The Impact of Economic Diversification on the State of Manufacturing in GCC: Focus on UAE

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GCC in Global Economy

2012 GCC Population: ~ 40M

Shifting weight

% of world GDP

	2000	2005	2010	2015	2020
US	30.7	27.7	24.4	21.2	19.7
EU15	25.2	28.8	25.1	22.7	19.9
EU27	26.5	30.6	27.6	26.9	26.5
Japan	14.6	10.2	9.1	7.2	5.6
China	3.7	5.1	8.9	11.8	13.8
India	1.4	1.8	2.3	3.3	4
Russia	0.8	1.7	2.9	3.4	3.2
Brazil	2	2	2.5	2.4	2.6
GCC	1.1	1.4	1.5	1.6	1.7

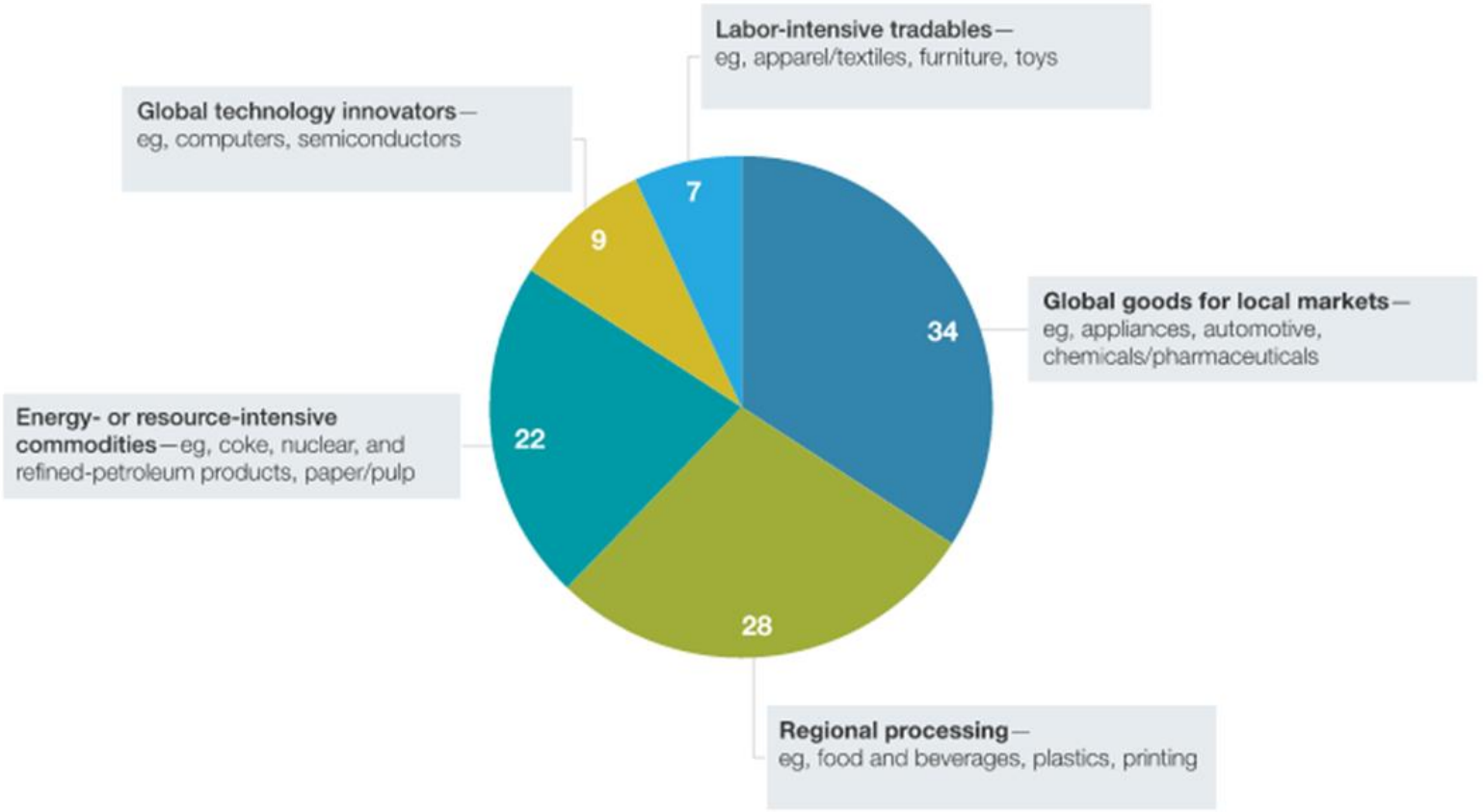
Source: EIU long-term forecasts

Manufacturing is the Future

Manufacturing is an extremely diverse sector, encompassing five broad segments whose sources of success differ greatly.

Manufacturing segments differ by
- distribution of factor costs across capital, energy, labor
- degree of innovation required to compete
- how tradable a product category is

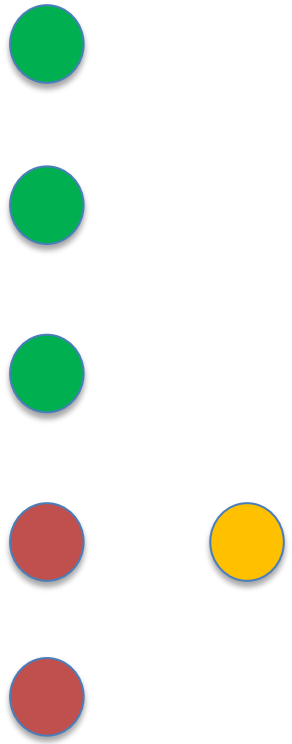
Global manufacturing gross value added, by segment, 2010, %
100% = $10.5 trillion



Source: Mckinsey Global Institute Report, 2012

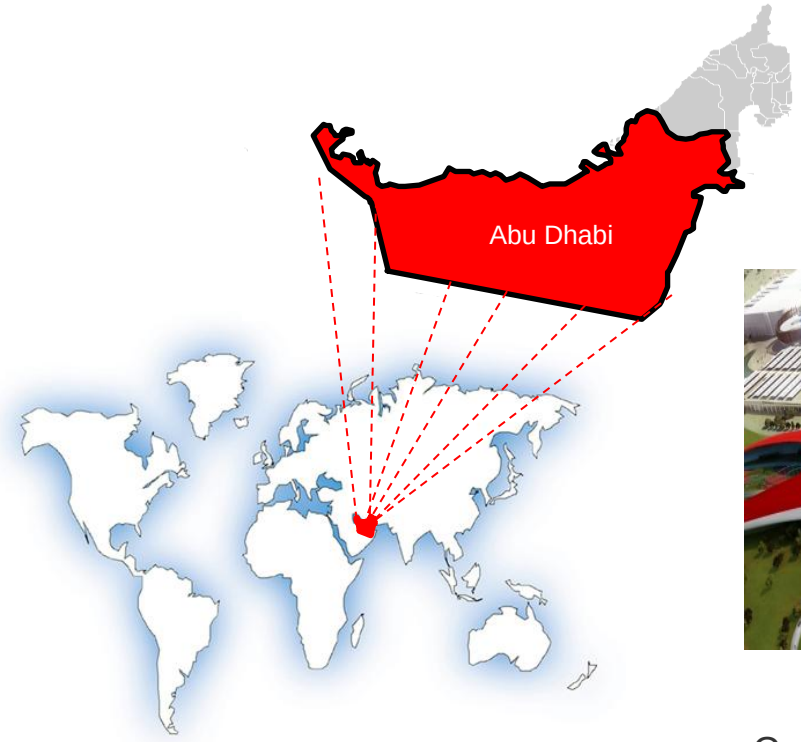
GCC: What Manufacturing Sectors?

- Capital Intensive
- Energy Intensive
- Trade Intensive
- R&D Intensive
- Labor Intensive



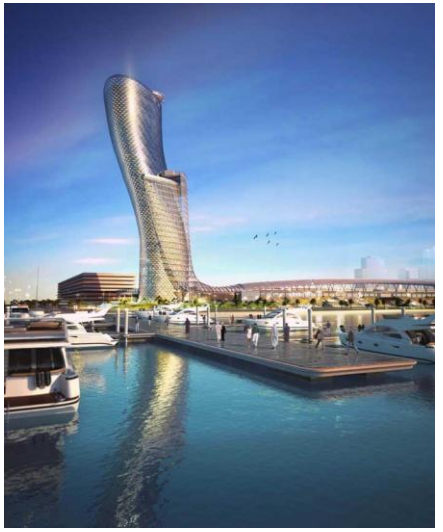
ABU DHABI ECONOMIC VISION 2030

Abu Dhabi: A Global City well integrated in the global economy



Leisure (Ferrari)

Business (Capital Gate)



Culture (Guggenheim)

Clean Energy (Masdar City)

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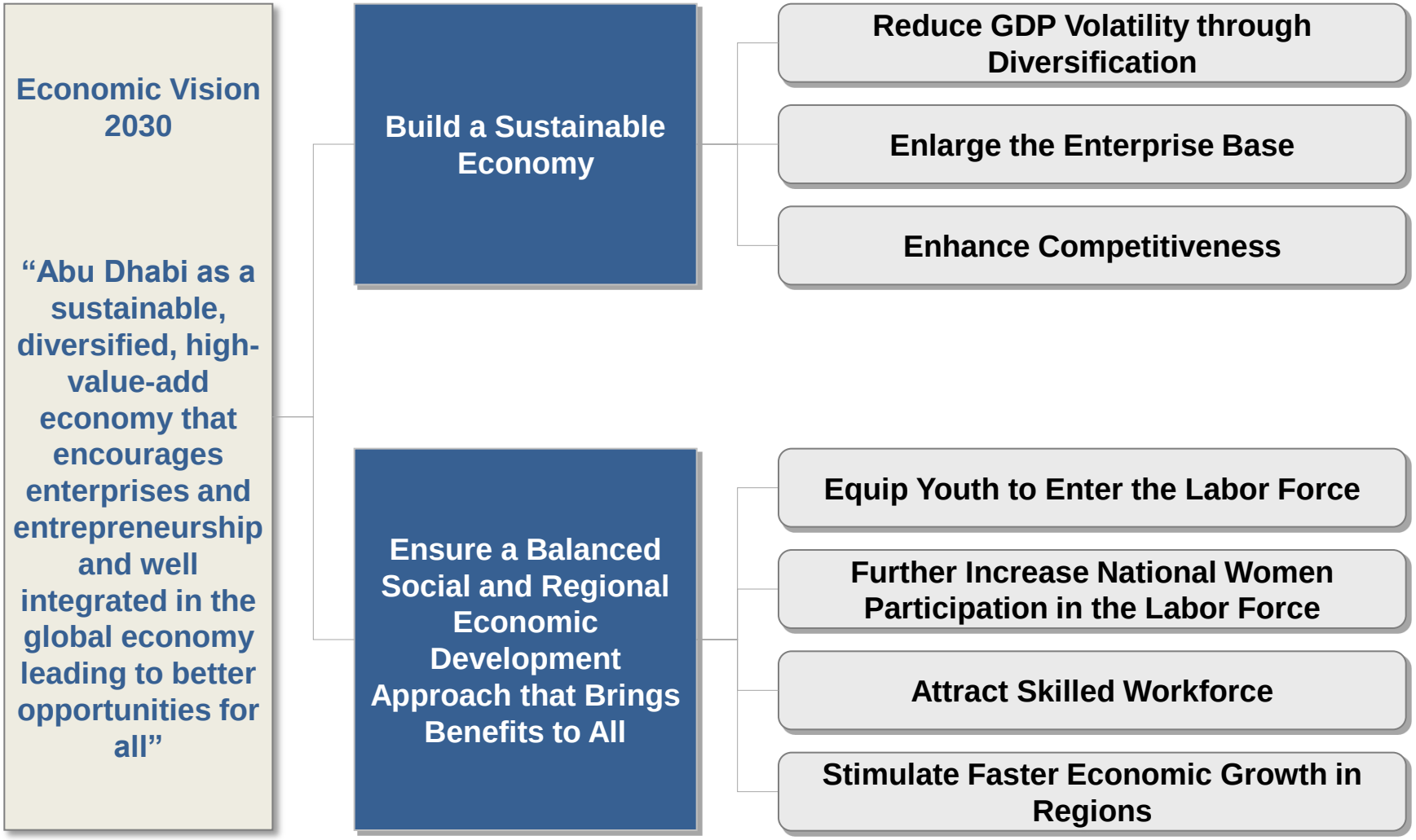
ABU DHABI ECONOMIC VISION 2030

Required policy priorities to achieve vision



Source: Abu Dhabi Economic Vision 2030

ABU DHABI ECONOMIC VISION 2030

The engines of future economic growth

Masdar INSTITUTE

GLOBAL FOCUS SECTORS

REGIONAL FOCUS SECTORS

Source: Abu Dhabi Economic Vision 2030

Khalifa Industrial Zone Abu Dhabi (Kizad)

The 417 square kilometer **Khalifa Industrial Zone Abu Dhabi (KIZAD),** is projected as the hub for manufacturing, logistics and trade across a number of sectors.

The Port Island extends 6km offshore, has a principal quay wall of 3.2km and is linked to the mainland by a 1km bridge

The targeted business sectors include petrochemicals, steel, pharmaceuticals, life sciences, chemicals, biotechnology, metals, food and beverages, logistics and transportation.

About Mubadala

- Formed in 2002 and 100% owned by the Government of Abu Dhabi
- Mandated to strengthen Abu Dhabi's growth potential, and to help the Government meet its socioeconomic targets
- Focused on investment and development across multiple sectors, with a portfolio valued at more than US$50 billion

Priority Sectors

Aerospace

Aluminum

Oil & Gas

Renewable Energy

Communication Technology

Semiconductors

Social Infrastructure Investments

Healthcare

Human Capital

Real Estate

Services

EMAL: Emirates Aluminum

Emirates Aluminium (EMAL) a joint venture of Dubai Aluminium (DUBAL) and Mubadala

The aluminium complex is being built in two phases on a 6 sq km site in KIZAD- Khalifa Industrial Zone

- EMAL is an important strategic initiative for Abu Dhabi, Dubai and the UAE and is a key component of Abu Dhabi's diversification and industrialisation policy.
- EMAL started second phase of expansion in September 2011. The firm builds new smelter with annual 520,000 tons of capacity for US$ 5.4 billion. The firm also improves productivity at existing smelter with 756 furnaces by end of 2014

Merger of Emal and Dubal Emirates Global Aluminum

- Emirates Global Aluminum will be the fifth largest aluminum company by production.

- Emirates Global Aluminum will serve over 440 customers in 55 countries, with a joint production capacity of 2.4m tons of aluminum per year.

Mubadala Aerospace

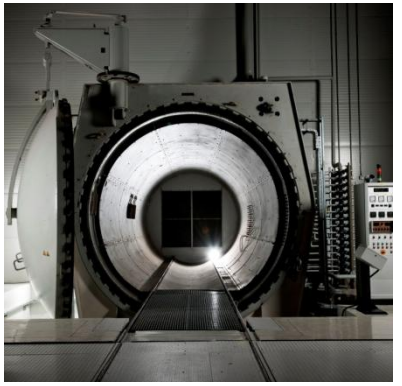
- Creating a network of leading, globally-integrated businesses delivering capabilities across:
  - Vertical 1: Maintenance, Repair, and Overhaul
  - Vertical 2: Aerostructures Manufacturing
  - Vertical 3: Original Equipment Manufacturing
  - Vertical 4: Flight Training
- Investing in Education, Training and Research and Development (R&D) initiatives that underpin the sectors development

مبادلة
MUBADALA
aerospace

Strata

- Strata is a state-of-the-art advanced composite aerostructures manufacturing plant in Al Ain – the UAE, wholly-owned by Mubadala Development.
- Strata's Vision is to be a leader in this sector and a partner of choice, driving the transformation of the global aerospace industry for Abu Dhabi, whilst delivering sustainable returns.
- The Strata facility sits within the Nibras Al Ain Aerospace Park, a 25 km^2 multifaceted development being developed by Mubadala Aerospace and Abu Dhabi Airports Company to establish Abu Dhabi as a global aerospace hub.





Nibras – Al Ain Aerospace Park

9 Development phases

25 km² Multifaceted development

10,000 Jobs to be created by 2030

From desert to market leader in a decade, with a high performing, multi-cultural workforce

ATIC
Semiconductor Industry

ATIC is changing the shape of the global semiconductor industry, nurturing talent and driving innovation. A wholly-owned subsidiary of Mubadala Development Company, ATIC is focused on building leading technology companies such as GLOBALFOUNDRIES, the fastest growing semiconductor company in the world.*

**IC Insights, an industry analyst group based in Scottsdale, AZ, USA.*

Masdar – Abu Dhabi Renewable and Alternative Energy Initiative



- **Masdar Institute** developed with Massachusetts Institute of Technology to develop human capital and research in alternative energies.
- Commercially-viable technologies are tested and deployed in Masdar City and sold globally.
- **Masdar City** will be the world's first carbon neutral, zero-waste to landfill, car-free city powered entirely by alternative energy sources.

Shams 1- one of the largest CSP plants in the world and the first in the Middle East



- **The Shams 1** project is the first service plant for renewable energy, involves the design, construction, operation and maintenance of a CSP plant located in the Western Region of the Abu Dhabi Emirate a build, own, operate basis.
- **Shams 1 plant** uses sustainable and renewable energy to produce electricity.
- **Shams 1** plant uses solar thermal collectors to concentrate heat from direct sunlight, the plant will save 175,000 tons of CO2 every year, equivalent to planting 1.5 million trees or taking approximately 15,000 cars off the road.
- Collectors features are high reliability, optical performance and a state of-the-art design that reduce production and assembly costs
- Total area of plant site is approximately 2.5 square kilometer and the solar field consists 768 units of Solar collector assemblies. The solar field includes 258,048 mirrors that take up a total mirror aperture of 627,840 square meter. In addition, the expected production capacity for the plant is 100 Megawatts.

Masdar Institute Research
Global Issues of Local Importance

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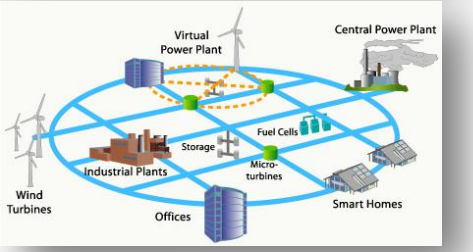
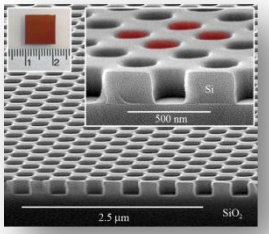
Water

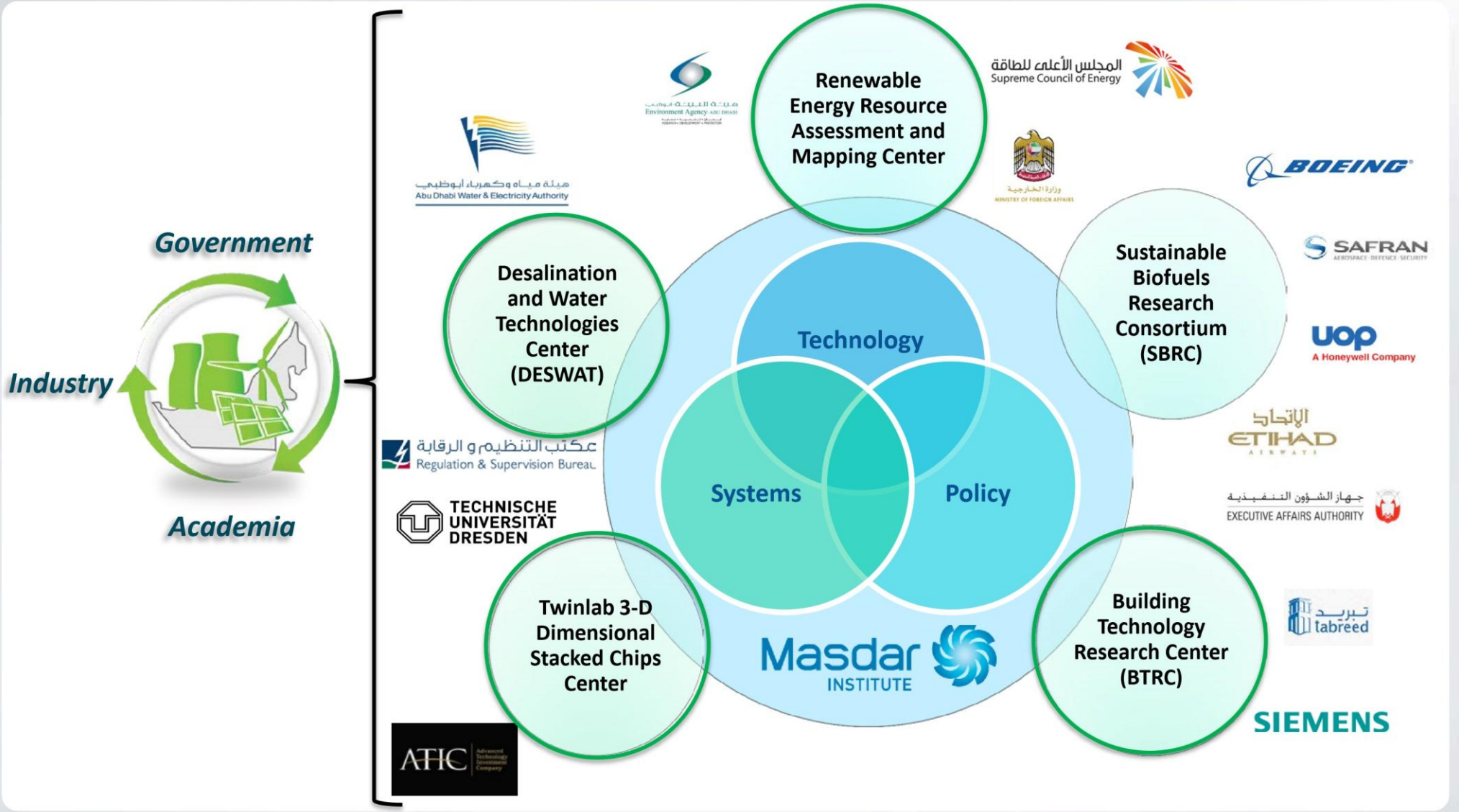
Energy ⟷ Climate

Use-Inspired Research

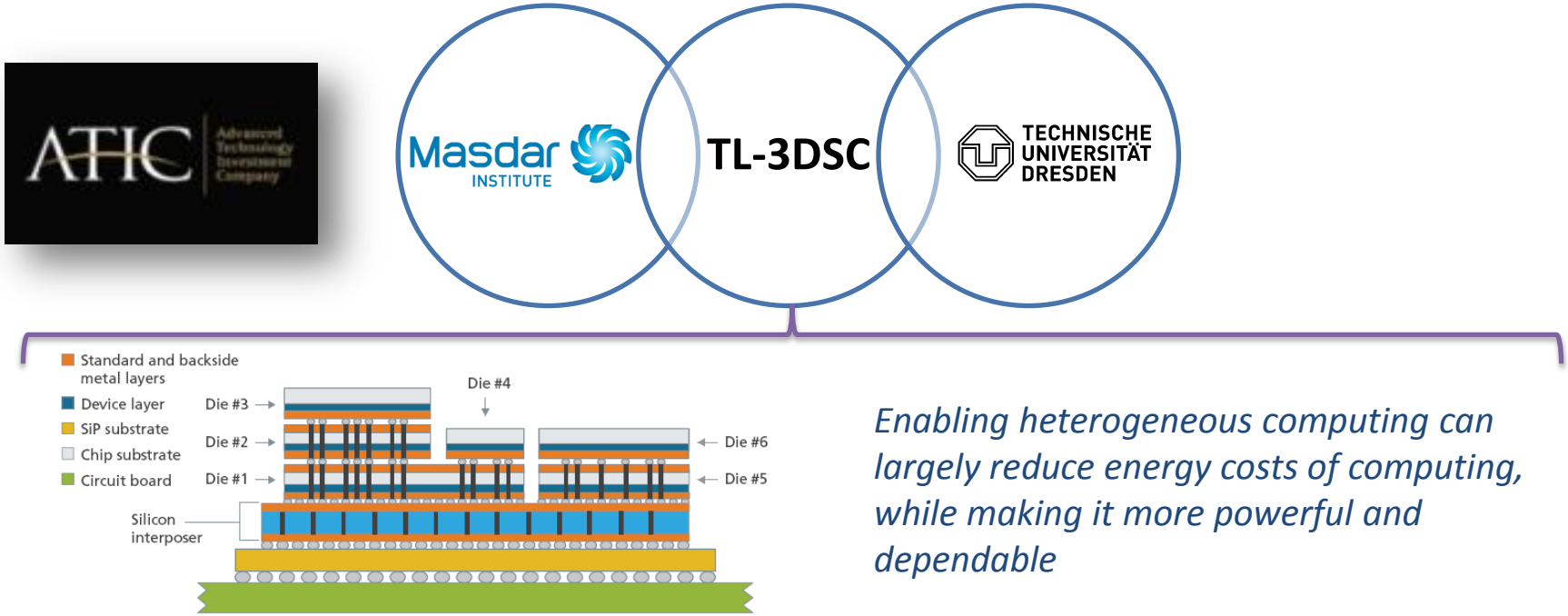




Multidisciplinary Research Centers



Twinlab 3D Stacked Chips (TL-3DSC) Research Center



Cadence, 2011: 3D ICs with TSVs – Design Challenges and Requirements

Enabling heterogeneous computing can largely reduce energy costs of computing, while making it more powerful and dependable

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- 3D-Integrated microelectronics for minimum energy design

TU-Dresden

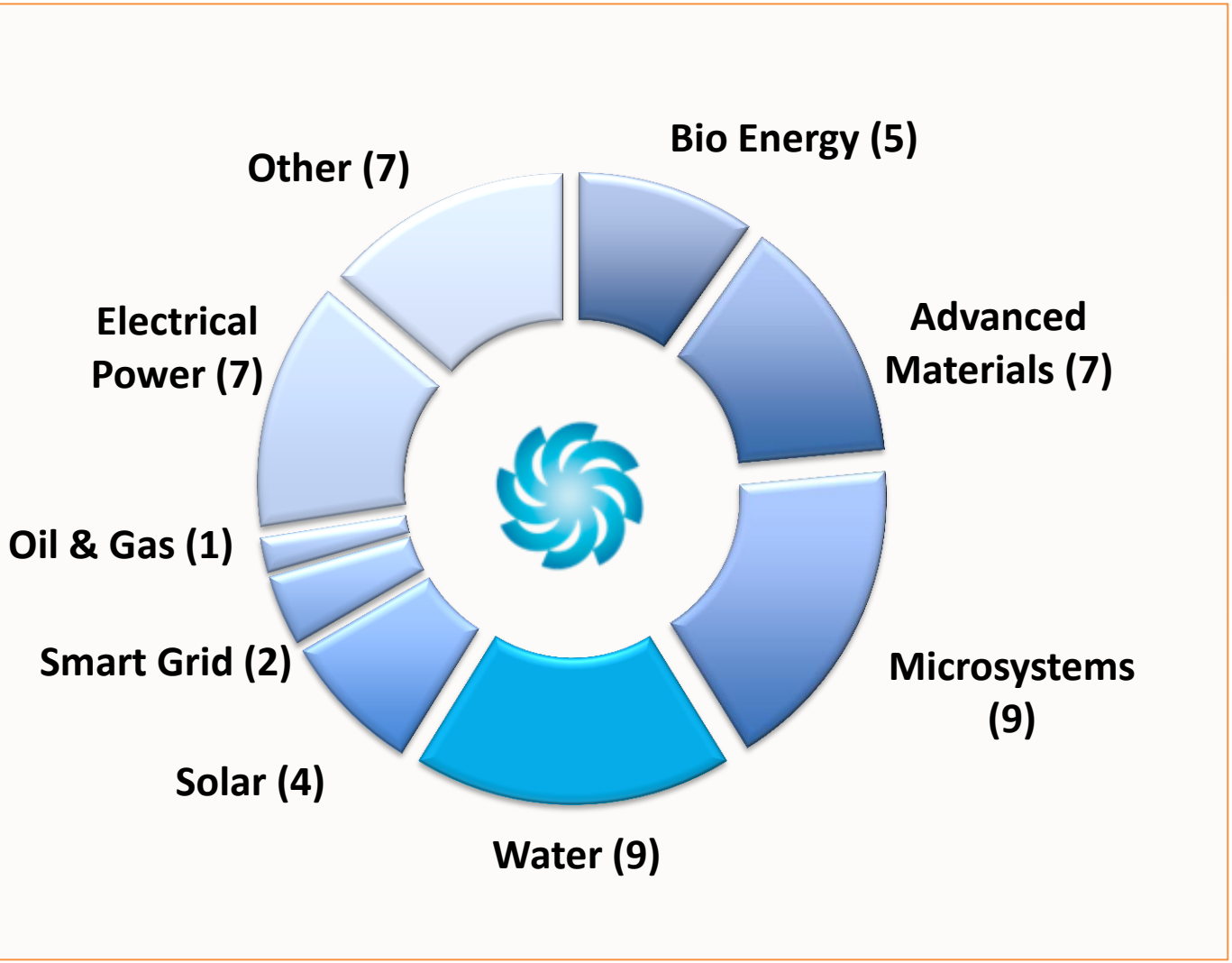
- 3D Chip Stack intraconnects for energy/bandwith optimization

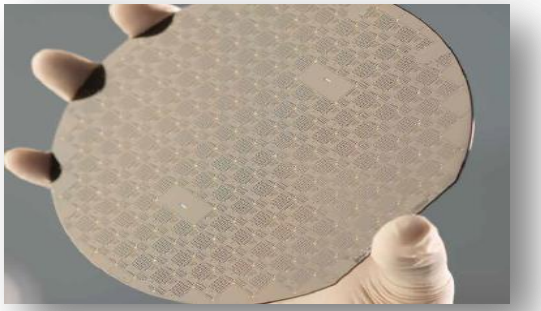
Opportunities

- Integrate heterogeneous chips in the same vertical stack
- Very high-levels of integration, resulting in very-small form factors
- High data-rate systems that overcome bandwidth & area bottlenecks
- MEES: up to 90% savings in energy

MI Technology Disclosures

By Topical Area





Masdar Institute Research Centers (iCenters)

- **iWater**
  - Institute Center for Water and Environment

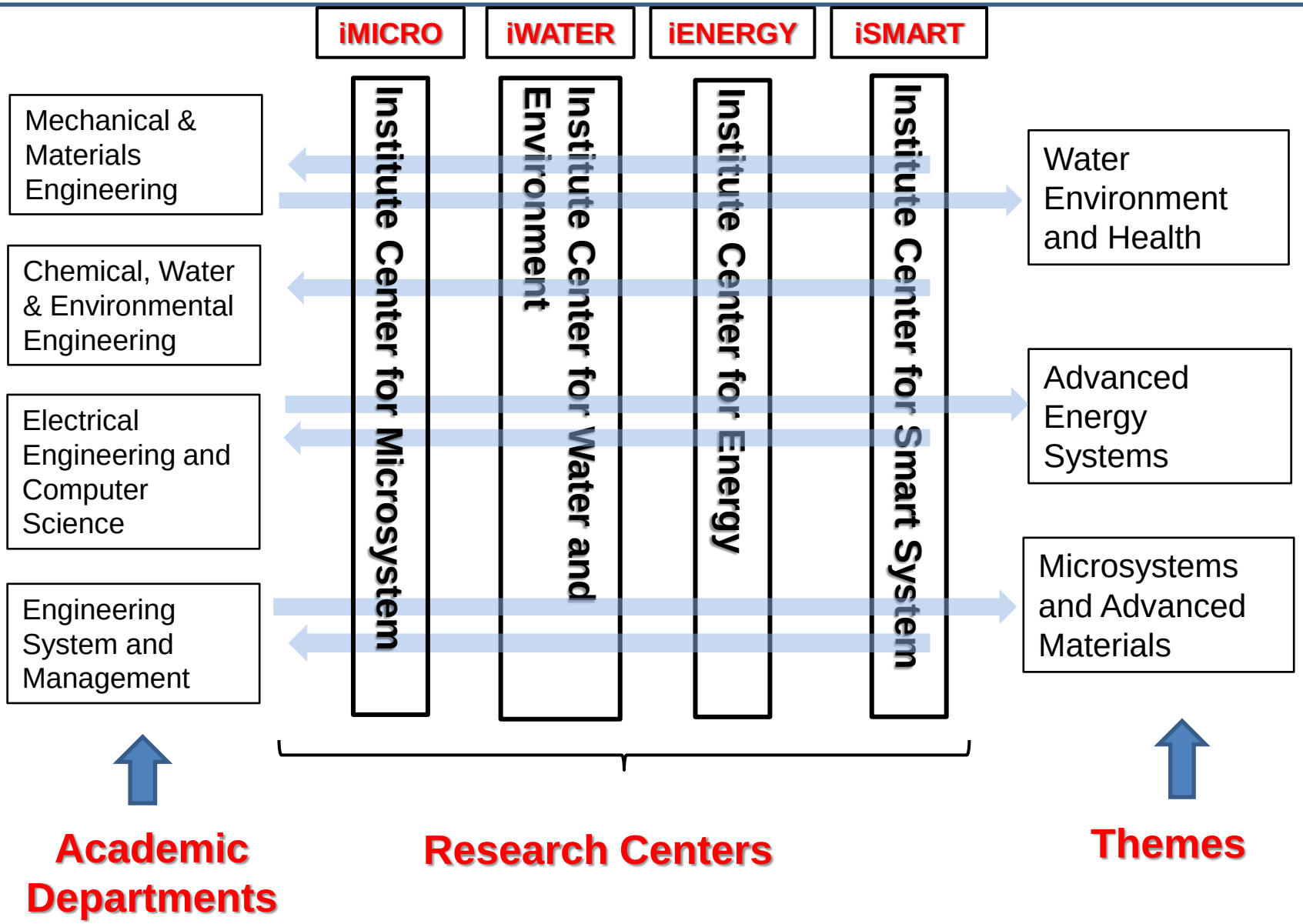
- **iEnergy**
  - Institute Center for Energy

- **iMicro**
  - Institute Center for Microsystems

- **iSmart**
  - Institute Center for Smart and Sustainable Systems

- **iInnovation**
  - Institute Center for Innovation and Entrepreneurship

MI's Research and Academic Structure



- Lightweight Alloys: processing and manufacturing
  - Aerospace
  - Energy application
- Energy-Aware Manufacturing Systems
  - Energy Efficiency
  - Energy Monitoring and Auditing
- Sustainable Supply Chain Management (SSCM)
- Design Methodologies for Reconfigurable Manufacturing Systems
- Waste to Energy/Products

Thank You

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