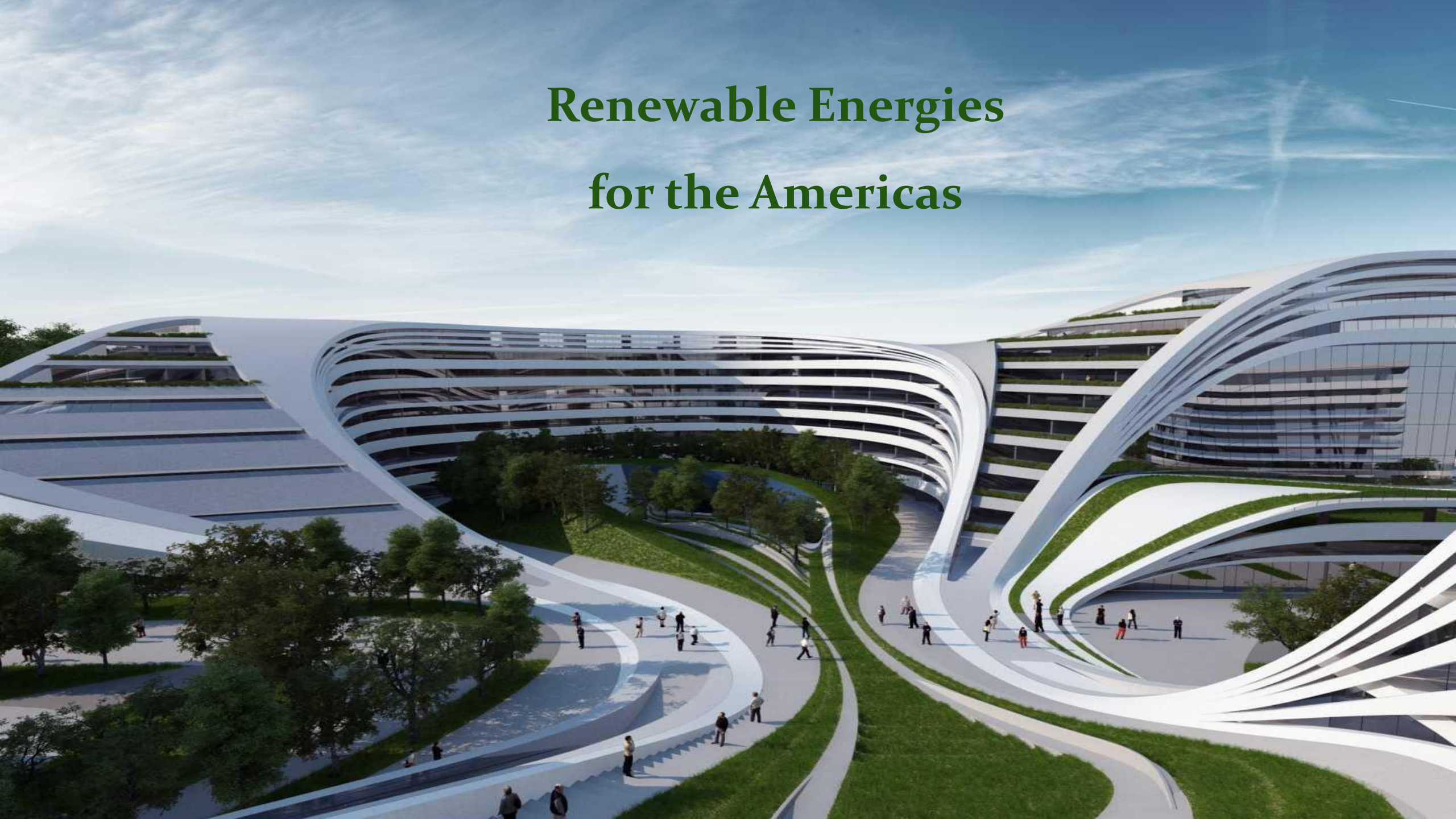
Renewable Energy Hubs

New business models

Renewable Energies for the Americas



MSI Universal – Setting the Scene

Key elements to success:

- **INCLUSION** - Policies that favor the migration of existing investors to new models of energy generation: Shared Value Approach
- **INNOVATIVE APPROACH** - Institutional based design and public policy from the standpoint of technological, managerial and regulatory innovation
- **TECHNOLOGY INTEGRATION** – Forward-looking, complementary use of technologies increases the sustainable value added proposition to the companies that implement them – and the societies that benefit from them
- **MONEY** – Without it, nothing will happen!

Presented by

Associate Companies of

MSI UNIVERSAL

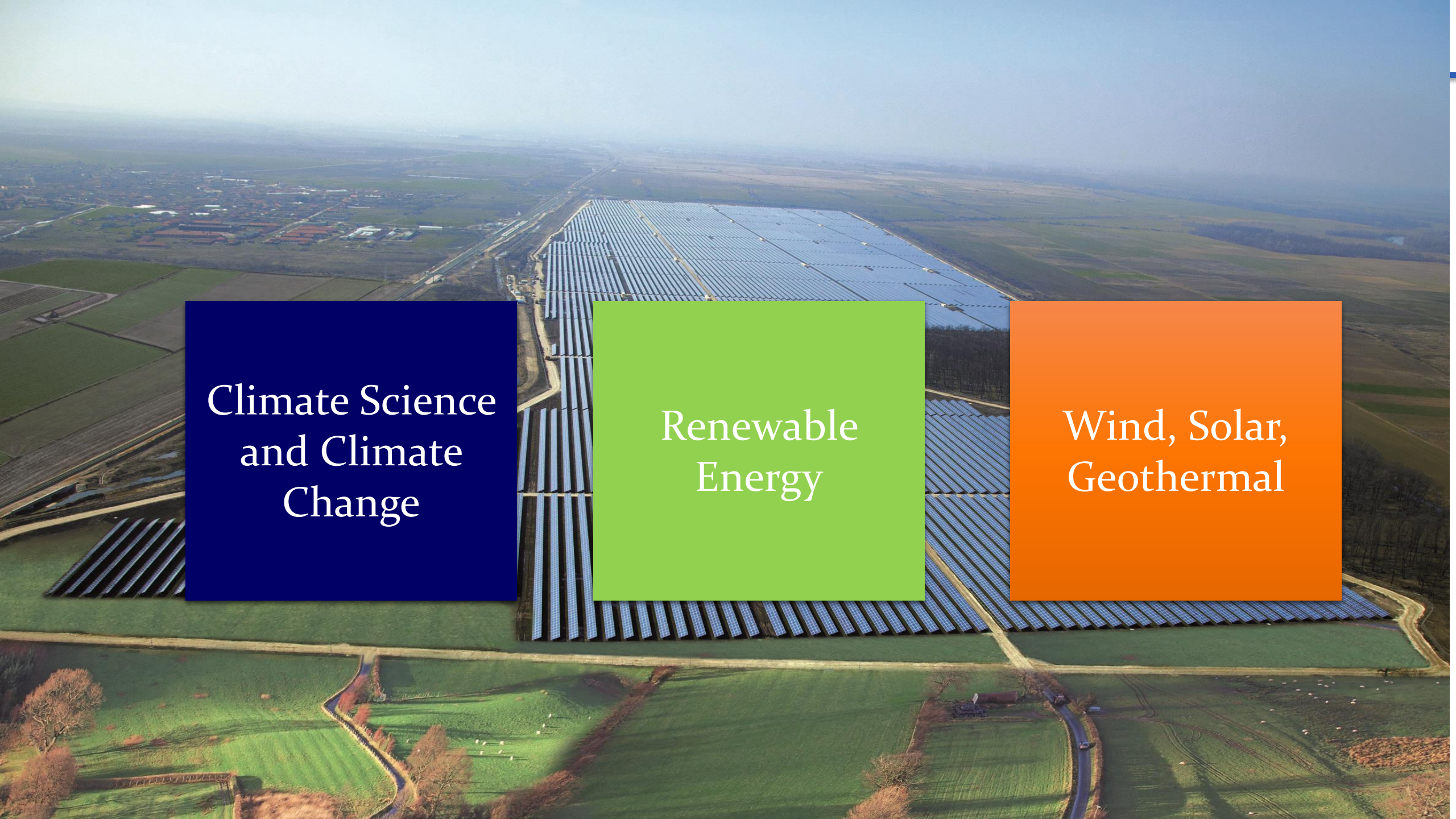
THE SARGASSO GROUP

The Power of Integration

ARNASA CONSULTING

Innovative Breath

CE

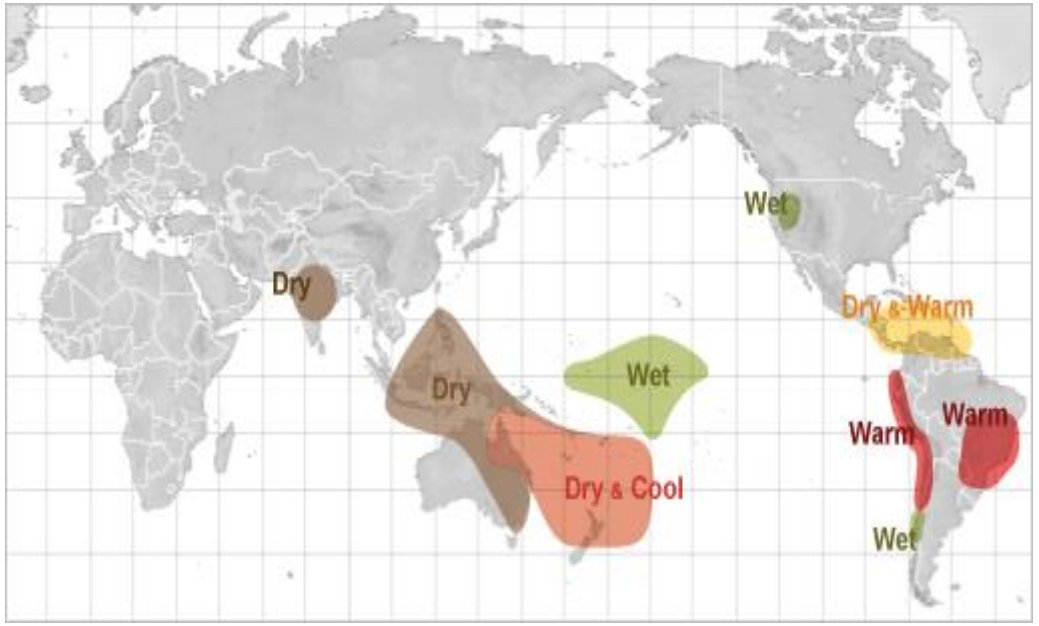

Climate Science and Climate Change
Renewable Energy
Wind, Solar, Geothermal

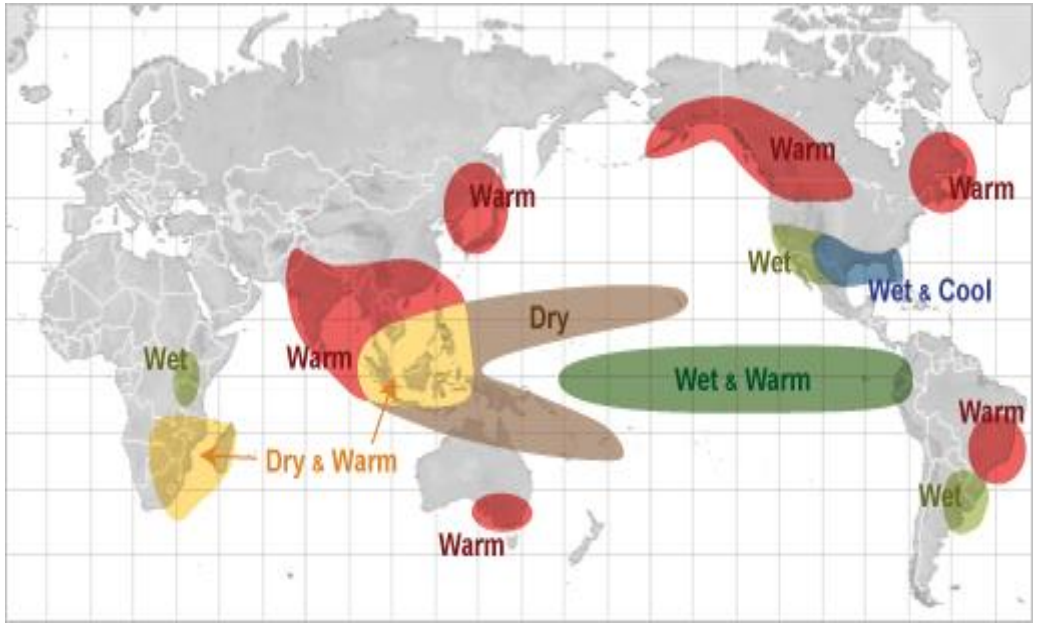
Climate Science has come of Age

- The **evidence**, indisputable is all around us
- The "**Defining Issue**" of our generation (President Obama)
- **Variations in Climate** from 1 year to the next is expected. Recognizing an acceleration in Climate Change factors, California laid down laws **to combat greenhouse gas emissions, CO_2 in particular**, requiring that **30% Power Generation must be from renewable energy sources by 2020**
- **Even though Big countries take action**, it is sometimes Small countries that take the lead
- For example Belize and Costa Rica, here in Central America in their eco system protection and development
- This conference in Guatemala today is more evidence of Central America taking the lead

Good news

- El Niño maps (**warming of surface waters**, Eastern and Central Pacific) influence temperature **and rainfall** in particular as shown below.



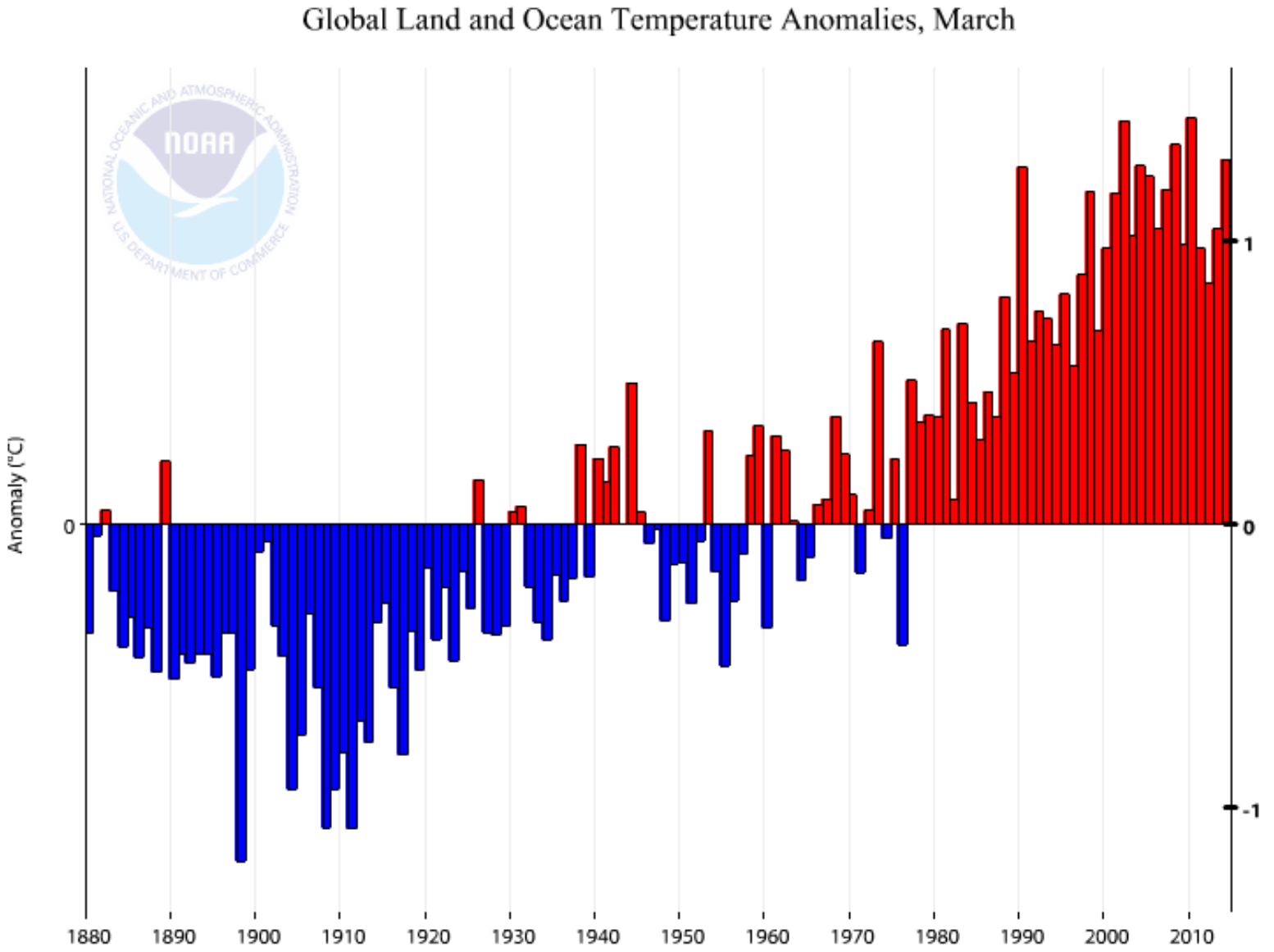


- Predictions are for a **Fair to Good** El Nino in 2014
- **Abundant fishing** usually reported off Coast Western Americas as warmer water sweeps to **the Western coast**

Not so good news

This graph shows the NOAA*1 Chart of Temperature Anomalies: 1880 to 2010.

In the last 30 years, all the Red Temperature Increases show continuous warming and very little cooling of the land and oceans.



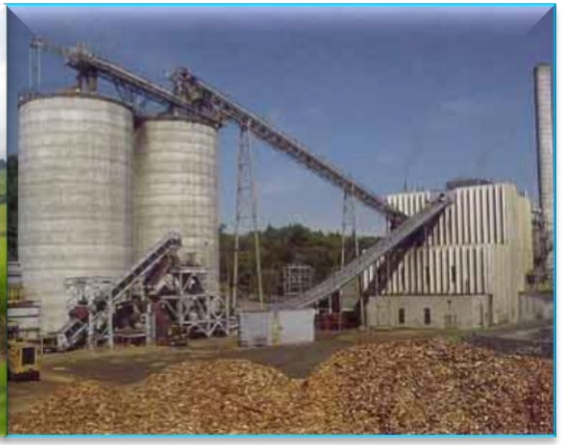
Source: National Oceanic and Atmospheric Administration (NOAA)

Alternative Energy Systems

Application depends on your needs, location, usage, funding available, etc.

- Wind
- Geothermal
- Solar

- Hydroelectric
- Energy Storage
- Biomass



Engineering and Project Management Methodologies

- Establish Goals & Objectives
- Develop Scope and Project Requirements
- Contract & Pricing Negotiations
- Preliminary Design – Engineering Planning
- Stakeholder Input, Regulatory, Community, Ownership
- Final Design Engineering Approvals for Construction
- Value Engineering & Quality Management
- Permits, Site Preparation, Construction Operations
- Construction Management, Milestones
- Construction Scheduling, Operations
- Project Completion, On-Schedule and In-Budget, Deliverables
- Completion of Contractual Obligations

Chow Engineering Example

- One example of a **small Solar Plant** we performed for a California utility.
- This shows a **7 MW Solar** PV Plant
- Approximately 14.2 hectares, **35,000 panels, 200w per panel**

Some remarks

- We are all becoming **very aware** of Climate Change issues

- Some countries including Central America nations have taken action, leading to a **Reduction of Greenhouse Emissions** with the simultaneous Development of Clean Energy

- So….We have started.

Let's continue with a **Commitment to Clean Energy and Renewables**

Renewable Energy Hubs, Business and Financial Integration

There is great debate around the Renewable Energy Business in the world. The central question is:

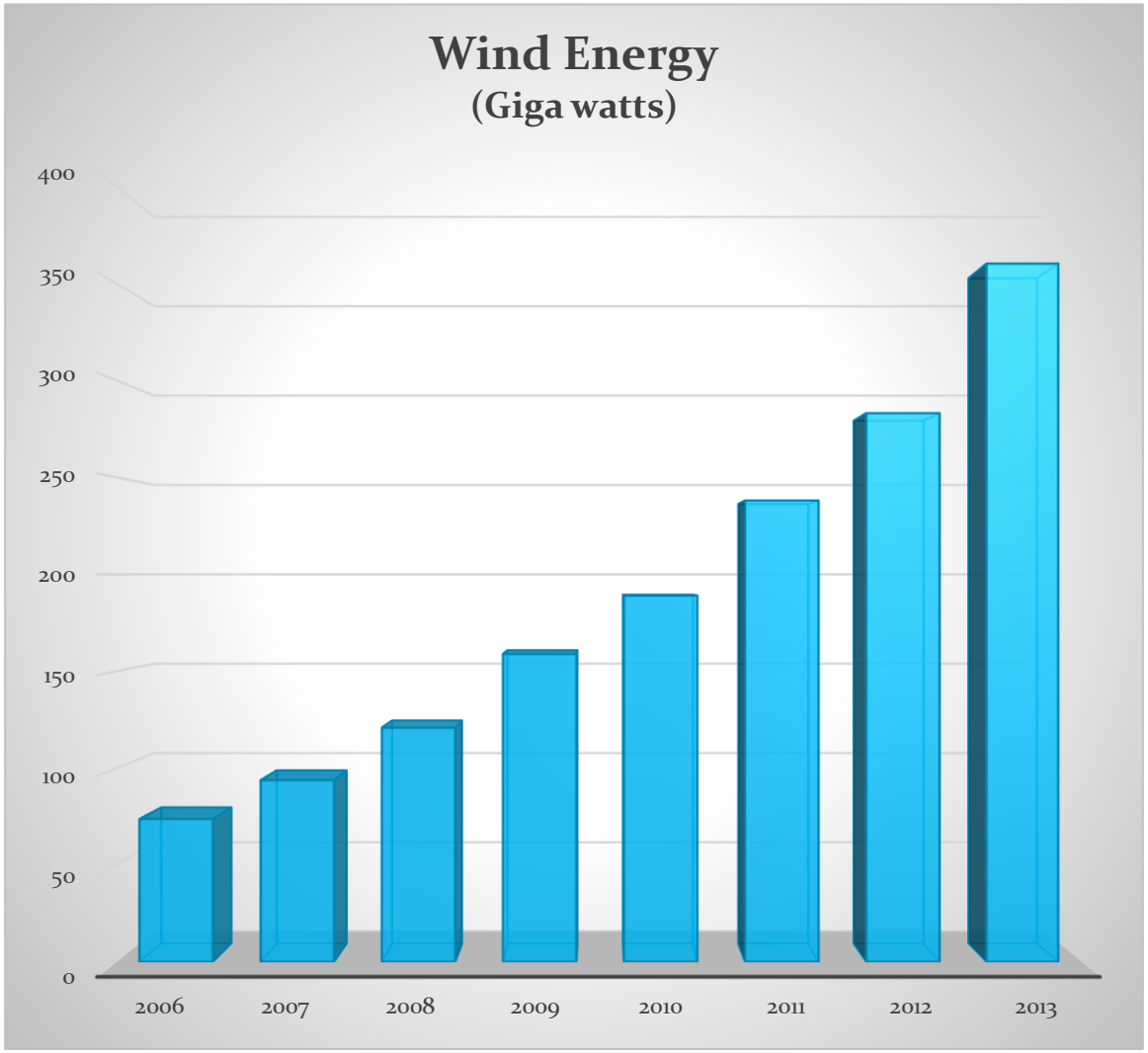
Are Renewable Energy Programs failing?

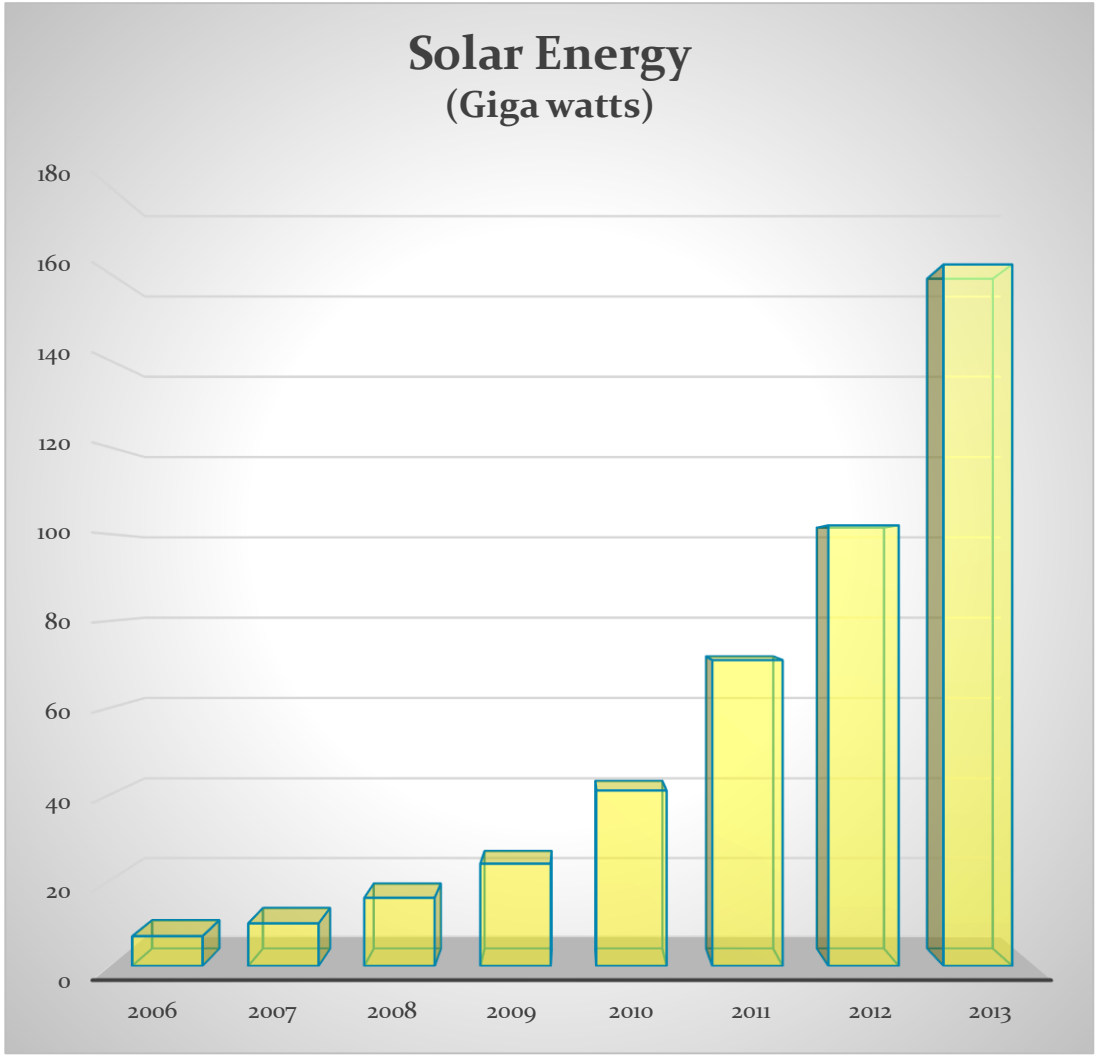
The answer is NO

Myth 1: There is Resistance

- There is an unstoppable cultural adoption: the train has left the station
- There are public mandates for migration that are not being met due to:
  - Lags in technological development
  - Difficulty of access to funds even when the world is awash with money
- The cases of open opposition are increasingly individual and not collective

Myth 1: Resistance?

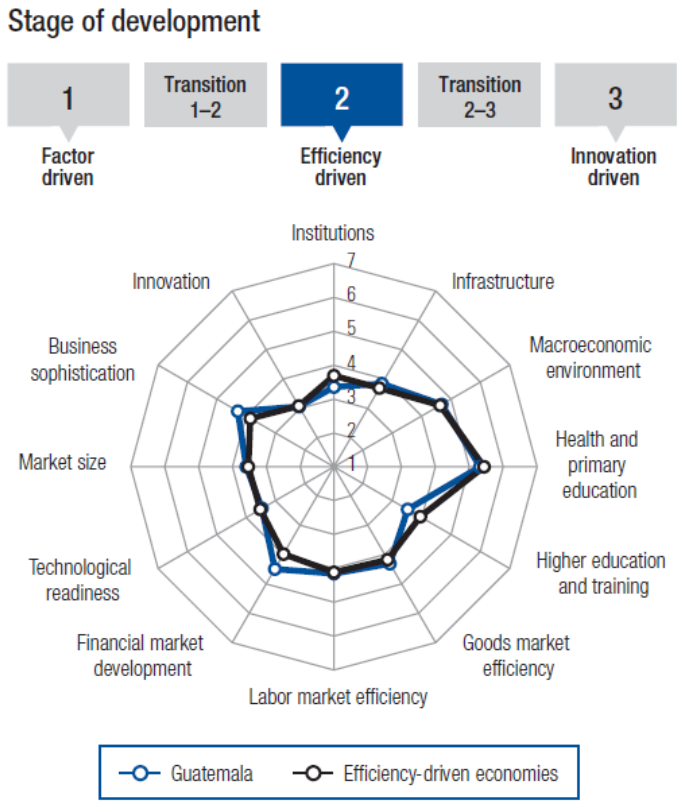




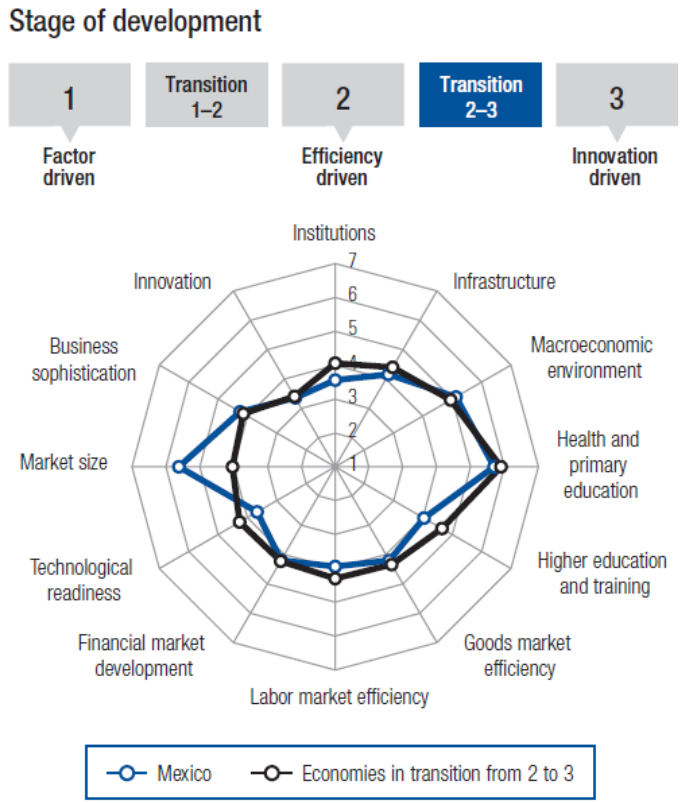
Source: McKinnsey

Myth 2: They Can't be Adapted

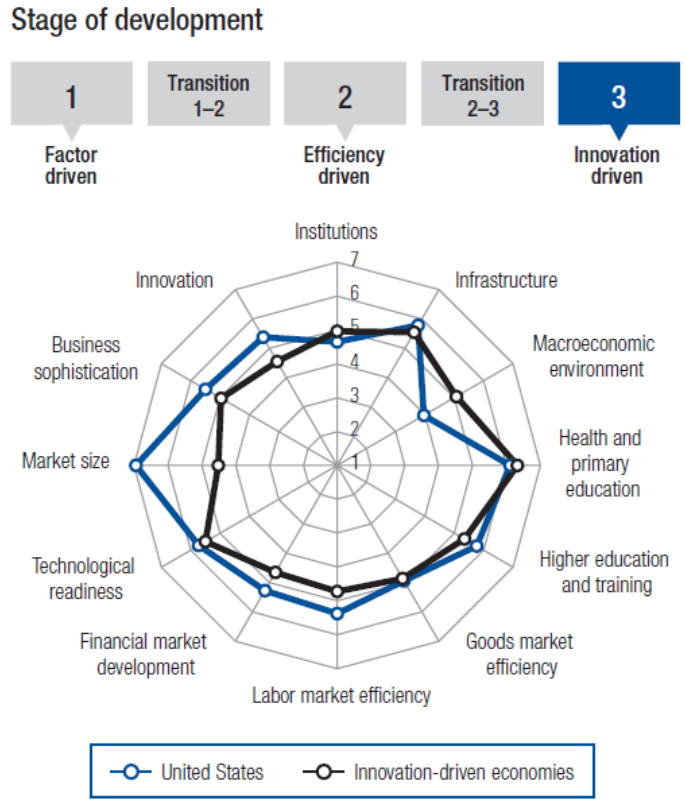
Innovation forces economies to search for alternative renewable energies if they want to be competitive:



Guatemala



Mexico

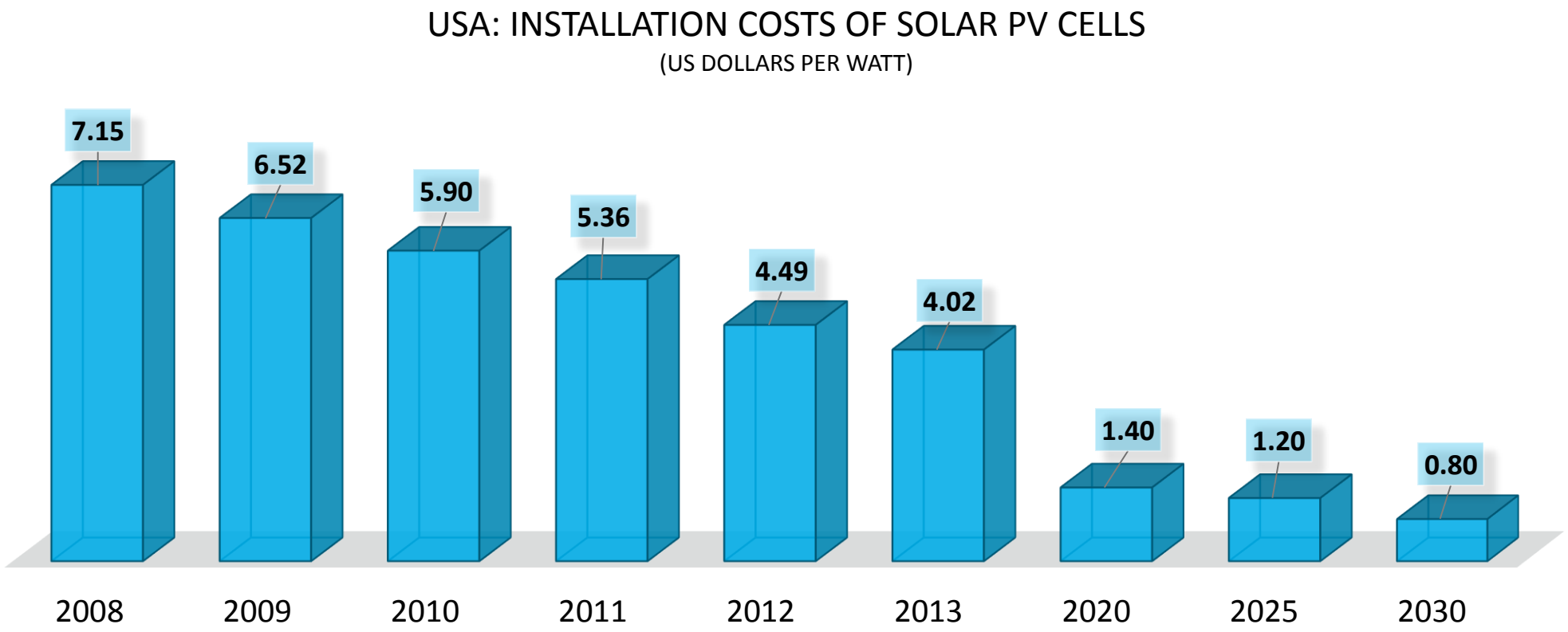


United States

Source: World Economic Forum

Myth 2: They Can't be Adapted

Solar PV installation cost has fallen 44% in the US since 2008 and is primed to tumble further:



Source: McKinnsey

Myth 3: They are Intermittent and Unreliable

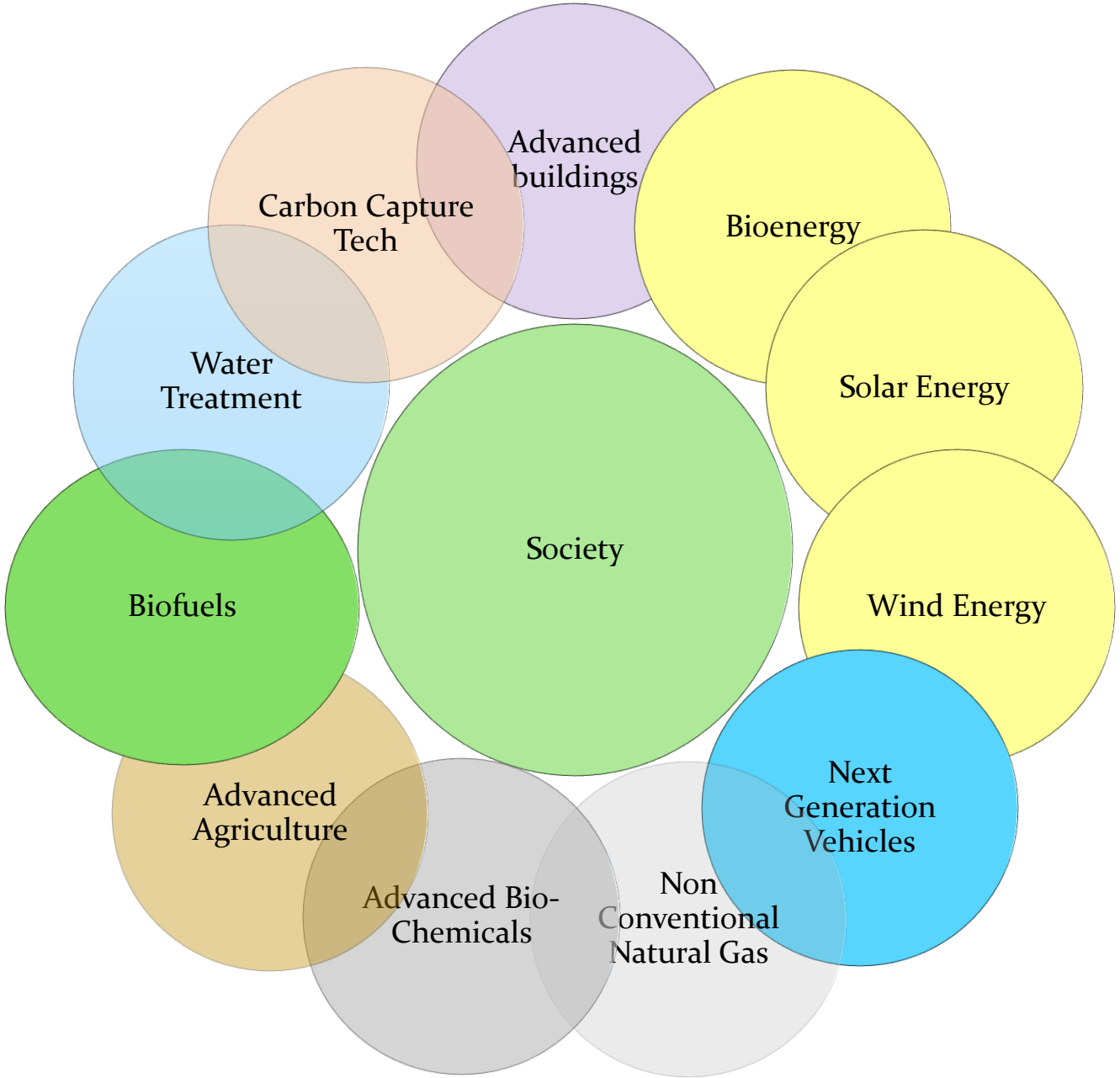
- Some are, most aren't
- Solar and wind are intermittent, but many other such as biofuels, bio-generators, tidal energy and municipal waste are not
- The impact of intermittency can be reduced or eliminated through deployment of advanced energy storage systems such as:
  - Batteries
  - Underwater Compressed Air
- Just eliminating electric utilities' need to provide for peak demand (one or two hours per day) can save money in capital and ongoing costs

Myth 4: They are Purely Government Driven

- Most research and development today is carried out by private companies and institutions
- Many corporations are disappearing as the business is consolidating
- This leaves fewer players but they operate in a more robust market
- Investments into the sector continue to flow: they rose from $30 billon in 2005 to more than $180 billon globally in 2013
- Two big drivers that continue to propel the switch towards renewables are
  - Growing middle class in emerging markets
  - Declining deposits of traditional resources

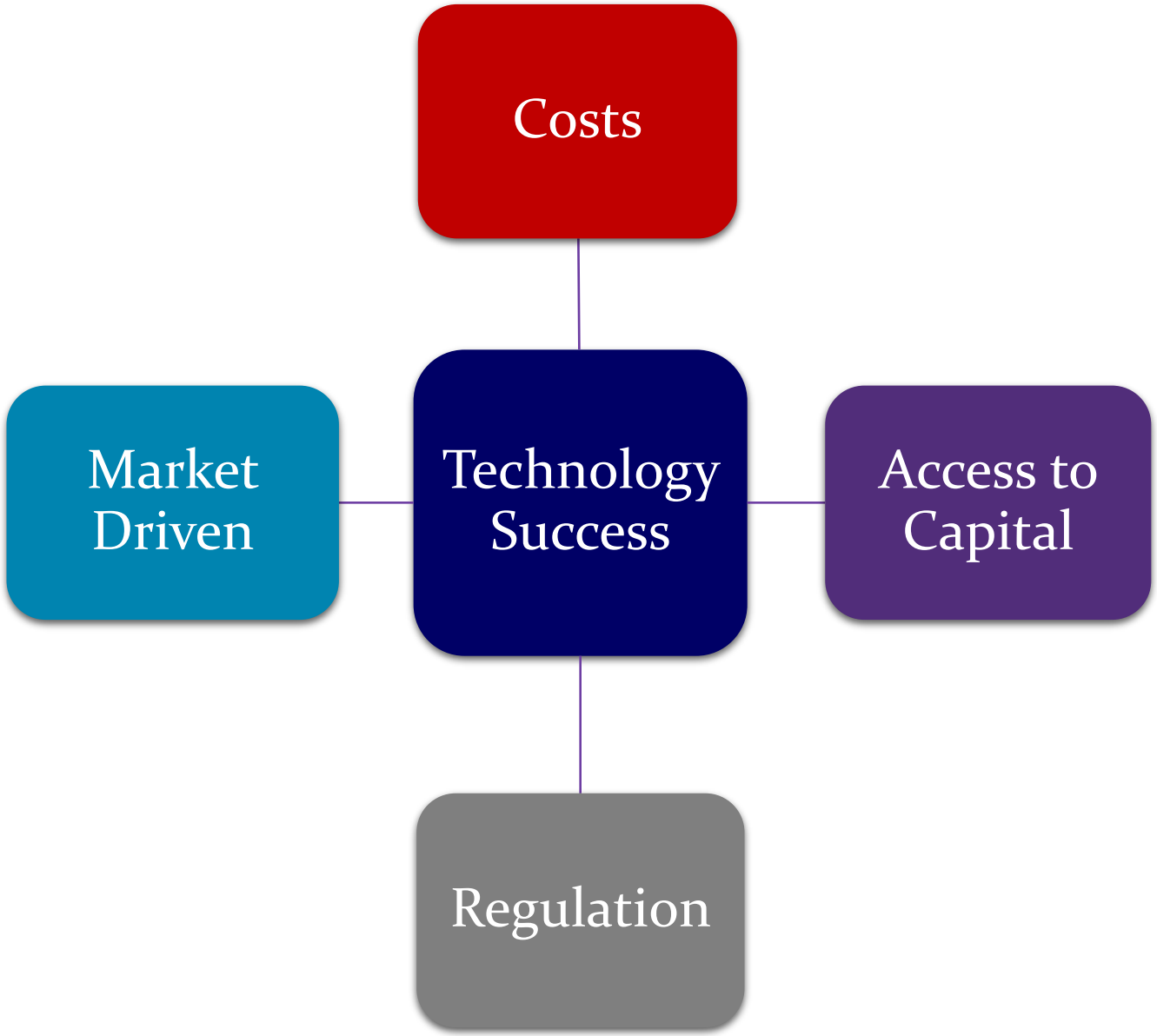
Renewable Energies

Technologies in the hands of private entities:



MSI Universal Investment Model in Renewable Energies

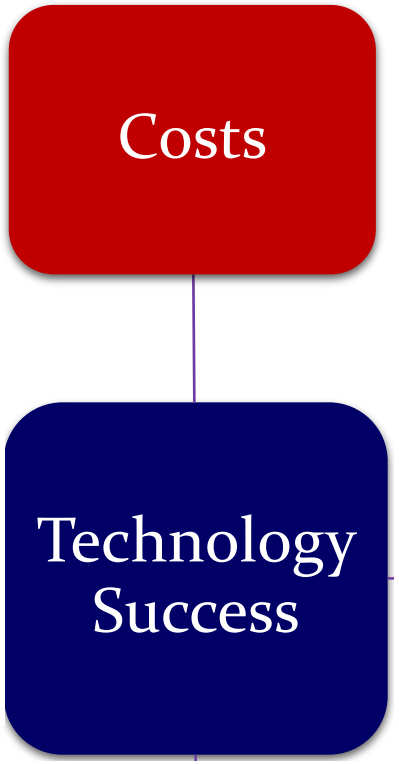
MSI Universal Model



MSI Universal Model

Renewable Energy Hubs:

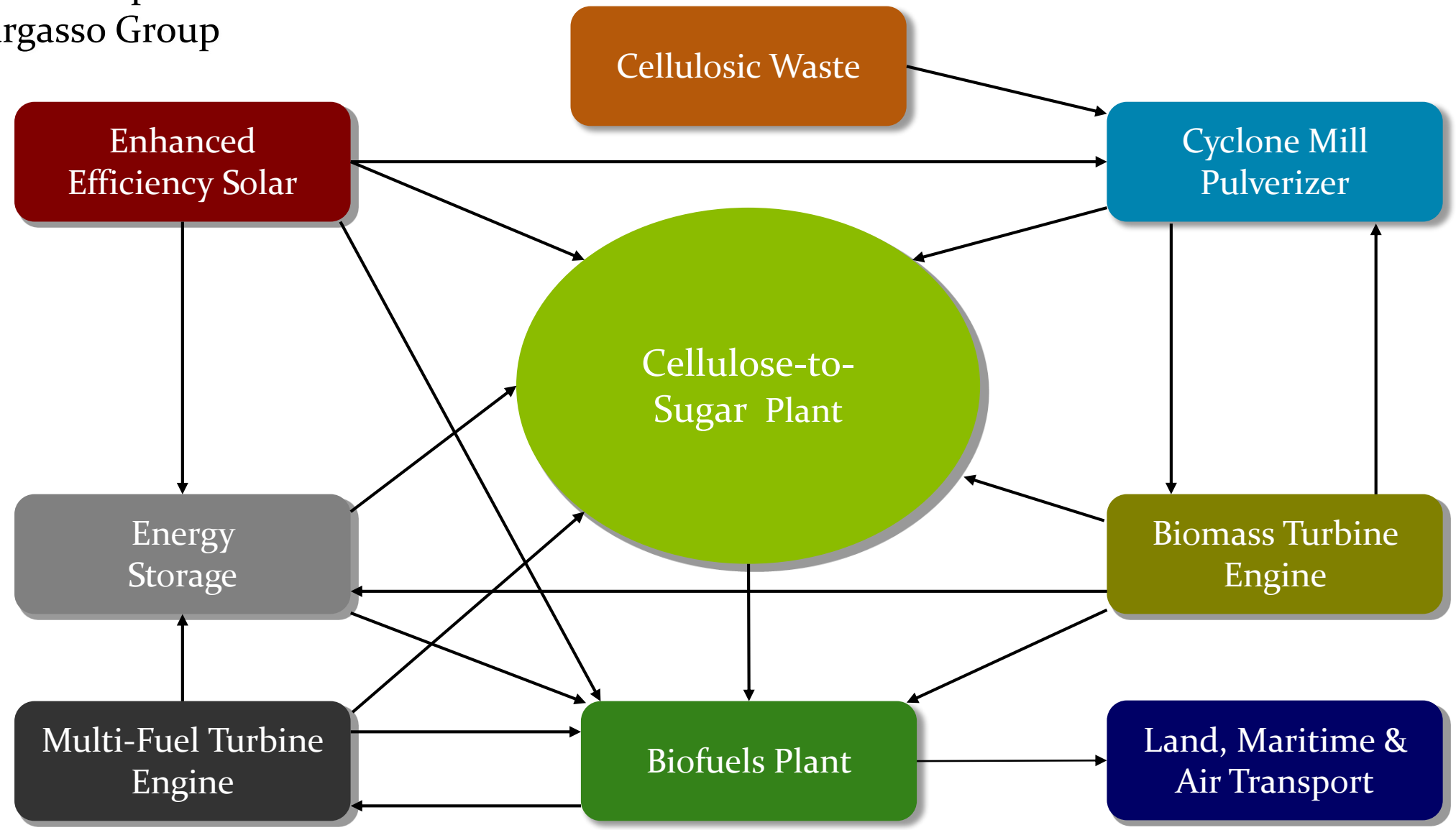
- Technology Integration that reduces operating, financial and adoption costs.
- Know what is available today but **plan for what will be possible tomorrow**.



By **integrating complementary technologies**, countries and companies can deliver the **massive, rapid and durable economic and social benefits** of sustainable technologies to their people.

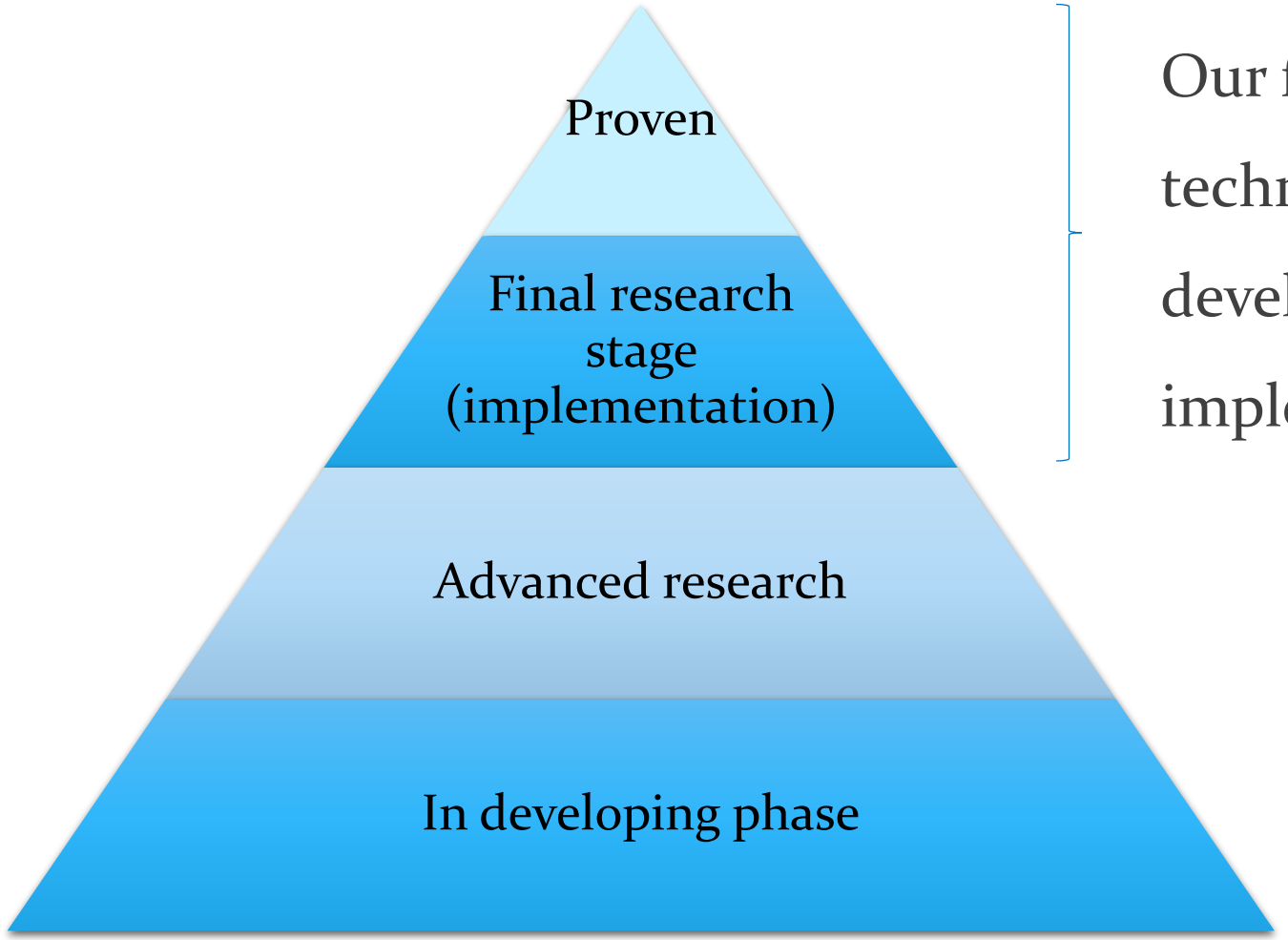
MSI Universal Model – Integrating Technologies

Business example:
The Sargasso Group



MSI Universal Model

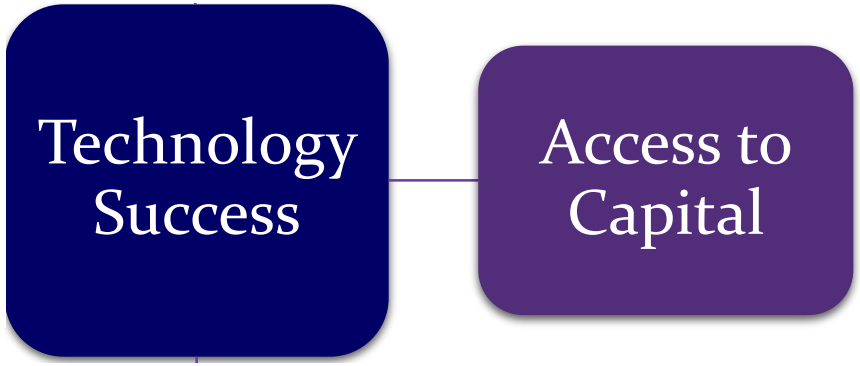
Windows to capital access differ depending on the development stage of technologies:



Our financial model applies only to technologies in the final stage of development (ready to be implemented) or already proven

MSI Universal Model - Finance

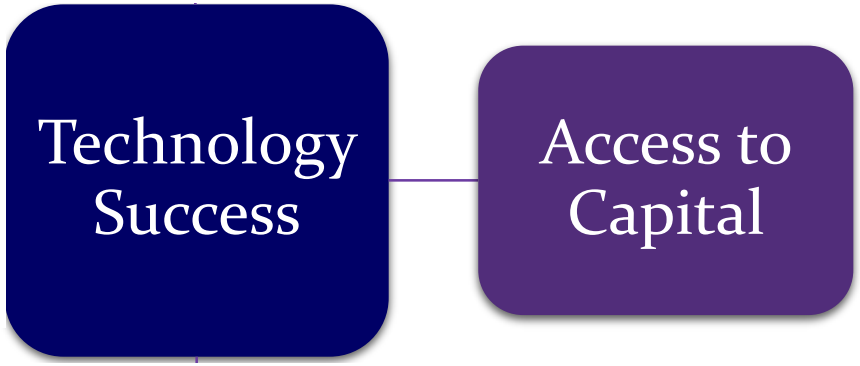
- Financial solutions designed on a project and country basis.
- Solutions adapted to the prevailing regulatory, economic and market conditions especially the return requirements of investors and lenders.



- Different arrangements with multiple capital sources that share our philosophy of technology integration and reflect the type of funding required.
- Type, term and cost of capital depend on purpose and (perceived) risks.

MSI Universal Model – Access to Funding

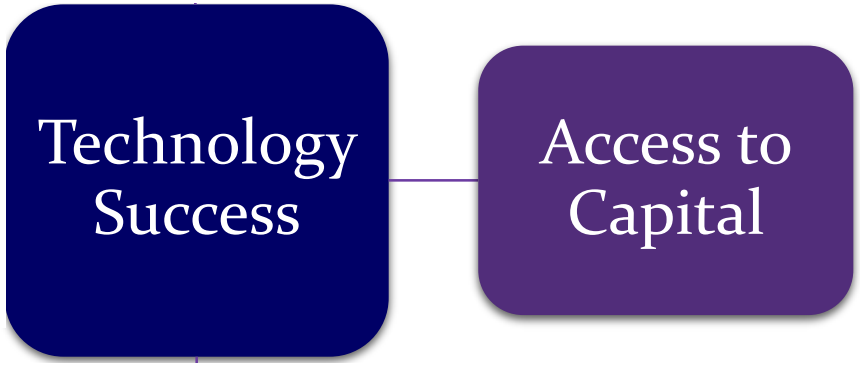
- Development Capital: Wealth management firms, investment banks, private equity funds. Equity or equity + debt
- Buyer Finance: Commercial banks, leasing companies. Debt.



- Export-Import Finance: Commercial banks, export agencies. Debt.
- Project Finance: Investment banks, commercial banks, investment funds, development banks, grants, specialist lenders. Debt or debt + equity.

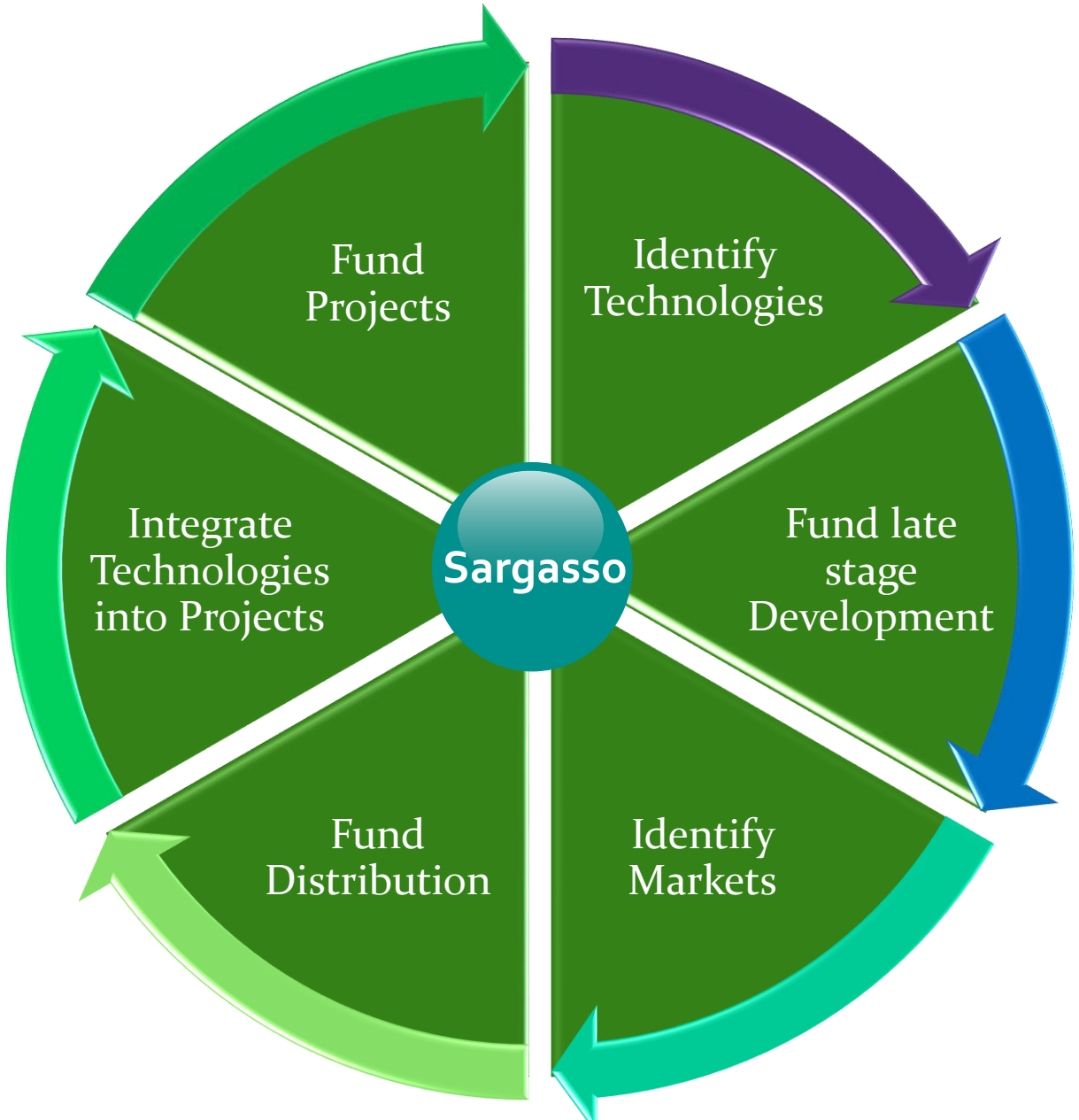
MSI Universal Model – Risk Factors

- Company: How sound is the borrower? How do you know?
- Technology: How proven is the technology?
- Market: Merchant risk vs Agreements or Letters of Intent with customers



- Political: Stability of democracy; rule of law; corruption; conflicts
- Currency: Convertibility, volatility, devaluations
- Execution: If it goes wrong, how easily can I sue?

MSI Universal Value Proposition



MSI Universal Model

We work with local authorities to take advantage of the domestic regulatory framework that the country offers:

Promote

Align

Cooperate

Technology Success

Innovate

Interact

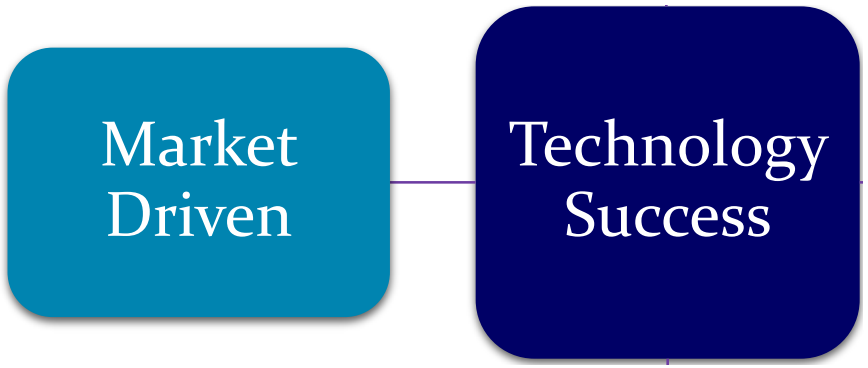
Adapt

Regulation

Create

MSI Universal Model

- Just having good technologies, access to capital and sound legislation is not sufficient.
- Without a robust business model that promotes sustainable development based on ongoing innovation, success will not be durable.



Our business focus is based on the concept of:

"Shared Value" between Governments, Companies & Society

MSI Universal Value Proposition

Company and Project Finance and Technology (Sargasso Group)

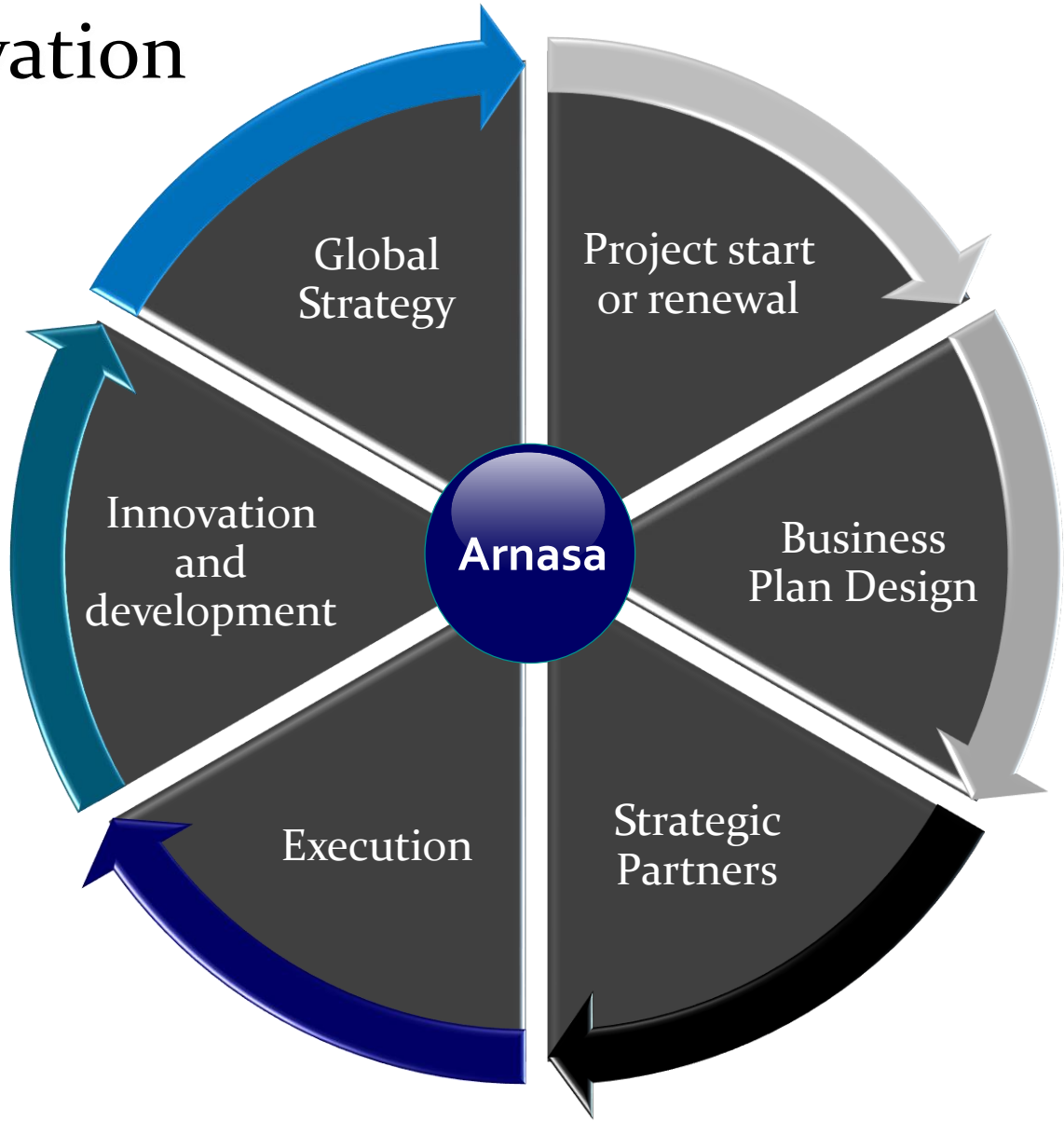
Smart Thinking, Business Modeling & Project Integration (Arnasa)

Project Management and Public Policy Relations (MSI Universal)

Engineering Execution Capability (Chow Engineering)

MSI Universal Value Proposition

Continual innovation process



Sustainable Project Management

Teams and Investors	Communication and Management	Project Metrics (Metrology)	Technology and Outsourcing	Social and Environmental Management	Legislation and Long Term Projections

MANAGEMENT STRUCTURE FOR RENEWABLE ENERGY PROJECTS

MSI Universal – Integrated Solutions

Construction Management

Development, Trade and Project Finance

Renewable Technologies

Networking

Business Landing

Sustainable Business Models

Large Scale Project Management

THE SARGASSO GROUP

The Power of Integration

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