

Higher Education Sector

Knowledge and Insights

Date of last update: 12 January 2023



Sustainability Impact of Universities – some key trends

1 M t

of energy related CO2-e are emitted by Australian universities each year

\$700M

is spent on energy by Australian Universities annually

Up to 25%

of energy is in educational buildings is wasted

9%

Of students (surveyed) rate sustainability as the most important factor in choosing a university (up from 3%-6%)

“Buildings account for \$28 billion, or 65 per cent, of the fixed assets of universities. Improving the energy performance of these primary assets could significantly reduce university operating costs”

71%

of energy consumption in Australian universities is due to scope purchased electricity (Scope 2 energy)

243 kWh

of energy is consumed per m2 per annum by Australian universities

75%

of students are aware of UN SDGs

“Educators are getting serious about sustainability, and so are students”

THEFIFTHSTATE **V** OUR PLANET OUR BUSINESS

<https://thefifthstate.com.au/education/educators-are-getting-serious-about-sustainability-and-so-are-students/>

Source: “Sustainability – is it a driver for international student destination and institution choice? By International Education Association of Australia.
<https://www.ieaa.org.au/insights/sustainability-is-it-a-driver-for-international-student-destination-and-institution-choice>. Accessed 11/07/22

Source: “2020 Higher Education Facts & Figures” by Universities Australia (Oct 2020)

Sustainability Drivers

Sustainability issues impacting student choices & therefore enrolments

Higher sustainability performance means Higher University ratings

Increasing operational (Energy) costs taking away resources from other priority areas

Increasing Government compliance requirements of Universities

Greater International efforts and acceleration

Higher expectations of donors, private /government funding agencies



Attract and retain more students

Increase cost savings

Reduce Compliance risk

Improve brand value & competitiveness

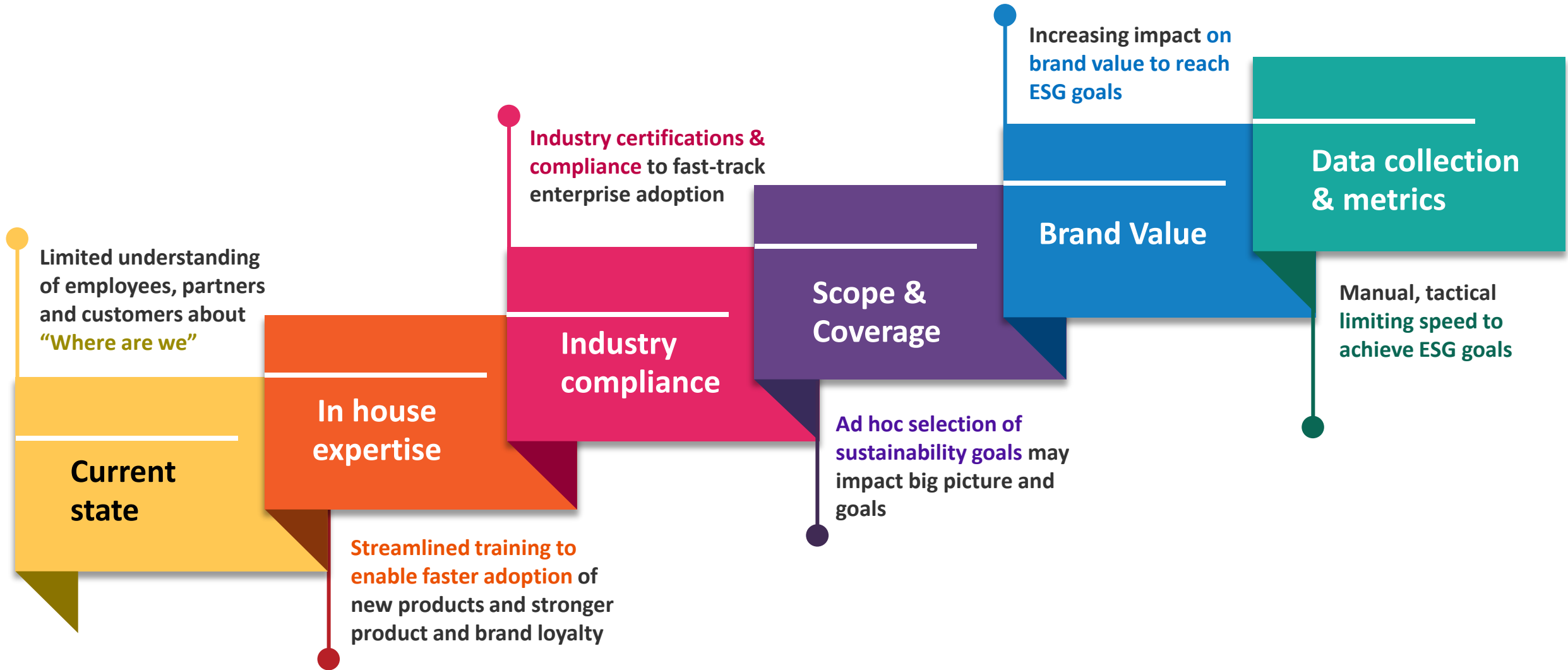
Be a responsible global citizen

Embedding Sustainability - Key Activity Areas



Source: Adapted from "Sustainability Plan 2017-2020" by The University of Melbourne.

Gaps & Challenges – Our Observations.....

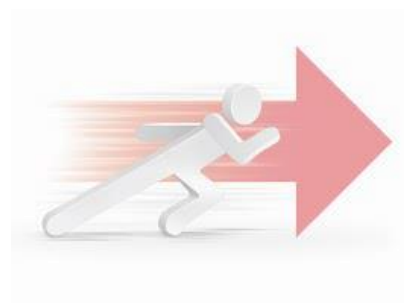


TCS Point of View

Universities are on an ambitious mission to meet tough sustainability targets including Net Zero, Carbon positive and Zero Waste. Consequently, they are progressing through their respective sustainability journeys, at varying levels of maturity, with pledges, vision statements, policies, action plans and implementation of various programs/projects and sustainability reporting.

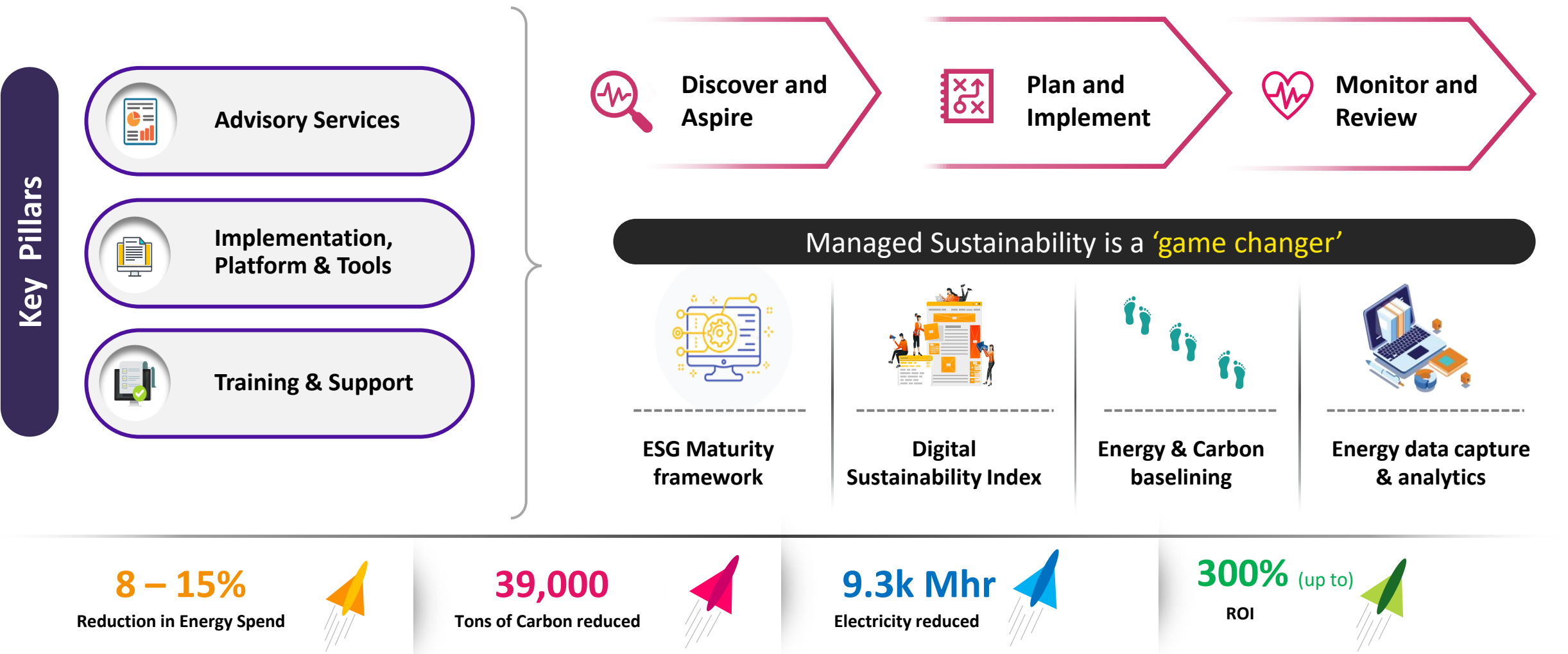
*This is commendable; however, it is now undeniable that it is time to greatly accelerate further action if global commitments, especially Net Zero Emissions by 2050, brought ahead by many Universities to 2030, are to be achieved to avert catastrophic climate changes. It is time to ramp up speed and transition to **Sustainability 2.0** – actions that deliver greater impact, faster, more accurately cost effectively and continuously.*

*With a decade of experience in developing sustainable practices supported by cutting edge digital platforms, TCS is well positioned to help Universities with their **Sustainability** efforts*



Our Proposal – End to End Sustainability Journey (Trusted) Partnership

TCS understands end to end sustainability journey and covers all stages of the Sustainability Value chain to help Universities achieve their sustainability goals



TCS Offerings – Solutions and Services

01

Advisory Services



Compliance & Reporting



ESG Maturity Assessment



Digital Sustainability



Sustainable Campus



Net Zero



Sustainable Procurement

02

Implementation, Tools & Platforms

TCS Clever Energy™

Enterprise grade energy & emission management

TCS iON Energy Management

Sustainable Consumption And Emissions Control

TCS iON Bill

Systemic Control and Process Improvement

TCS iON ESG

ESG Control and Reporting Automated

Zero-Carbon

Establish quick carbon emissions baseline

TCS ESG Integration Solution

Strategic insights into responsible investments

03

Training & Support



Co-designed training and academy



Co-research, industry consulting



Student, community engagement on sustainability

Our Advisory Services

Advisory Services – Sustainability Compliance, Standards & Reporting



<https://icdigitale.com/iso-international-standards/>



<https://www.ipaaustralia.gov.au/tools-resources/certification-rules/1369520>

ISO 14001 Environmental Management Systems

ISO 5001 Energy Management Systems

Modern Slavery Reporting (Modern Slavery Act 2018)

**National Greenhouse Gas Emissions Reporting Scheme
(NGERS Act 2007)**

National Carbon Offset (NCOS) Certification

GRI Reporting

**NATIONAL
GREENHOUSE AND
ENERGY REPORTING**

<http://www.cleanenergyregulator.gov.au/NGER>



<https://www.globalreporting.org/standards/>



<http://www.lisaheinze.com/2017/05/modern-slavery-act.html>

Modern Slavery Act 2018

Advisory Services – Strategy & Planning



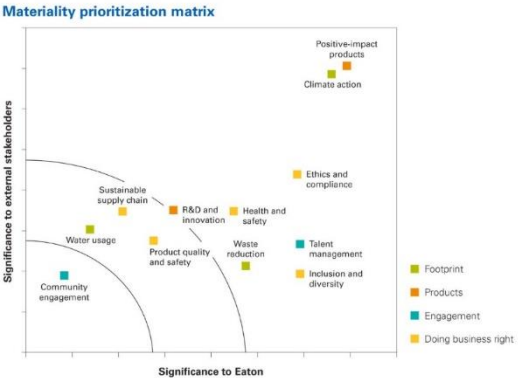
<https://proandroiddev.com/our-engineering-roadmap-1231dc5812>



<https://www.surveymonkey.com/mp/benchmarks/>



<https://thefinanser.com/2021/08/what-is-sustainable-investing.html/>

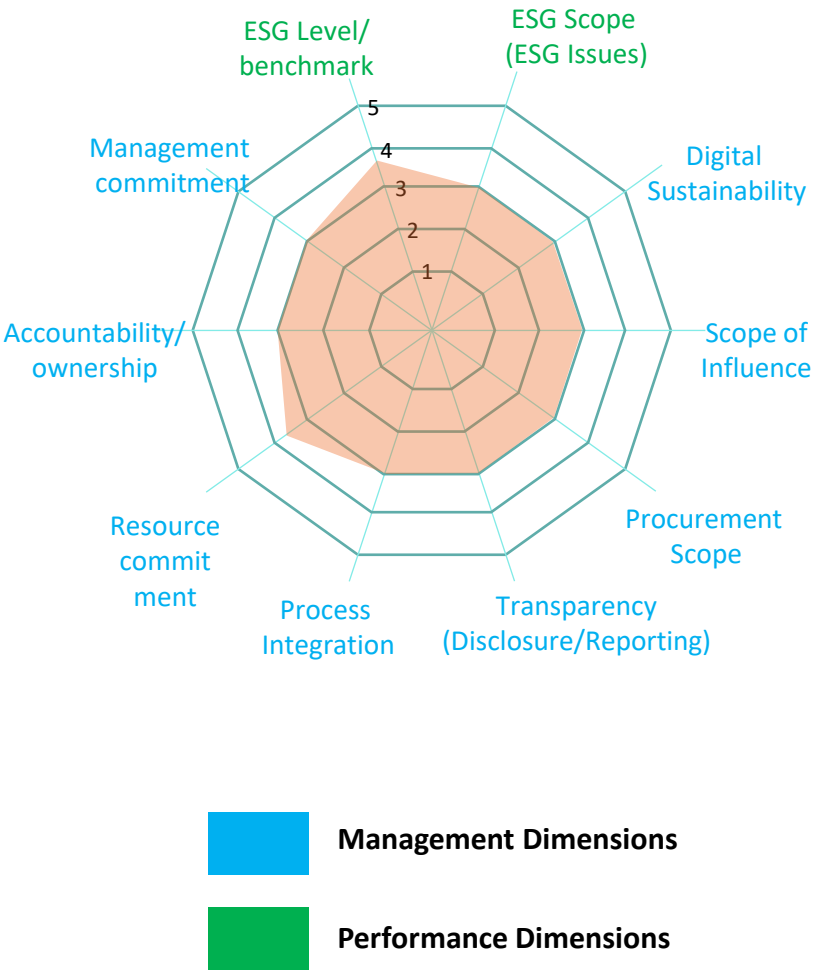
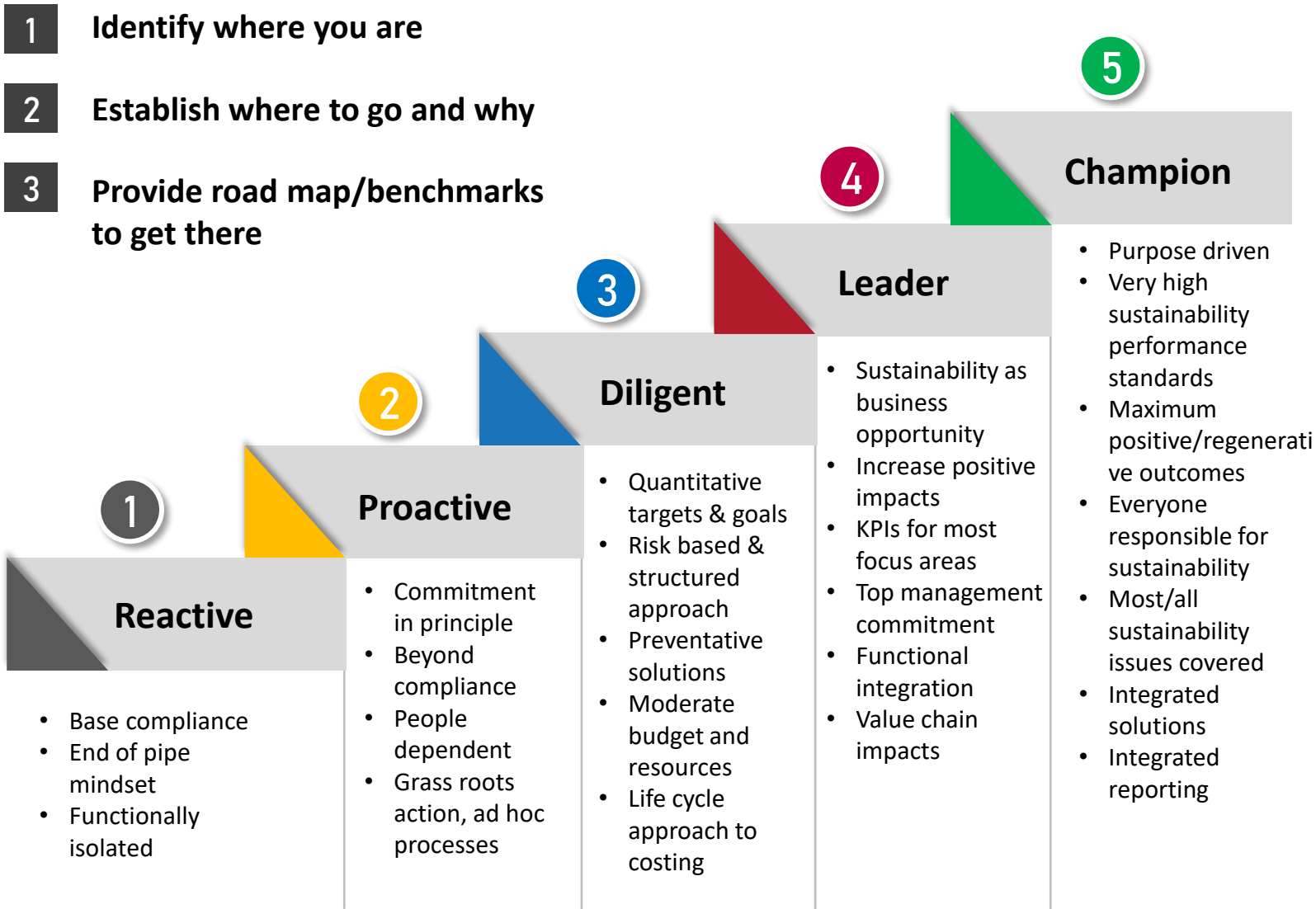


<https://www.eaton.com/us/en-us/company/sustainability/materiality.html>



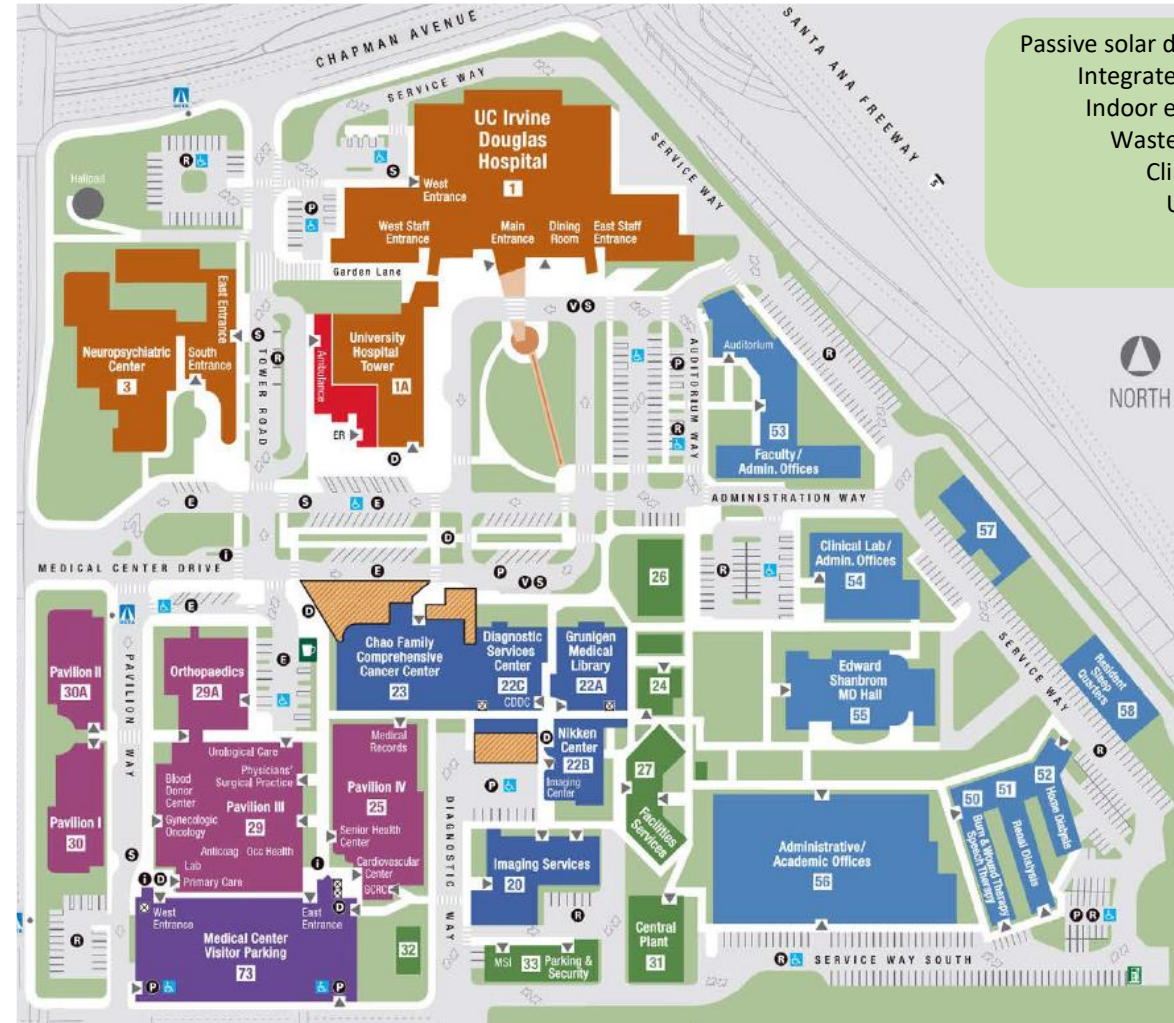
<https://backlog.com/blog/projects-success-depends-internal-stakeholders-heres-keep-happy/>

Advisory Services – ESG Maturity Assessment

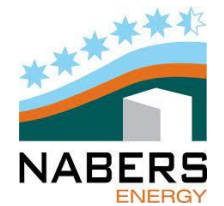


Advisory Services – Sustainable Campus

- Sustainable design strategies
- Metrics and indicators
- Sustainable design standards development
- Net Zero energy design
- Project design input/review (end to end)
- Applied research (technologies/products)
- Green ratings and certification
- Circular economy & sustainable products
- Life cycle assessment
- Thermal/energy modelling
- Integrated design process
- Customised training and capacity building



Passive solar design and energy efficiency
Integrated water management
Indoor environmental quality
Waste/Circular economy
Climate Resilience
Urban Ecology
Transport
Materials



<https://www.climatecontrolnews.com.au/topics/arbs-2020/next-20-years-of-nabers-energy-ratings>



<https://www.ironbarksustainability.com.au/resources/articles/built-environment-sustainability-scorecard-bess-now-open-for-council-subscriptions>



<https://bdaa.com.au/your-cheat-sheet-to-green-rating-tools/>



<https://www.architectureanddesign.com.au/news/bpn/green-star-rating-tool-for-public-buildings>

<https://cpep.uci.edu/physical/pdf/UCI-MC-Design-Framework.pdf>



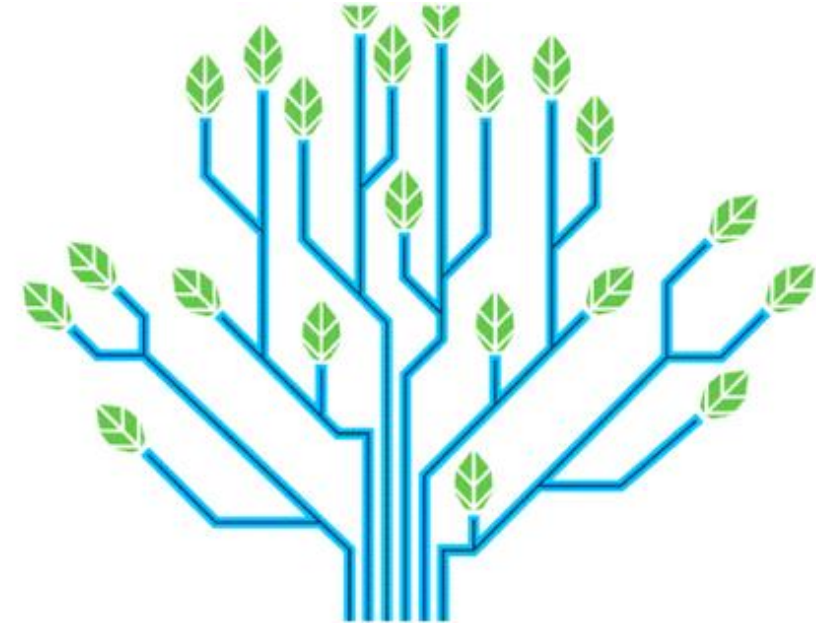
Advisory Services – Digital Sustainability



<https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.pccube.com%2Fen%2Fgreen-computing%2F&psig=AOvVaw0qOuWIVvOq7zexR38UfV8N&ust=1652143780331000&source=images&cd=vfe&ved=0CAoQjhxqFwoTCMiptbyZ0fcCFQAAAAAdAAAAABA4>

Sustainability impact of digital technology

- Scope 3 emissions assessment
- Operational vs embodied carbon optimization

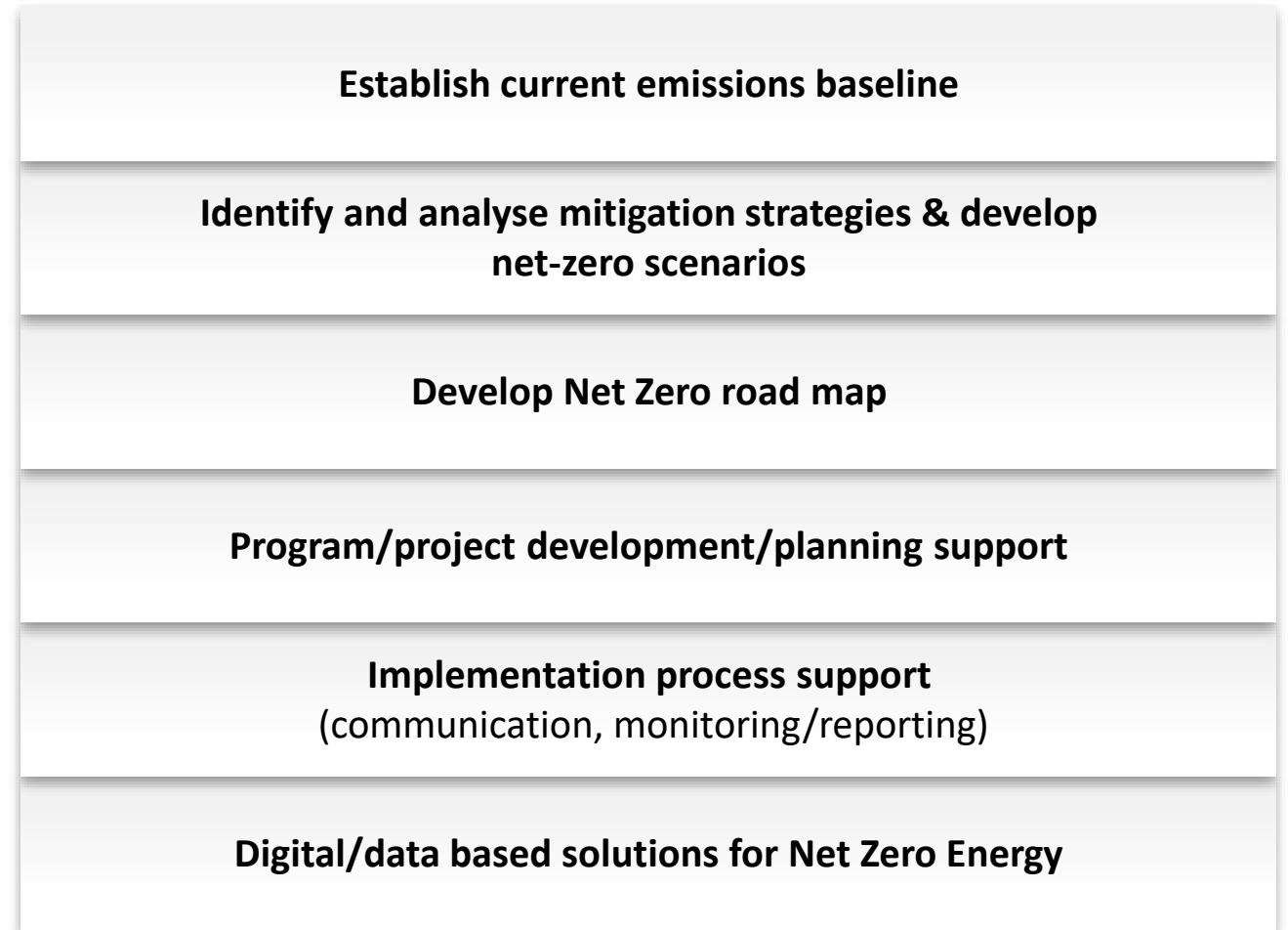
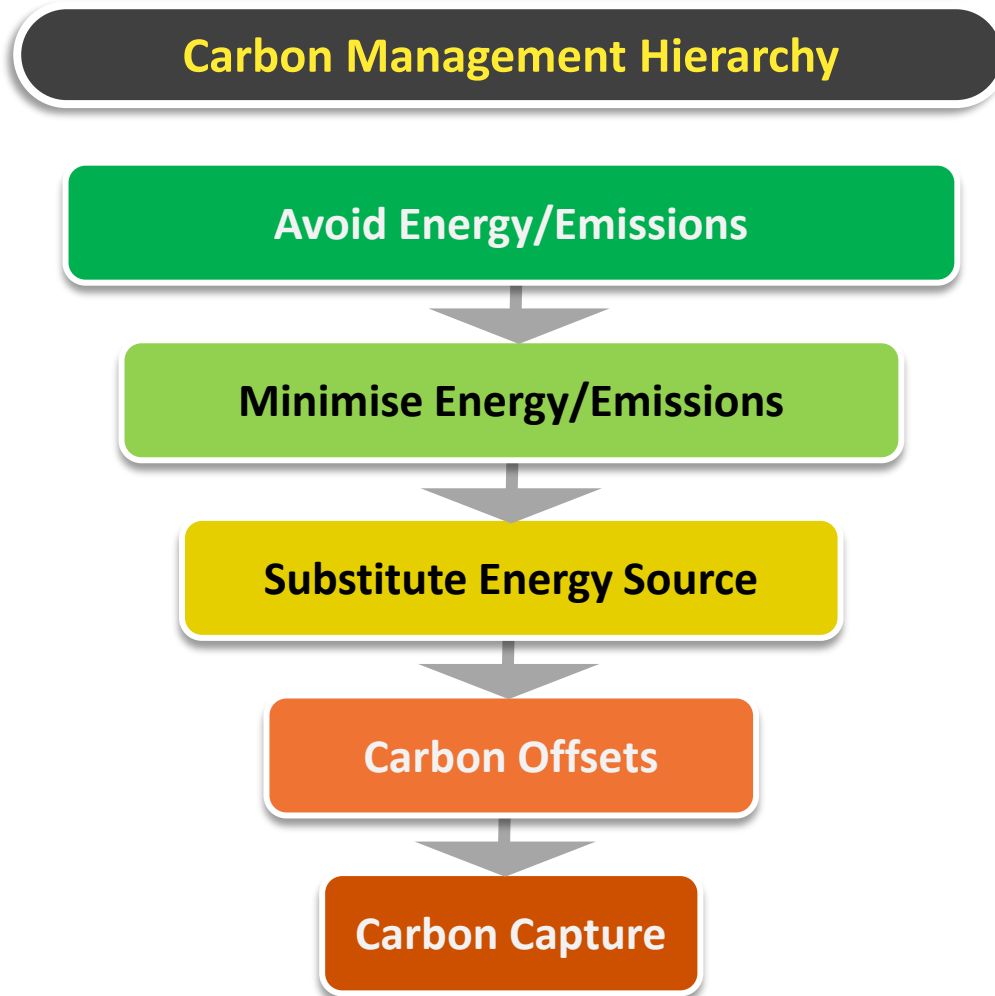


<https://blogs.cisco.com/partner/cisco-and-its-partners-co-creating-innovative-sustainability-solutions>

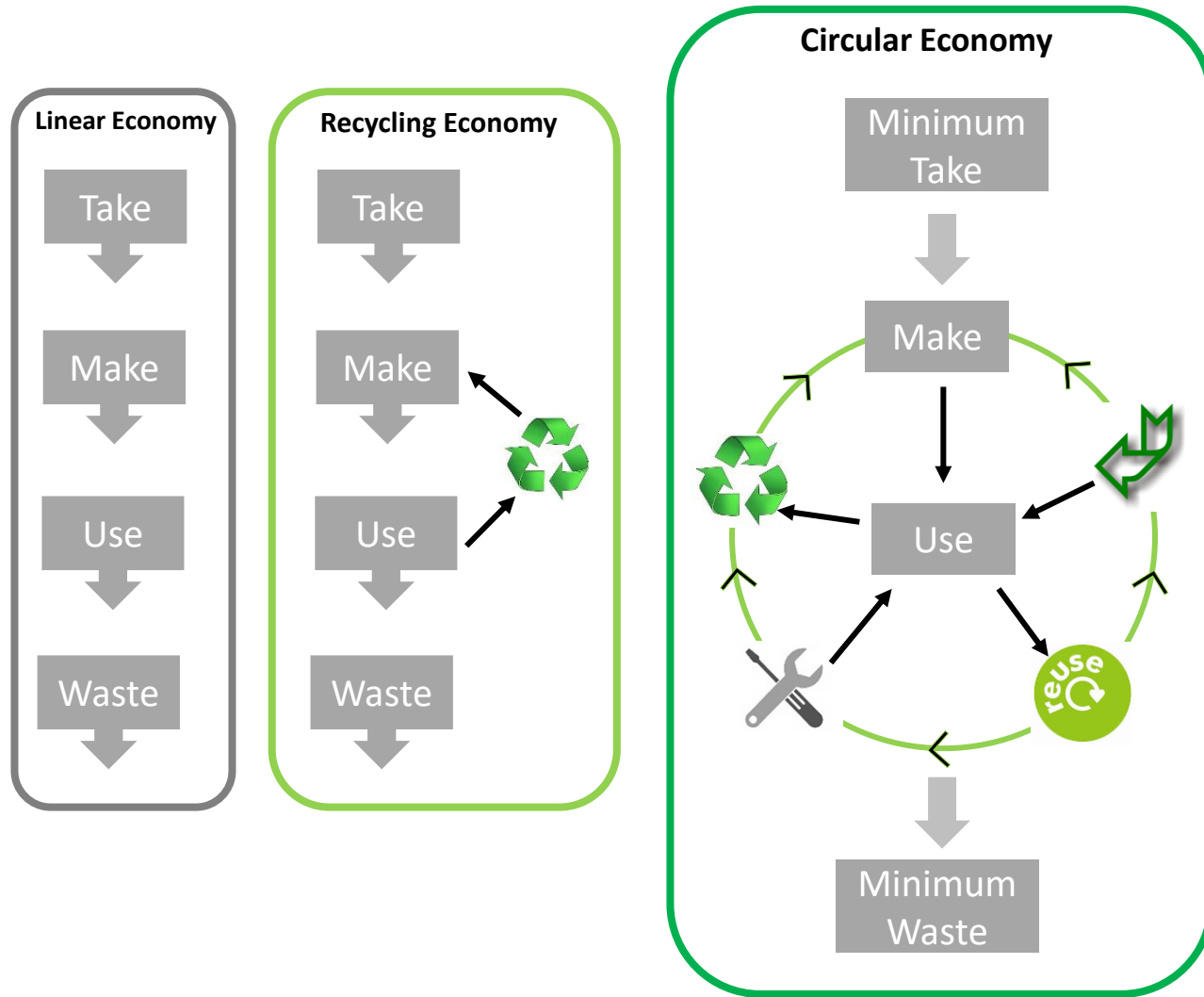
Digital Technology as enabler of sustainability

- Digital sustainability maturity assessment – Identify where you are
- Establish where to go
- Provide roadmap/steps to get there

Advisory Services – Net Zero, Zero Carbon



Advisory Services – Circular Economy



(Author adaptation of source at <https://www.weforum.org/agenda/2022/01/5-circular-economy-business-models-competitive-advantage/>)

- **Circular economy strategy**
 - Current status
 - Gaps analysis with circular economy principles/framework
 - Roadmap with KPIs
- **Opportunities identification**
- **Circular sourcing/procurement strategies**
- **Mapping potential funding and collaboration partners**
- **Digital/data-based solutions for circularity**

Advisory Services – Sustainable Procurement

- Supply chain mapping
- Environmental and social hotspot analysis of products/services value chain
- Risk analysis to prioritise value chain impacts (sustainability issue or product/service category focused)
- Impact reduction strategies (sustainability issue or product/service category focused)
- Gap analysis and alignment with ISO 20400 – Sustainable Procurement



<https://www.red-inc.com/blog/iso-20400-sustainable-procurement/>



<https://globalecolabelling.net/>



<https://www.ipaustralia.gov.au/tools-resources/certification-rules/2024265>

Our Solutions

Tools and Products



Tools

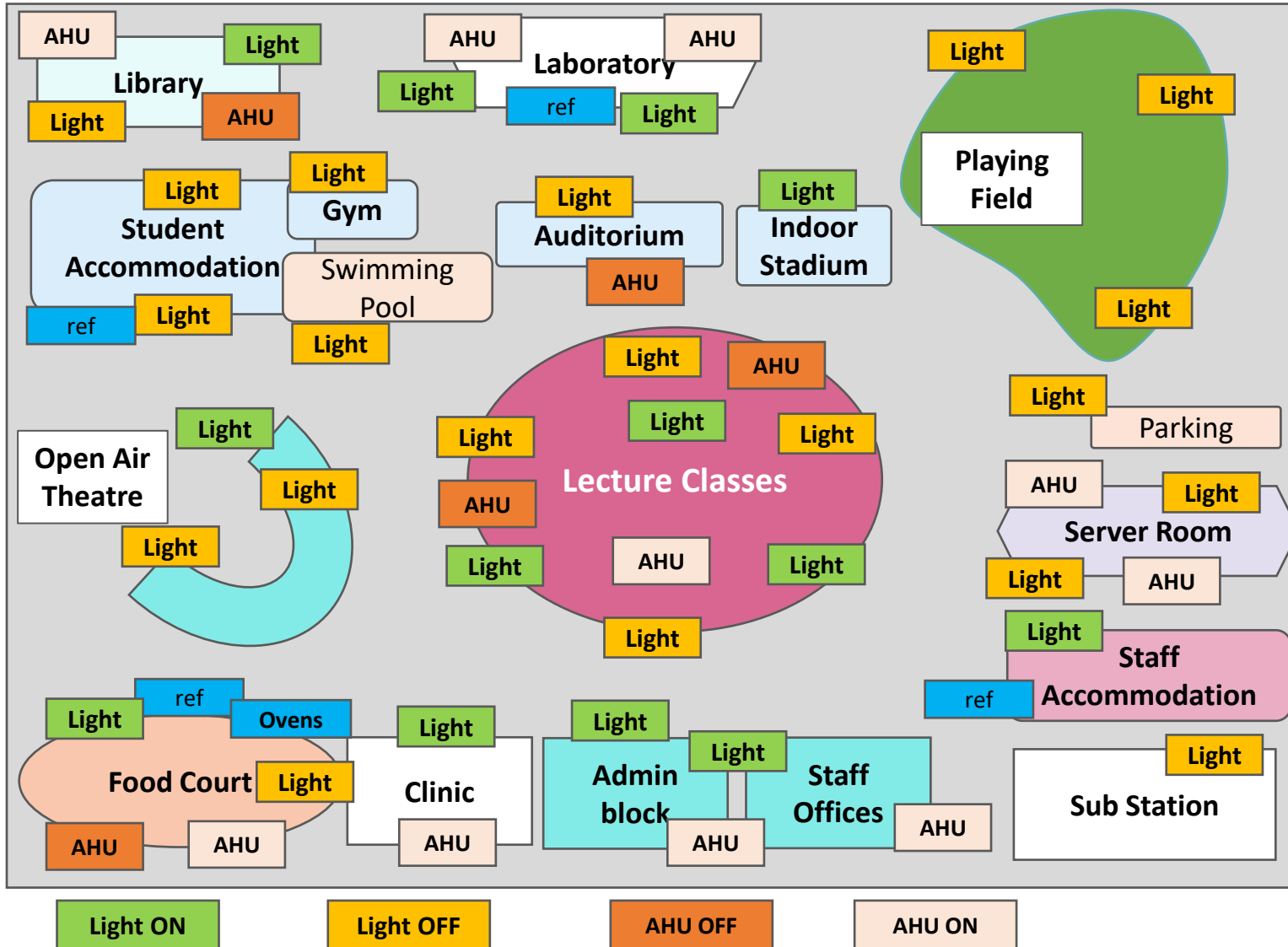
- **Sustainability Maturity Model/Matrix** (overall sustainability maturity)
- **Digital Sustainability Index** (digital sustainability maturity)

Digital Products

- **Zero-Carbon** (establishing quick carbon emissions baseline)
- **TCS Ion Energy Management system** (enterprise level energy and emissions management system)
- **Clever Energy System – suite for IoT** (enterprise level energy and emissions management system)
- **ESG Integration Solution Accelerator** (Organisational ESG performance scoring)

TCS ESG
Integration Solution
Accelerator

Energy Management – Spatial Representation in University Context



Lighting - Interior / Exterior (~3-5 %)

- Scheduling of noncritical lights and nonworking hours
- Auto Lighting luminous adjustment based on foot fall

Chiller, HVAC Monitoring & Optimization (~8%)

- Performance Monitoring
- COP, Loading % and TR Monitoring
- Alerts and Alarms
- Predictive Maintenance
- Scheduling

Dynamic Set Point optimization (~4%)

- Specific power consumption monitoring
- AHU /RTU loading and Anomalies identification.
- Dynamic Temperature set point of AHU/CHUs

Refrigeration Monitoring (~6-8%)

- On – demand defrost control and Antisweat heating control
- Compression ratio, temperature lift monitoring
- Refrigerant leakage monitoring

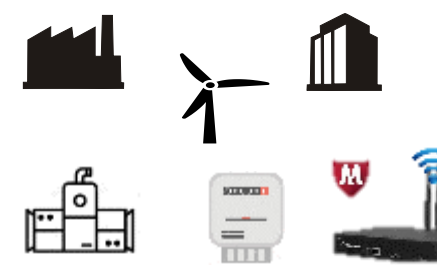
Other Assets (Bakery Ovens, Rotisseries, etc.)

- System/Equipment level performance monitoring,
- Operational anomaly identification
- Early faults detection
- Energy Efficiency KPI Tracking

TCS Clever Energy™ - Quick View


ENERGY DATA

Diverse Vendor Eco-System

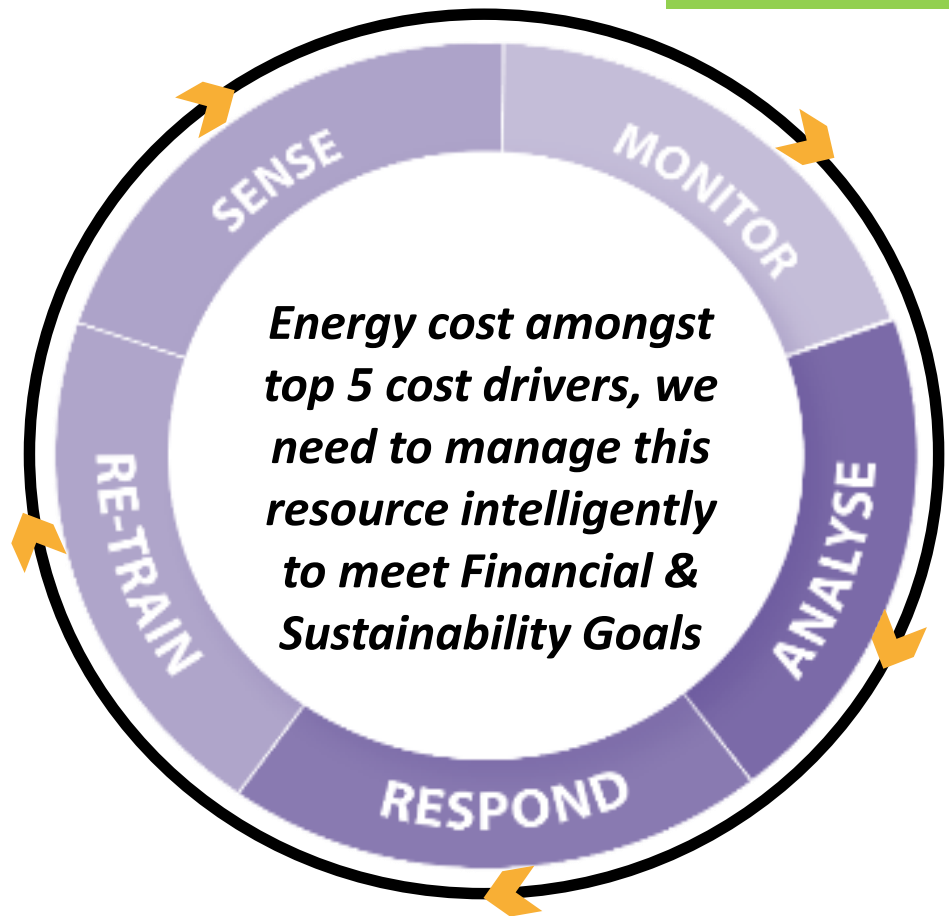


- ❖ WiFi, Zigbee, Bluetooth, BACNet, OPC UA, Modbus
- ❖ Https, MQTT, TCP/IP, LWM2M, CoAP

CLOSED LOOP SELF- OPTIMIZATION



- ❖ Adjustable to changes in weather and occupancy



ALERT MONITORING & CO-RELATION





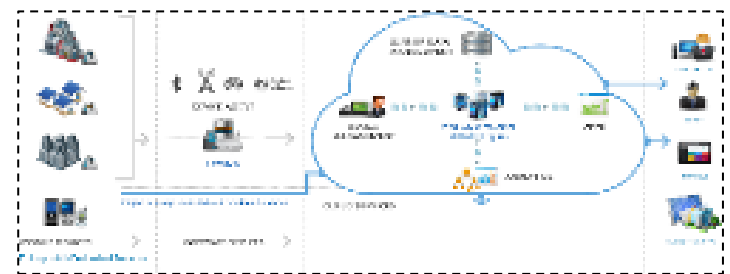
- ❖ Real Time Alerts on Consumption anomalies

REAL TIME MONITORING



- ❖ Agile Resource Optimization Center

MACHINE LEARNING



- ❖ Prediction of Energy Consumption
- ❖ AI ML driven Analytics & Algorithms

Key Saving Opportunities by TCS Clever Energy™



Heating Ventilation & Air Condition (HVAC)

- Wastage Identification and Reduction
- Asset Scheduling (shift from Time based to condition based) & Dynamic Set Points



Refrigeration

- On – demand defrost control and Antisweat heating control
- Compression ratio, temperature lift monitoring
- Refrigerant leakage



Assets Ovens, Rotisseries etc.)

- Demand Vs Supply correlation
- Process Anomalies through Energy Pattern
- Demand based Operation



Intelligent Tariff Management

- Energy exchange and Trading
- Better utilization of TOD tariff, Peak Demands etc.
- Energy Prediction & Forecasting



Benchmarking & Baselining

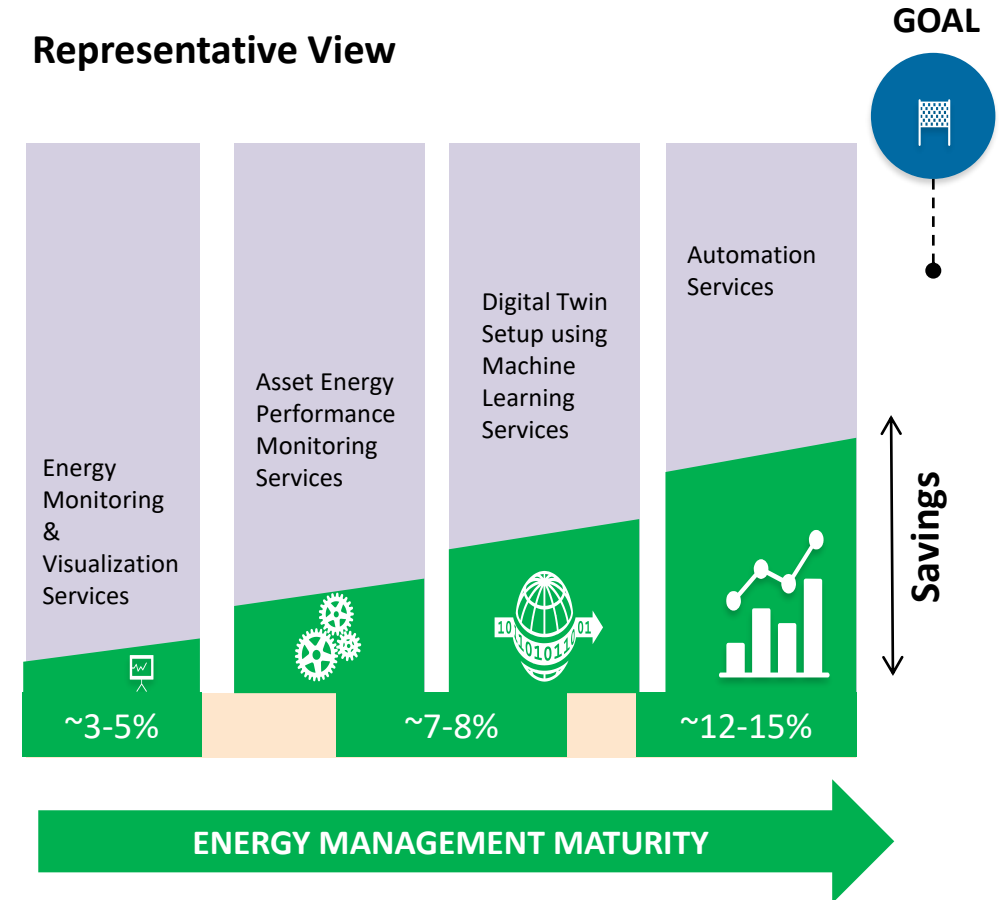
- Compare and progress inter and intra facility performance
- Savings Verification comply to IPMVP



Carbon Management

- Reduce Scope 1 & 2 Emissions for purchased energy
- Help Shift towards RE 100 Goals
- Compliance & Regulatory Reporting

Representative View

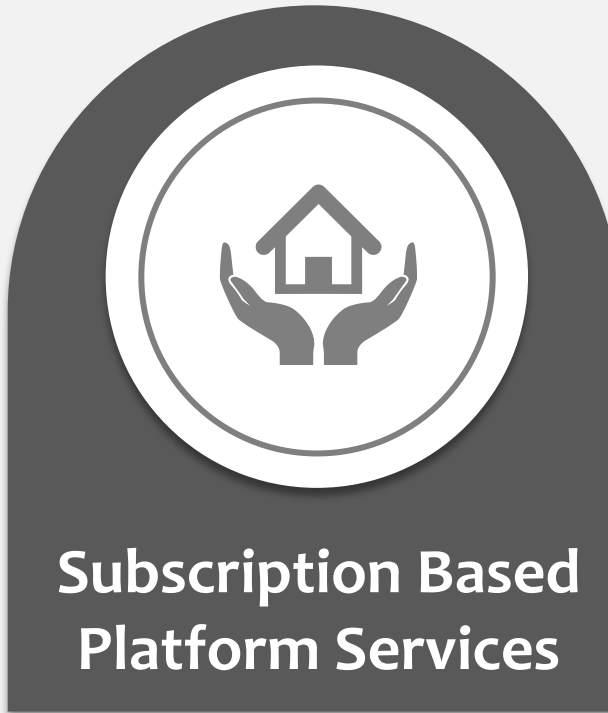


Business Centric Pricing Model

ROI up to 300% & Breakeven withing a Year



Leverage TCS service
(consulting & implementation)
capabilities in energy mgmt.



Annual subscription of TCS' IOT
platform powered TCS Energy
Management Solution



Self funded model that is
predicated on committed savings
to pay off program investments

✓ Recommended *Building on belief*

An enterprise level ESG management, energy and emission management system that helps you achieve carbon neutral goals by reducing emission, become energy and cost efficient and meet your financial and sustainability goals.

Consumption

Sustainable Consumption
And Emissions Control

**TCS iON Energy
Operations**

Energy Consumption

Control

Systemic Control and Process
Improvement

**TCS iON Bill
Manager**

Bills & Contracts

Compliance

ESG Control and Reporting
Automated

**TCS iON ESG
Management Platform**

EHS data aggregation & More

Capabilities



Renewable Energy Monitoring

Monitor your solar/ wind/ hydro energy power generation and consumption real-time on our platform



Predictive analytics

Get information and alerts regarding your future energy consumption and cost to reduce business risks.



IoT Dashboards

Specifically designed for IoT monitoring, you can monitor device functioning and the proportionate energy consumption



Asset Health Calculator

Check the performance of your equipment's on the go, to identify potential energy savings opportunities



Sustainability Management Platform

Track the activities across your organisation and generate standardized reports in taking a step to become a sustainable business



Bill Manager Dashboard

Complete view of your utility bill components along with data driven analytical widgets to help you take informed decisions

Lead the digital wave, be ahead in the game

Our Success stories

Clever Energy - TCS Story

- ❖ 150+ Buildings
- ❖ 35+ Million Sq. Ft.
- ❖ 13,000+ Meters
- ❖ 1.5 M Observations/Day

Flat Energy Bill though Capacity increased by 15%

Global TCS Implementation



200,000+
HOUSES LIGHTED
FOR A YEAR



~10+%
YoY
SAVINGS



39,000
TONS OF CO2
SAVED

Customer Story



Energy Management for Leading UK bank, 1200+ (Office, Branches & DC)
Potential Estimated 8%-12% (£17 – £25 Mn) Savings over 5 Years. Overall Energy Spend; £47M

Energy Management for American Investment Banker
Savings Estimated 4.7%-7.5% (\$3 – \$4.5 Mn) Savings over 3 Years. Annual Energy Spend: \$ 20 M. 4% Savings trend observed.

Energy Management for American Furniture Retailer, 214 Stores
(\$1.7 Mn to \$2.3 Mn (5-7%) reduction in Energy Spend on Annul Energy Spend of \$ 33 Mn)

EMS for Retail Major in UAE Covering 1300 Stores, DC, Offices & malls
(8%-15% (\$20 – \$40 Mn) - Savings over 5 Years. 11% Year 1 Savings achieved)



Project Background

- The Key requirement of the client was to understand and centrally manage energy consumption at their 27 sites
- They were also looking at compliance reporting, i.e. filing a carbon compliance reporting with the UK government.
 - Electricity consumption Monitoring
 - Water consumption and Power Factor Monitoring
 - Carbon Reporting
 - Analytics & Dashboard
 - Reporting



TCS Solution

The Implementation scope included-

- Remote Monitoring of 150 utility meters spread across 27 sites
- Carbon Reduction Reporting in 88 sites for 100 meters.
- Data collection was done through utility data collection portal and thereby providing centralized digitized data for all their sites
- Regular data analysis was done, on the basis of incidents raised by the system.
- Recommendations for process improvement and cost reduction in utility consumption was suggested regularly.
- Projects initiated were tracked to closure through our portal and command center.



Business & Environmental Benefits

- Overall **25%** reduction in energy consumption and cost in 6 years
- Consistent **8%** savings achieved YoY
- **3.8K** ton of carbon reduced throughout the contract period
- **9.3K MWh** of electricity consumption reduced throughout the contract period.





Project Background

- The key requirement was to track utility bills for 180+ assessment centres
- Completely automate Bill collection to analytics derived from the utility bills for process improvement
 - Utility Bill Collection
 - Utility Bill Digitization
 - Centralised digital repository
 - Analytics & Dashboard
 - Reporting



TCS Solution

The Implementation scope included-

- Bill Collection included uploading of Bills from 183 assessment centers on TCS iON platform
- The Bills had about 15 different formats from different utility provider's, this was configured and digitized
- We created a centralized digital repository for these bills.
- We created significant KPI's like consumption per FTE, consumption according per sq.m. area etc.
- Periodic reporting and regular analytics and insights was shared with the respective stakeholders.

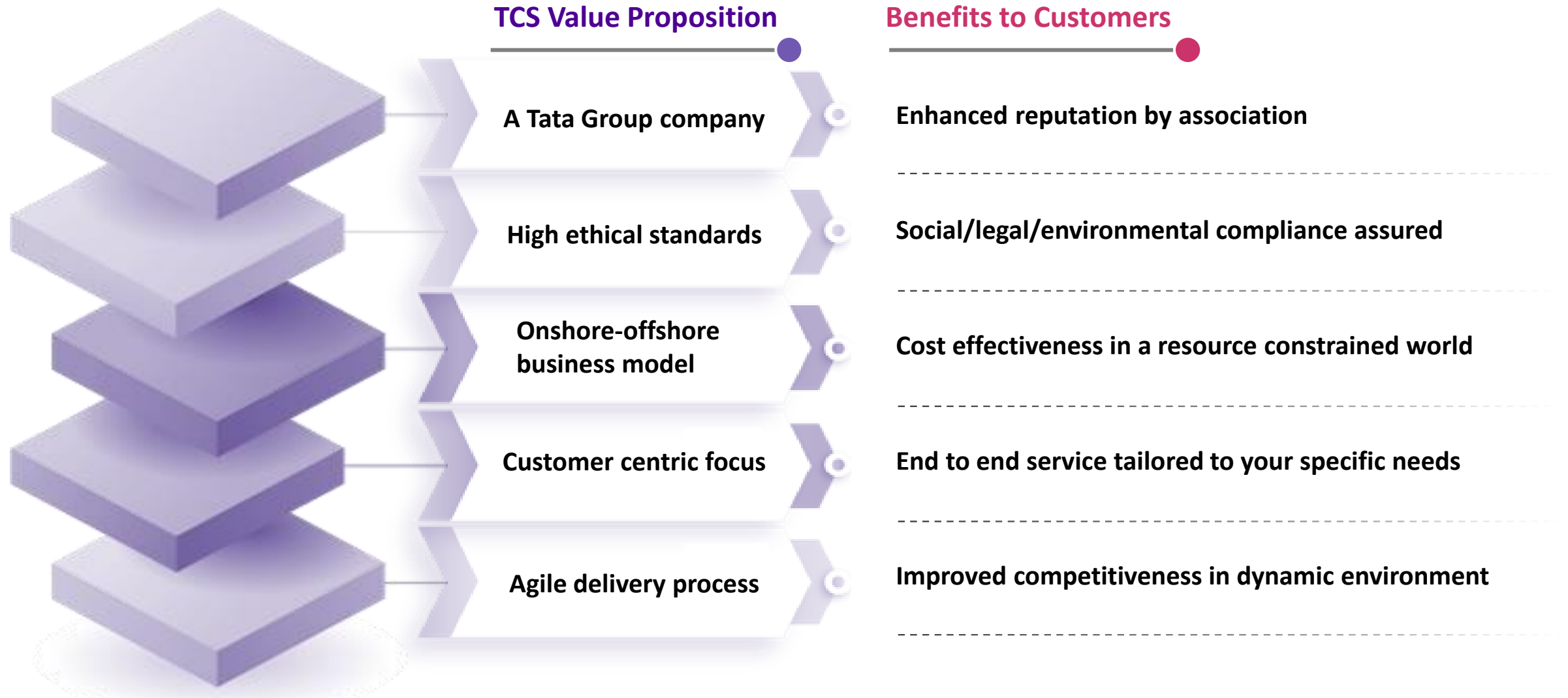


Business Benefits

- **10%** Potential savings were identifies.
- Significant reduction in **man hours** to handle utility bills.
- Late payment's and **Penalties** highlighted and avoided
- **FTE's** were used better in other crucial tasks.



TCS Differentiator



Industry Regulation (APAC)

Australia:

- National Greenhouse and Energy Reporting (NGER)
- Large-scale Generation Certificates (LGC) Reporting
- National Pollutant Inventory (NPI) Reporting
- Modern Slavery Act
- Tertiary Education Facilities Management Association (TEFMA) Reporting
- Carbon Neutral Reporting (Climate Active)

Legend:

Regulatory requirement

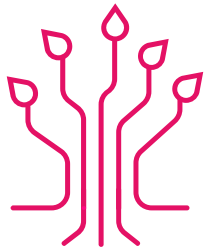
Industry requirement

Voluntary

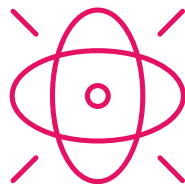
Building on belief

TCS, the purpose-led transformation partner.
We use innovation and the power of collective knowledge to build on our shared beliefs.

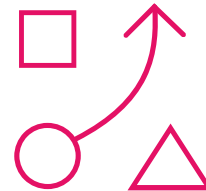
TCS commitment



In it for good



Bring everything



Know-how



Master the journey

Thank you