INTEGRATED POLICY ANALYSIS AND MODELLING OF NATIONAL TRANSFORMATIONS TO ACHIEVE THE SDGS

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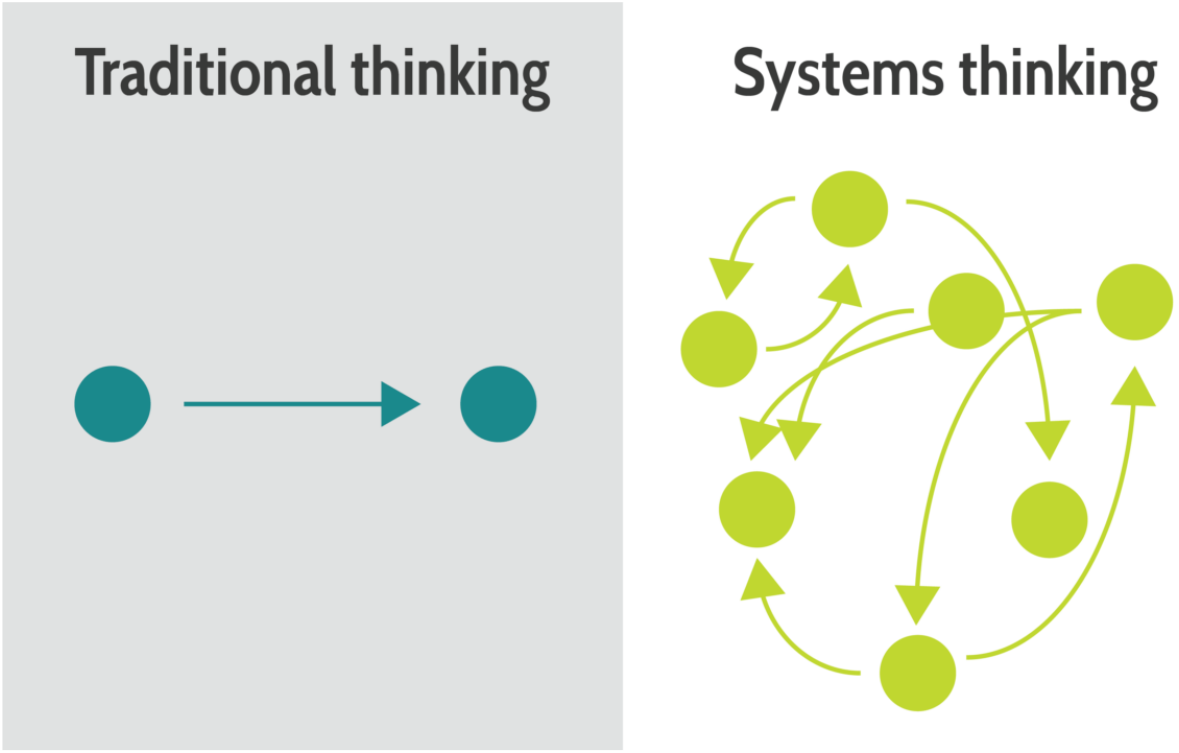
Characteristics of the SDGs:

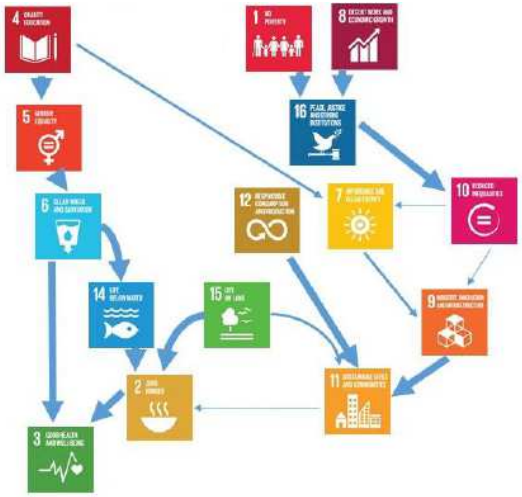
- **Complex** – 169 targets
- **Comprehensive** – whole-of-system
- **Integrated** – economy, society, environment
- **Long-term** - future perspective; foresight
- **Results-based** – indicators, 2030 targets
- **Transformative** – not BAU

Complex Problems = Systems Approaches



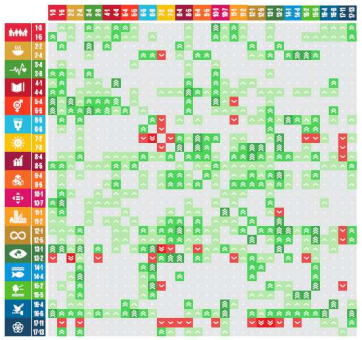
“For every complex problem there is an answer that is clear, simple and wrong”

Systems Thinking Approaches for SDG integration

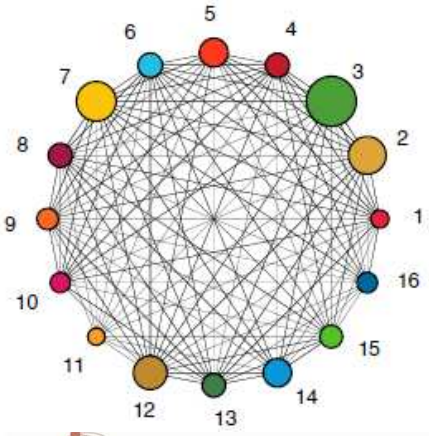


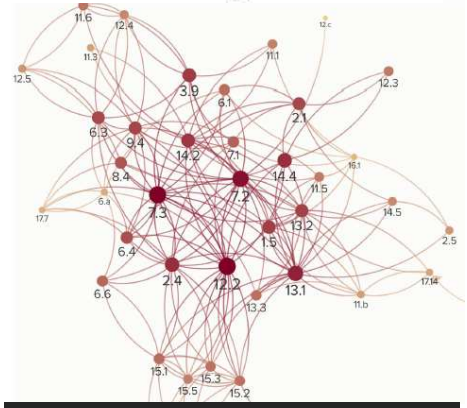
FWKS / Systems Maps / CLDs

+3	Indivisible
+2	Reinforcing
+1	Enabling
0	Consistent
-1	Constraining
-2	Counteracting
-3	Cancelling

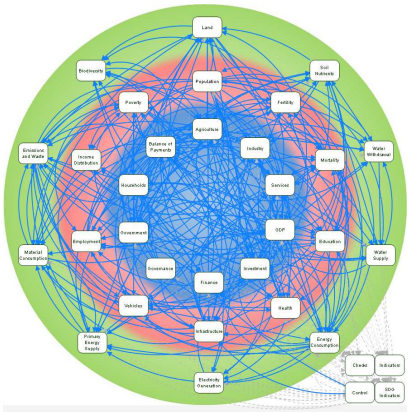


Cross-Matrix Analysis





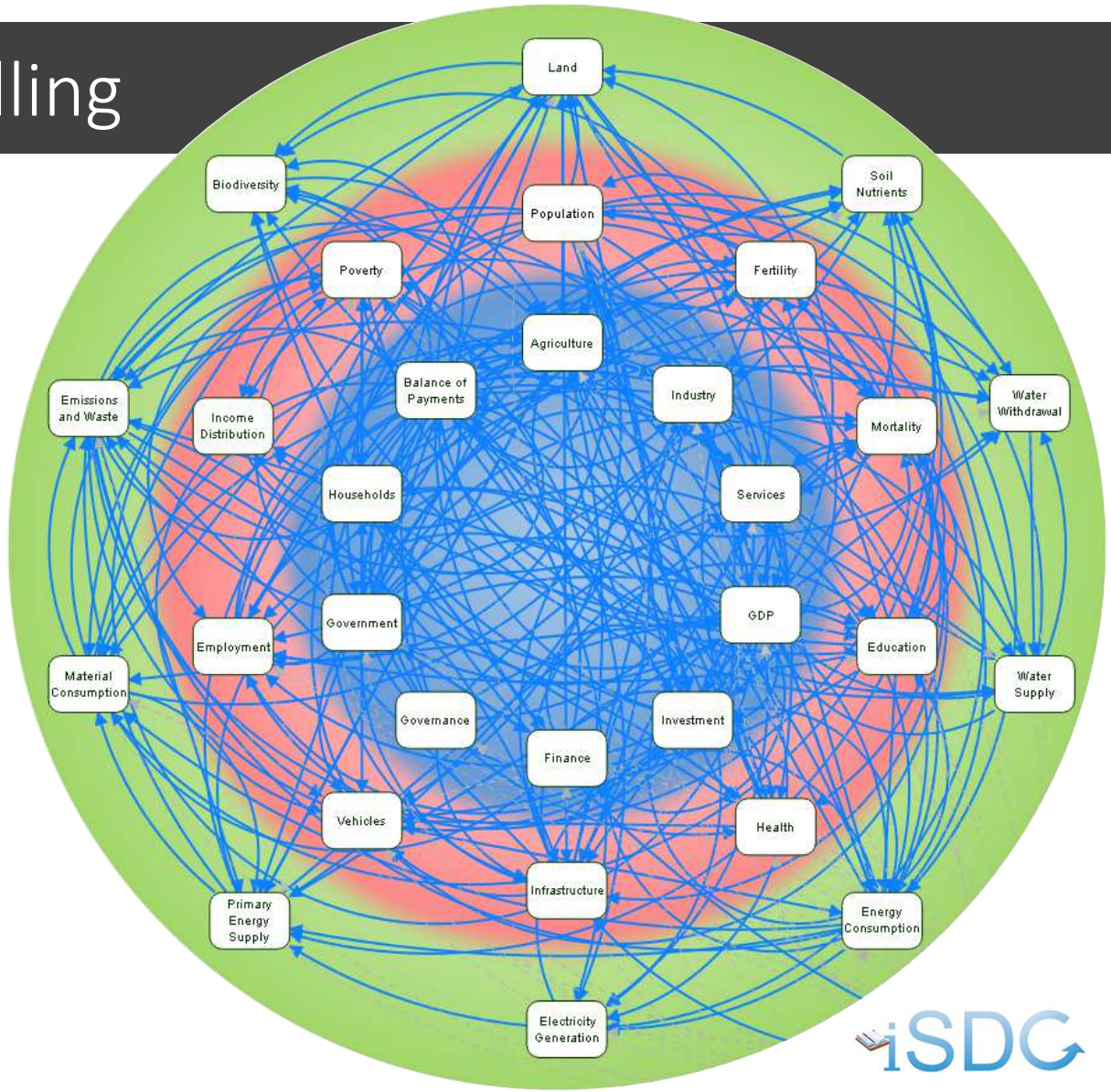
Network Analysis / Statistical Approaches



Dynamic Modelling

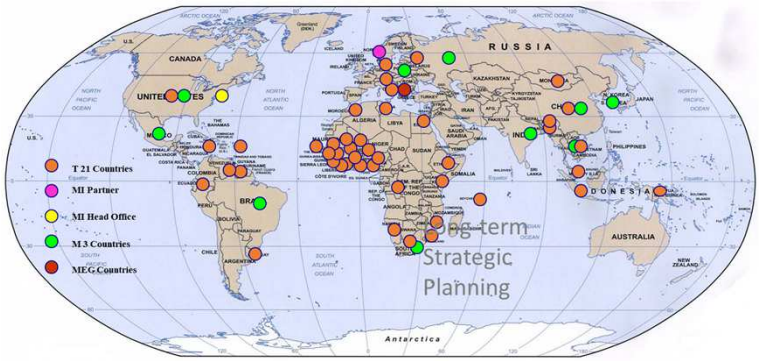
System Dynamics Modelling

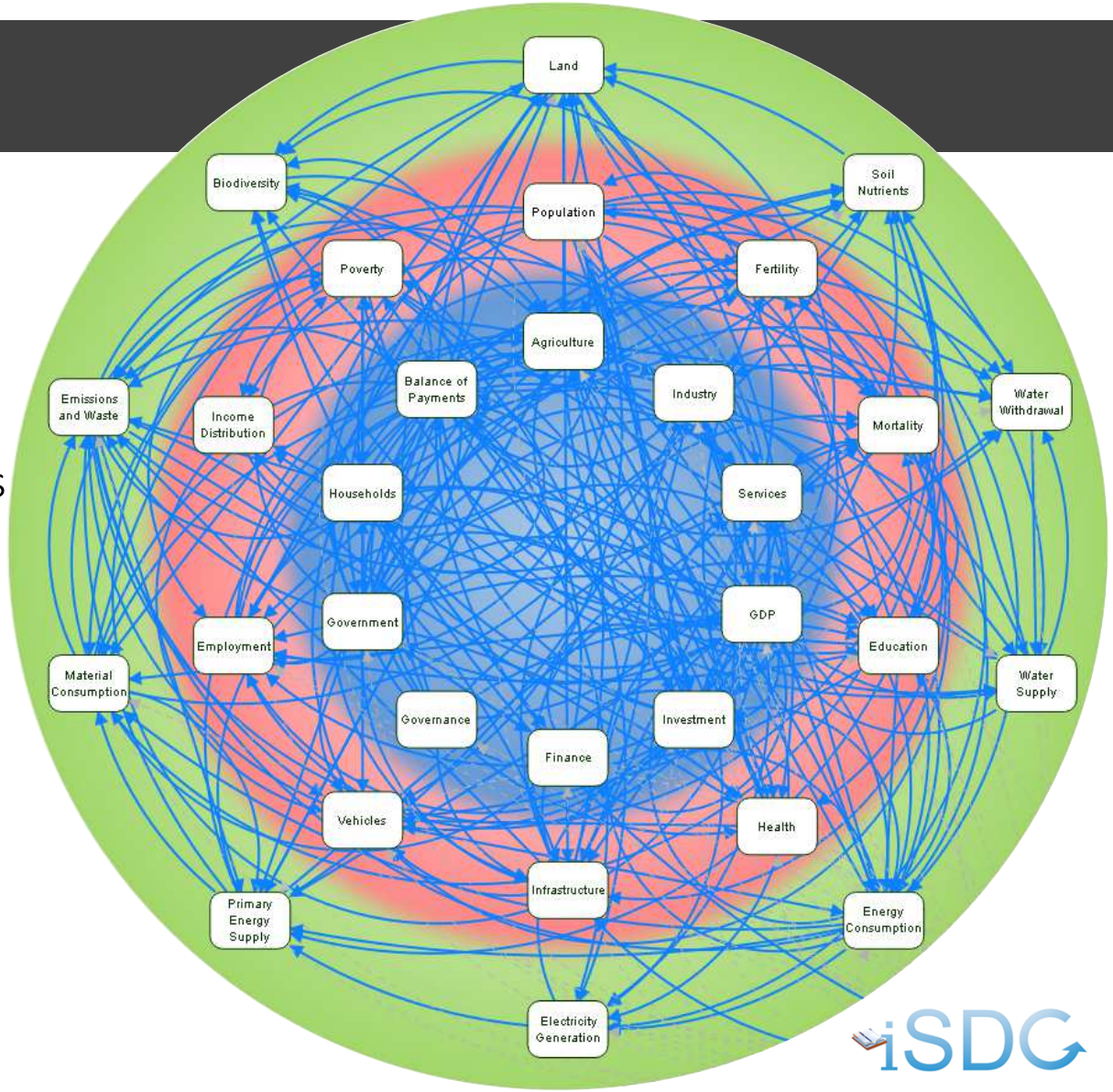
- ✓ *iSDG* integrated simulation model – Millennium Institute
- ✓ System dynamics language – stock and flow structure
- ✓ 30 sectors
- ✓ 3000+variables
- ✓ Flexible, modular & transparent structure – adaptable
- ✓ Calibrated on 25+ years of data
- ✓ Multi-parametrical optimisation
- ✓ Model validation and sensitivity analysis procedures



MI's Flagship Tool

- ✓ A 'policy flight simulator'
- ✓ Simulates the effects of different policies and investments on SDGs achievement by 2030
- ✓ Generally via policy scenario analysis
- ✓ 40+ country modelling applications globally

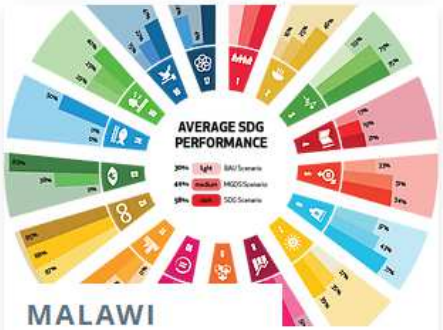




iSDG

iSDG Modelling Applications - Africa

Towards Achieving the SDGs in Ivory Coast – an Integrated Scenario Analysis



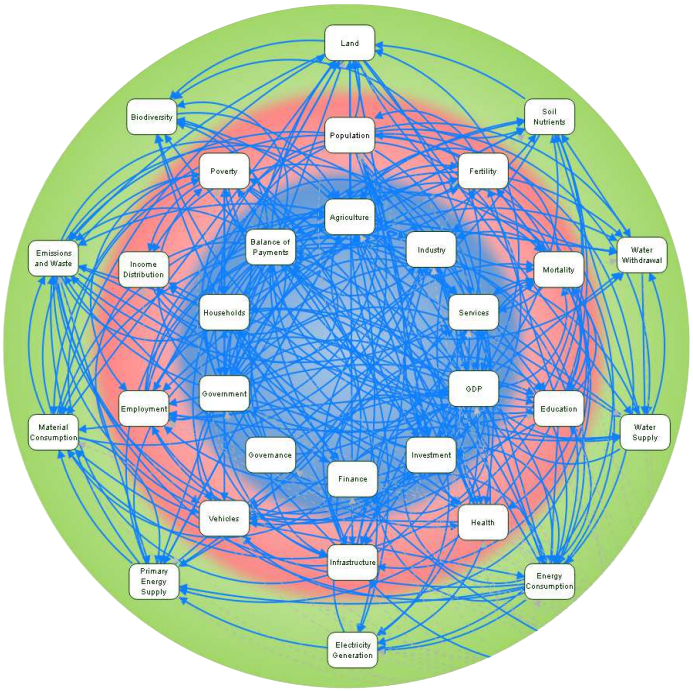
iSDG Simulation for Prioritization and Domestication of SDGs in Malawi

Achieving the SDGS in Nigeria: Pathways and Policy Options

Le Sénégal à l'horizon 2030 : Analyse de scénarii de progrès vers les ODD

MILLENNIUM INSTITUTE

iSDG Model – “Back-End”



>3,000 variables

iSDG

iSDG Model – “Front-End”

GLOBAL SUSTAINABILITY

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Modelling national transformations to achieve the SDGs within planetary boundaries in small island developing states

Cameron Allen[1,2,3], Graciela Metternicht[1], Thomas Wiedmann[2] and Matteo Pedercini[4]

https://doi.org/10.1017/sus.2021.13

nature research

nature sustainability

ANALYSIS

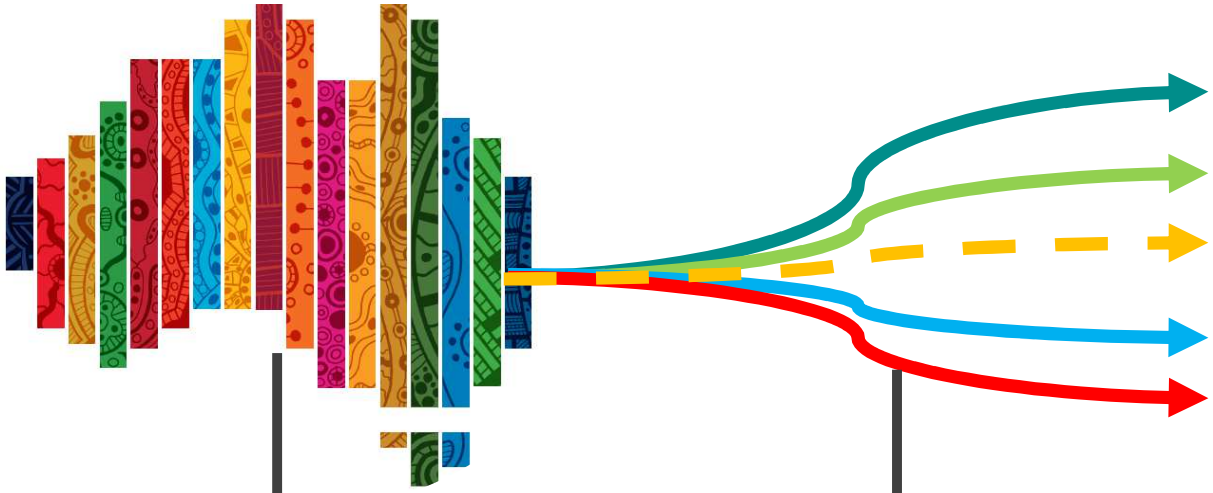
https://doi.org/10.1038/s41893-019-0409-9

Greater gains for Australia by tackling all SDGs but the last steps will be the most challenging

Cameron Allen[1*], Graciela Metternicht[1], Thomas Wiedmann[2,3] and Matteo Pedercini[4]

https://doi.org/10.1038/s41893-019-0409-9

Modelling Stages…



COUNTRY DATA & MODEL

COUNTRY SCENARIOS

SDG EVALUATION FRAMEWORK

1. THE MODEL

- ✓ *iSDG* integrated simulation model – Millennium Institute
- ✓ System dynamics language
- ✓ 30 sectors
- ✓ 3000+variables
- ✓ Flexible, modular & transparent structure – adaptable
- ✓ Calibrated on 25+ years of data
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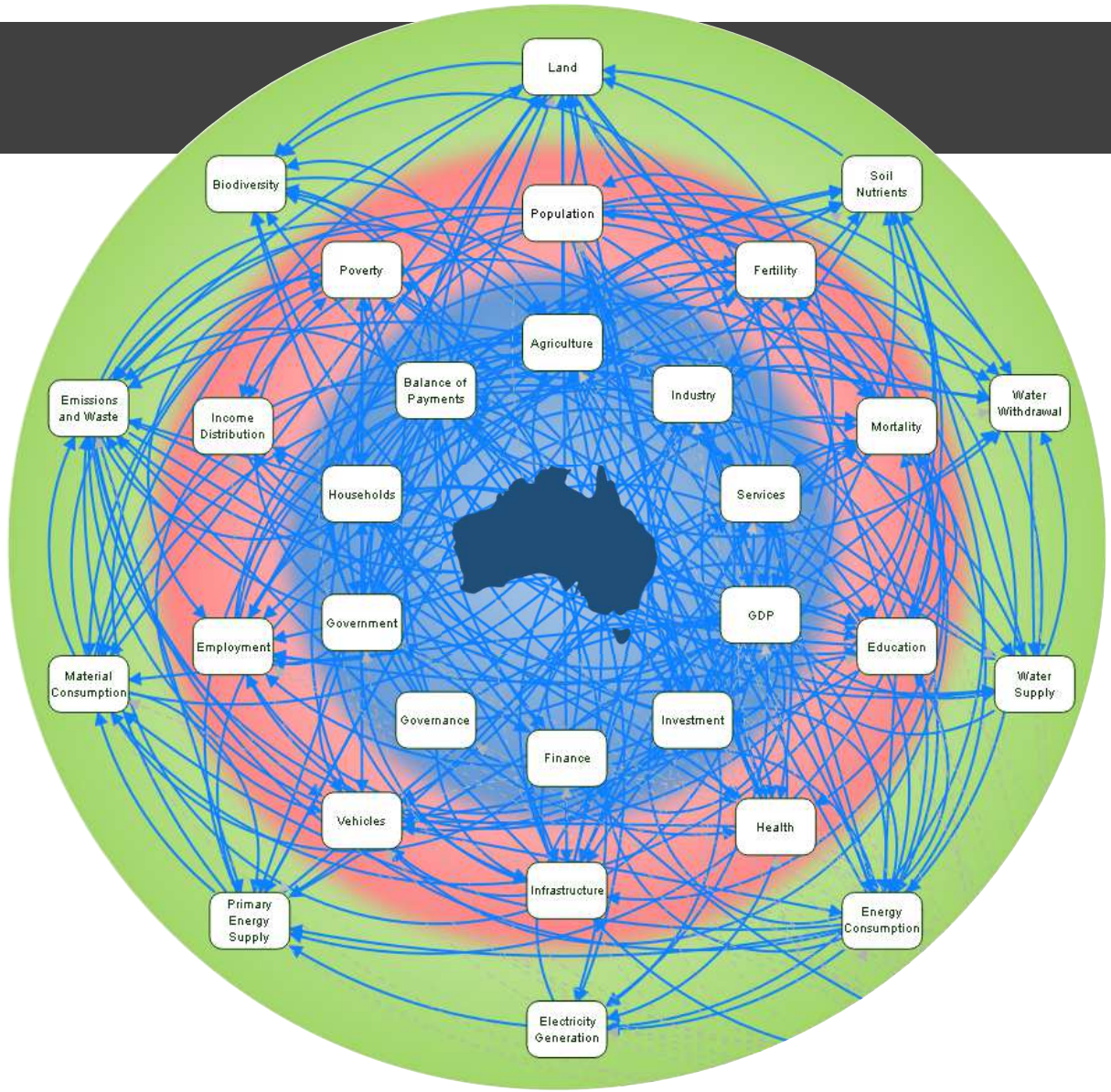
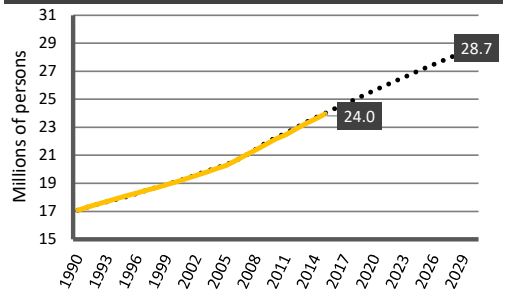
- ✓ Model validation and sensitivity analysis procedures



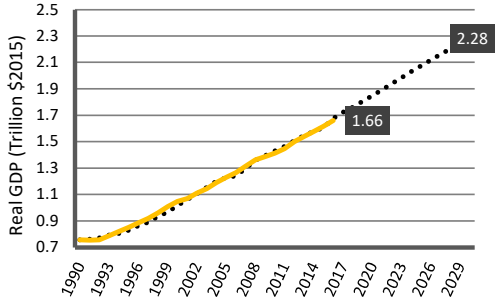
1. THE MODEL – Baseline (BAU)

Variable	R^2
Total population	0.99
Real GDP	0.99
Total investment	0.94
Government Expenditure	0.99
Total final energy consumption	0.92
Total water withdrawal	0.86
GHG in CO2-e	0.82
Life expectancy	0.99

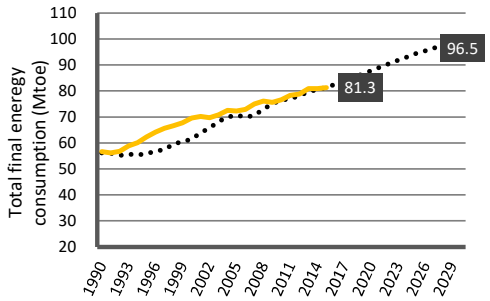
Population



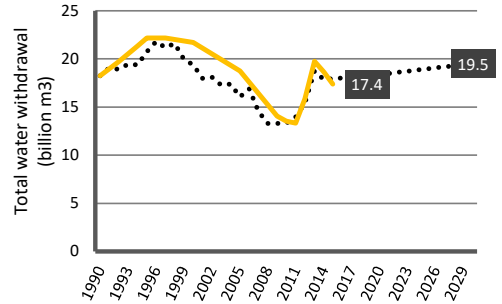
Real GDP



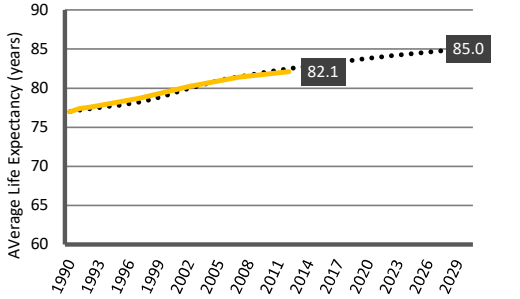
Energy Consumption



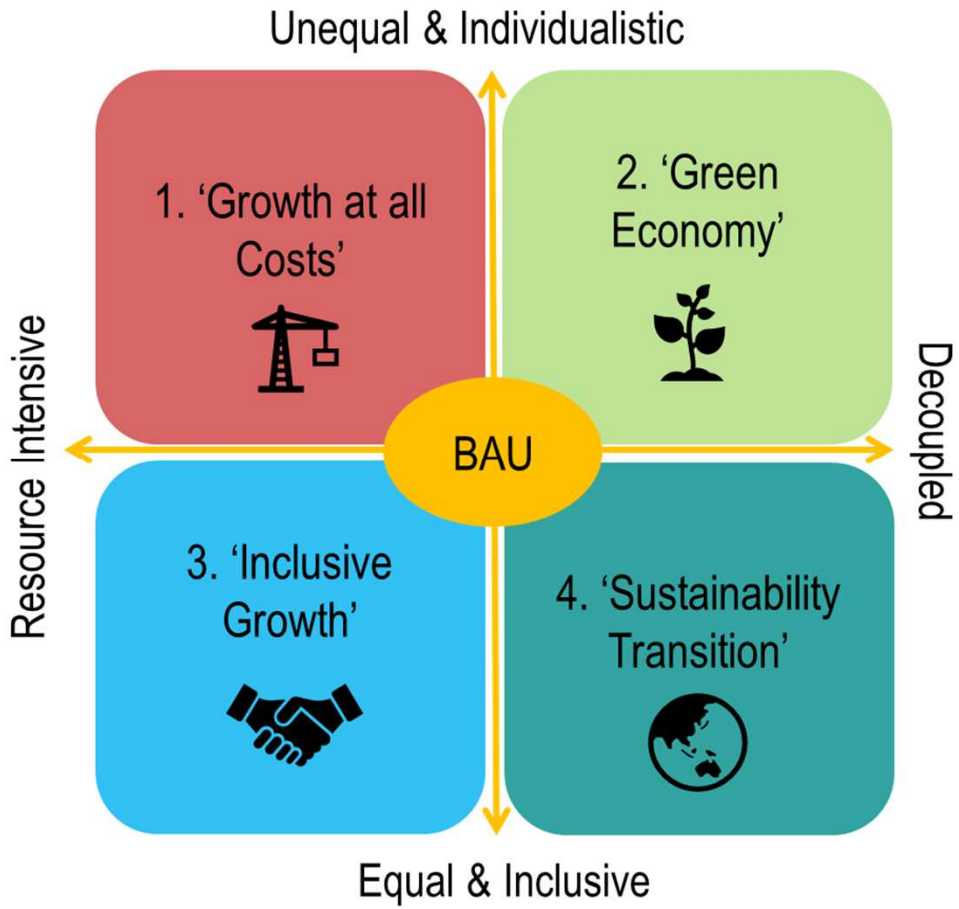
Water Consumption



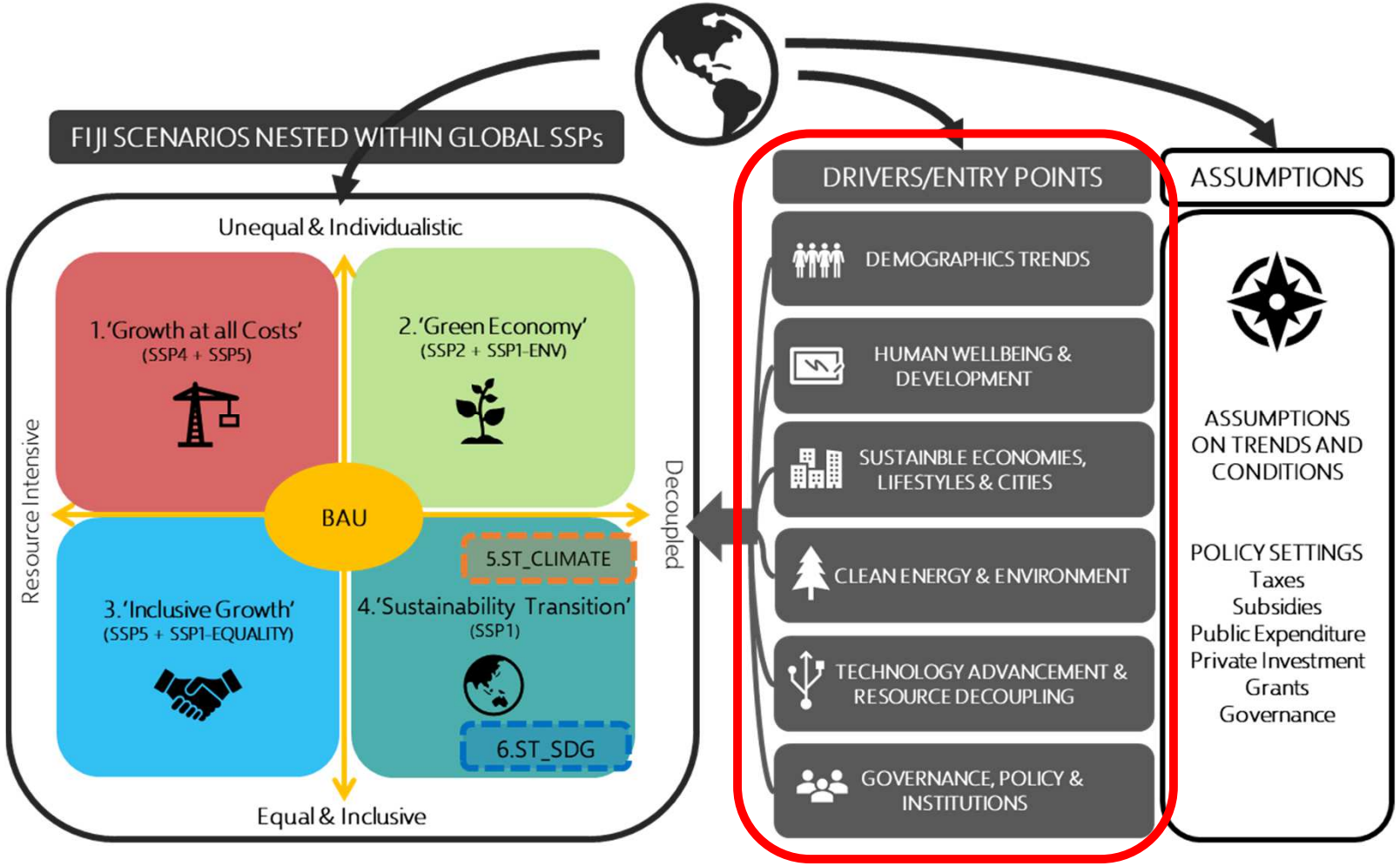
Life Expectancy



2. THE SCENARIOS



Scenario Entry Points – Sustainability Transformations



Entry Points & Interventions

DRIVERS/ENTRY POINTS

- DEMOGRAPHICS TRENDS
- HUMAN WELLBEING & DEVELOPMENT
- SUSTAINBLE ECONOMIES, LIFESTYLES & CITIES
- CLEAN ENERGY & ENVIRONMENT
- TECHNOLOGY ADVANCEMENT & RESOURCE DECOUPLING
- GOVERNANCE, POLICY & INSTITUTIONS

Human Wellbeing and Development:

- Expenditure on education and access to healthcare and basic services
- Social subsidies and transfers; redistribution
- Gender equality targets

Entry Points & Interventions

DRIVERS/ENTRY POINTS

- DEMOGRAPHICS TRENDS
- HUMAN WELLBEING & DEVELOPMENT
- SUSTAINBLE ECONOMIES, LIFESTYLES & CITIES
- CLEAN ENERGY & ENVIRONMENT
- TECHNOLOGY ADVANCEMENT & RESOURCE DECOUPLING
- GOVERNANCE, POLICY & INSTITUTIONS

Sustainable economies, lifestyles and cities

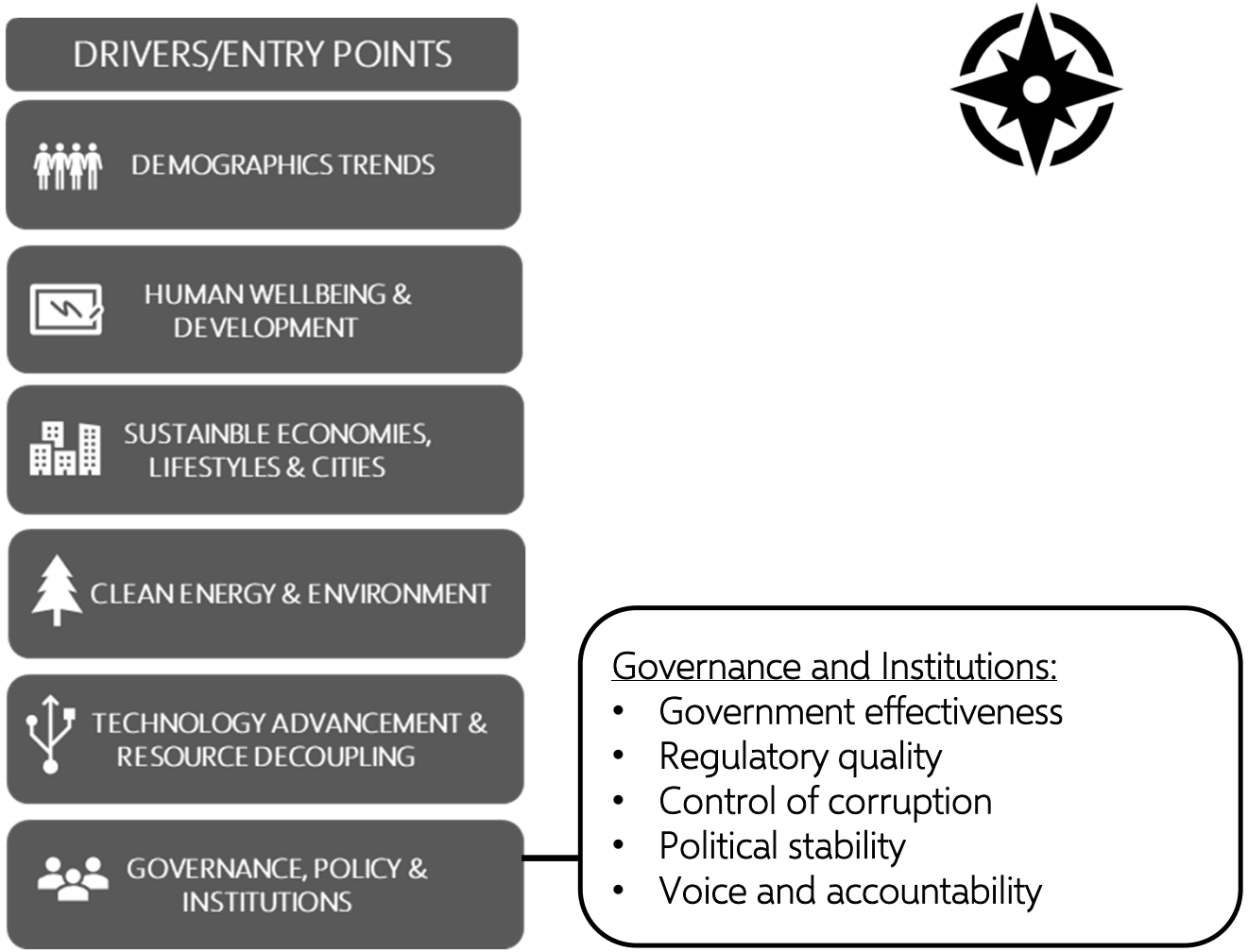
- Tax settings on consumption, income & profits and trade
- Investment in sustainable infrastructure, transport, buildings, industry
- Expenditure on climate change adaptation

Entry Points & Interventions

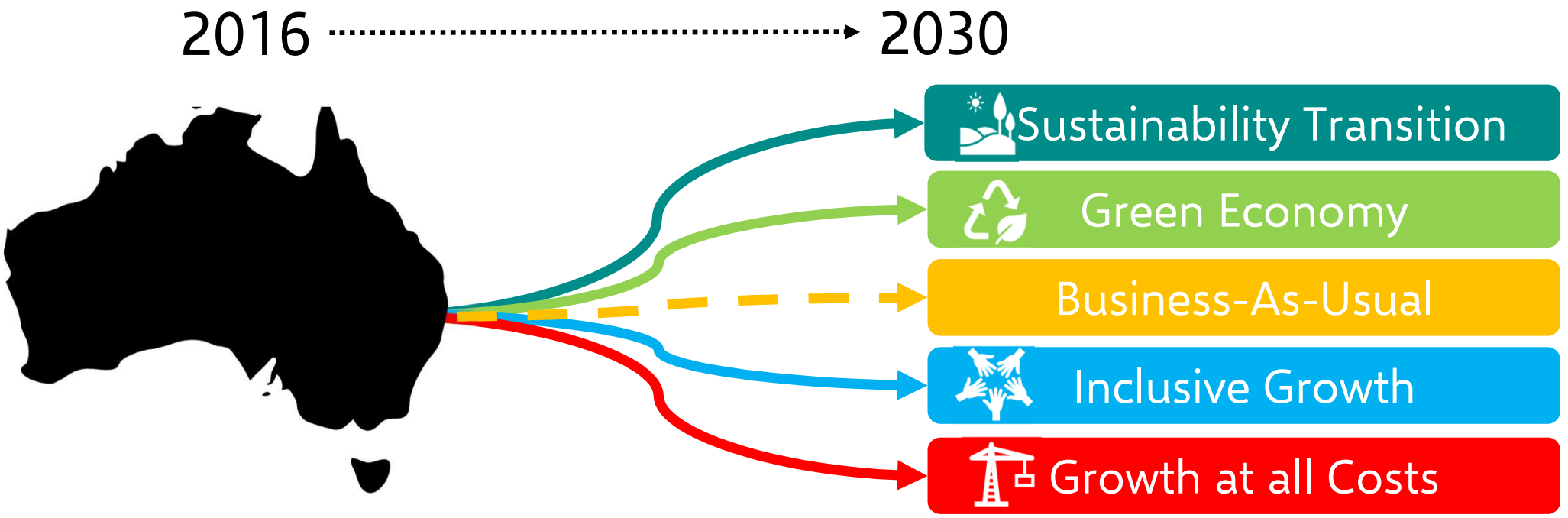
<u>Clean energy and environment / Resource Decoupling</u>

- Investment in solar, wind, hydro, biomass energy
- Investment in energy efficiency (household, industry, vehicles)
- Electrification of buildings and transport (BE & EVs)
- Investment in reforestation, sustainable ag, marine and terrestrial protected areas
- Material and resource efficiency targets

Entry Points & Interventions



Project Scenarios to 2030 or beyond…

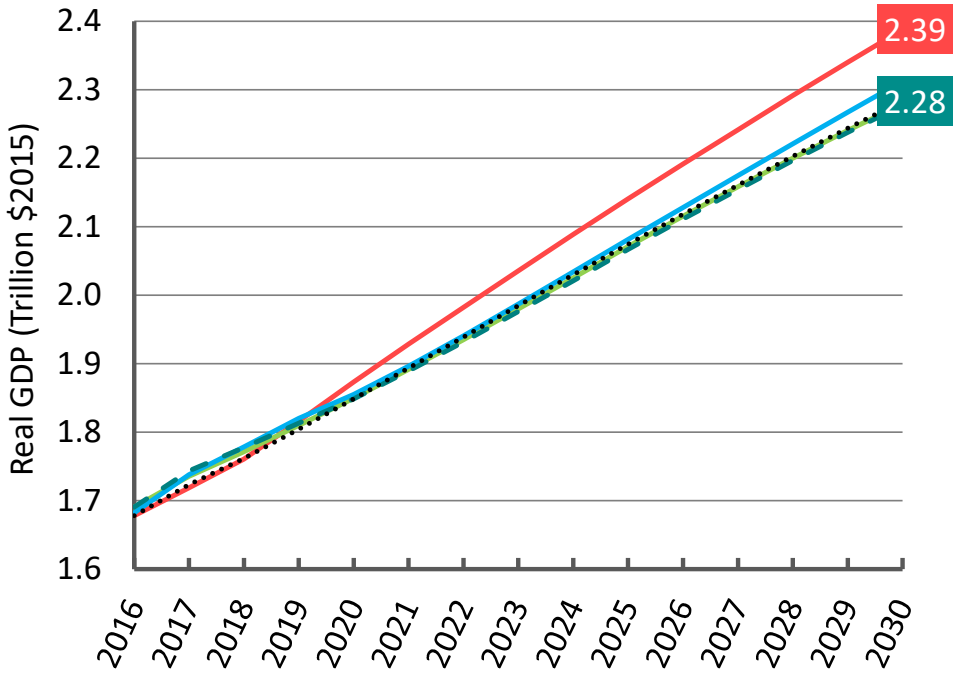


Alternate Scenarios – Economic Performance

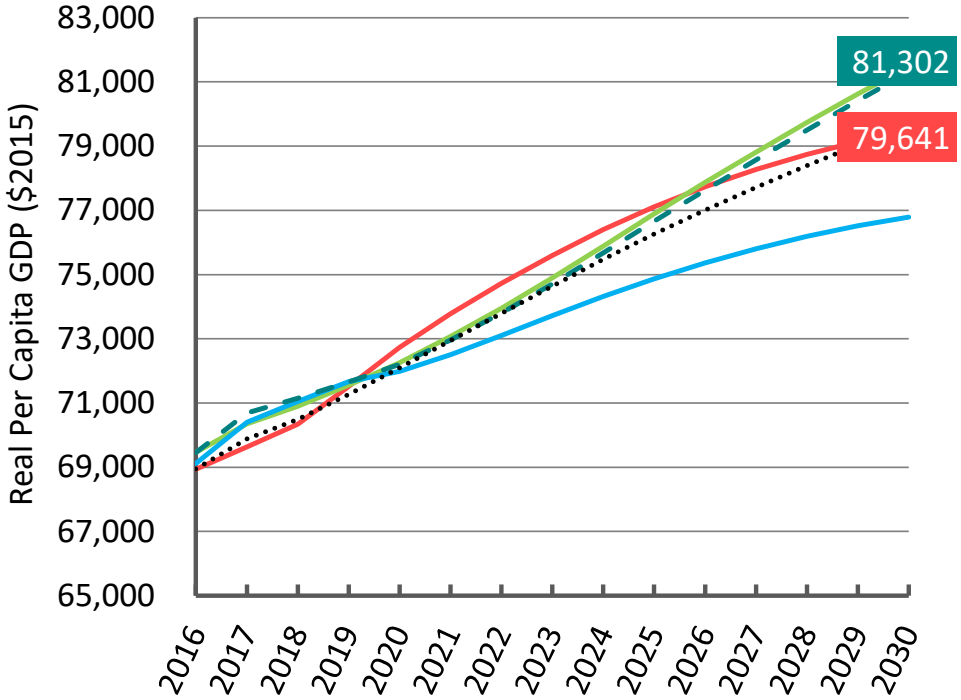
'Sustainability Transition'

'Growth at all Costs'

Total GDP

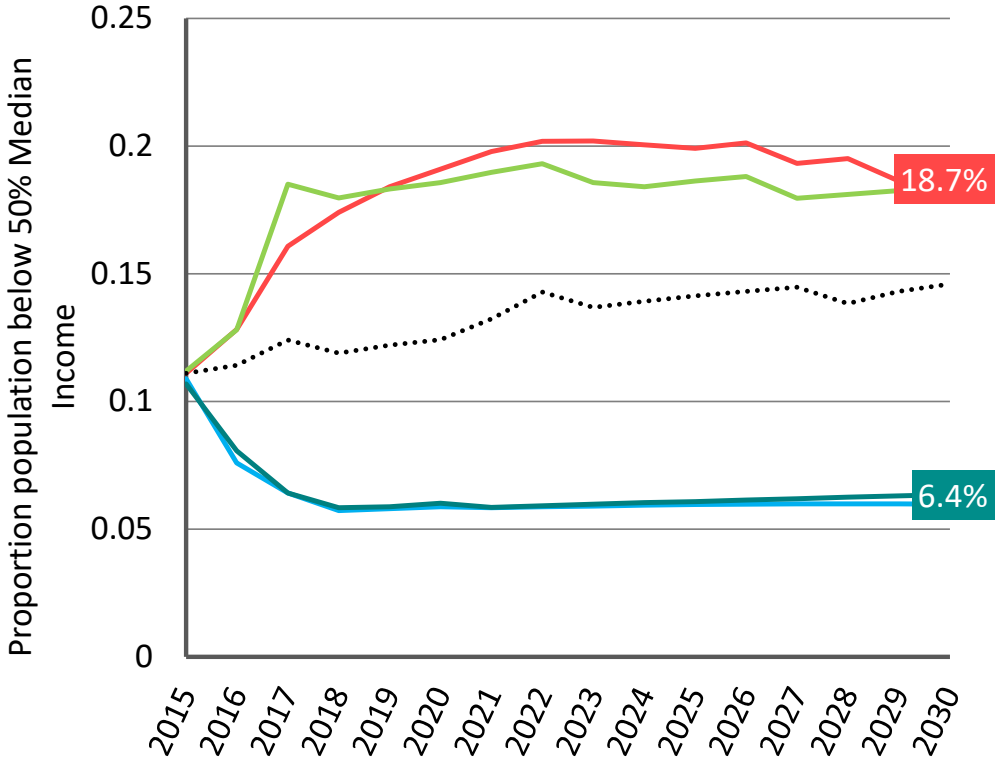


GDP per capita

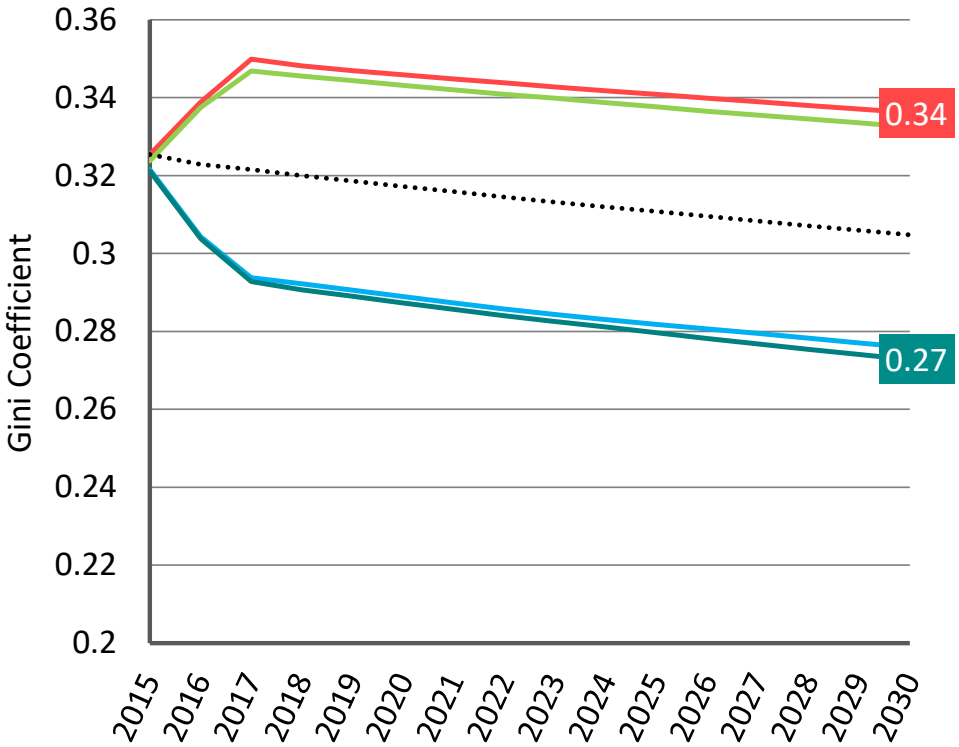


Alternate Scenarios – Social Performance

Poverty

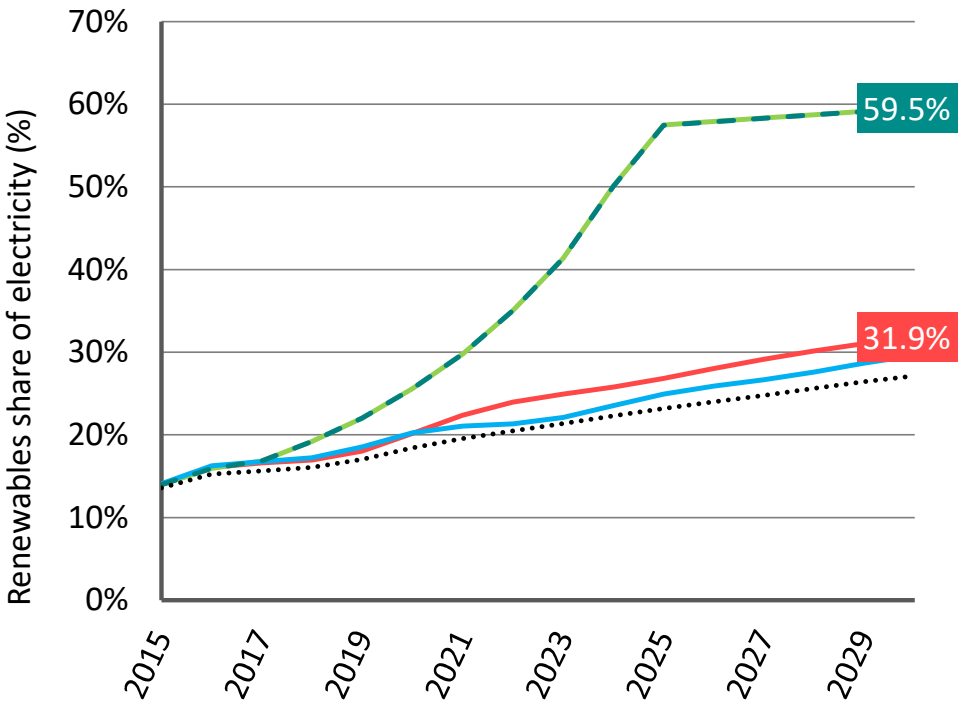


Income Inequality

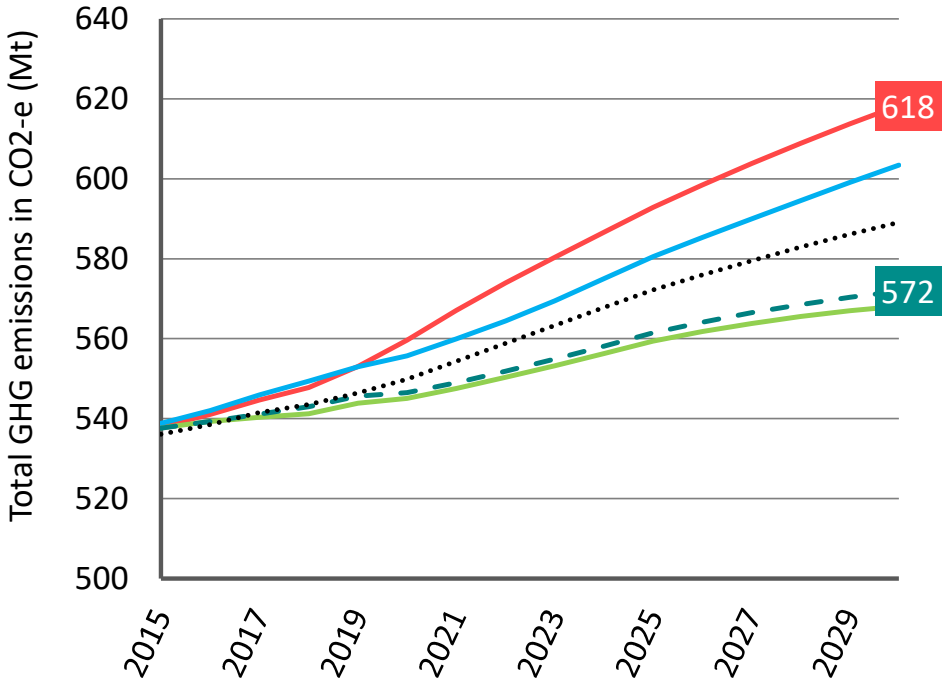


Alternate Scenarios – Environmental Performance

Renewable energy



GHG Emissions



3. THE EVALUATION FRAMEWORK

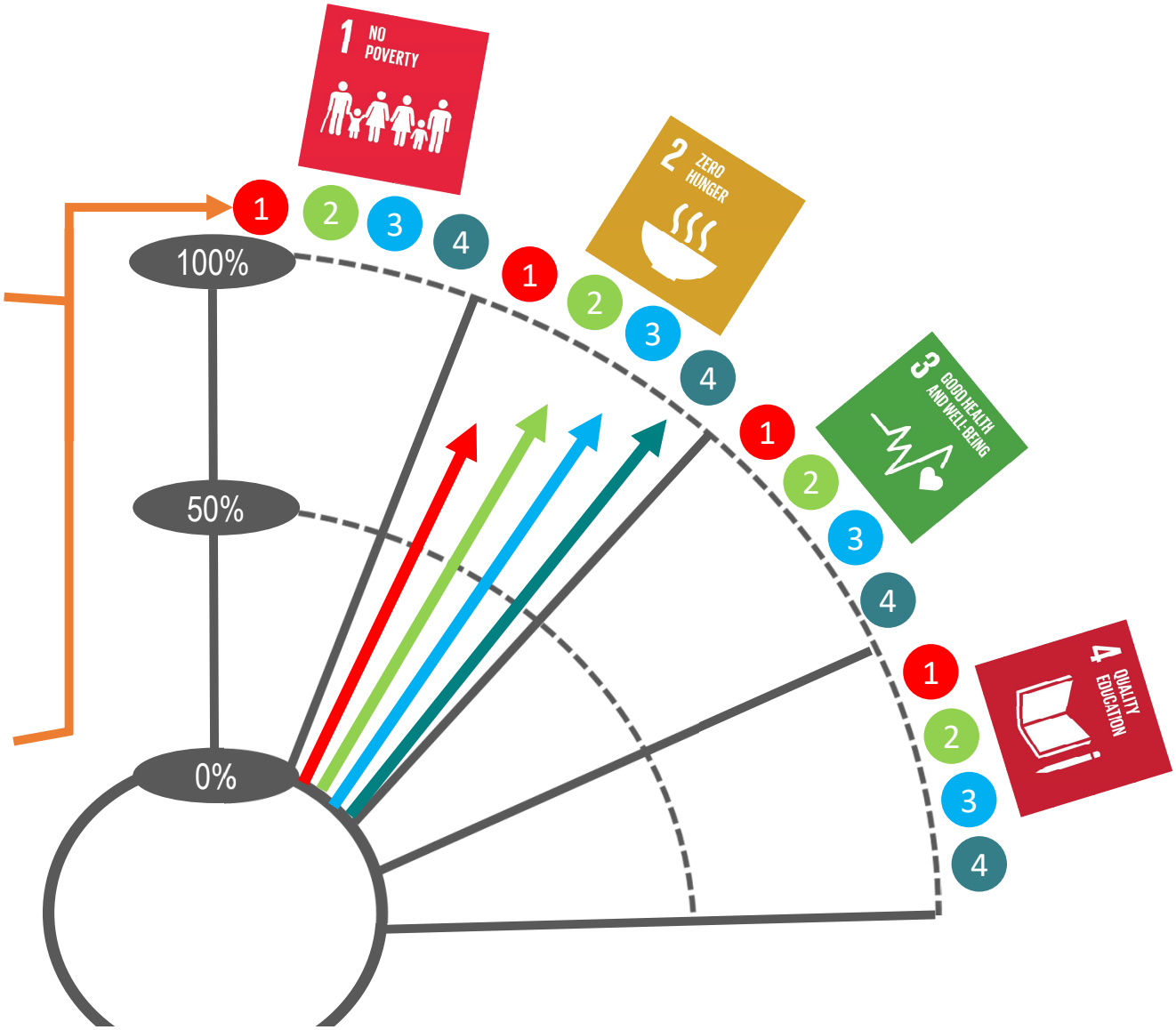
2016 ⋯⋯⋯

1 Growth at All Costs

2 Green Economy

3 Inclusive Growth

4 Sustainability Transition



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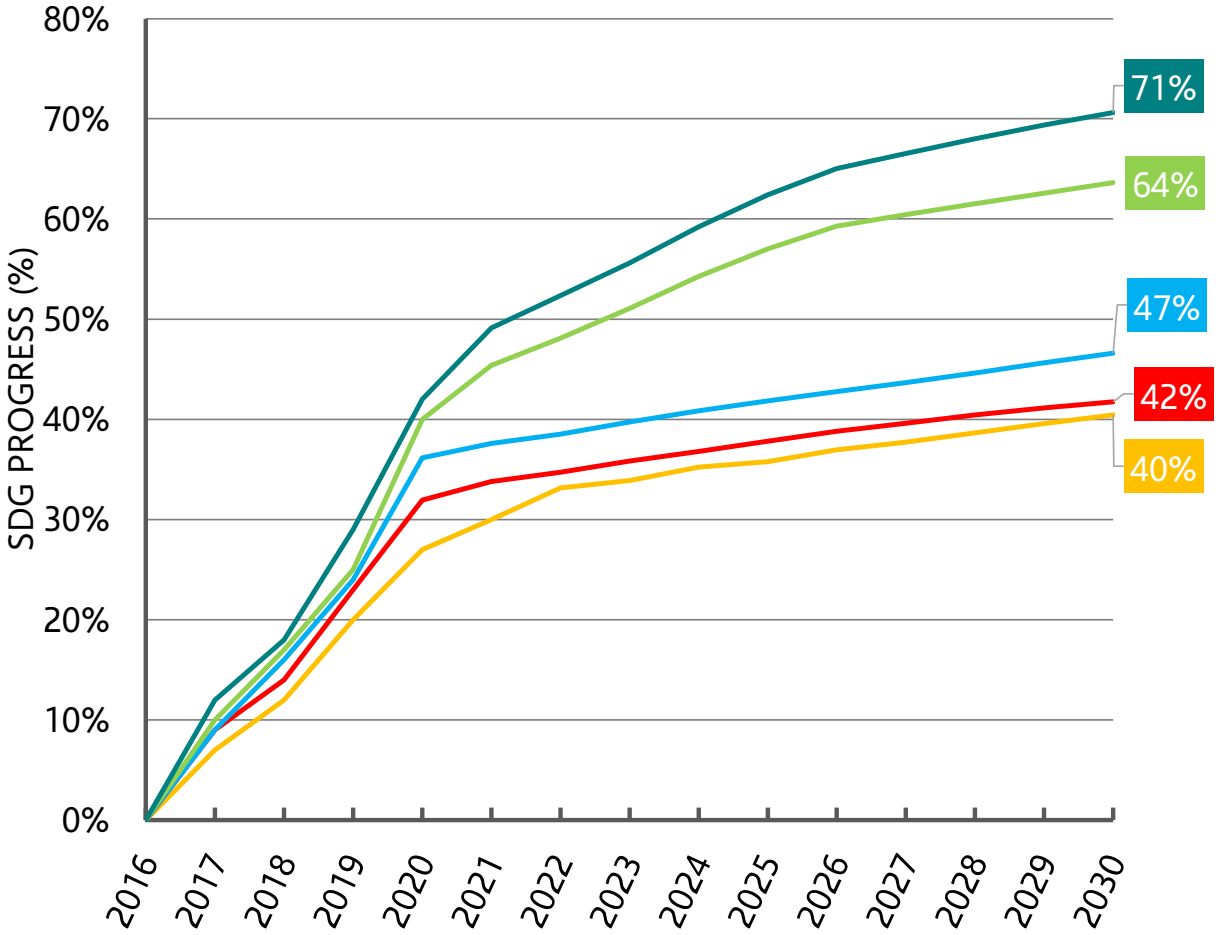


Sustainability Transition:

FAIRER: higher equality and lower poverty

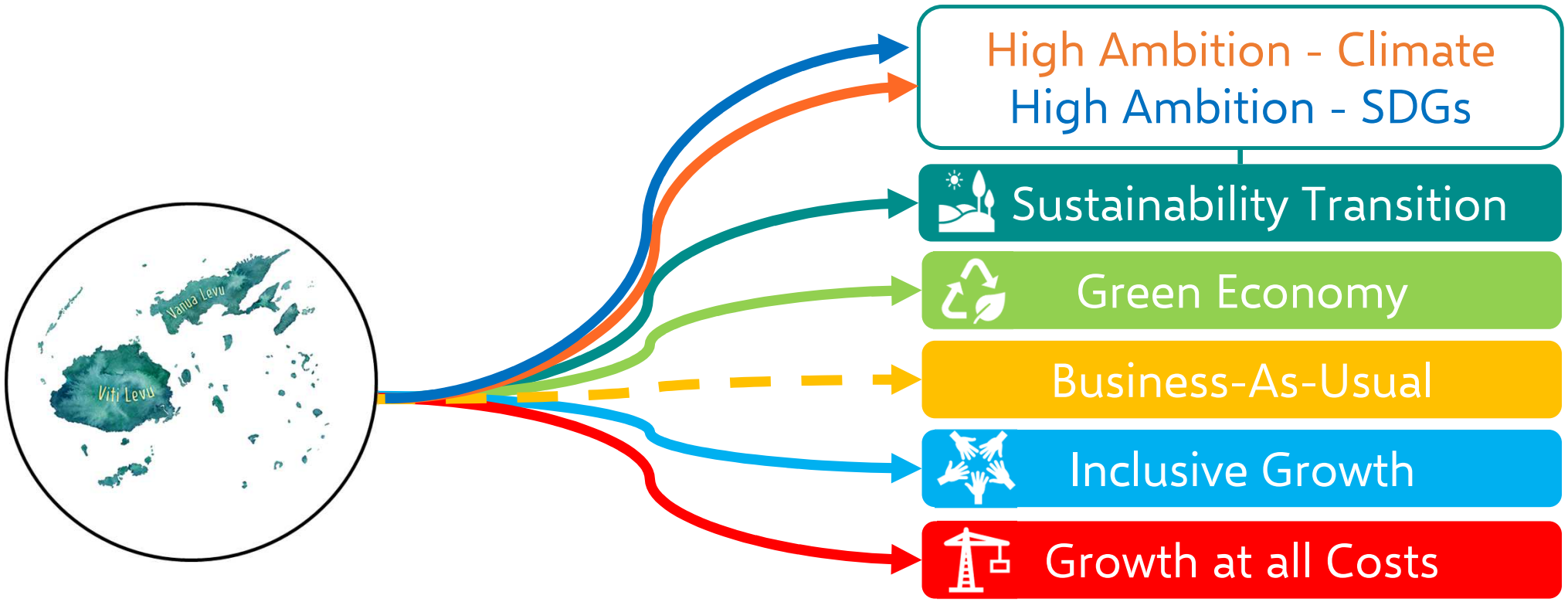
GREENER: reduced environmental footprint

PROSPEROUS: higher GDP per capita

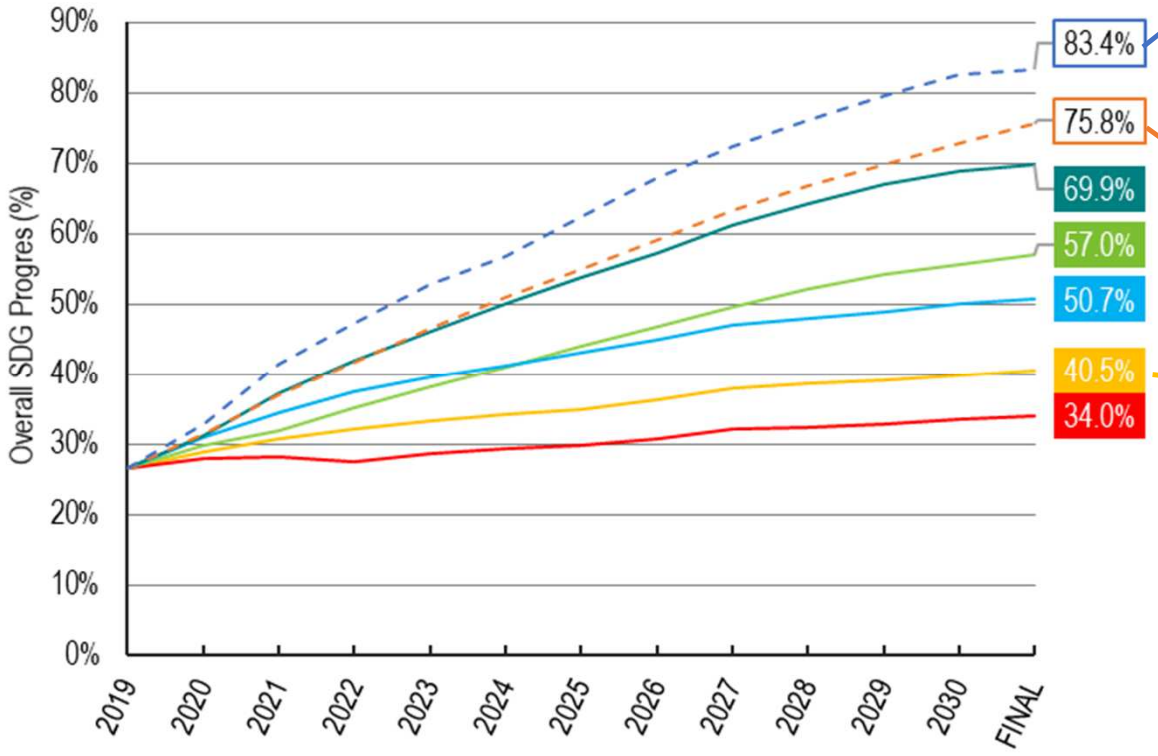
What did we learn - Australia?

- On current trends, Australia will fall short of the SDGs in 2030 (40% progress)
- Rapid progress on SDGs is there for the taking – additional investment 4% GDP per annum across key entry points financed through additional revenue
- Government has a key role to play using policy levers and expenditure to drive investment and change behaviour
- Research before COVID – potential to guide medium-term recovery, investment – build back better

FIJI SCENARIOS



Overall progress on SDGs by 2030

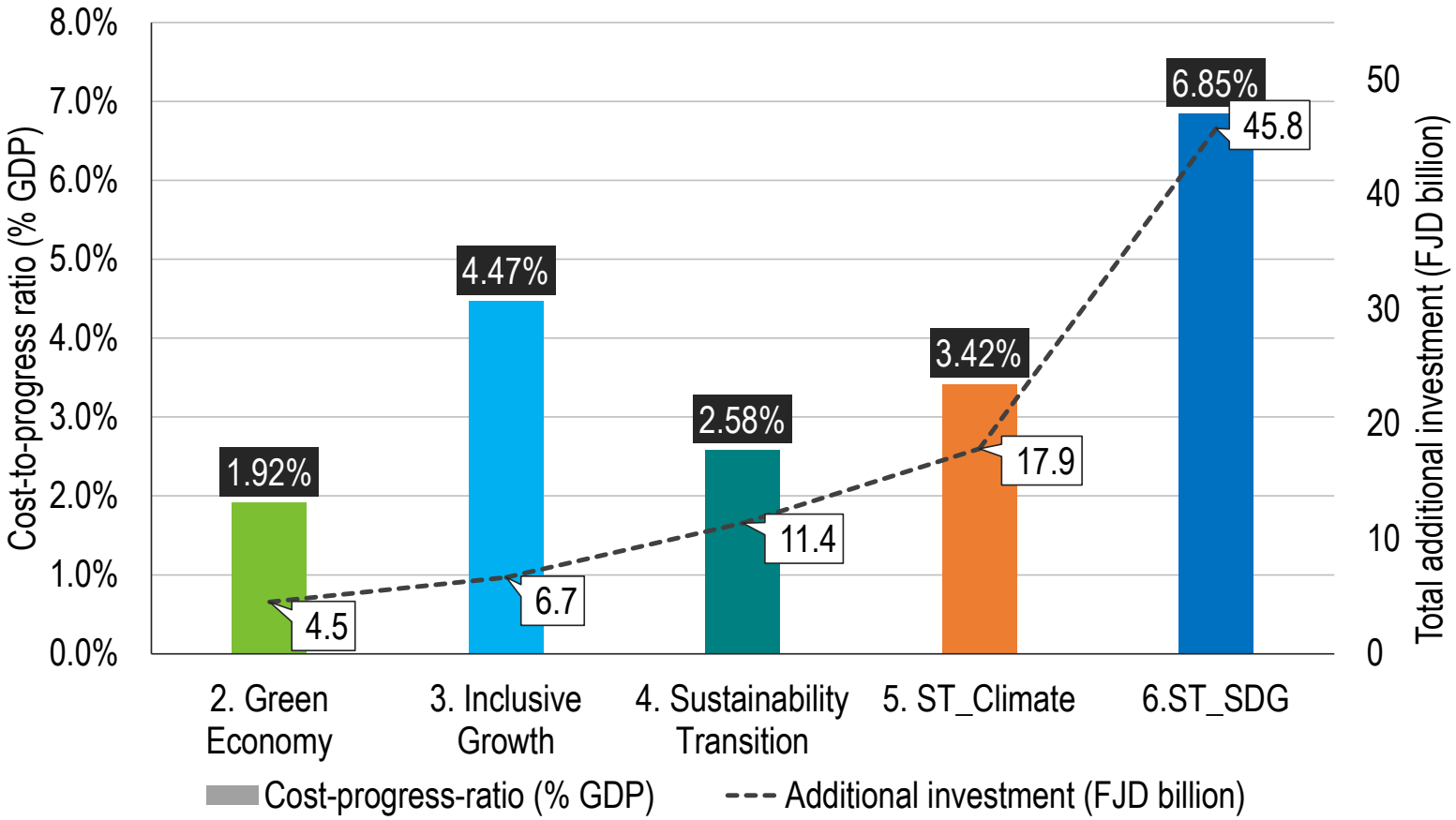


High Ambition SDG 83%

Climate Action 76%

BAU 41%

Fiji – Investment requirements per % progress on SDGs



THANK YOU

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