



International Institute for
Applied Systems Analysis
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science for global insight



Sustainable Development for All The World in 2050

**SDGs:
Prosperity
Social Inclusion
Sustainability**



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Rio de Janeiro, Brazil – 5-6 September 2019*



IIASA, International Institute for Applied Systems Analysis

Glassboro Summit and Signing of IIASA Charter in Royal Society



Howard Raiffa YSSP Talk in 1992

The IIASA charter was signed in London in October 1972, but the history goes back six years earlier. In 1966 American president **Lyndon Johnson** gave a rather remarkable speech — in the middle of the Cold War — in which he said it was time that the scientists of the **United States and the Soviet Union worked together on problems** other than military and space matters, on problems that plague all advanced societies, like **energy, our oceans, the environment, health**. And he called for a liaison between the scientists of East and West.





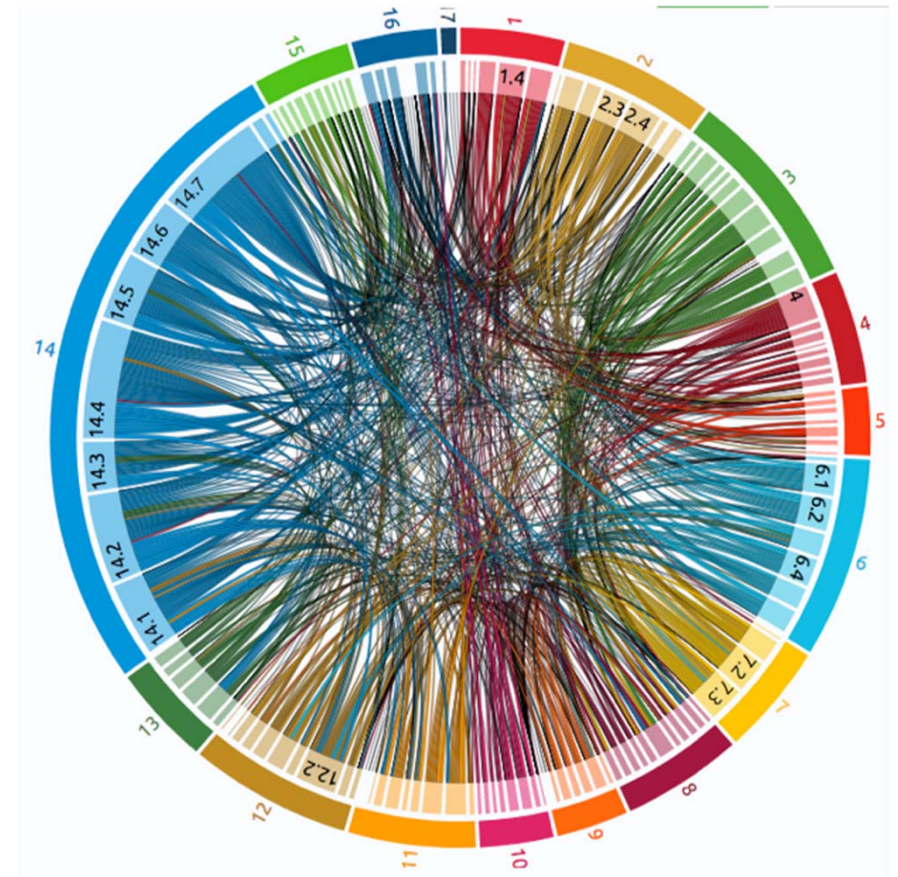
UN DESA and UNFCCC conference on synergies between the SDGs and the Paris Agreement – 1-3 April 2019

Interlinkages among the SDGs

Using knowledge on interlinkages to **exploit synergies and minimize trade-offs** in the policy process can contribute to overall policy coherence

- Survey of existing publications
- A tool to visualize the cumulated interlinkages from a set of publications
- Meta analysis of the main studies on interlinkages

Interlinkages: Goals and Targets



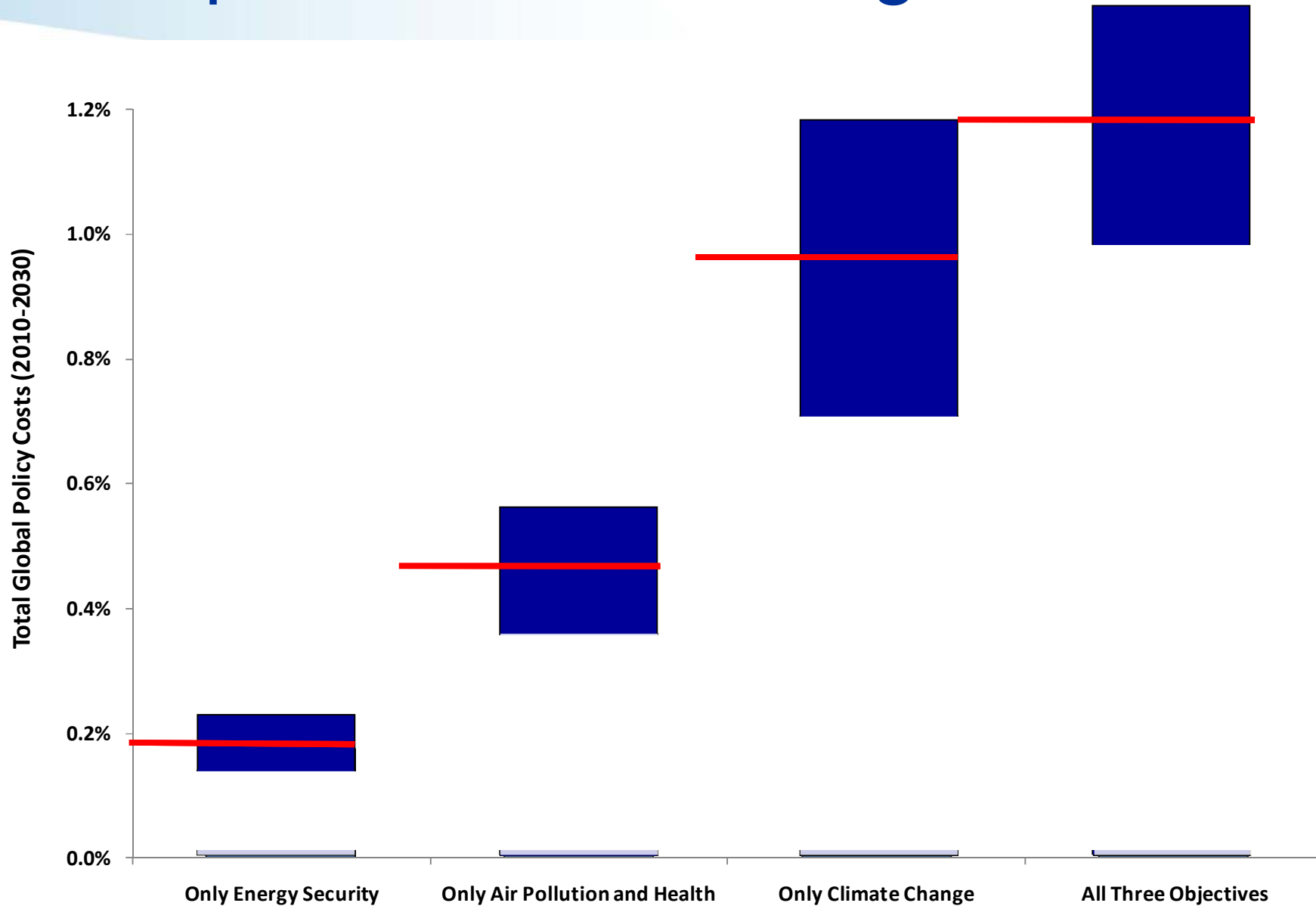
Interactions between SDG 7 & other SDGs

Sustainable Development Goals

- 1 – No Poverty
- 2 – Zero Hunger
- 3 – Good Health and Well-being
- 4 – Quality Education
- 5 – Gender Equality
- 6 – Clean Water and Sanitation
- 7 – Affordable and Clean Energy
- 8 – Decent Work and Economic Growth
- 9 – Industry, Innovation and Infrastructure
- 10 – Reduced Inequalities
- 11 – Sustainable Cities and Communities
- 12 – Responsible Consumption and Production
- 13 – Climate Action
- 14 – Life below Water
- 15 – Life on Land
- 16 – Peace, Justice and Strong Institutions
- 17 – Partnerships for the Goals



Multiple Benefits of Integrated Policies



TWI2050 Report (www.TWI2050.org)

Key Messages

Synthesis

1. Framing and Introduction
 2. The Challenges Ahead
 3. Sustainable Development Pathways
 4. Governing the Transformation
- >60 authors from ~20 organizations
 - >150 contributors and participants



TWI2050 Launch HLPF
11 July 2018, UN

TWI2050 Report (www.TWI2050.org)

Key Considerations

1. Six Fundamental Transformations for a Sustainable Future for All
2. The Digital Revolution
3. Preconditions for a Sustainable Digital Revolution
4. Digitalization and Sustainable Development
5. Governing the Transformation toward Sustainability in the Digital Age

➤ 45 authors from ~20 organizations



TWI2050 Launch HLPF
12 and 19 July 2019, UN

TWI2050 Report (www.TWI2050.org)

nature
sustainability

PERSPECTIVE

<https://doi.org/10.1038/s41893-019-0352-9>

Six Transformations to achieve the Sustainable Development Goals

Jeffrey D. Sachs¹, Guido Schmidt-Traub ^{2*}, Mariana Mazzucato³, Dirk Messner⁴,
Nebojsa Nakicenovic⁵ and Johan Rockström⁶

The Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change call for deep transformations in every country that will require complementary actions by governments, civil society, science and business. Yet stakeholders lack a shared understanding of how the 17 SDGs can be operationalized. Drawing on earlier work by The World in 2050 initiative, we introduce six SDG Transformations as modular building-blocks of SDG achievement: (1) education, gender and inequality; (2) health, well-being and demography; (3) energy decarbonization and sustainable industry; (4) sustainable food, land, water and oceans; (5) sustainable cities and communities; and (6) digital revolution for sustainable development. Each Transformation identifies priority investments and regulatory challenges, calling for actions by well-defined parts of government working with business and civil society. Transformations may therefore be operationalized within the structures of government while respecting the strong interdependencies across the 17 SDGs. We also outline an action agenda for science to provide the knowledge required for designing, implementing and monitoring the SDG Transformations.

Six Major Transformations (TWI2050.org)

**Digital Revolution
for Sustainable
Development**



**Education, Gender
& Inequality**



**Sustainable
Cities &
Communities**



SDGs:
Prosperity
Social Inclusion
Sustainability

**Health
Wellbeing &
Demography**



**Sustainable
Food Land, Water
& Oceans**



**Energy
Decarbonization
& Sustainable
Industry**



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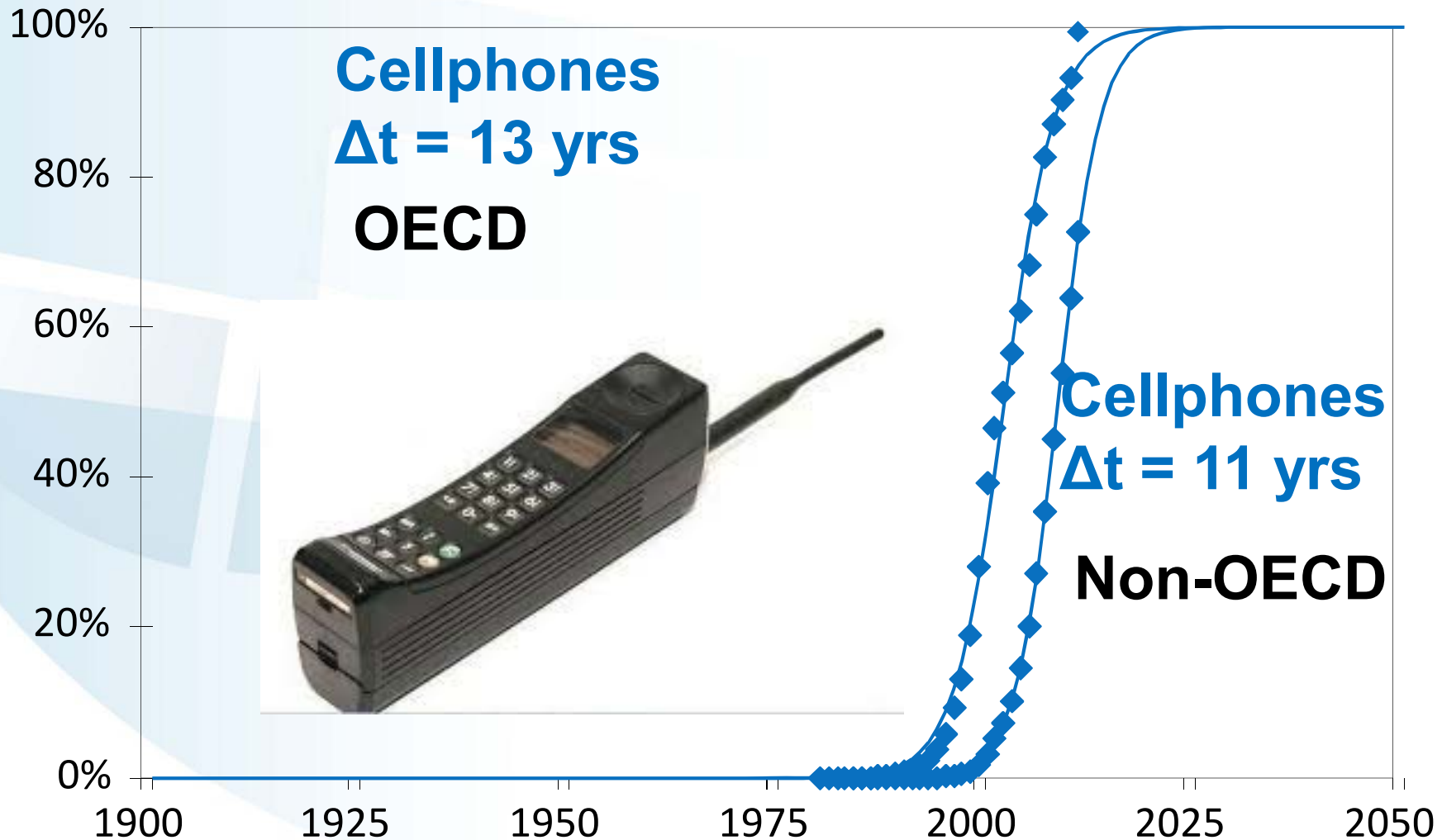


**Energy
Decarbonization
& Sustainable
Industry**



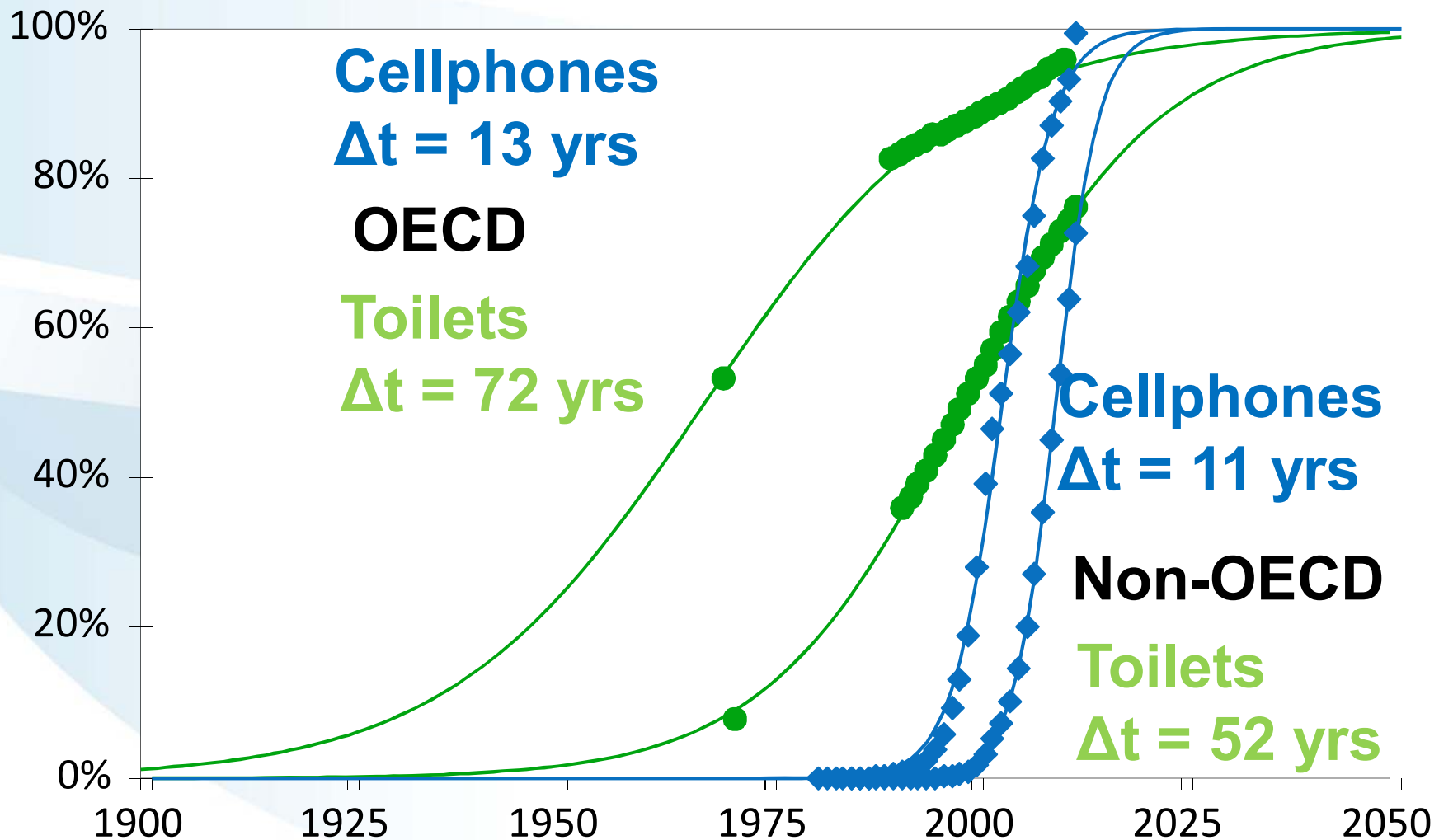
Technology Diffusion Compared

(access to cellphones)



Technology Diffusion Compared

(access to safe sanitation and cellphones)



Impact of IC Technology Convergence

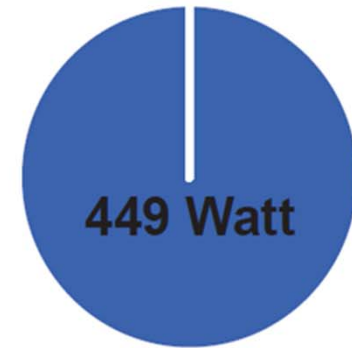


5 Watt

2.2 Watt



=



Power consumption



Stand-by

Impact of IC Technology Convergence



5 Watt

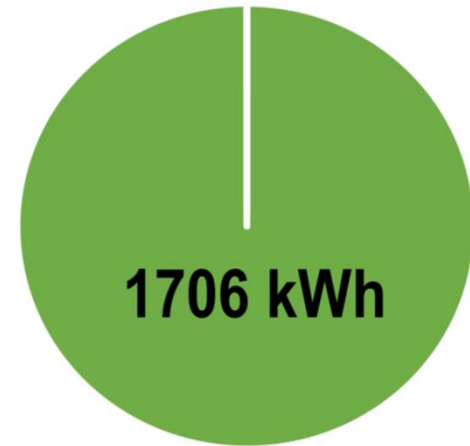
2.2 Watt

75 kWh

0.1 kg



=



Embodied energy



Weight

The Map of Artificial Intelligence Ethical Issues



Short Term

Long Term

AI as agents

Structural unemployment

Fairness in algorithms

Machine ethics

Proliferation of autonomous weapons

Finalizing human values for machines to propagate

Status of humanity in a world dominated by artificial agents

Controlling artificial general intelligence and creating friendly superintelligence

AI as subjects

Legal status of autonomous systems

Suffering in reinforcement learners

Consciousness in artificial intelligence

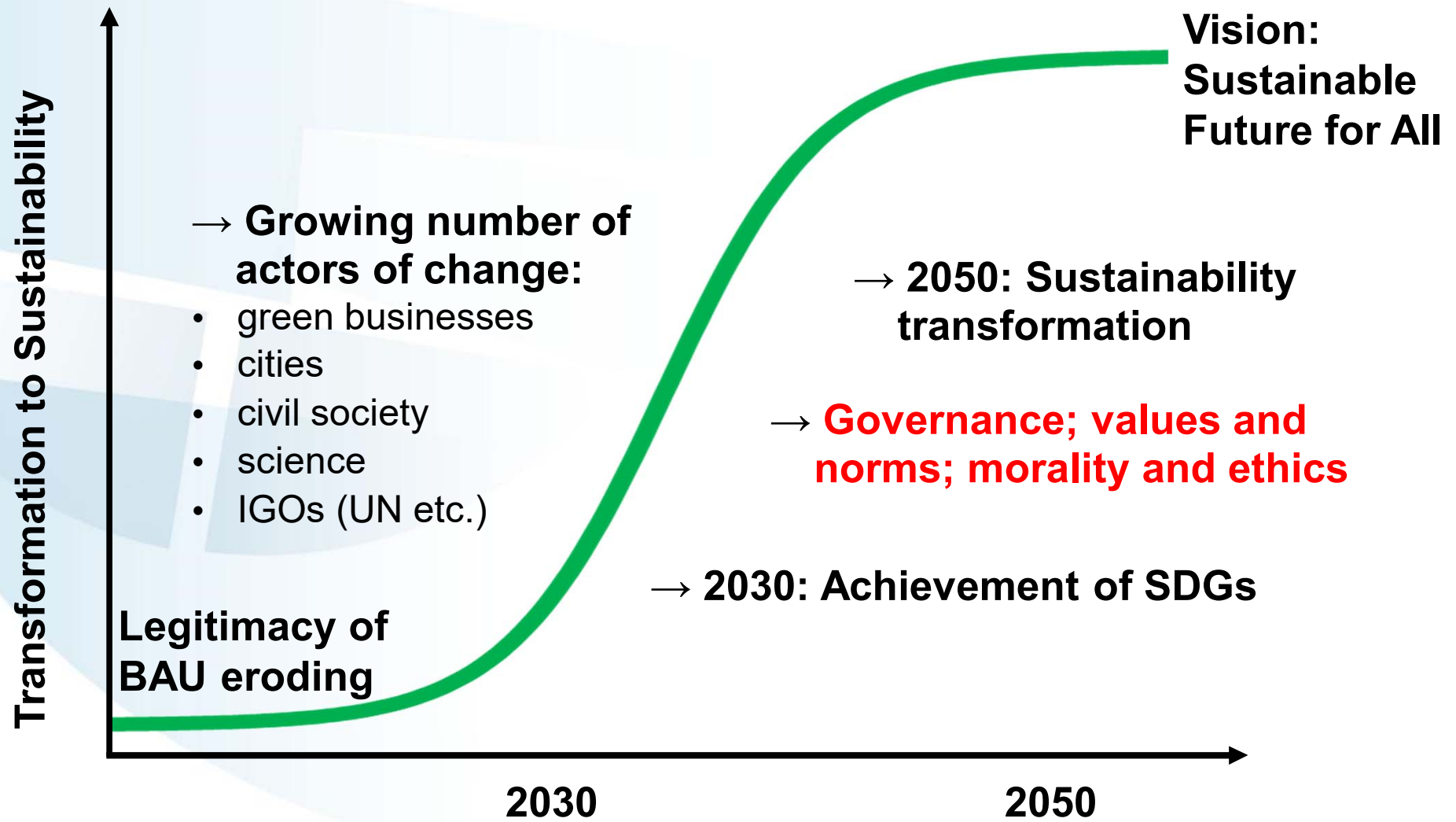
Well-being of AIs

Moral status of mind uploads

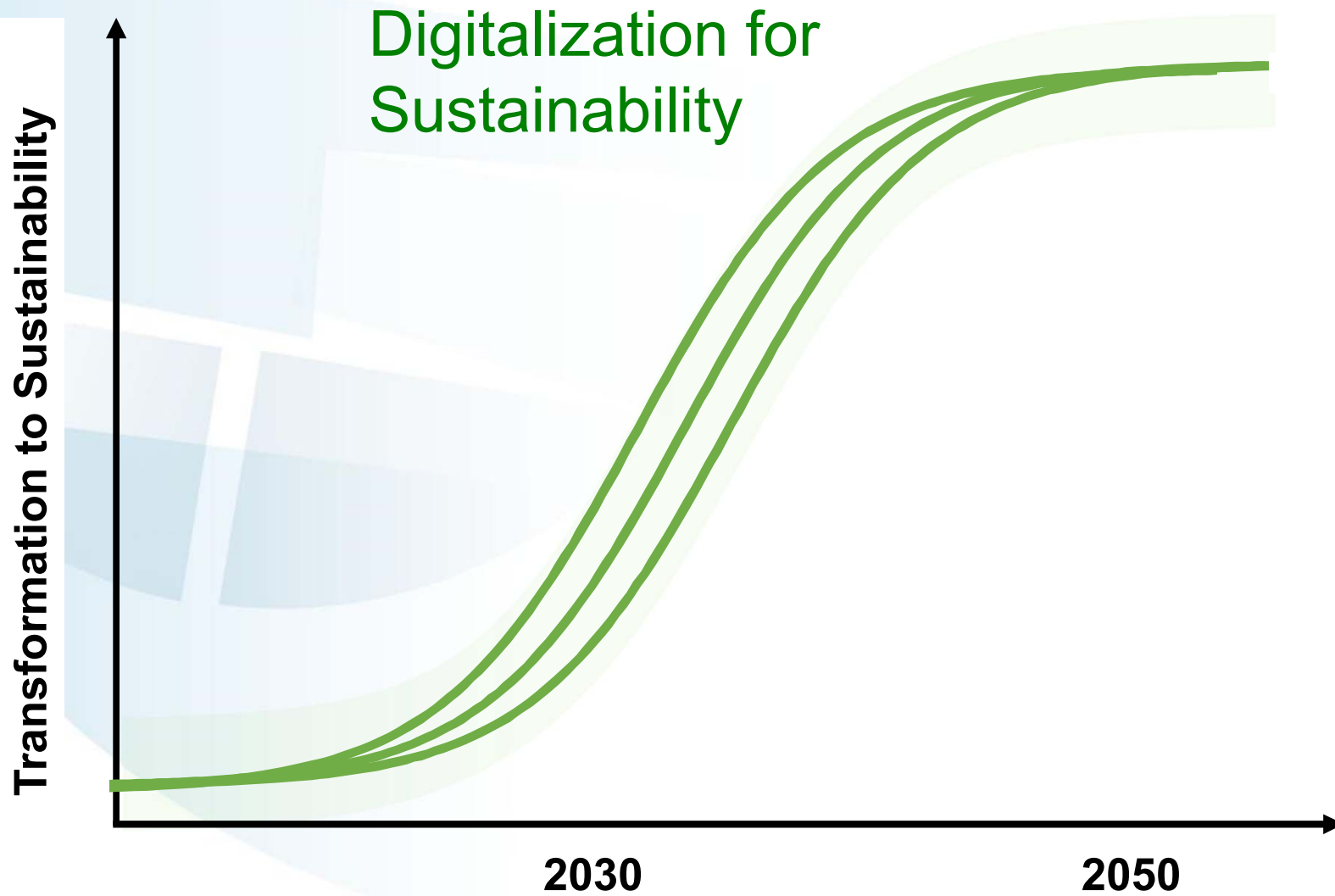


The World in 2050 (TWI2050.com)

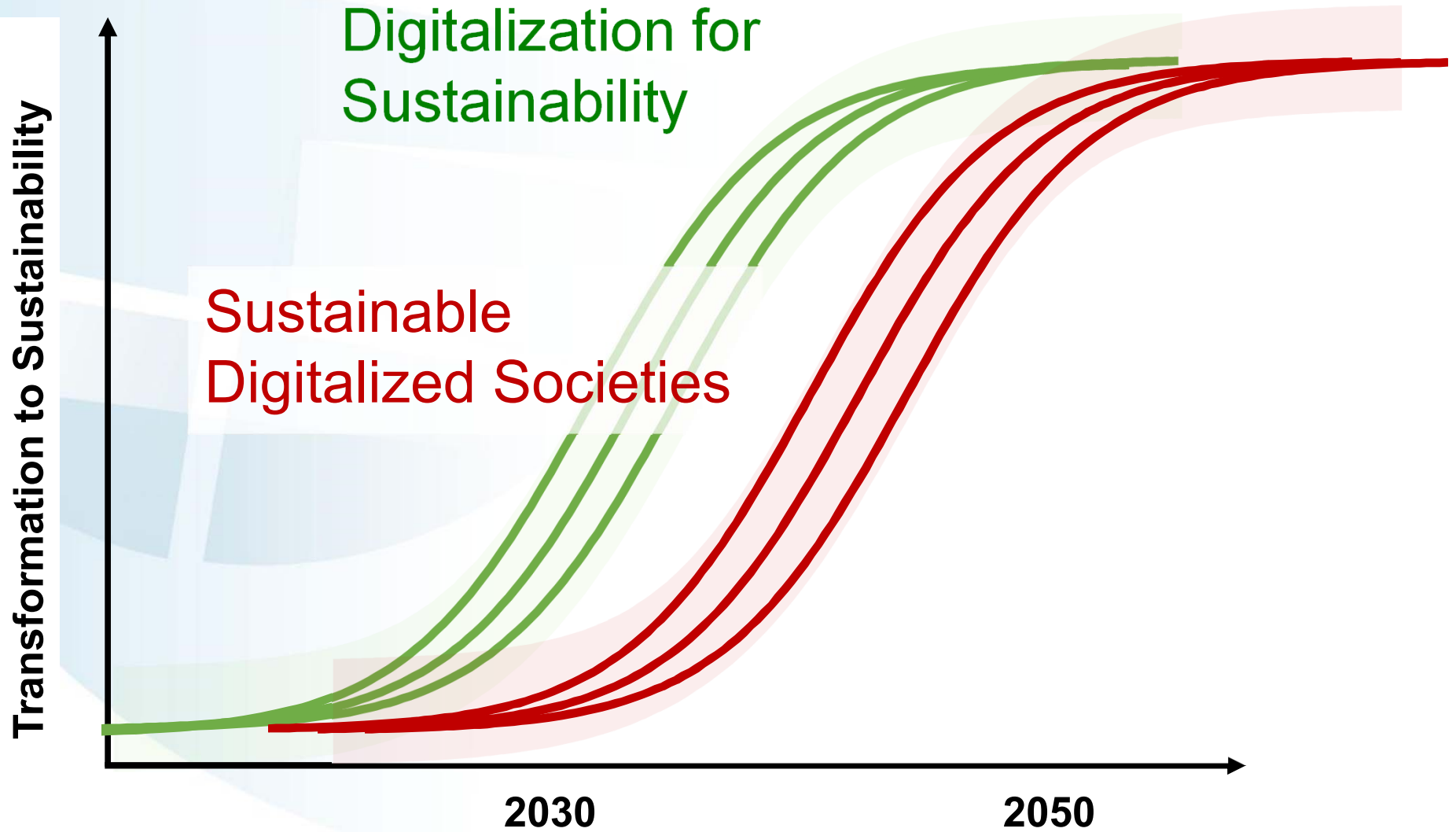
“Doing More with Less” within Planetary Boundaries



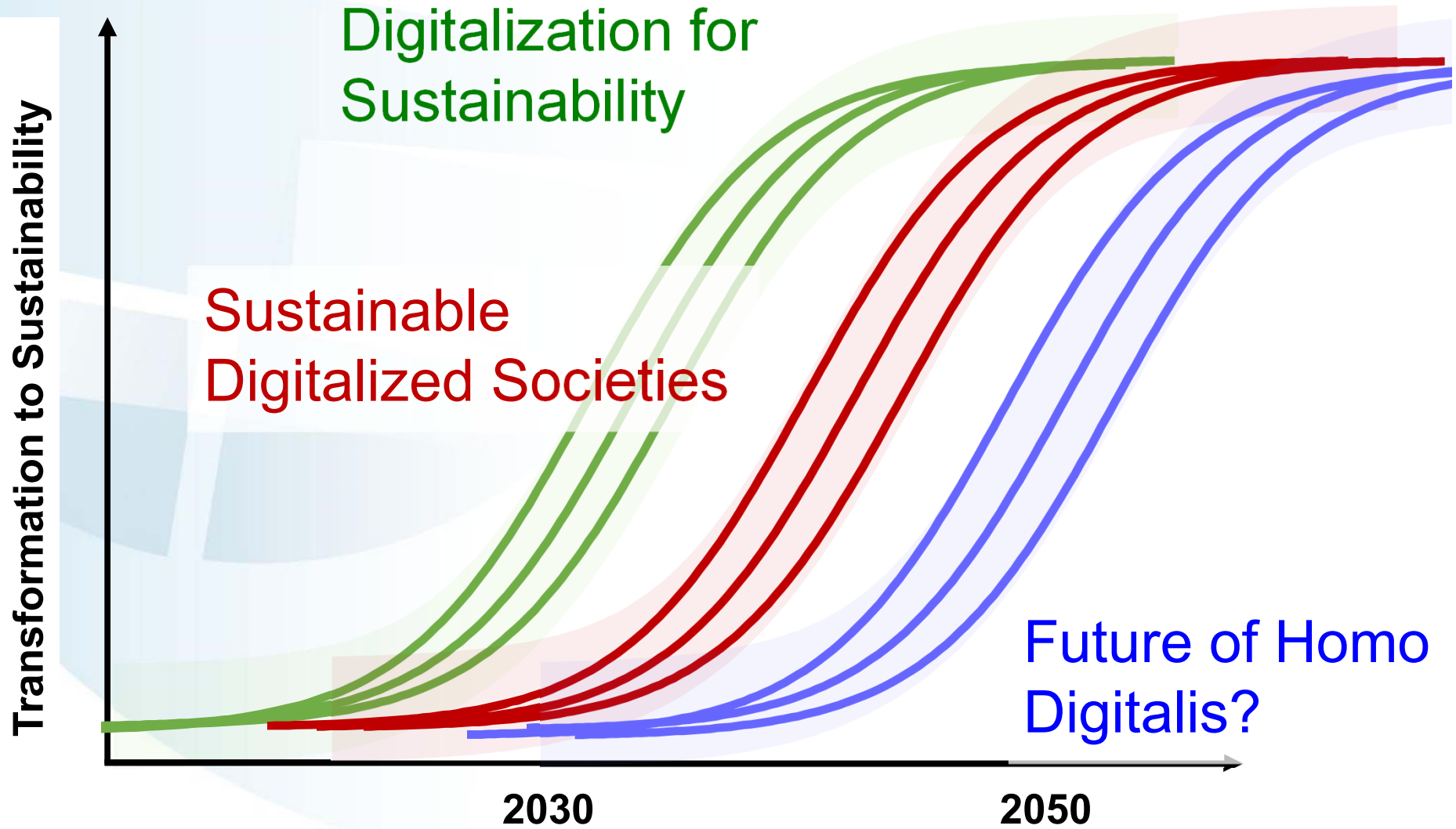
The World in 2050 (TWI2050.com)



The World in 2050 (TWI2050.com)



The World in 2050 (TWI2050.com)



Some Key Messages

- ➔ Transformational and holistic change is needed but to succeed we must **take along winners and losers**
- ➔ The world is at crossroads as we are currently experiencing signs of a **counter-transformation**
- ➔ Six transformations reduce the complexity of the 17 SDGs rendering **2030 Agenda actionable**
- ➔ Digitalization is central like all **six transformations but is challenging the absorptive capacity of society**
- ➔ Essential for sustainability transformation is **effective and inclusive governance, values and norms (How)**
- ➔ Build **responsible knowledge societies** capable of taking action towards sustainability in the Digital Age

STI Policy Coherence

- ➔ Paradox of STI:
 - cause of problems, e.g. as negative externalities
 - but solution, if socially and environmentally sound
- ➔ Key to
 - Understand inter-relationships, interdependencies and trade-offs
 - Leverage synergies among STI policies and SDGs
 - At all levels - global, national, regional and local
- ➔ Tools to support policy coherence:
 - integrated assessments
 - systems thinking
 - road-maps





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THANK YOU

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