

The background is a dark blue-grey color. It is decorated with various geometric elements: orange circles of different sizes, some with dotted patterns; white circles and hexagons; orange hexagons; and white dotted patterns arranged in various shapes. There are also orange lines and dots scattered throughout.

Engineering as a Key Pillar of Singapore's Economy

01. What is Engineering

02. Blast from the Past

Engineering in the early days

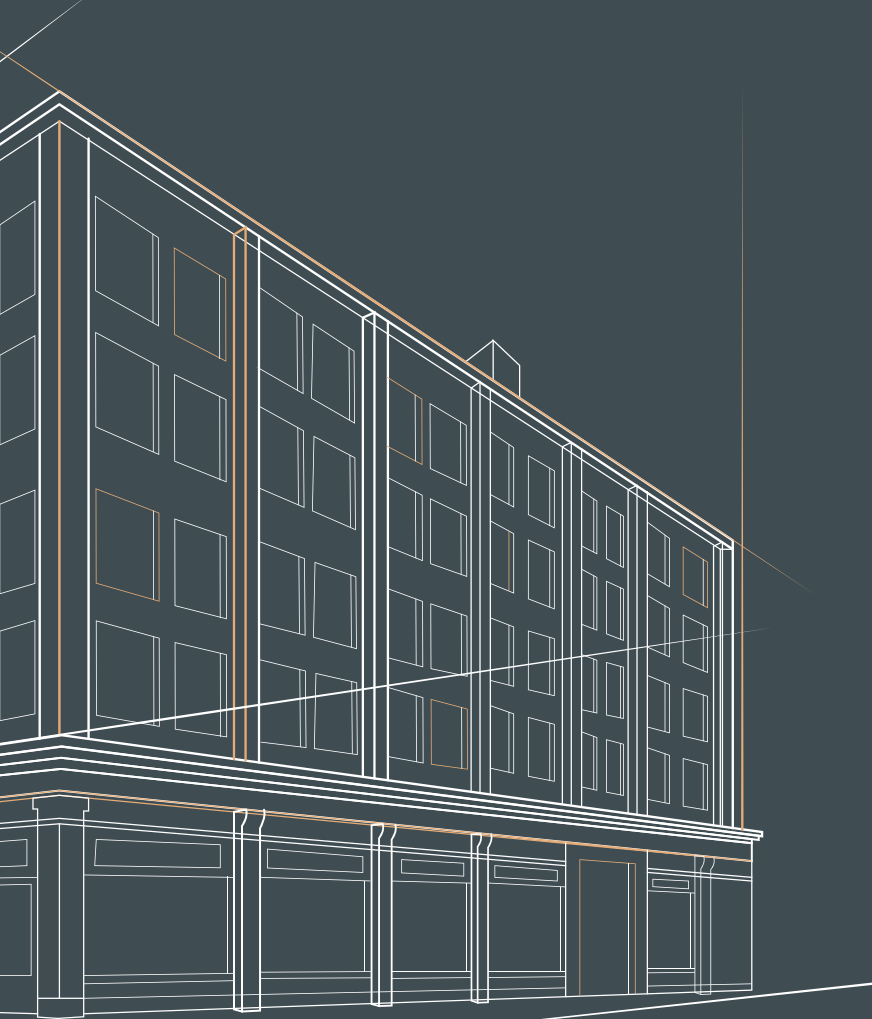
03. Back to Present

- Singapore's Manufacturing Industry
- Water System
- Oil Refining



04. Projection to Future

05. Lessons Learnt

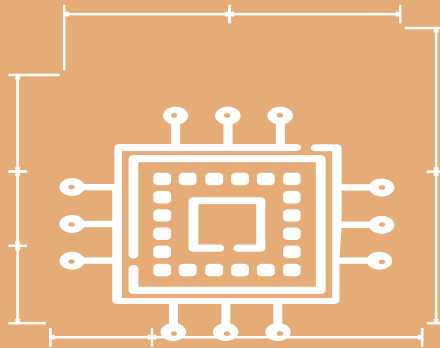


01

What is
Engineering?



..... Engineering in the Early Days



**Semiconductor
Industry**

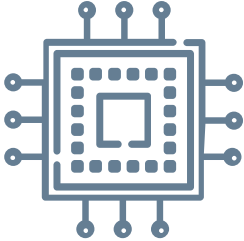


**Manufacturing
Industry**

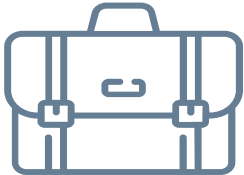


Engineering in the Early Days

Semiconductor Industry



Second Nation in the World to Enter Semiconductor Industry



Largest Job Creator

Created 7,000 jobs in 3 years



Engineering in the Early Days

Manufacturing Industry



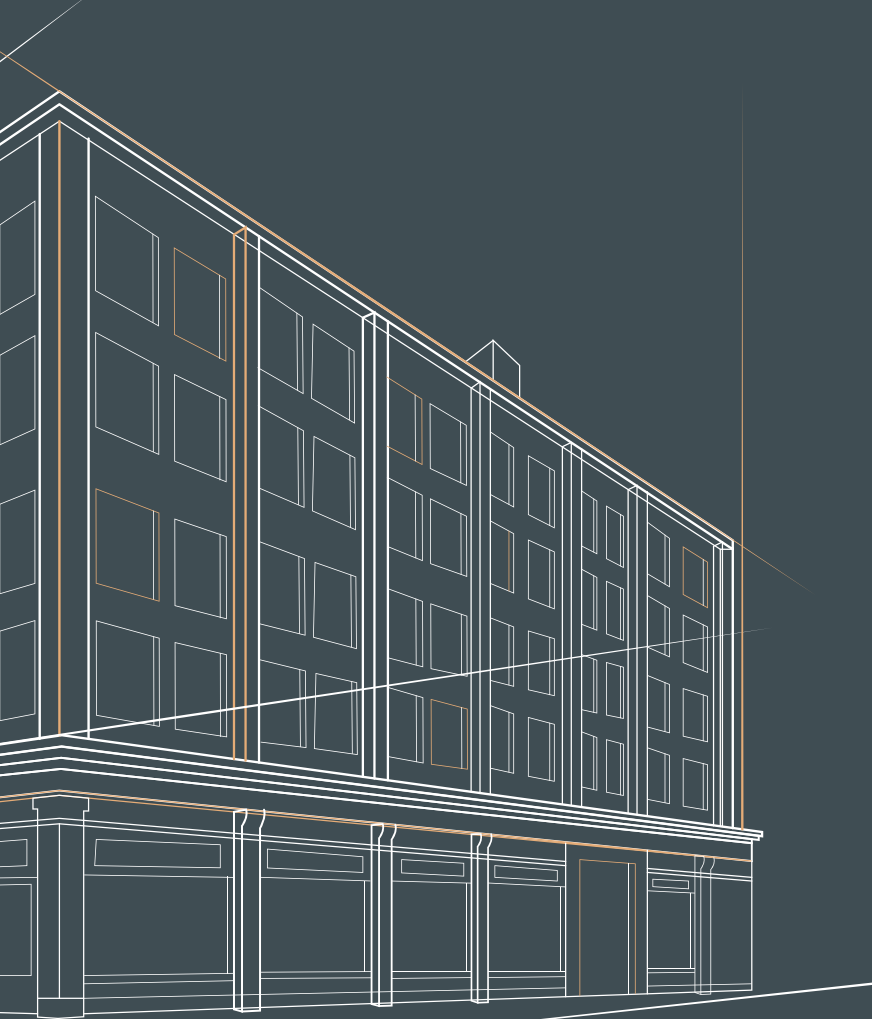
Manufacturing

Mainstay of Singapore's economic growth



Employment

Employed 352,600 workers, were responsible for 29 percent of the GDP



02

Back to Present

How Singapore is
benefiting from
engineering now

Singapore's Manufacturing Industry



Singapore's Manufacturing Industry



Key Contributor to SG's Economy

Contributed to 20.9% of nominal GDP



Globally Recognised

4th largest global exporter of high tech products + HQ for many big companies



Globally Competitive

Singapore is committed to innovation through engineering



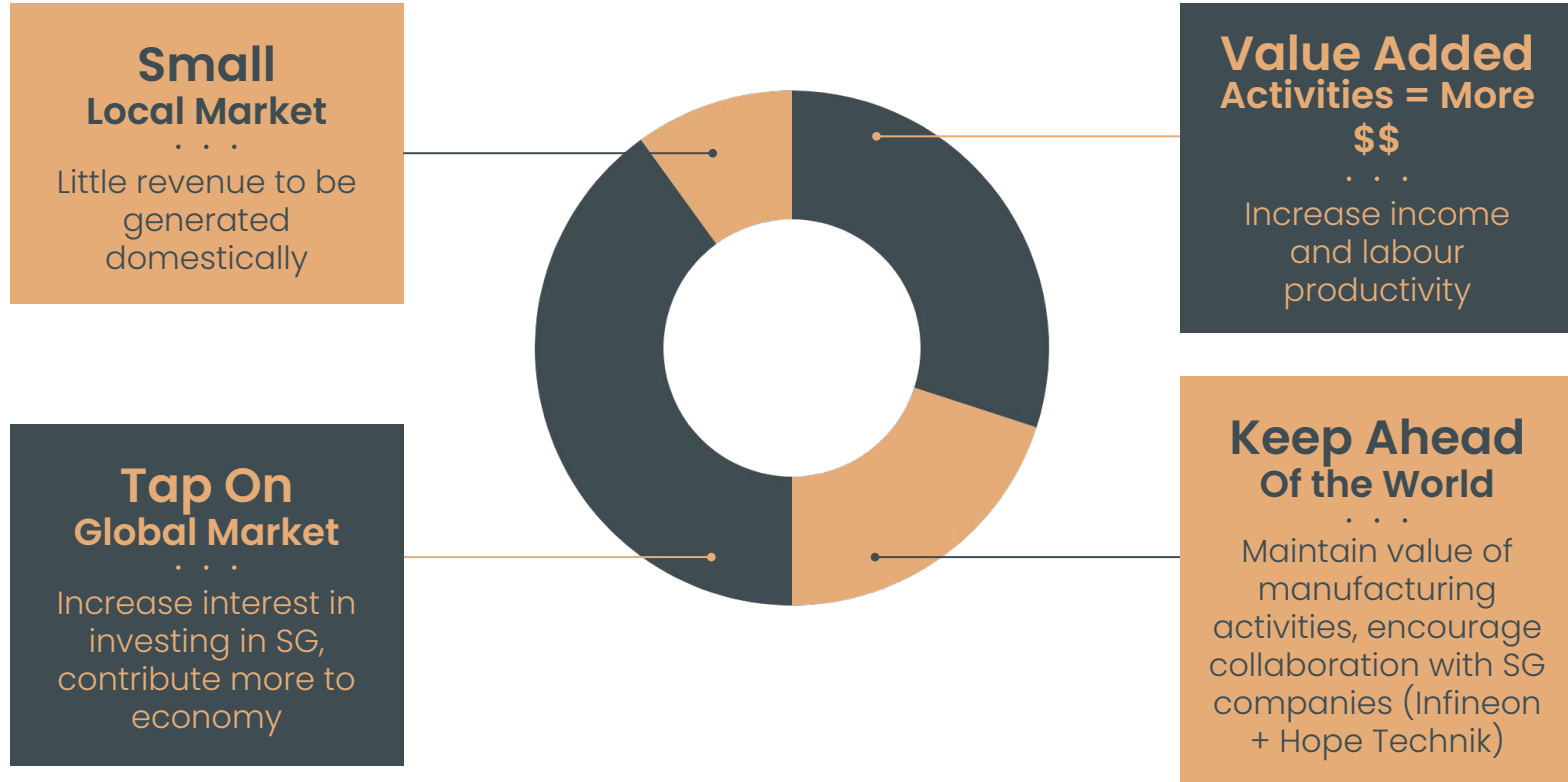


Why Do We Need to be Globally Competitive?

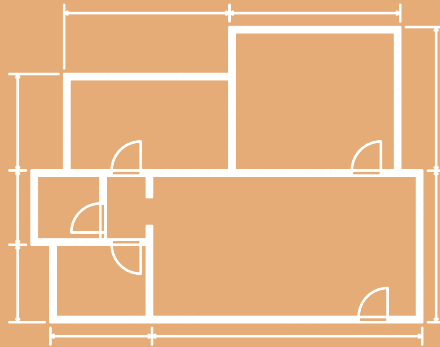
Not just because we are *kiasu*...right?



Global Competitiveness & Our Economy



... Other Benefits Enjoyed from Manufacturing Industry ...



Increase Jobs for All

Increase in jobs across all fields required to set up a new facility



Learn From Experience

SG workers gather experience from MNCs to set up their own companies

The background features a dark blue field with various abstract geometric elements in orange and white. In the top left, there is a large orange circle with a white dotted pattern inside. To its right is a white hexagon, followed by a horizontal row of white dots. Further right is a small white circle with a grey dot inside, and a larger orange circle with a small orange dot on its circumference. On the far right, there are white lines forming a large triangle and a smaller orange hexagon. A solid orange circle is positioned on the left side of the image.

Water System

• • Evolution of Singapore's Water System • •

- Technology advancements
- Safe to drink water
- Internationally recognized as a global hydrohub



Challenges



**Increased
Demand for Water**

Sustainability

4 National Taps



**WATER FROM LOCAL
CATCHMENT**



IMPORTED WATER



NEWater



DESALINATED WATER

40% of Singapore's water needs!

NEWater

- Recycles our treated used water
- Weather resilient
- Designed to cushion water supply during dry weathers
- Expected to supply 55% of Singapore's water needs by 2060
 - Water agreement with Malaysia



How Water System Benefits Singapore

- A pillar of Singapore's water sustainability



The background features a dark blue field with various abstract geometric elements in orange and white. In the top left, there is a large orange circle containing a dense grid of small white dots. To its right is a white hexagon, followed by a horizontal row of white dots. Further right is another orange circle with a small white dot inside and a small orange dot on its circumference. In the top right corner, there are white lines forming a large triangle and a smaller orange hexagon. A small orange circle is also visible on the left side of the top section.

Oil Refining

Oil Refining By Numbers

1.5%

**World Refining
Capacity**

Singapore produces
1.5% of world's
production capacity

3%

Singapore's GDP

Contributes to 3% of
Singapore's GDP

Oil Refiners in Singapore



Shell

ExxonMobil

ExxonMobil



SPC



BP

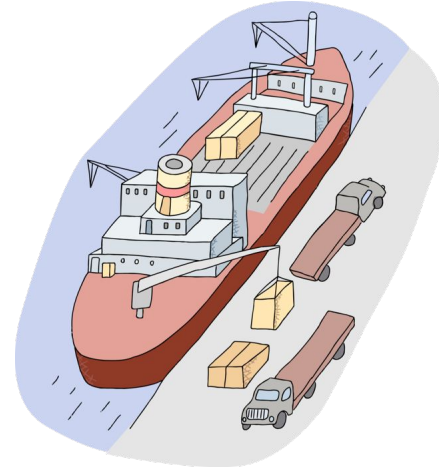
Benefits



Investments



Jobs



Importance as
Shipping Hub

The background features a dark blue field with various abstract geometric elements in orange and white. These include a large orange circle with a white dotted interior in the top left, a white hexagon, a grid of white dots, a white circle with an orange dot, a white triangle with an orange hexagon inside, and several smaller orange circles and hexagons scattered throughout.

Green Technology



Green Technology By Numbers



\$2.7B

Investment in Green Projects

Green Investments Project (GIP) launched by MAS in November 2019

30%

Percentage green buildings in 2017

By floor area

80%

Percentage green buildings in 2030

By floor area

Role of Engineers



Development

Creating more efficient and reliable technology



Implementation

Helping to make these green ideas into reality

ERI@N – Energy Research Institute @ NTU



Energy Research Institute @ NTU

Dedicated to world-class energy research that spans across areas such as development of green buildings, renewable energy deployment, “car-lite” society and establishing low-carbon districts

Benefits



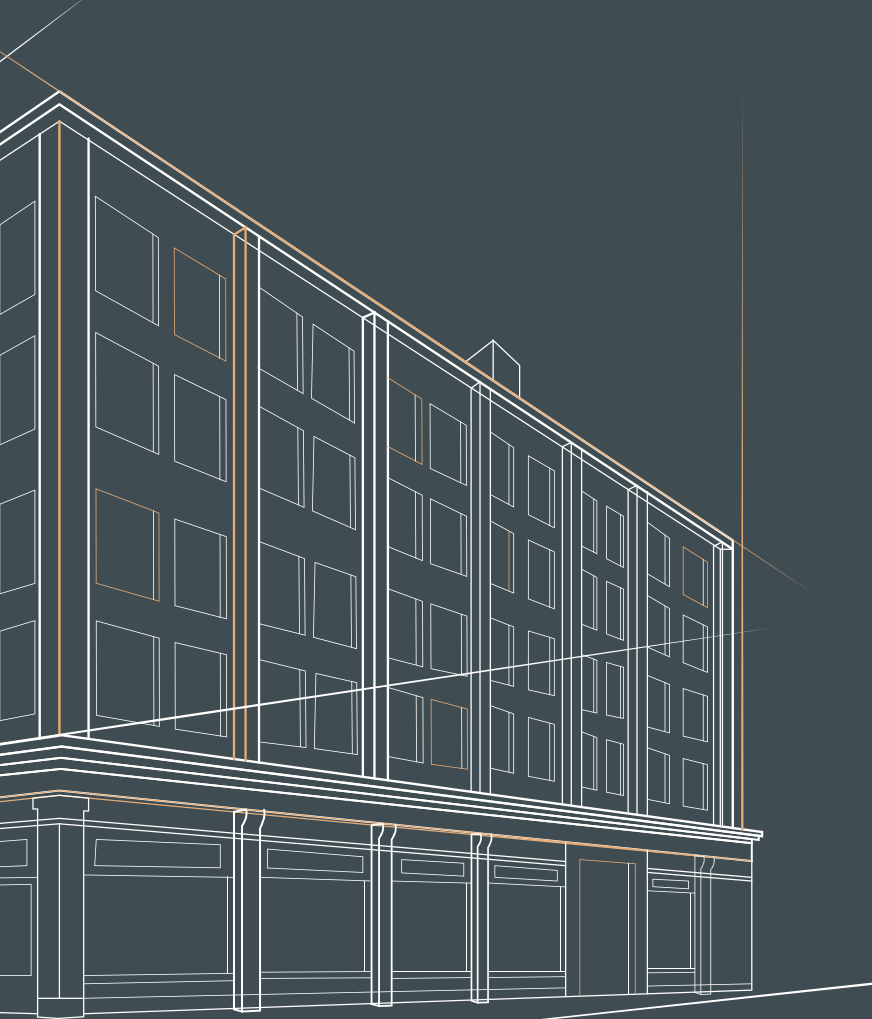
Investments &
Jobs



Diversifying
Energy Sources



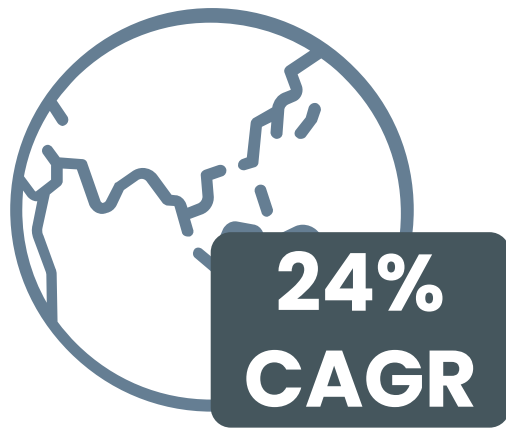
Improvement in
Quality of Life



04

Projection to
Future





Sustainability



Importance of Sustainability

5.7B **Living in water-stressed areas by 2050**
700M people displaced by 2030 due to water scarcity (SUMAS)



\$1T **Cost of food wastage**
Combined across countries globally (FAO)



Example of areas for improvement (1)



Food & Water

Alternate food sources & production methods



96% less land

87% less water

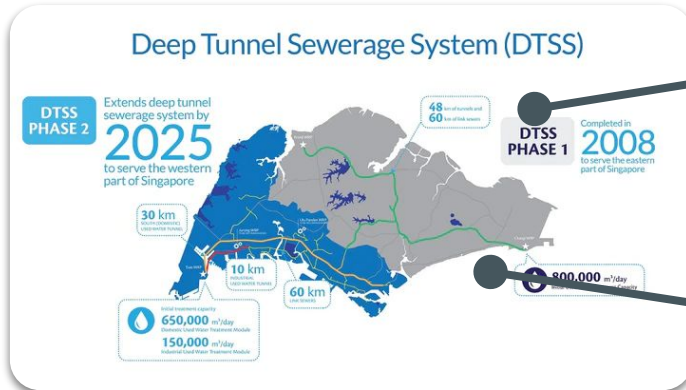
89% less emission

Example of areas for improvement (2)



Energy Production

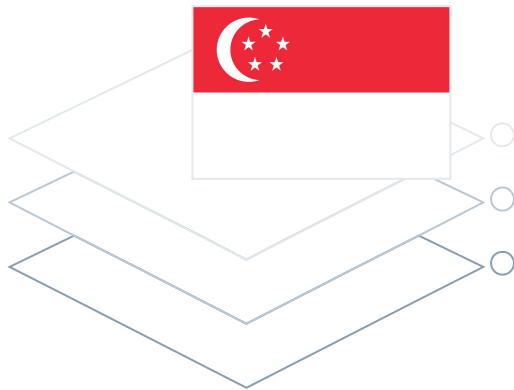
Renewable and sustainable energy source



...sufficient to power
**300,000 four-room
HDB** apartments.

... **30% more compact**
footprint compared to
conventional plants.

How to accelerate the growth



Direct investment

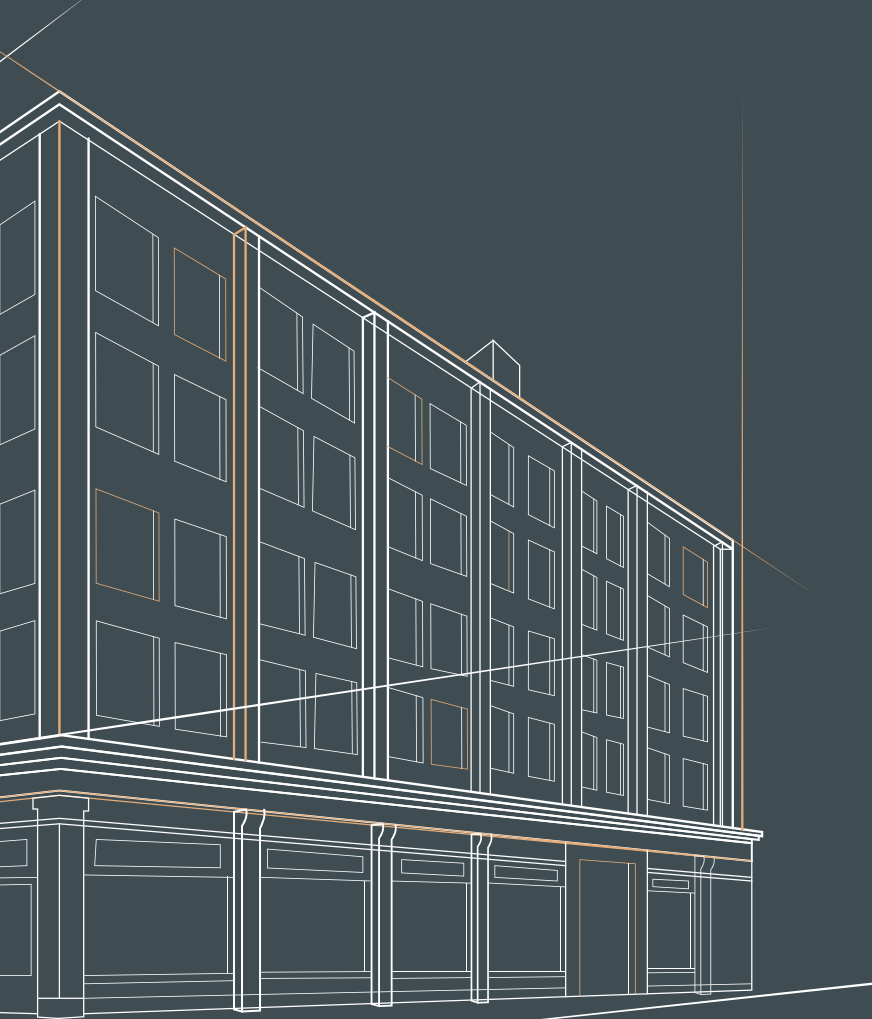
To ease barrier to entry
for high R&D cost

Encourage Adoption

Through grants and
financial incentives

International Expansion

Provide support to export
solutions overseas

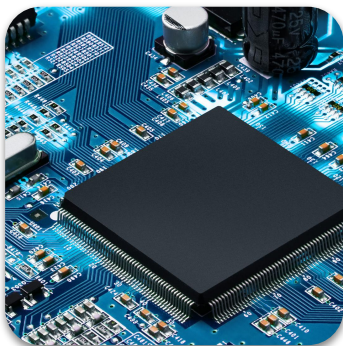


05

Lessons Learnt

What we've learnt through
our research





Past



Now



Near Future



FAR Future

The background is a dark blue-grey color. It is decorated with various geometric elements: orange circles of different sizes, some with dotted patterns; white circles and hexagons; orange hexagons; and white dotted patterns arranged in circles, hexagons, and rectangular grids. Some elements are solid, while others are outlines or dotted. The text "Thank you :)" is centered in a white, bold, sans-serif font.

Thank you :)