

MASDAR
ABU DHABI FUTURE ENERGY COMPANY



مسدر
شركة أبوظبي لطاقة المستقبل

Masdar City

Project Development Overview

February 09

Agenda



- The Masdar Initiative
- Masdar City Location
- Masdar City Overview
- Masdar's Business Model
- Life in Masdar City



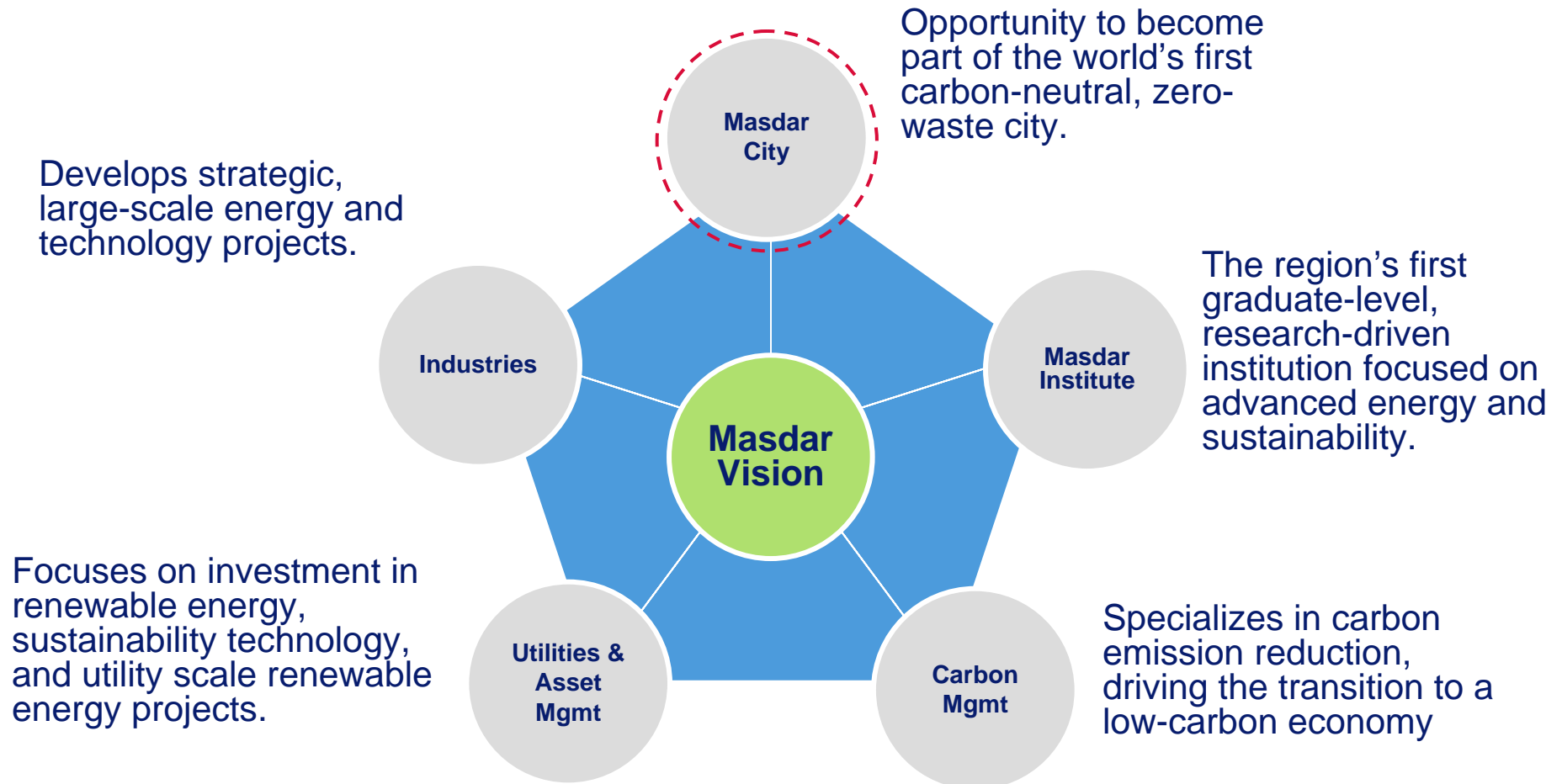
Masdar Initiative Objectives



- To emerge as the **global hub** for Cleantech education, research, development and production
- To **partner** with global leaders and innovative companies in the Cleantech industry
- To **diversify** the Abu Dhabi economy with a focus on renewable energies
- To develop a sustainable city that incorporates the **highest quality of life with the lowest environmental footprint**
- To create a city which is **carbon-neutral**, uses only **renewable energies** and produces **zero waste**



Masdar Initiative Overview



The Masdar Institute

- Independent, not-for-profit, research-driven, graduate level institute
- Create a new generation of world energy leaders in Abu Dhabi; a generation that will have major influence worldwide
- Developed in partnership with the Massachusetts Institute of Technology (MIT)
- Offers Masters and PhD programs in science and engineering disciplines, with a focus on alternative energy and sustainable technologies
- Located in Masdar City. The first phase will be completed by Fall 2009
- Full financial aid package for students



In partnership with:



Massachusetts Institute of Technology



Carbon Management Unit



- Carbon emission reduction and monetization
- Driving the transition to a low-carbon economy in Abu Dhabi and the region
- Monetizing greenhouse gas emission reduction under the United Nations' led Clean Development Mechanism (CDM) framework of the Kyoto Protocol
- Particular focus on CO₂ Capture and Storage (CCS).



Utilities & Asset Management Unit



- Invests in renewable energy and sustainability projects.
- Concentrating Solar Power (CSP), Concentrating Photovoltaic (CPV), wind and Waste to-Energy
- SHAMS 1: a 100 MW CSP plant in Madinat Zayed, Abu Dhabi; using parabolic trough technology
- Invests in a strategic portfolio of renewable energy and sustainability technology assets.
 - Clean Tech Fund with Credit Suisse
 - New funds with General Electric



Industries Unit



- World-class manufacturing facilities for key alternative energy industries in Abu Dhabi
- Polysilicon, photovoltaics, hydrogen, and concentrated solar power
- Applying scale to drive costs down, making Abu Dhabi an exporter of clean technologies
- International partnerships and acquisitions, providing access to key markets and technologies



Other avenues of involvement with Masdar

Masdar Clean Tech Fund

\$US250 million venture capital fund

Zayed Future Energy Prize
awarded annually to Honoring those who have
made the greatest contribution to renewable
energy and sustainable living.



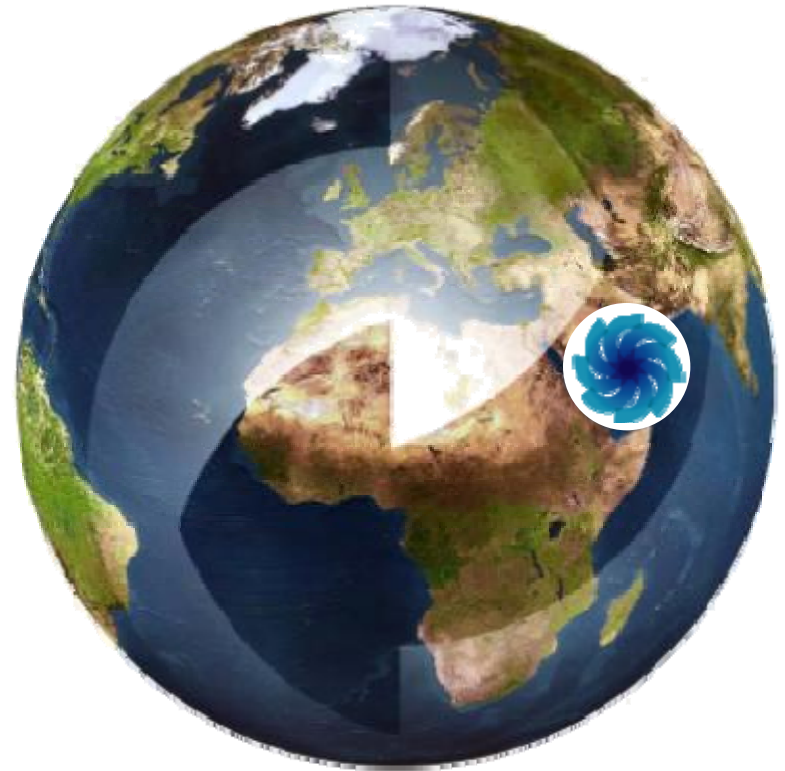
The World Future Energy Summit:
Abu Dhabi January 19-21, 2009 with over
15,000 attendees



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Masdar City Location - GCC



Key Growth Drivers

Economic Liberalization

- Most countries have entered WTO
- Many are negotiating FTAs with US
- GAFTA and Euro-Med Partnership are progressing

Population Growth

- Governments encouraging private sector development attracting expatriate workers to the region
- Young growing population - over 50% of the population is less than 20 years old

Oil Boom

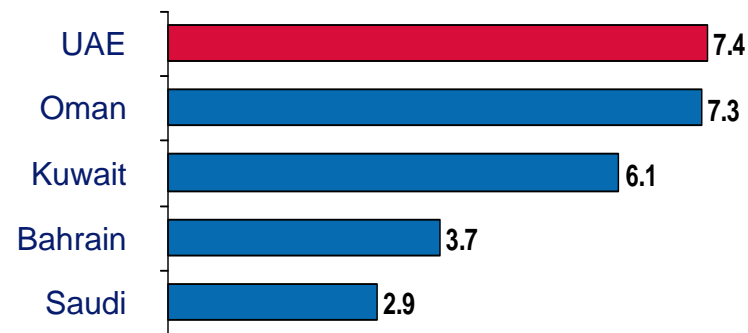
- Worldwide demand surged and ME is a major supplier
- Oil prices have reached over US\$100 per barrel
- Oil & Gas exports account for as much as 60% of GDP
- As a result, governments have large surpluses

Repatriation of Petrodollars

- In the past, petrodollars used to buy Western assets
- Today, petrodollars are being invested regionally



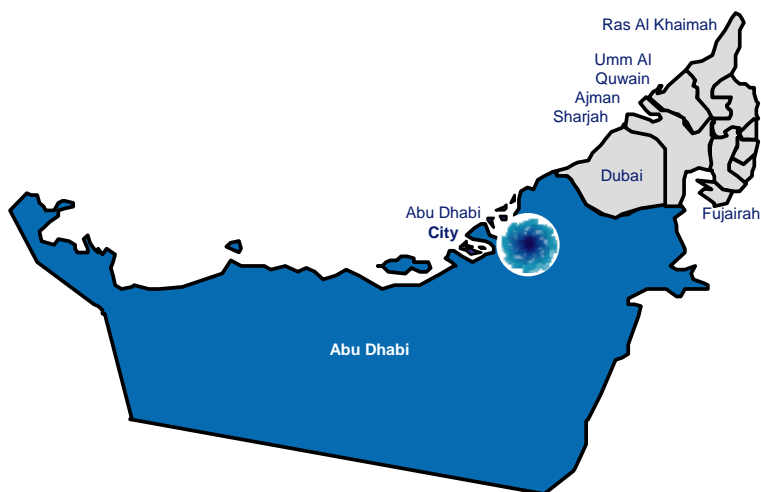
GCC Political Stability Index (Scores from 1-10)



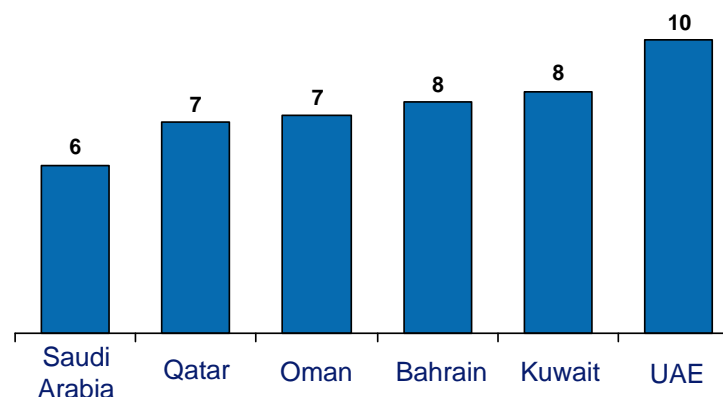
Masdar City Location - United Arab Emirates

UAE Economic Features

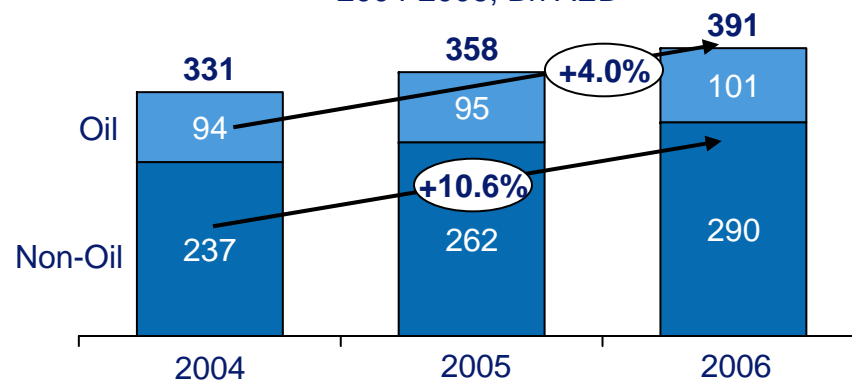
- Main non-oil businesses are tourism, transport, trade, construction and financial service
- Regional leader in infrastructure quality, telecommunications, utilities and business infrastructure
- Over 32 special economic zones that are home to over 20,000 businesses



GCC Non-Oil GDP Growth Rate, %
- 2002-2007 Average -

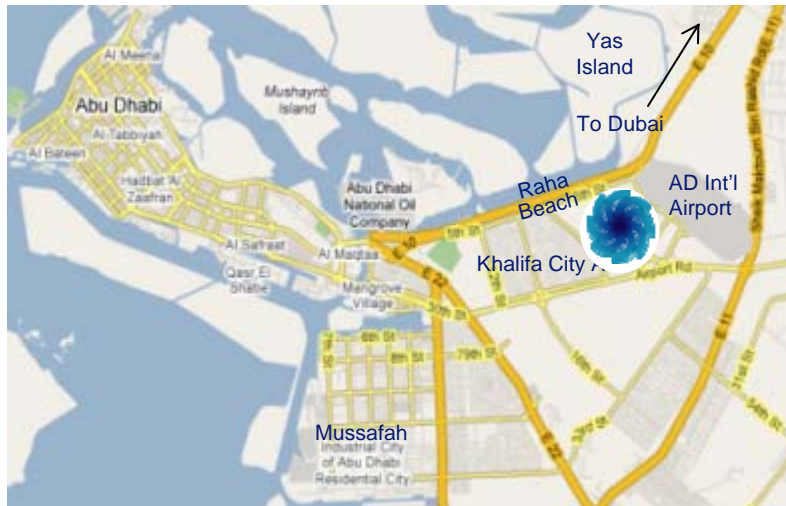


UAE Oil vs. Non-Oil GDP at Constant Prices
- 2004-2006, Bn AED -



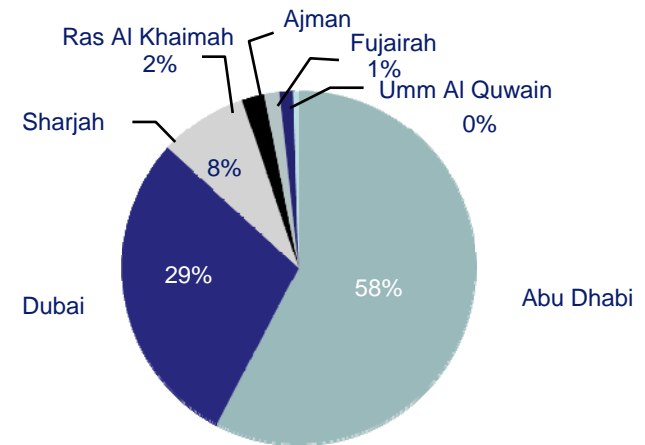
Masdar City Location – Abu Dhabi

Abu Dhabi Statistics	
Area	67,600 Sq. km
Population	1.6 Million
Oil Reserves	92 Billion Barrels
Crude Oil Production	2.7 Million B/D
Natural Gas Reserves	196 TCF
Natural Gas Production	45.4 BCM/Y
GDP	220 Billion Dhs/ 103 Billion US\$

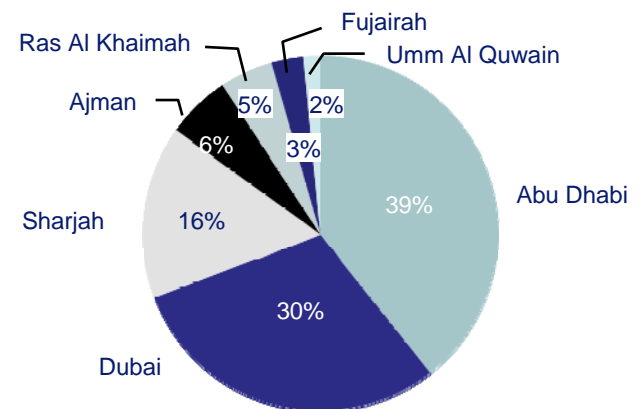


Source: Google Maps

GDP Breakdown by Emirate



Population Breakdown by Emirate



Masdar City – Project Site

Masdar Initiative Description and Components

Masdar City will pioneer the sustainable green building practices with the aim of achieving zero-carbon emissions, zero waste and being powered entirely by renewable energy sources

Renewable Energy

- The City will be exclusively powered with Renewable energy

Building Design

- Building design will ensure the latest use of energy efficient technologies and smart design

Innovative Transportation System

- The City will contain pioneering public transportation systems

Recycling / Waste to Energy

- The City will strive towards a zero waste objective

Masdar Institute

- A graduate-level, research-driven institution in partnership with MIT

Masdar City Master Plan



Masdar City Profile

- **Location:** Abu Dhabi
- **Built Area:** 6 million m²
- **Population:** 40,000 residents, 50,000 commuters
- **Density:** 135 people / ha



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Mobility Solutions



- Masdar City will be the first land-based city to operate without fossil fueled autos and trucks
- Walking, Cycling, PRT and LRT are the modes of transportation within Masdar City.
- With 50,000 commuters per day, Masdar City will have strategically placed parking areas for fossil-fueled vehicles



Personal Rapid Transport (PRT)



Light Rapid Transport (LRT)

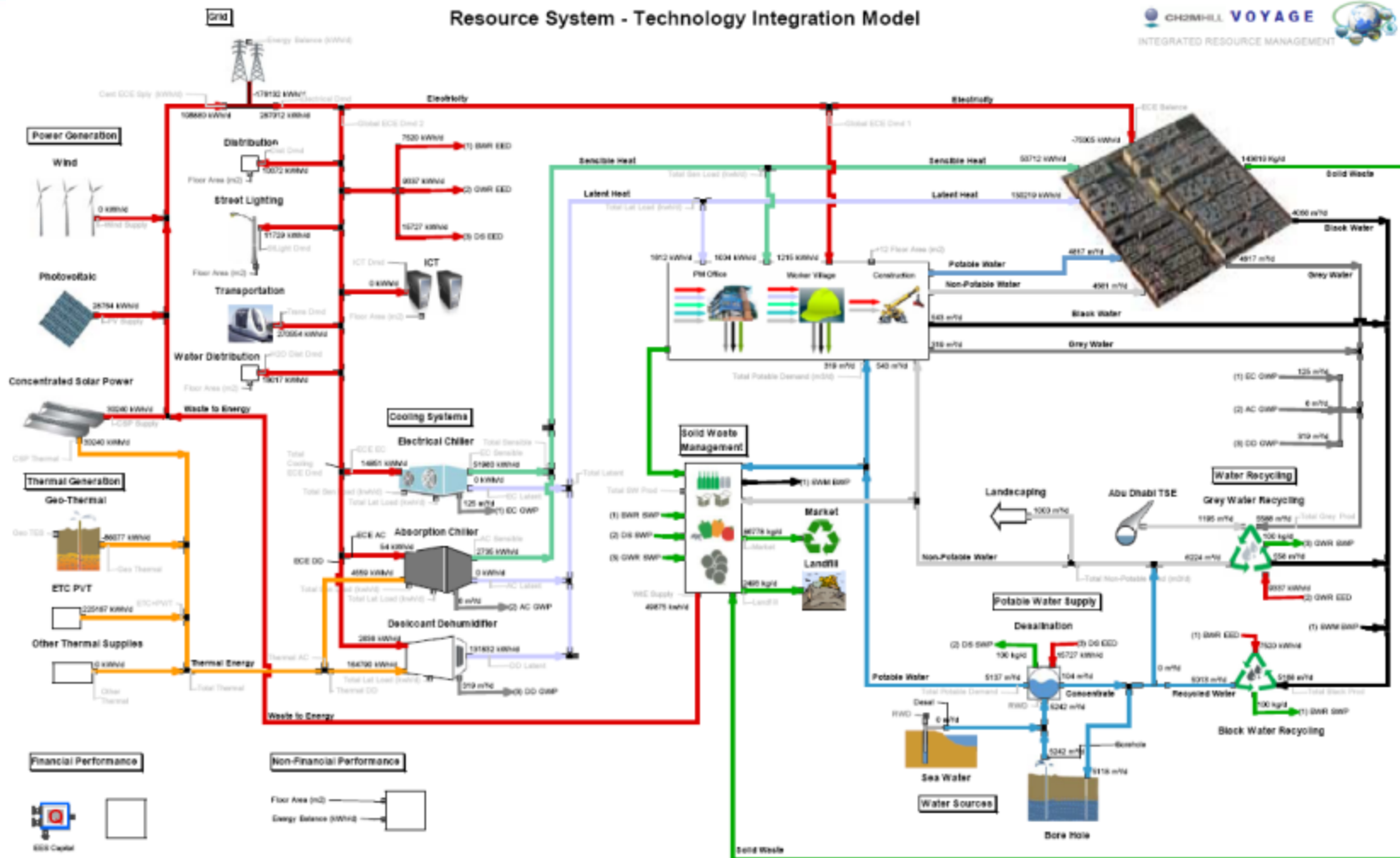
PRT Fast Facts	
PRT Vehicles:	2,160
PRT Stations:	83
MRT Vehicles	810
PRT Trips per day:	100,000
Max. Walking Distance to PRT Station:	150m
LRT Trips per day:	5,000



Mobility Grid



Masdar City Systems Overview

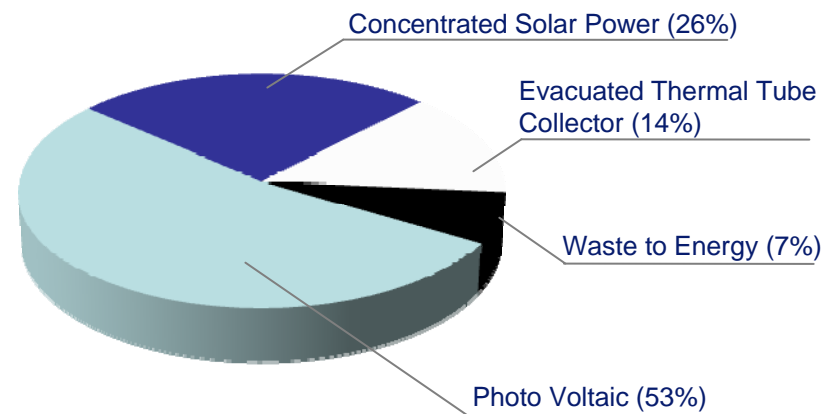


Energy

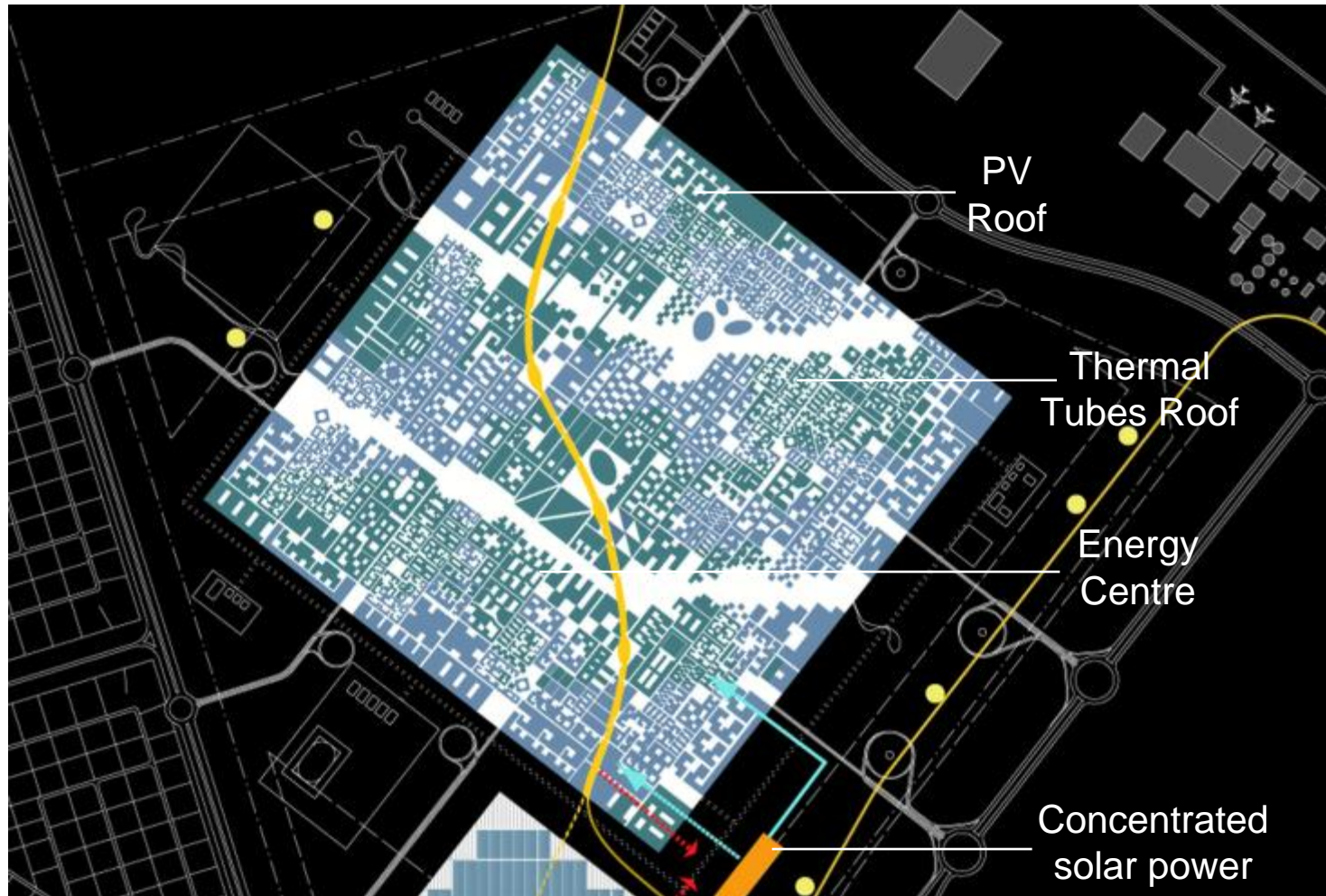


- >70% reduction in energy usage from typical construction ~ exceeds LEED® Platinum standards
- >200 MW of Renewable Energy Supply
- >170 MW from Photovoltaics ~ 2.5x greater than the largest existing PV installation
- <30 kWh per capita per day energy usage ~ 9x less than USA

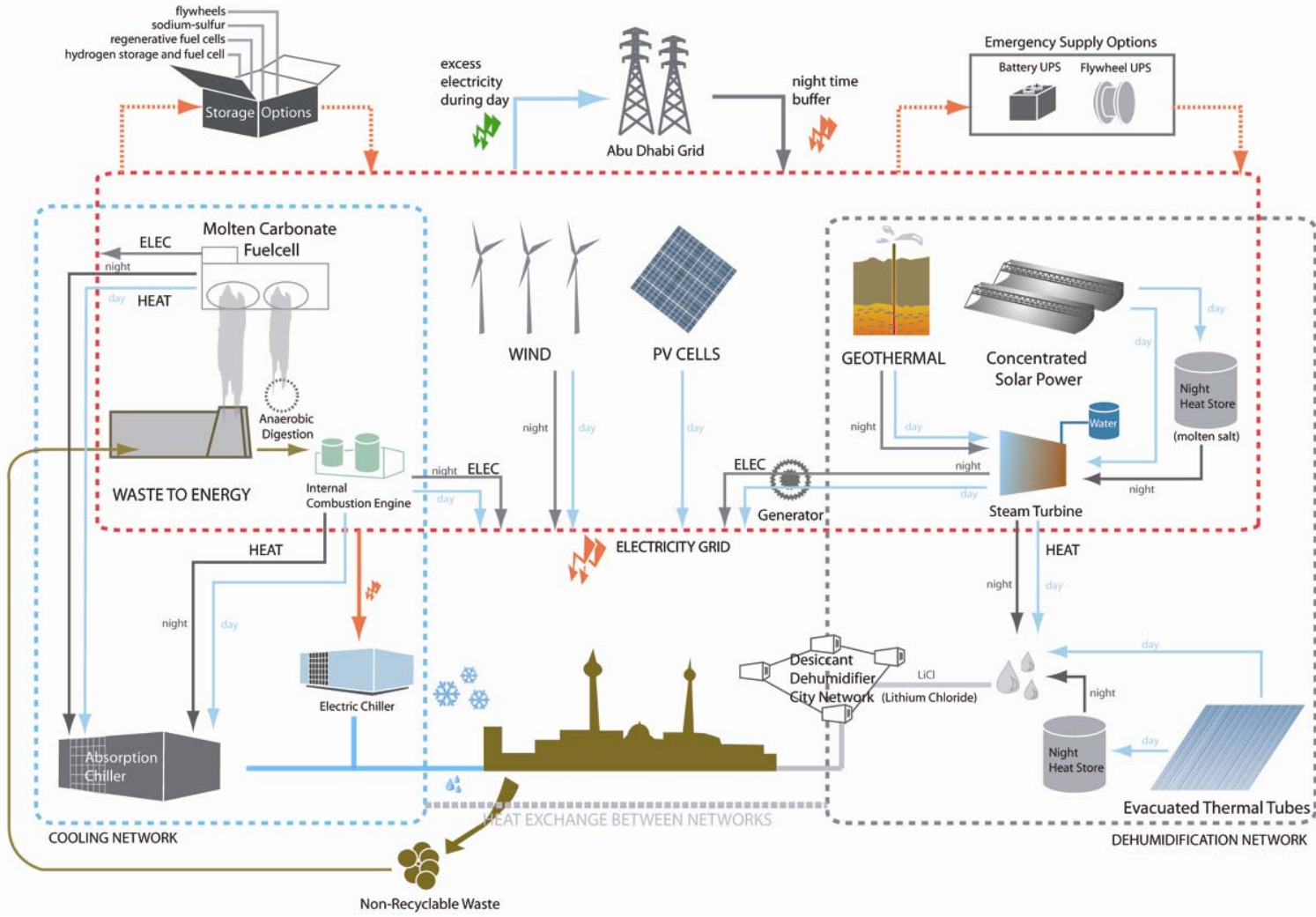
100% Renewable Energy Sources



Energy Grid



Energy Systems Process



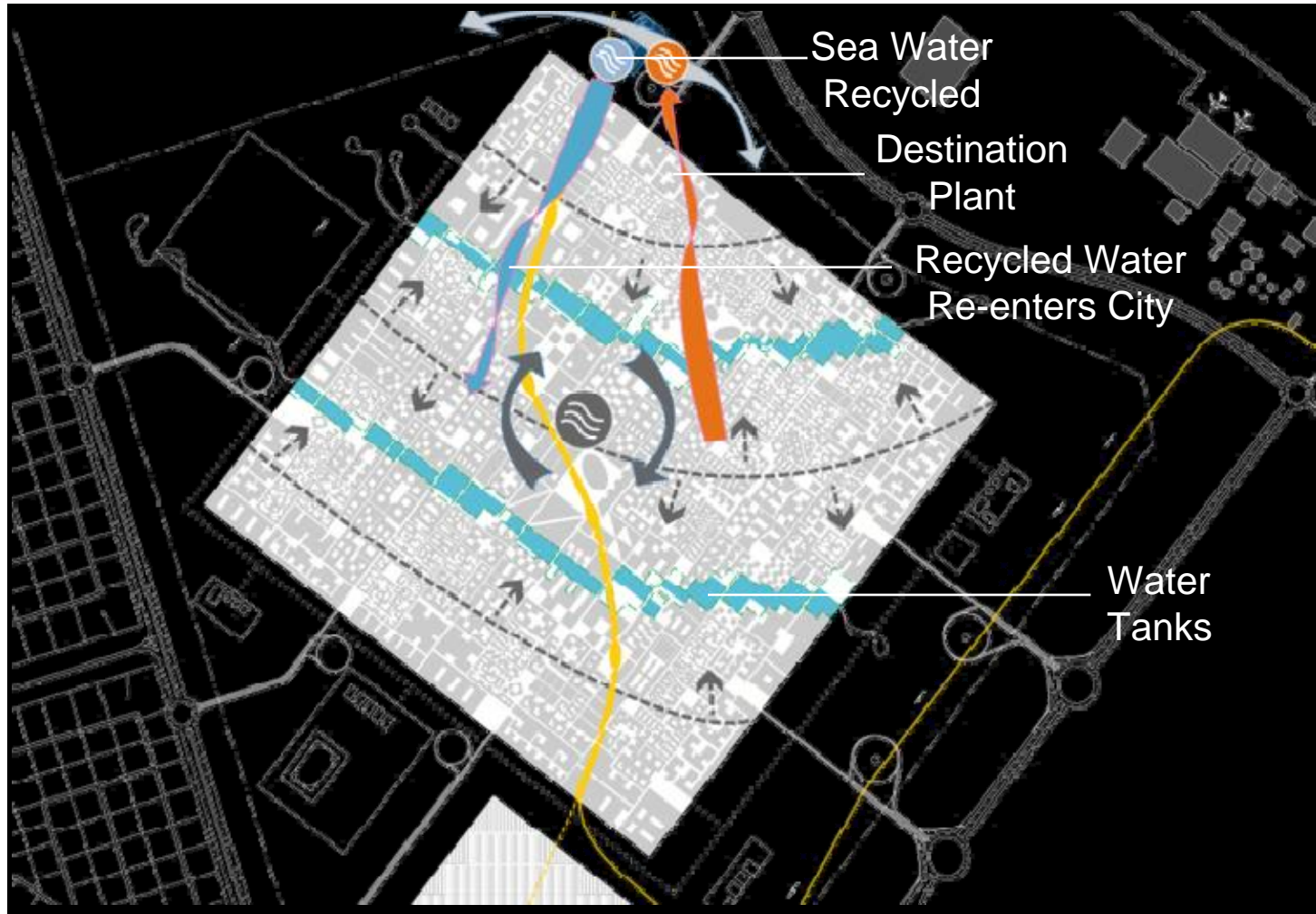
Water



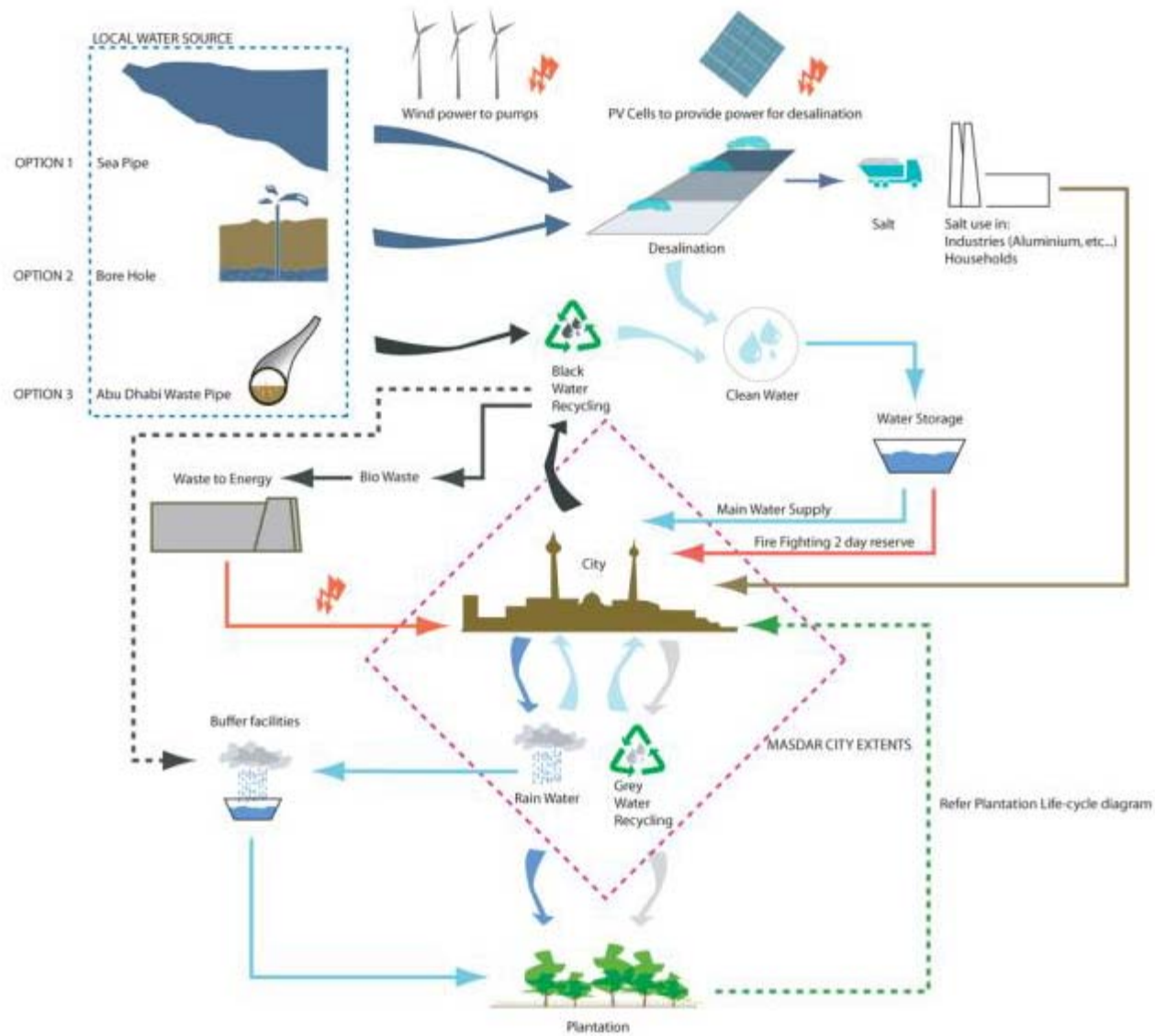
- Safe, cleaned to the highest levels, and reliable for drinking, irrigation, and reuse
- Managed on-site using advanced water and wastewater treatment schemes
- >60% of demand supplied by recycled water
- Potable water use will be <80 litres per day ~ 50-70% of high performing systems



Water Grid



Water Systems Process



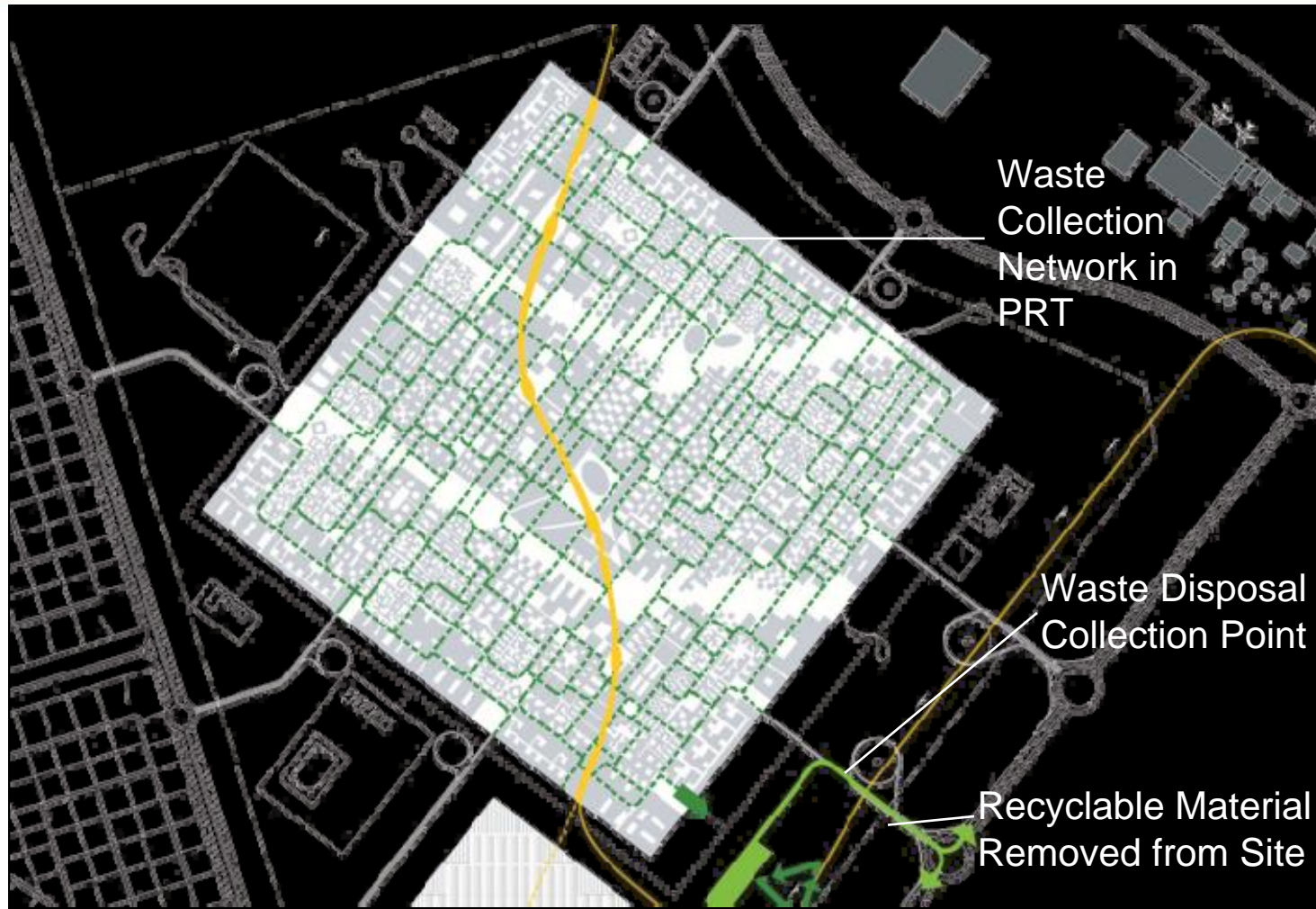
Waste



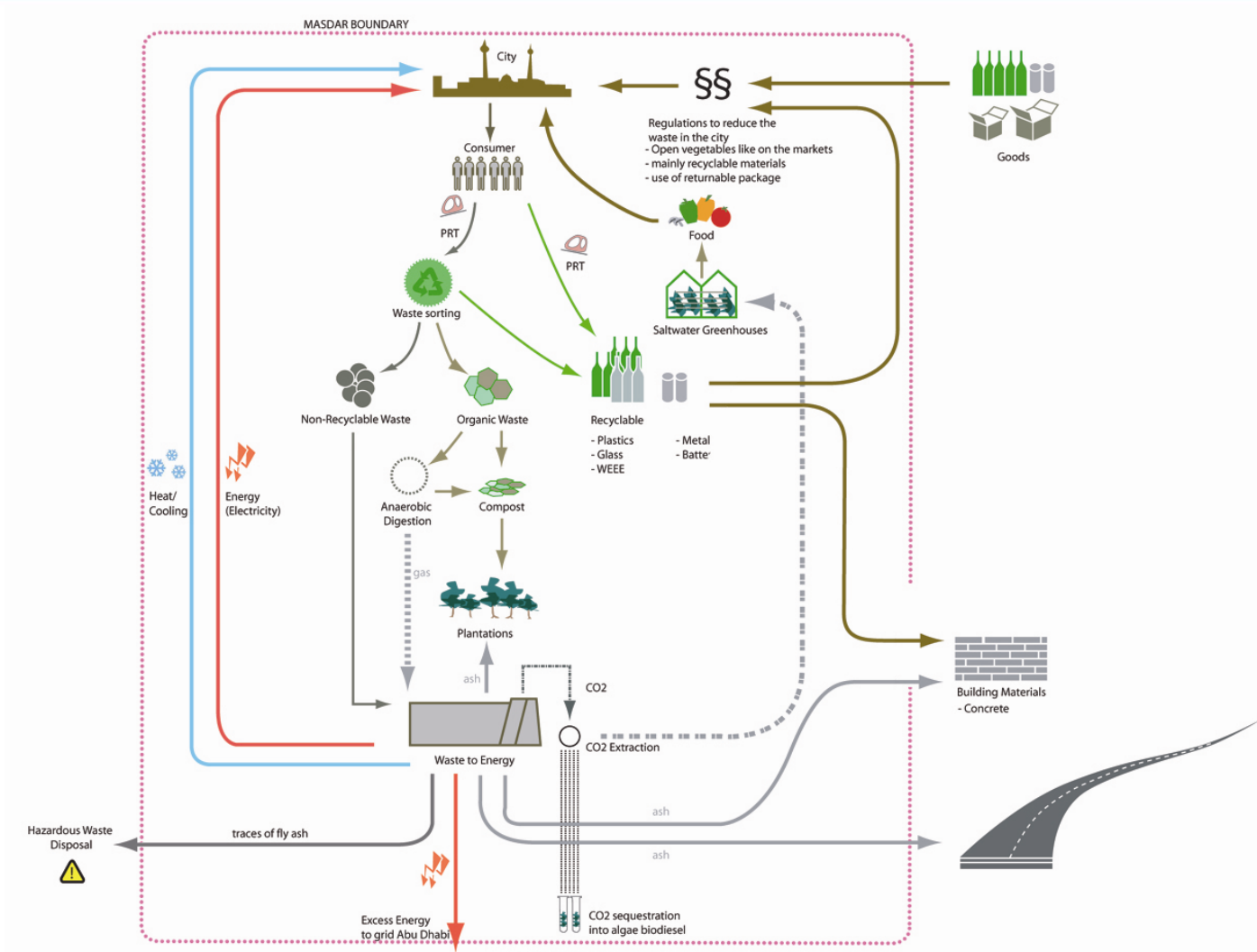
- Managed through an integrated, user-friendly, invisible and odourless system
- <2% waste to landfill
- Recover energy from materials that have reached the end of their useful life
- Composting system for biodegradable waste



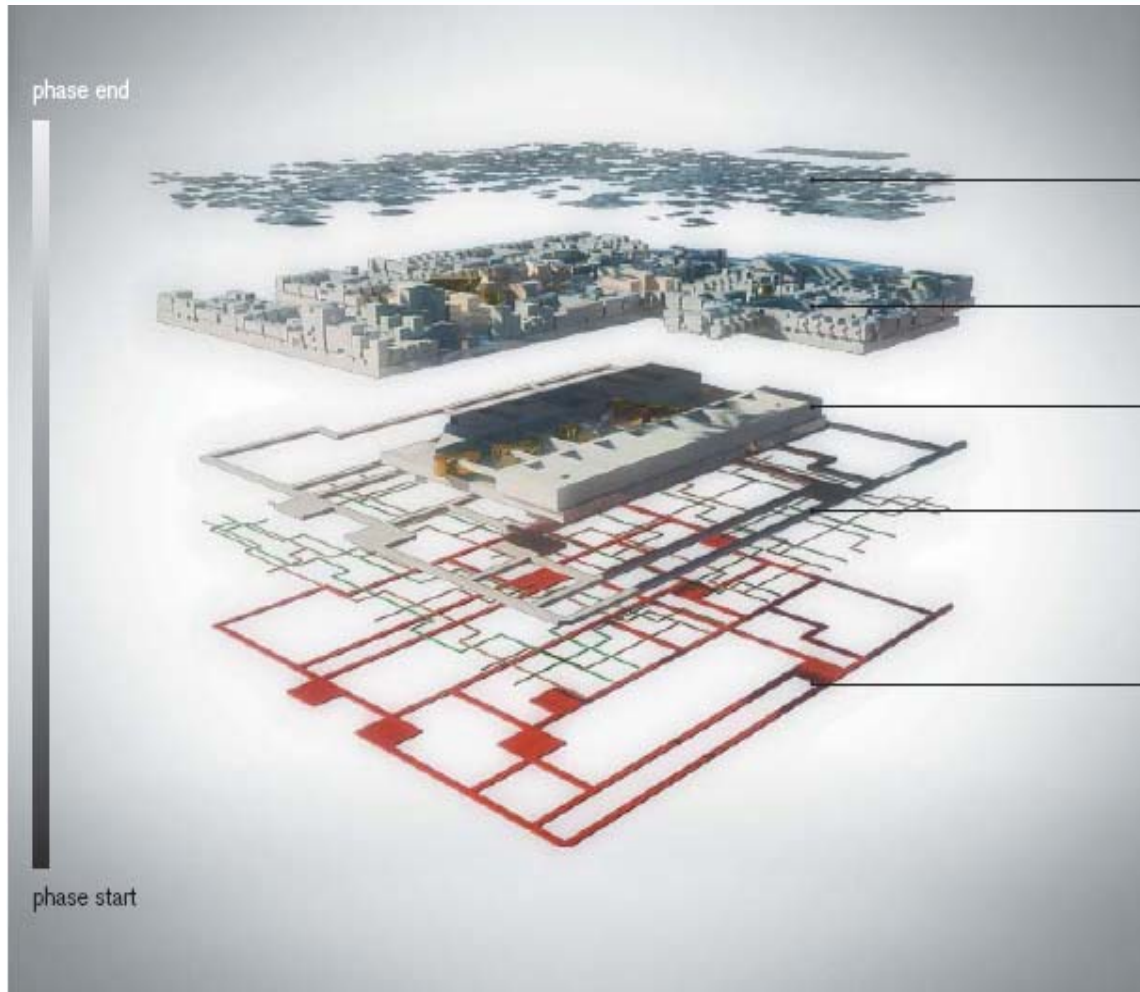
Waste Grid



Waste Systems Process



Masdar City Layering



PV Roof

Building Plots

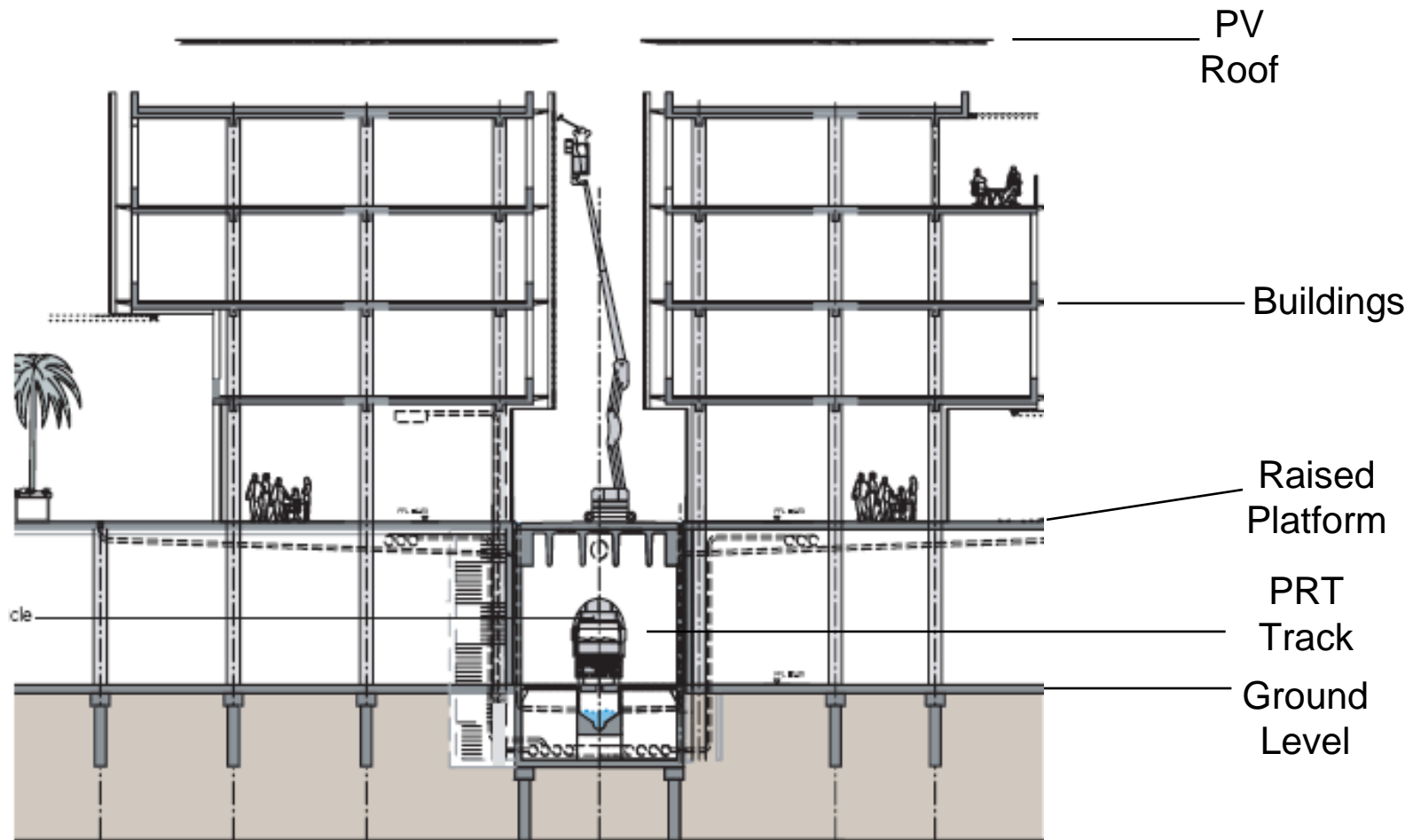
Key Building Plots

PRT & Raised Streets

Primary Infrastructure



Construction – Raised Street Level

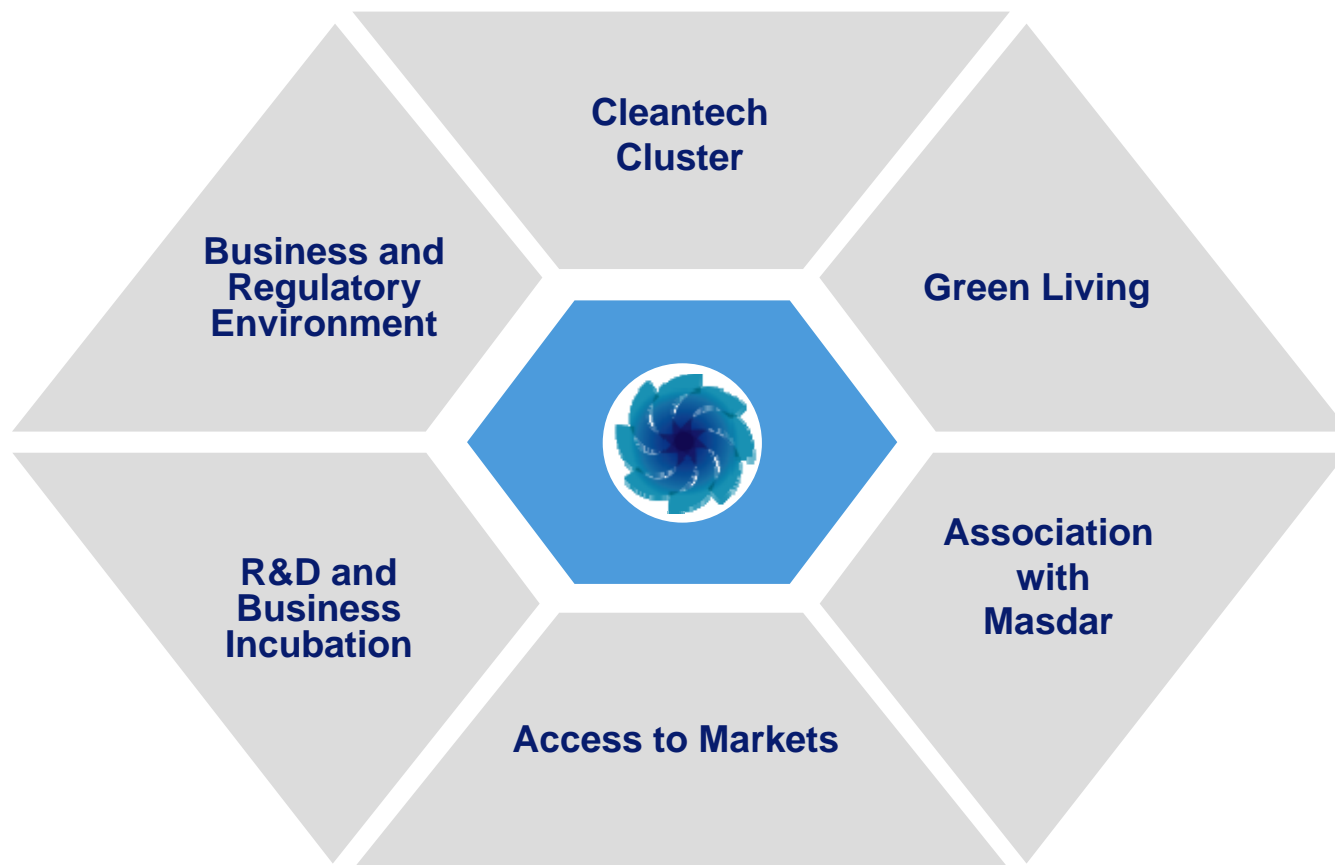


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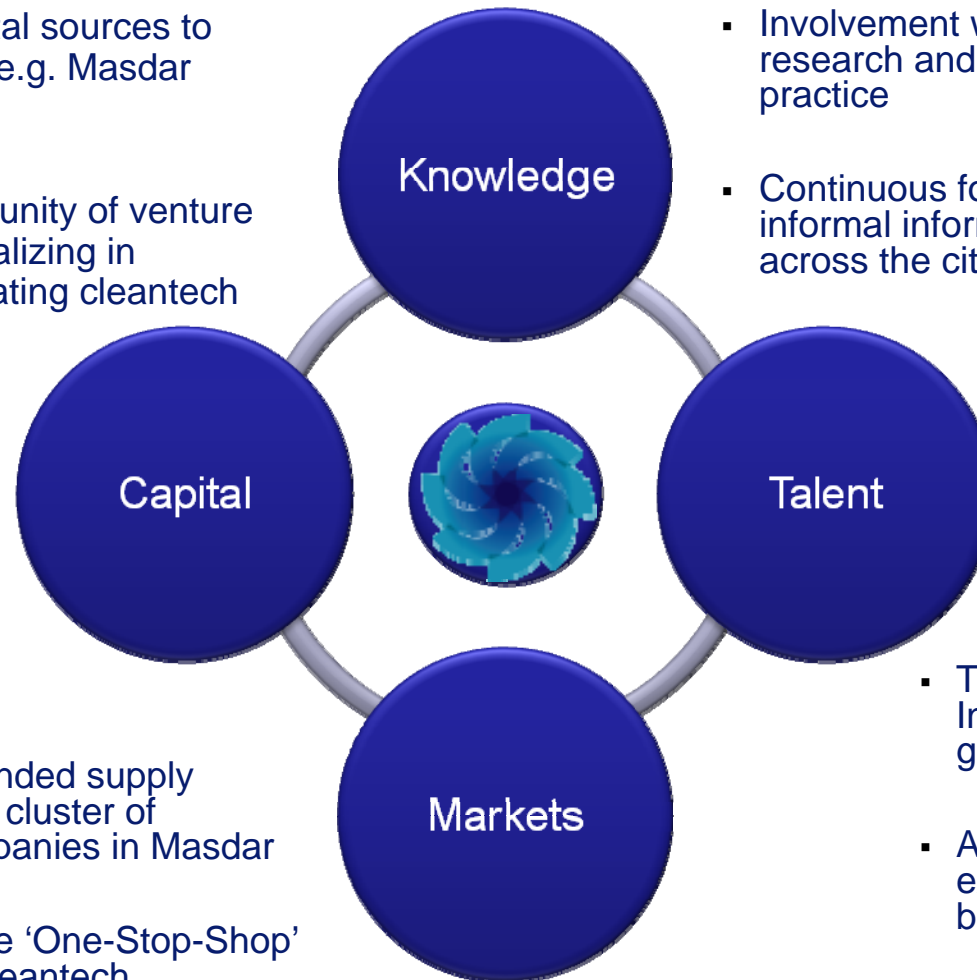
Masdar's Business Model



Cleantech Cluster



- Availability of capital sources to grow businesses (e.g. Masdar Clean Tech Fund)
- Access to a community of venture capital firms specializing in funding and incubating cleantech



- Involvement with leading research and industry best practice
- Continuous formal and informal information sharing across the city
- The expertise of the Masdar Institute's faculty and graduates
- A pool of skilled labour with expertise in cleantech that will be attracted to Masdar City

- Access to extended supply chains through cluster of cleantech companies in Masdar
- Benefit from the 'One-Stop-Shop' approach for cleantech companies



Green Living



Residents

Traditional Arabic Design with community spaces and green areas

Highly developed mobility solutions – only 100m from the nearest link

Easy access to neighbouring developments and Abu Dhabi International Airport

Corporate Tenants

Fulfill corporate sustainability responsibilities

Masdar City is powered by 100% renewable energy sources and committed to zero net waste output

The city will contain the latest in green infrastructure (eg. Computing facilities)



Association with Masdar



- Benefit from the global visibility and media coverage of the Masdar Initiative
- Companies can showcase their commitment to sustainable business through Masdar's reputation of leadership in the Cleantech field

GE, Abu Dhabi firm in \$8b joint venture

General Electric Co and Abu Dhabi investment agency Mubadala Development Co said on Tuesday they have entered into an \$8 billion joint venture.

GE will establish a clean energy technology center and an Ecomagination center in Masdar City which will house over 100 technologists focused on the sustainability industry

Source: <http://www.ameinfo.com/164288.html>

Masdar breaks ground on photovoltaic factory in Germany

The plant will use advanced production technologies to bring PV closer towards grid parity, and enhance a local economy with a rich history of manufacturing and technology. The \$230 million (EUR 150 million) German plant marks the first phase of Masdar's \$2 billion (EUR 1.3 billion) investment in thin-film PV manufacturing, one of the largest investments ever made in solar

Source: <http://www.ameinfo.com/166720.html>

Masdar and Hydrogen Energy plan clean energy plant in Abu Dhabi

Masdar, Abu Dhabi's initiative for renewable and alternative energy and clean technology, and Hydrogen Energy, the joint venture between BP Alternative Energy and Rio Tinto, announced the signing of an agreement to work together on the front-end engineering design of an industrial-scale hydrogen-fired power generation project with capture of the carbon dioxide (CO₂), which would then be available for transportation and storage.

Source: <http://www.ameinfo.com/144410.html>

Masdar and Bahrain firm strike carbon capture deal

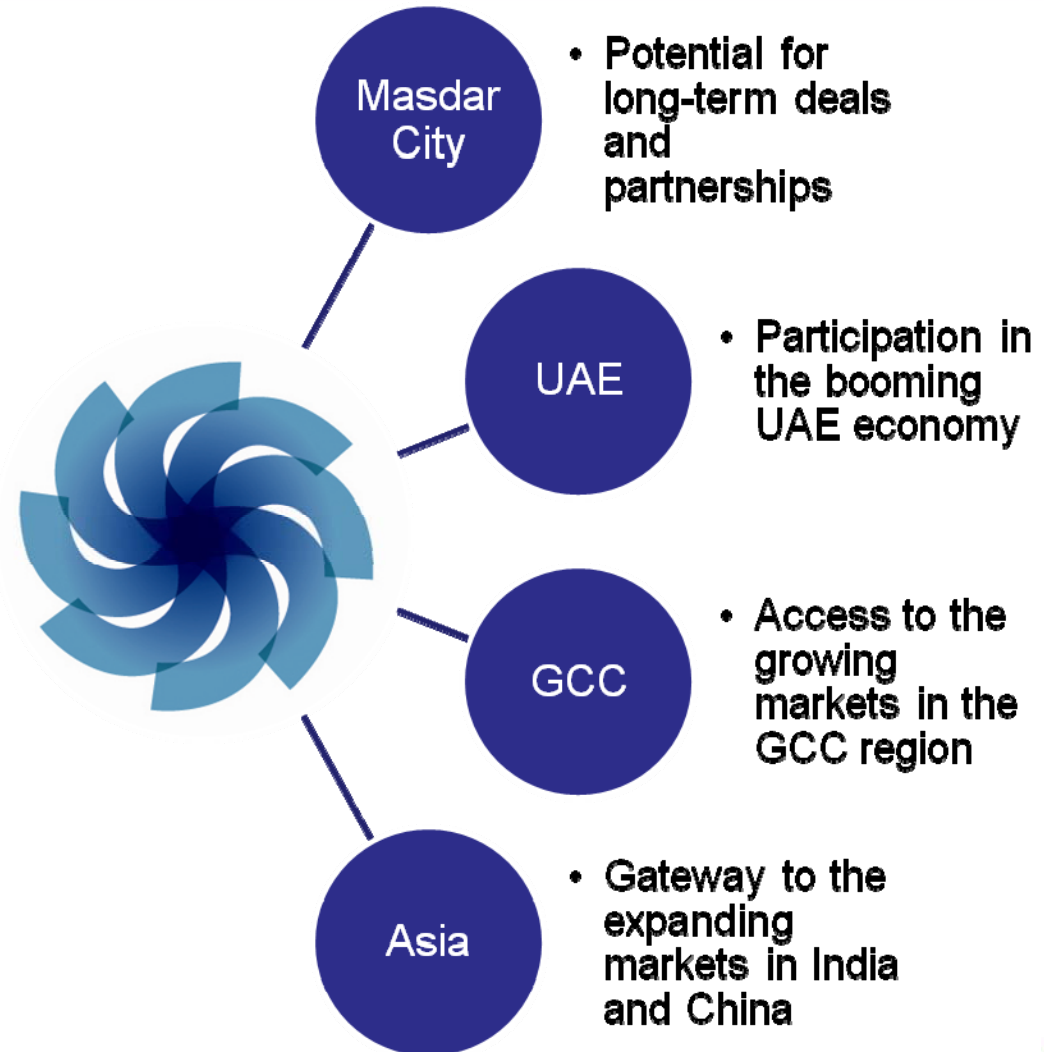
The Bahrain project will be developed under the Kyoto Protocol's Clean Development Mechanism (CDM). It will capture carbon dioxide from flue gas and then recycle the captured gas as feedstock in the production of urea and methanol.

The Bahrain project is expected to reduce more than 100,000 tonnes of carbon dioxide equivalent per year as of 2010, said Masdar in a statement.

Source: <http://www.ameinfo.com/164382.html>



Access to Markets



R&D and Business Incubation



Research & Development

Access to the Masdar Institute

Access to skilled labour from the Cleantech cluster

Availability of leading-edge research facilities

Business Incubation

Access to sources of capital from the VC community

Support from IP rights and legal advice

Ideal environment to pilot new technologies and test ideas



Business & Regulatory Environment



Free Zone Status

0% taxes for companies and individuals

0% import tariffs

100% foreign ownership

Strong IP protection

No restrictions on capital movement

Regulations to facilitate quick and easy business setup and registration

Access to pool of low-cost labour

Access to Abu Dhabi Government's regional business network



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Life in Masdar City – Masdar HQ Exterior



Life in Masdar City – Masdar HQ Interior



Life in Masdar City – Civic Square



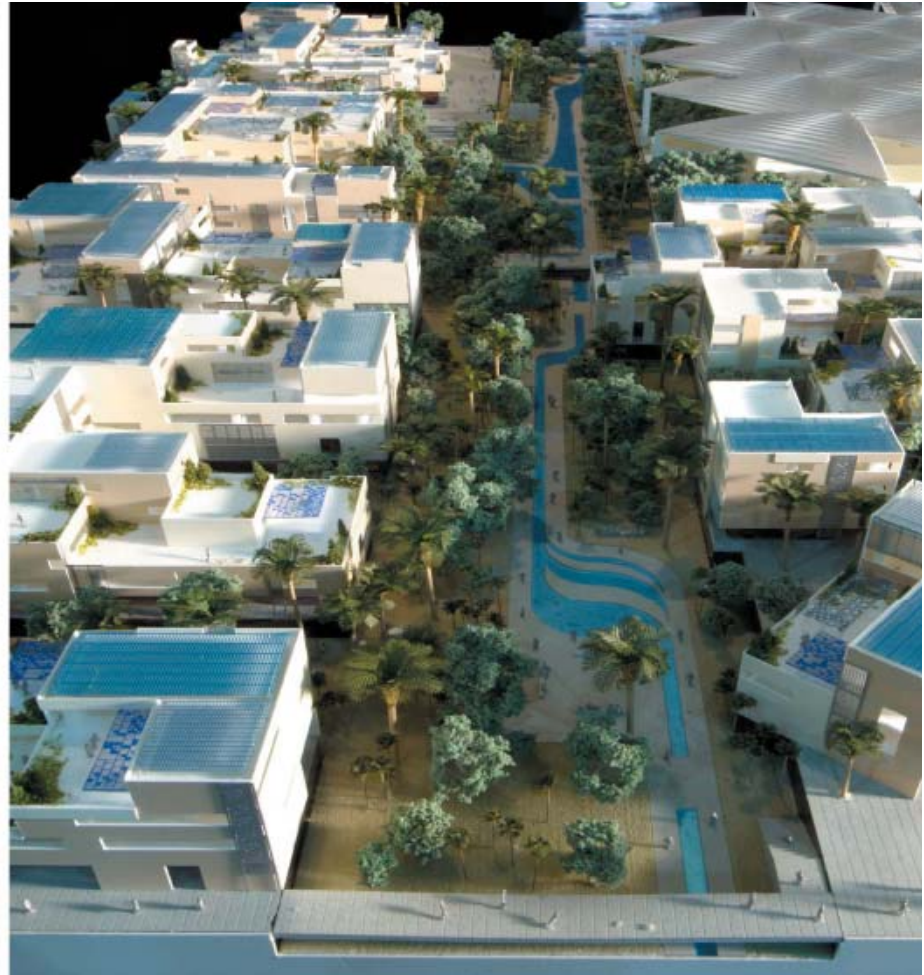
Life in Masdar City – Masdar Institute Square



Life in Masdar City – School



Life in Masdar City – Green Fingers



Life in Masdar City – Terrace



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Thank you!

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