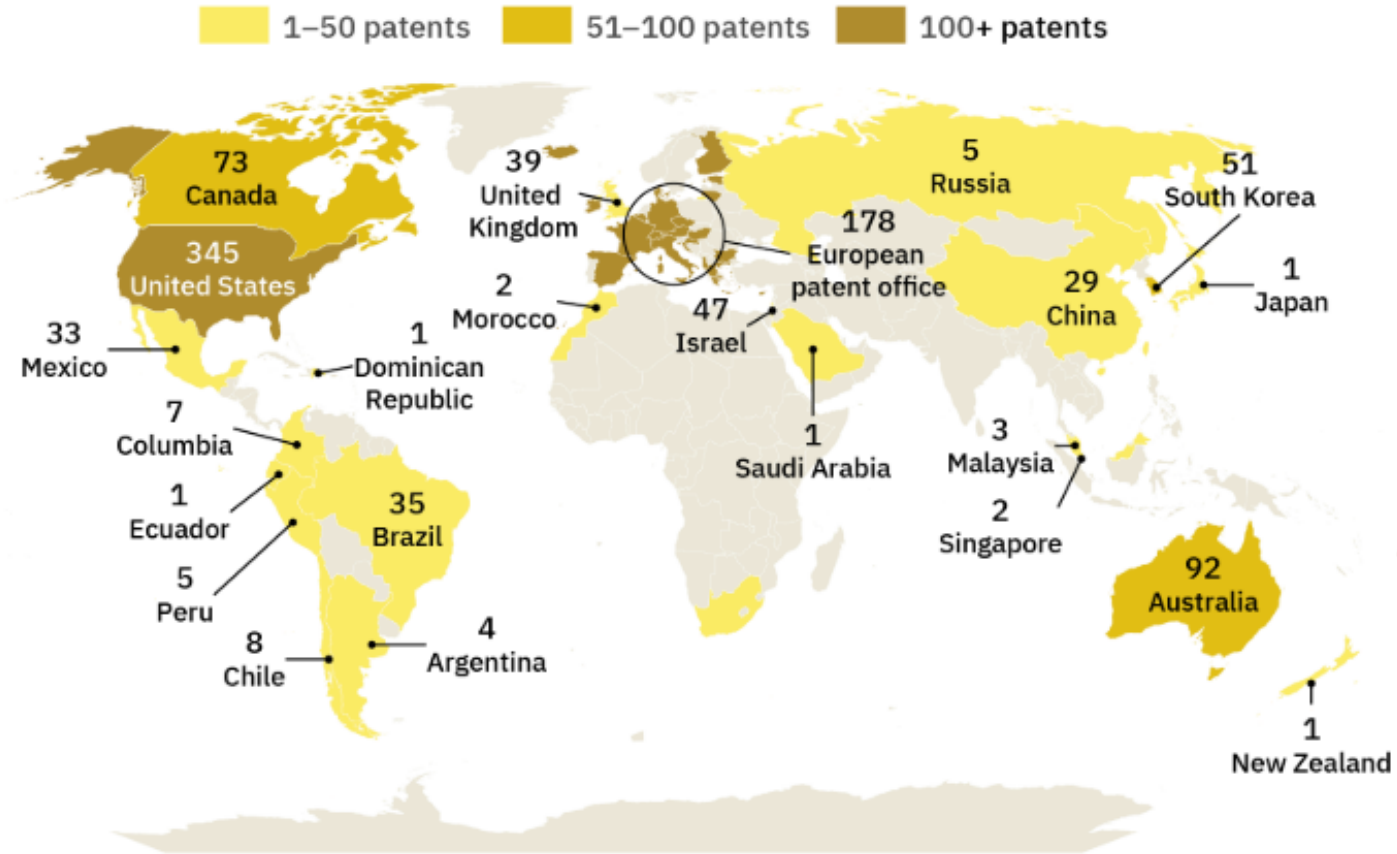
Investing in plant-based proteins has the highest C02e savings per dollar of any sector



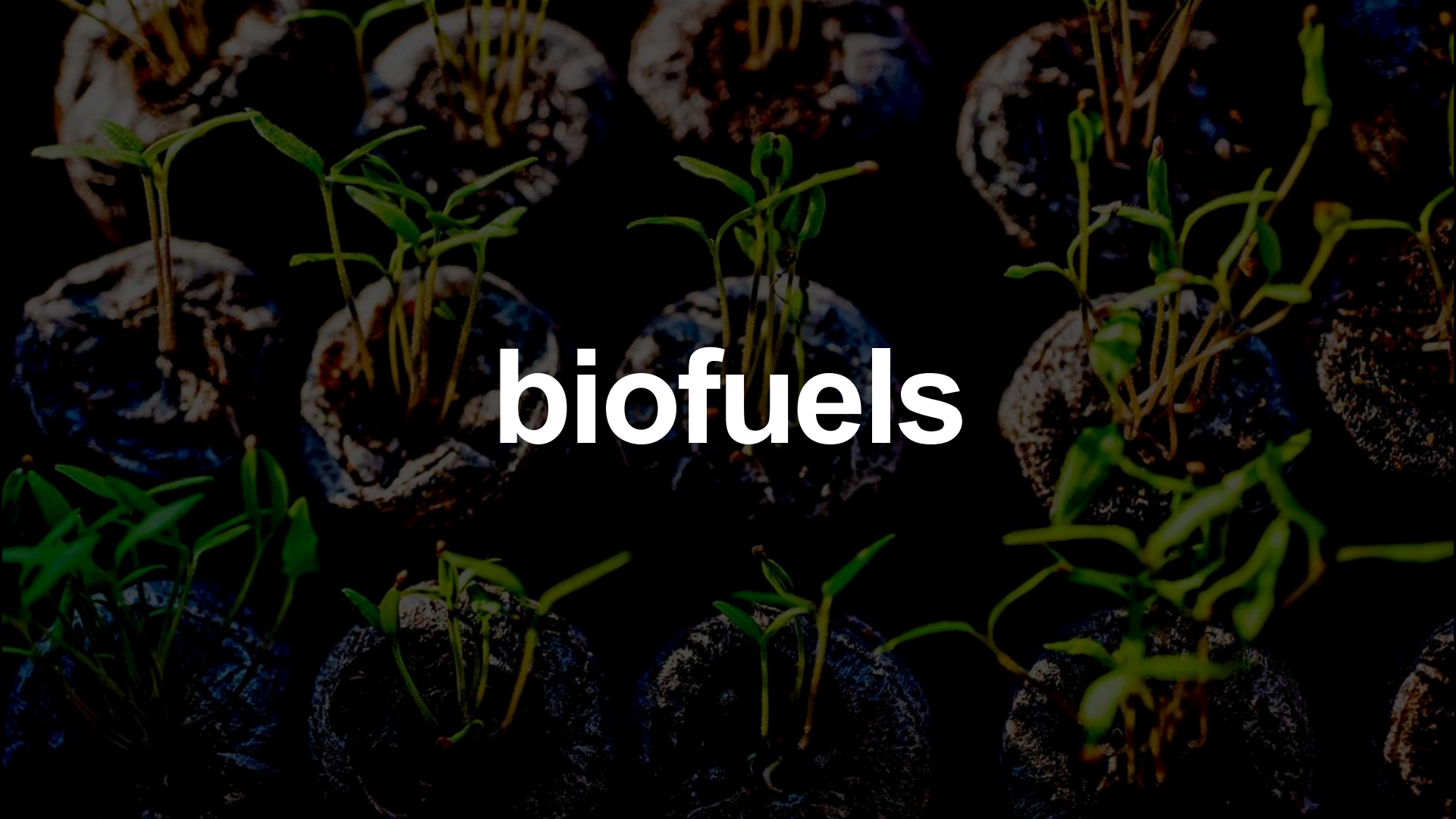
- **Mostly economic:** most investments in the sector, such as replacing animal-based proteins with alternative proteins at cost parity, are economically viable
- **Mixed:** some investments in the sector, such as building automation and roof insulation, are economically viable; others in the same sector, such as moving to heat pumps in older buildings, are not
- **Mostly uneconomic:** most investments in the sector, such as introducing carbon capture and storage in cement production plants (which adds costs, but no savings), are not economically viable

Source: BCG/Blue Horizon report: "The Untapped Climate Opportunity in Alternative Proteins", Feb-April 2022, BCG/GFMA report, "Climate Finance Markets and the Real Economy": BCG Analysis. 1)Market value for avoided tons of CO2e, assuming a price of $50 to $80 per ton. 2)CO2e savings from plant-based meat only (red meat, pork, chicken, fish, and seafood).

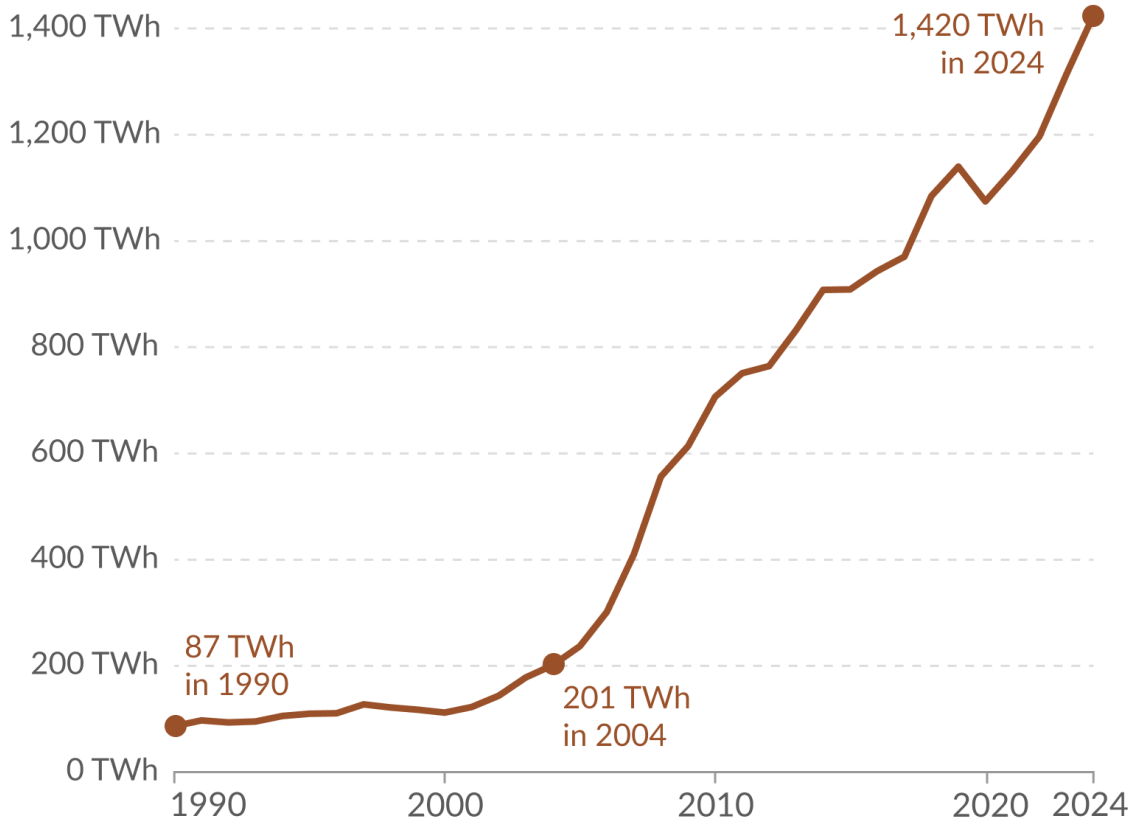
Figure 19: Patent applications by jurisdiction (2021-2023)



Source: GFI analysis of patent landscape from The Lens - https://www.lens.org.

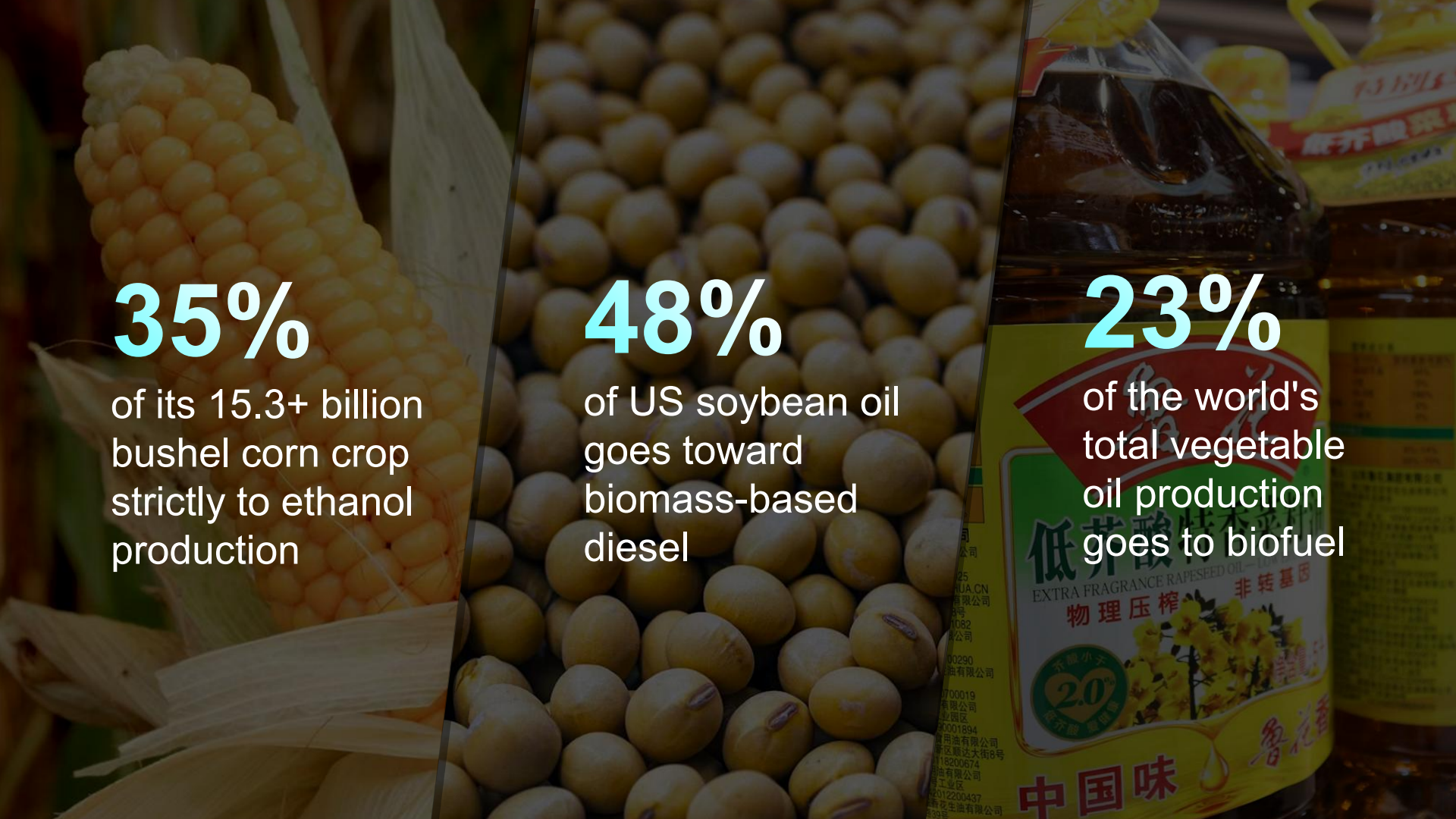

biofuels

Liquid biofuel production, measured in terawatt-hours per year.
This includes bioethanol and biodiesel.



Data source: Energy Institute – Statistical Review of World Energy (2025) CC BY


魯花
低芥酸特香菜籽油
EXTRA FRAGRANCE RAPESEED OIL—LOW ERUCIC ACID
物理压榨
非转基因
2.0%
中国味
魯花香


35%
of its 15.3+ billion bushel corn crop strictly to ethanol production
48%
of US soybean oil goes toward biomass-based diesel
23%
of the world's total vegetable oil production goes to biofuel
EXTRA FRAGRANCE RAPESEED OIL
物理压榨
非转基因
中国味


LANZAJET
LANZAJET
neday is now.
LanzaJet Freedom Pines Fuels


Solugen
Biorefine


PIVOT BIO
PIVOT BIO
PROVEN
PIVOT BIO
PROVEN

seeds as chemical energy precursors

We’re shifting toward high-throughput biochemical analysis, stricter genetic purity verification, and new environmental compliance frameworks.

Shift from Germination to Biochemical Metrics

Oil & Sugar Profiling + Industrial Purity Testing

Verification of Invasive and Environmental Risks

Weed Seed Screening + Stricter Import Regulations

High-Tech Genetic Screening and GMO Segregation

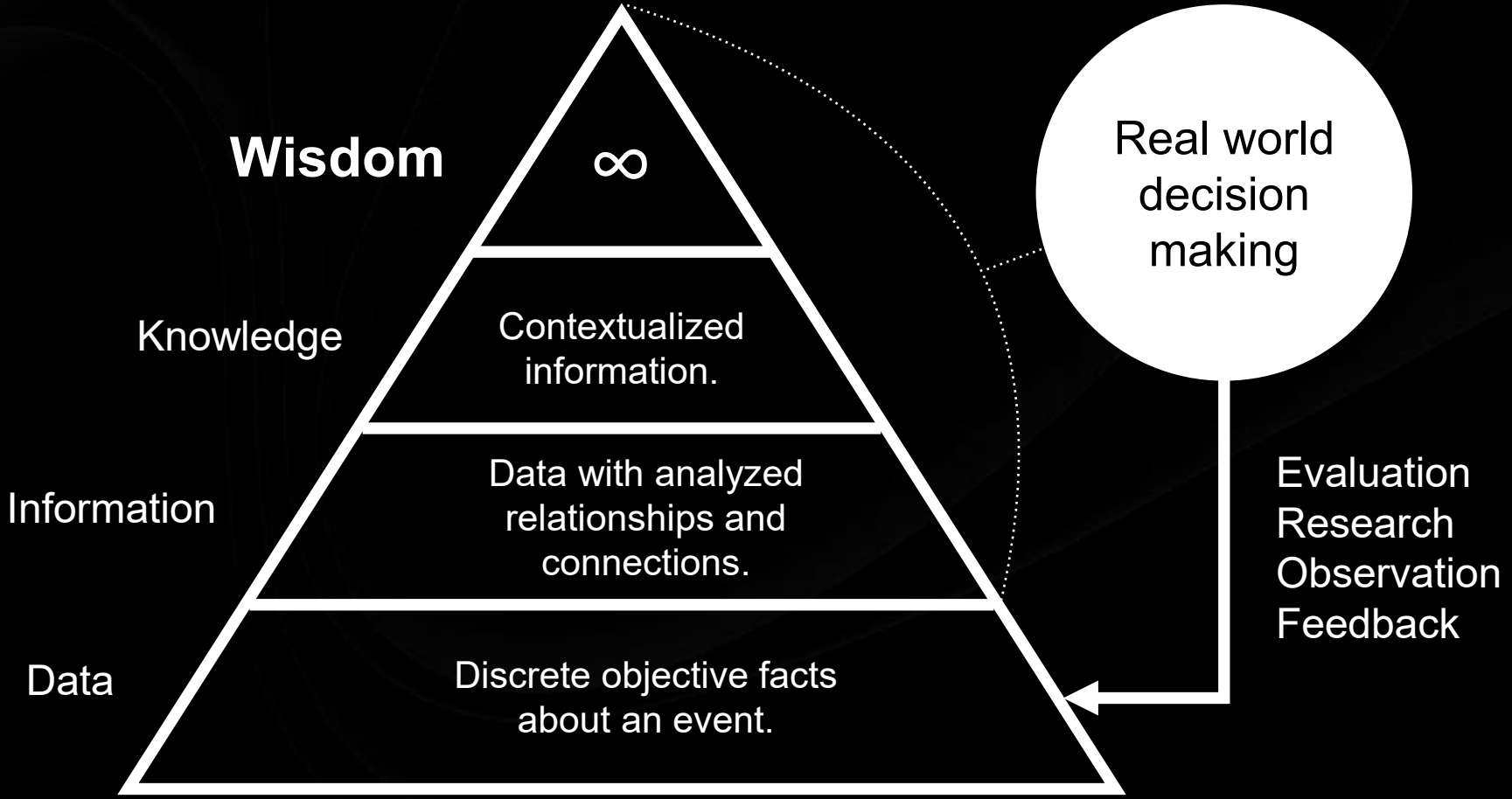
Preventing Co-Mingling + Advanced DNA Assays

Evolution of Certification Frameworks

Carbon-Traceable Seeds and Global Standardization continues

What if… we see seeds as programmable biological platforms?


Intelligence
Evolution
NIKOLAS
BADMINTON


Wisdom
∞
Knowledge
Contextualized information.
Information
Data with analyzed relationships and connections.
Data
Discrete objective facts about an event.
Real world decision making
Evaluation
Research
Observation
Feedback


JAGUAR


Take Away


generative
intelligence

AI unlocks secrets of rice yield sustainability after 50 years of continuous cropping

August 28, 2025

A new study highlights how machine learning can effectively identify key factors influencing rice yield for over five decades, emphasizing the importance of tailored management practices and varietal replacement as a response to climate change.

LOS BAÑOS, Philippines (28 August 2025) – An international research team has uncovered the key drivers of rice yield sustainability by applying artificial intelligence (AI) to the world's longest-running triple-cropping experiment.

MTRANN

10-15%
reduction in crop losses*

8-12%
Improvement in growth stage monitoring accuracy

20-25%
Improvement in yield predictions

* By detecting rice blast / bacterial blight early from field or drone images

316k

jobs in the agriculture sector will be replaced by robots by 2035*

* 60% of the total agricultural workforce

Source: Roots Analysis

$12.6bn

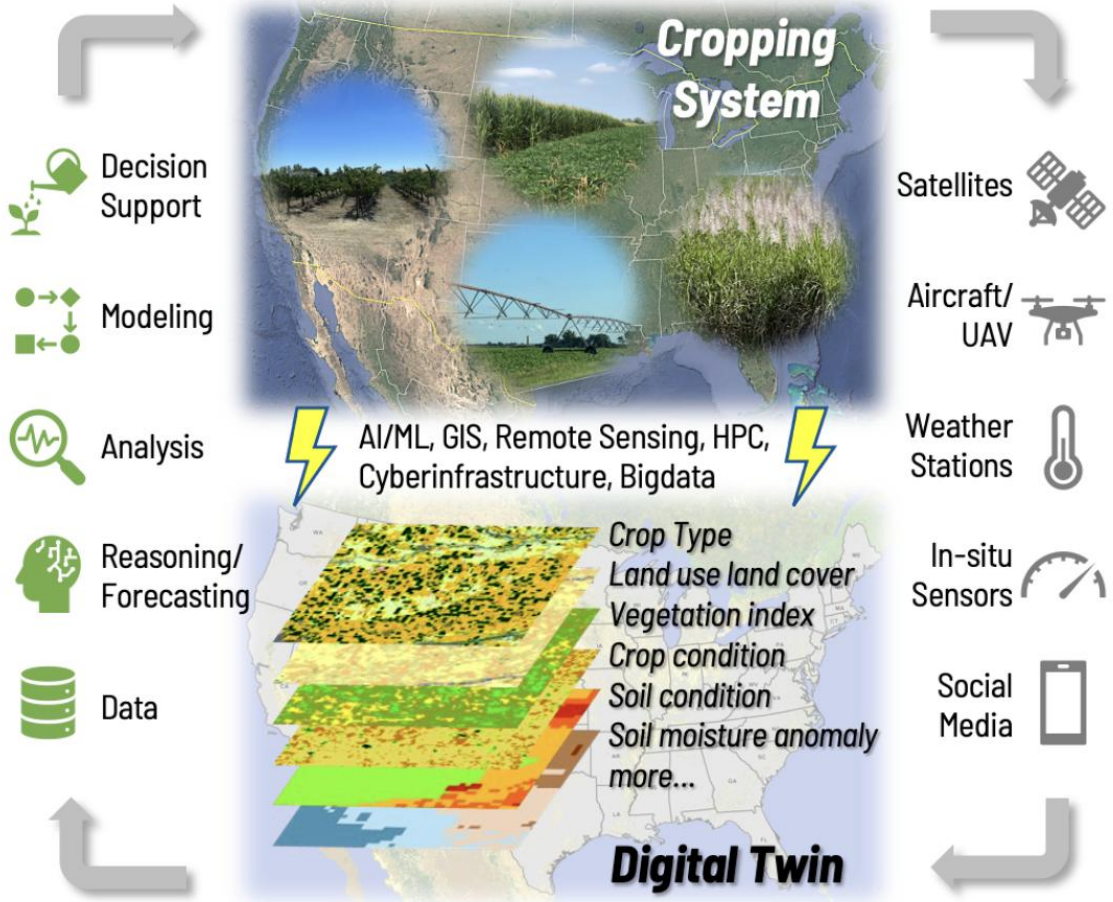
Size of the global IoAgT by 2030 at a CAGR of 7.3% from 2025 to 2030.

Source: markets and markets

SeedLLM·Rice

7-billion-parameter model trained on 1.4 million rice-related publications, representing nearly 98.24% of global rice research output. SeedLLM powers crop improvement and climate adaptation through advanced reasoning and comprehensive data integration.

‘SeedLLM·Rice: A large language model integrated with rice biological knowledge graph’, Yang et al (2025)



Source: CropSmart

- Growth patterns and weather conditions.
- Crop management, disease detection, pest control
- Yield prediction
- Risk Management
- Operations/equipment management
- Farmer-to-farmer advice

Employees who spend 7–10% of their total work hours in AI tools have the highest productivity rates*

* only 3% of employees currently fall within that range

Source: ActivTrak


building an
AI capability

1. Strategy

Stop asking “Where can we use GenAI?” Start asking “Which decisions are most bottlenecked, high-value, and data-ready?”

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2. Operating triads

Seed owner + data product owner + AI engineering owner focused on priority areas

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Split metrics into: cycle-time/cost, and economic lift (reuse, recycle, reduce + efficiencies + new products and business models)

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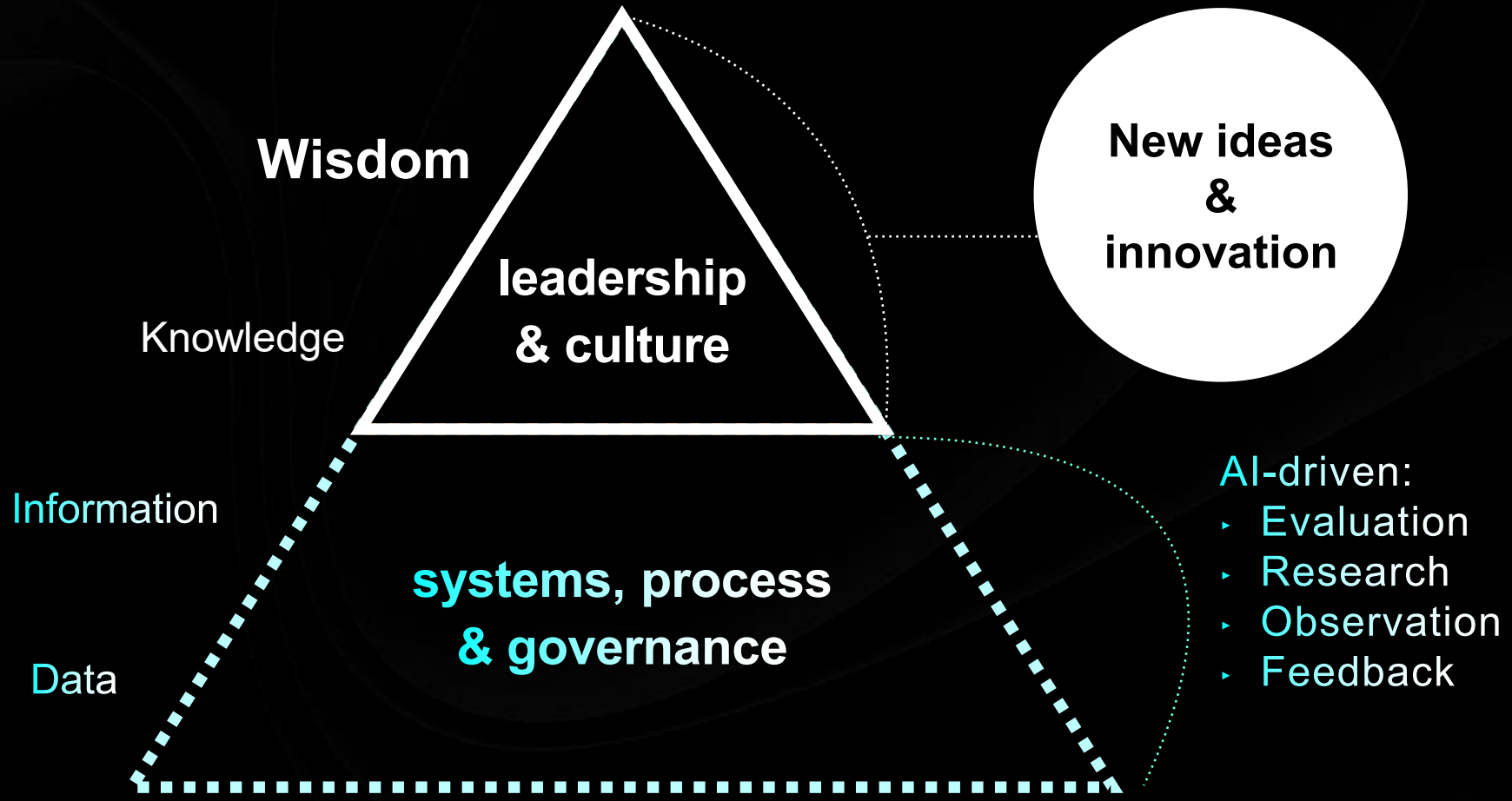
4. Risk

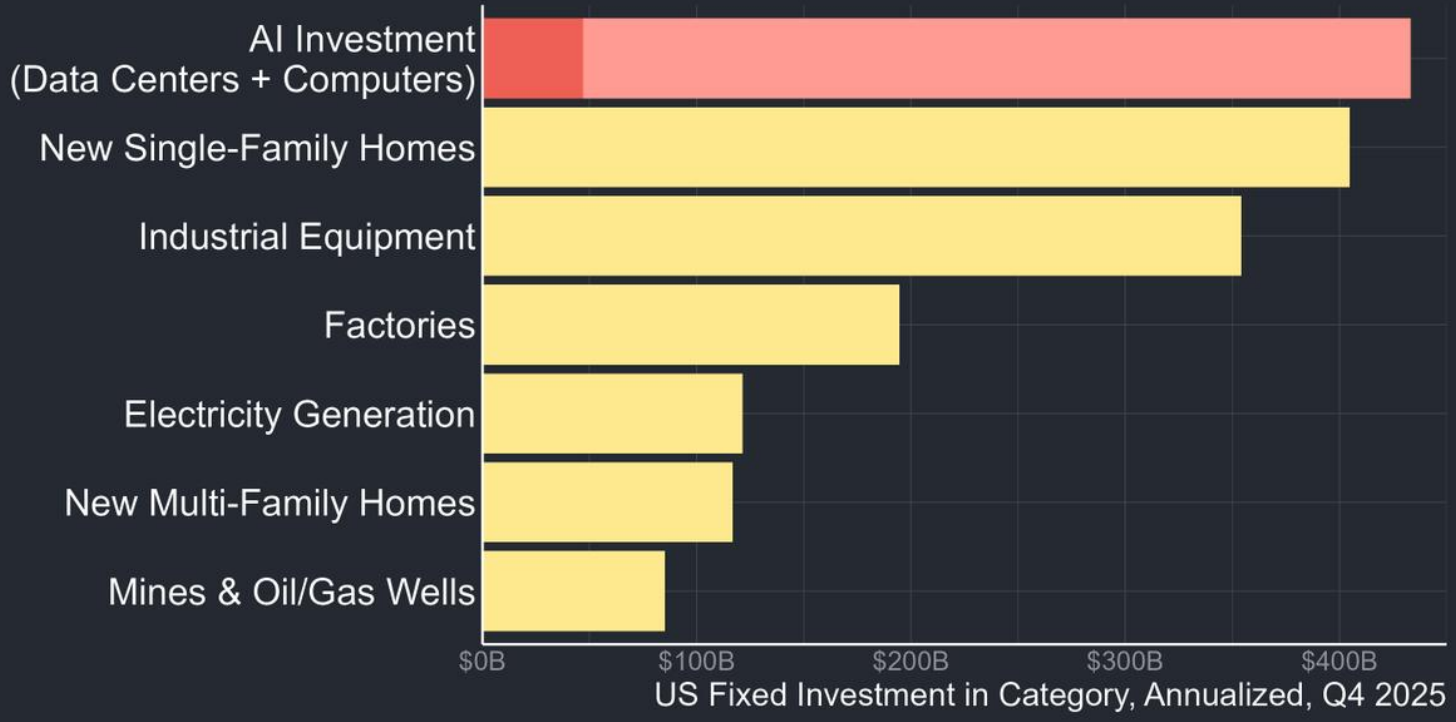
Put governance where it matters: dataset provenance, bias representativeness, and validation on AI-driven technologies helping with circularity.


Wisdom
leadership
& culture
Knowledge
Information
Data
systems, process
& governance
New ideas
&
innovation
AI-driven:
Evaluation
Research
Observation
Feedback

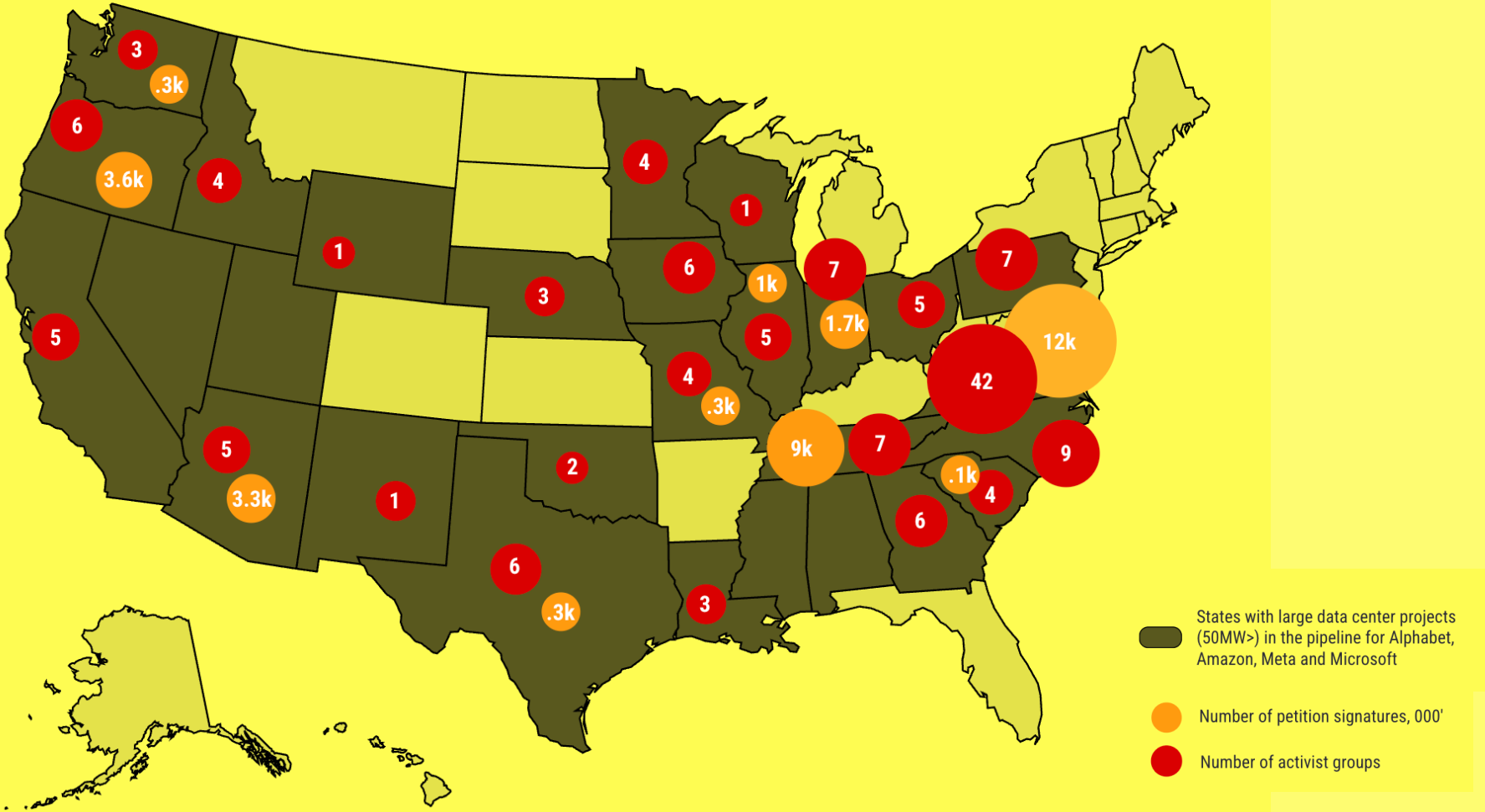
Intelligence		Wisdom
Solving problems efficiently	→	Understanding life meaningfully
Analytical	→	Integrative & reflective
“How can I succeed?”	→	“What matters, and how should I act?”

US AI Construction vs Other Investments

The US is Spending a Massive Amount on Data Centers & Computers, Rivaling Major Construction Categories



Graph created by @JosephPolitano using BEA Data


3
.3k
6
3.6k
4
1
5
5
3.3k
1
6
.3k
2
3
4
1
6
1k
3
5
4
.3k
9k
7
1.7k
5
42
7
12k
7
9
.1k
4
6
States with large data center projects (50MW>) in the pipeline for Alphabet, Amazon, Meta and Microsoft
Number of petition signatures, 000'
Number of activist groups

What if… we pioneer responsible seed intelligence methods?


Exploring
Futures
NIKOLAS
BADMINTON

$1bn investment

Considered investment

Future of chocolate

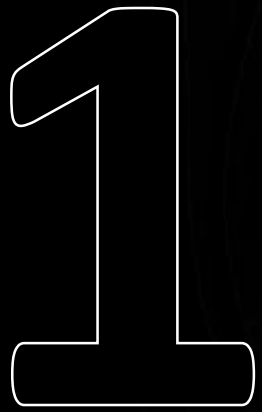

NEW BELGIUM.
Fat Tire
TORCHED EARTH
16 FL.OZ
(1 PINT)
5.2%
ALC/VOL


LEGO
2050
SEED SCIENCE
LABORATORY
Research. Innovate. Grow.
12+
Age
41750
Set
1212
pcs/pzs
ISTA
Seed Quality Assurance
INNOVATION
FOR A BETTER
TOMORROW
SUSTAINABLE
FUTURE


2050
SEED SCIENCE
LABORATORY

Ignite hopeful futures work today by questioning everything*

* and there's zero risk in doing so



Move from continuation to transformation.

2 Decode uncertainty where megatrends collide.

3

Embrace anticipatory governance.

Shift your mindset from what is to what if…

5 minutes to future

1. Pick a signal
2. Think about + / -
3. What if…

Think like a hope engineer

Facing Our Futures

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