



## **Fuel Cells: Emerging Market**

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## Fuel Cell Today – an Independent Resource

### FCT Consulting

Three main types of analysis undertaken:

1. Can we use a fuel cell to power product 'X'?
2. We want to use fuel cells but what are the risks?
3. What are the future markets going to look like?

### Website

[www.fuelcelltoday.com](http://www.fuelcelltoday.com) :

1. 15+ free reports - analysis on developments in the industry over the past year
2. Reports on potential future developments in the industry (application and region)
3. News, directory, fuel cell map etc. etc.

### Fuel Cell Today Annual Review





## **Emerging Markets: an Introduction**

### **What is an Emerging Market?**

“An emerging market is a non-traditional region or country which could see significant fuel cell diffusion and uptake within the next five years”

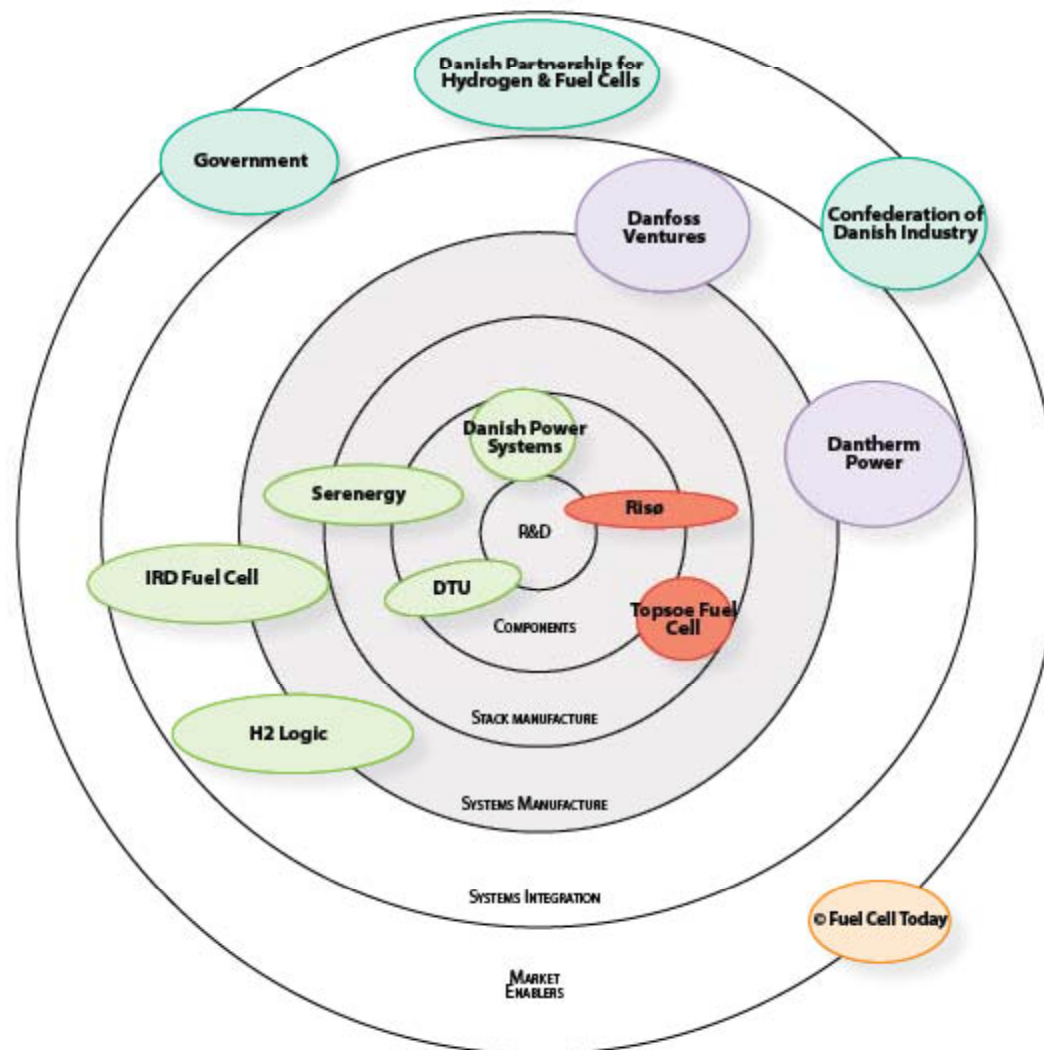
Examples include:

Argentina, Brazil, China, India, Poland, Russia, South Africa, the UAE.



## Denmark as of 2009

- Key market enablers in place;
- Good mix of SMEs and large corporations;
- Not swamped by R&D;
- Depth of Activities





## Energy and Economic Overview

- Population: 1,000,000,000
- GDP Growth Rate: 8.7%
- GDP per capita: \$726
- CO<sub>2</sub> tonnes per capita per annum : 2
- Energy consumption per capita: 338 kg

India's rapid economic growth requires increasing amounts of electrical power. Constrained by pollution and energy security concerns, this is leading to an emerging market for alternative energy, including fuel cells, in various applications.





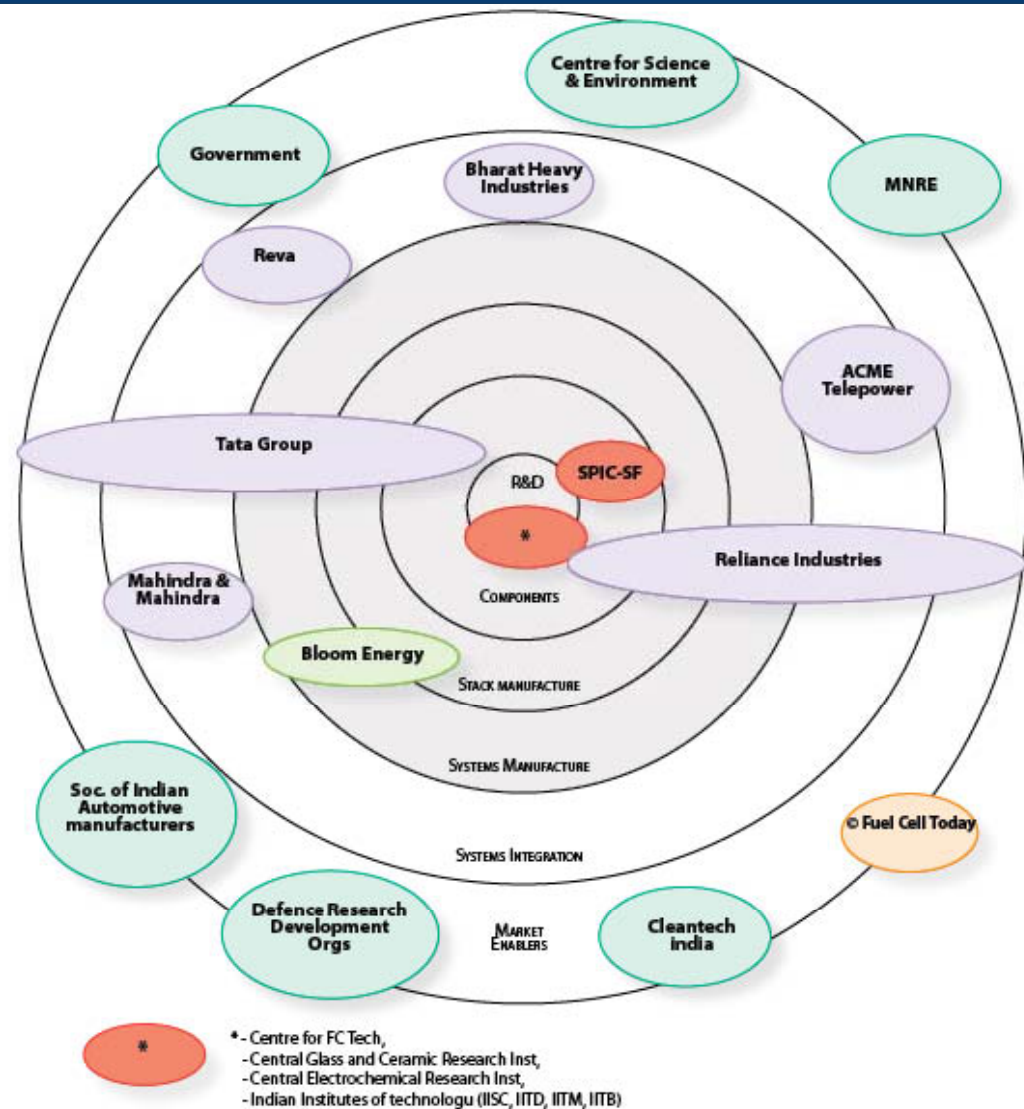
## India: Stationary fuel cells

- Several companies are looking to establish an indigenous manufacturing base in India (**'reverse import substitution'**) primarily aimed at developing stationary fuel cells.
- One of the key early markets for fuel cells in India is in the mobile telecoms backup power sector. It is estimated that over 500,000 new telecoms backup sites will be required before 2011, with many of these located in rural areas.
- Two key deals underway which could rapidly increase rate of adoption in India.
- The imminent construction of a nationwide natural gas infrastructure is leading a number of corporations to focus their operations towards becoming energy service providers, using reformed natural gas fuel cells as part of a portfolio energy solutions for buildings.



## India as of 2009

- Good mix of market enablers including VC groups in place;
- Market dominated by vertically integrated firms, “cradle to coffin” companies;
- Low numbers of newcomer SMEs;
- Depth of activities but breadth needs attention





## Energy and Economic Overview

- Population: 44 million
- GDP Growth Rate: 4.3%
- GDP per capita: \$5,000
- CO<sub>2</sub> tonnes per capita per annum : 10
- Energy consumption per capita: ?

South Africa is keenly focused on economic growth as well as energy provision. Increasing value added manufacturing through targeted R&D as well tax breaks for companies is being used to stimulate a local fuel cell industry.





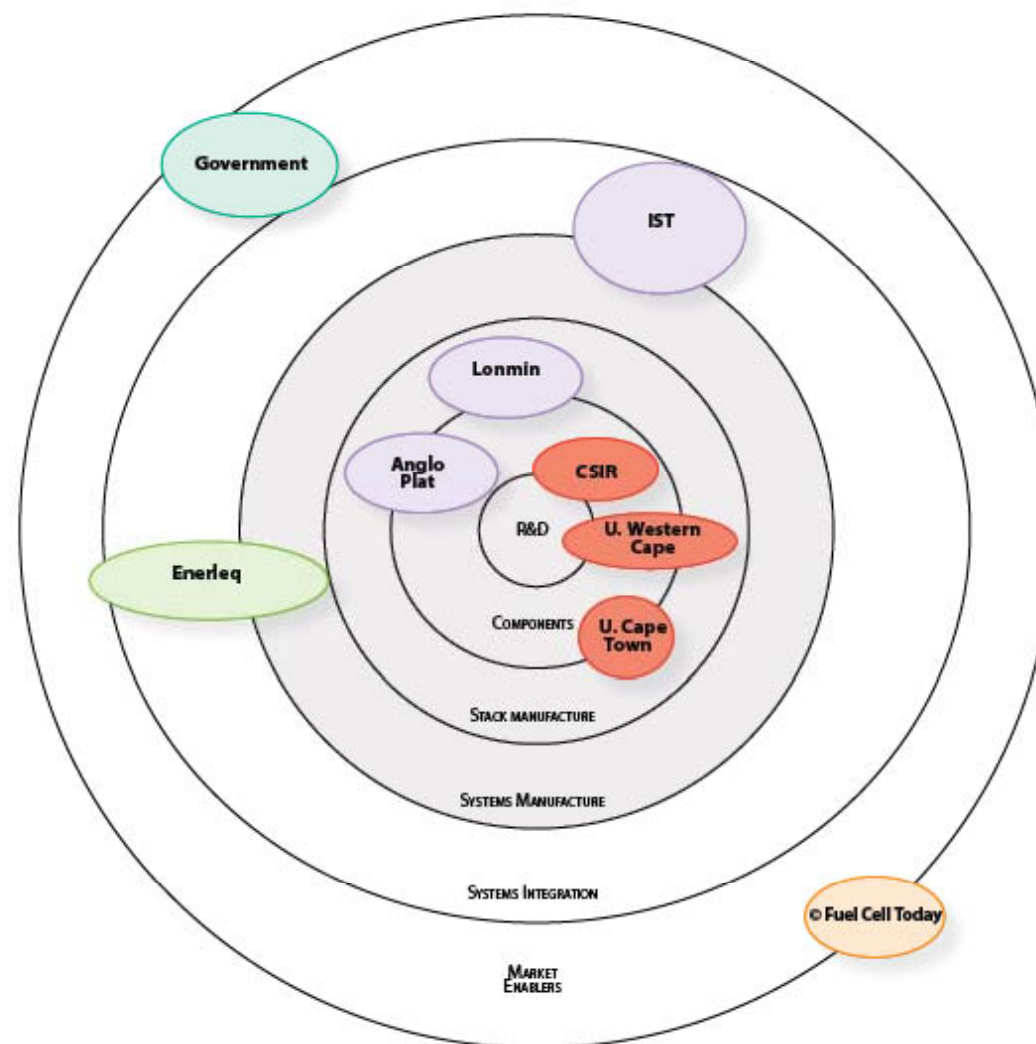
## South Africa Fuel Cells

- Companies are being encouraged to look to establish an indigenous manufacturing base in South Africa as part of the programme of beneficiation. Resource rich.
- At present limited on the ground activity (Plug Power, P21 and UTC). Limitations focused on CAPEX and fuel logistics.
- The S.A. complete Hydrogen and Fuel Cell Strategy is due to be formally launched in 2010.
- To date funding has focused on the creation of three centres of R&D excellence, including the U. of the Western Cape and U. of Cape Town working on, for example, reformer catalysis, fuel cell systems integration, human capital and high temp PEMs etc. Funding in the hundreds of millions of \$. Aim to develop and spin out technology with a high value add to the fuel cell industry.
- At the very start of the process of building an industry.



## South Africa as of 2009

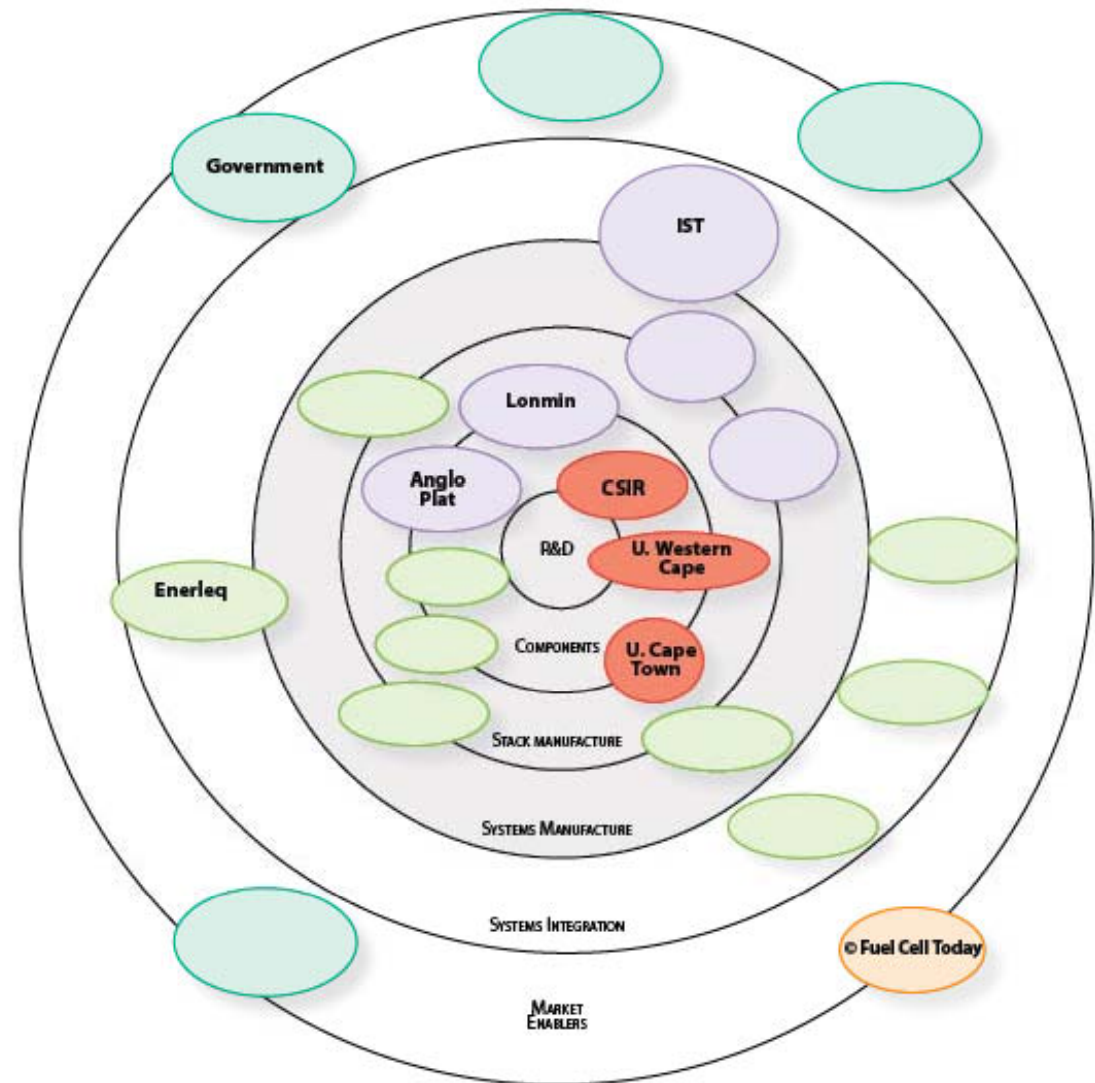
- Government on board – critical,
- Good foundation in R&D and Components,
- Only one SME active on the ground.





## Forecast – South Africa 2015

- Number of corporations opening manufacturing bases in S. Africa;
- A handful of SMEs forming, primarily in the components and systems integration sector;
- Private finance is on stream, stimulating investment.





## **Summary:**

- India and South Africa, amongst other Emerging Markets are not looking to be passive adopters of fuel cell technology but also, critically, developing manufacturing capacity;
- Increasing number of Emerging Markets have strong central government support which is a critical first step on the transition process;
- A number of these economies could challenge North America and Europe as centres for fuel cell manufacturing;
- Non-traditional countries represent large markets for the adoption of stationary fuel cells but issues with fuel (natural gas and LPG based units) are critical;
- Subsidies needed to bring down initial CAPEX but not as a long term security blanket to prop up ineffectual technology.



*Thank You*

*Stand 101*