

Smart Grids + Clean Power 2014

*The Energy Trilemma
Guiding future Investments for Infrastructure
and sustainability needs*

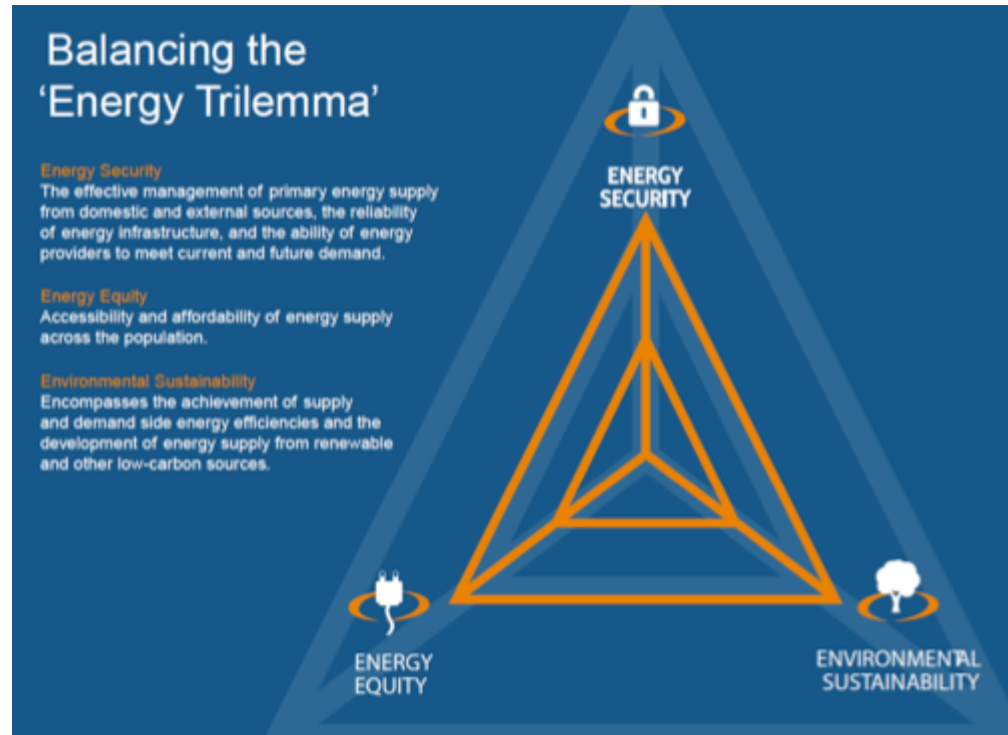
Peter Sharratt

4th June

www.hvm-uk.com



The energy trilemma

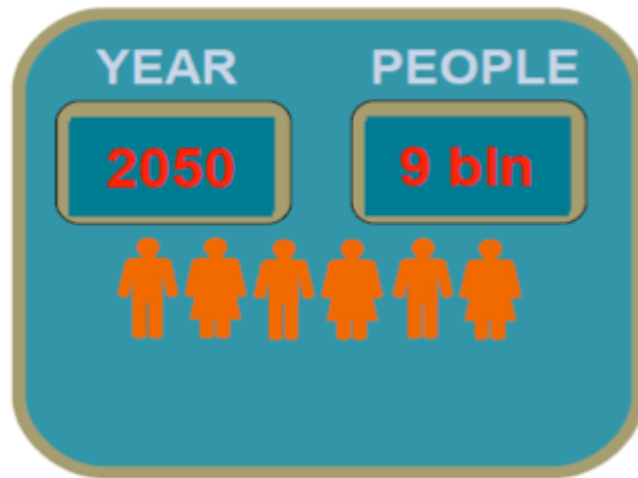


Themes:

Re-thinking growth

Value at stake

Re-thinking growth: Understanding the global challenge



Rising population + Global Security



Aging Infrastructure + Carbon

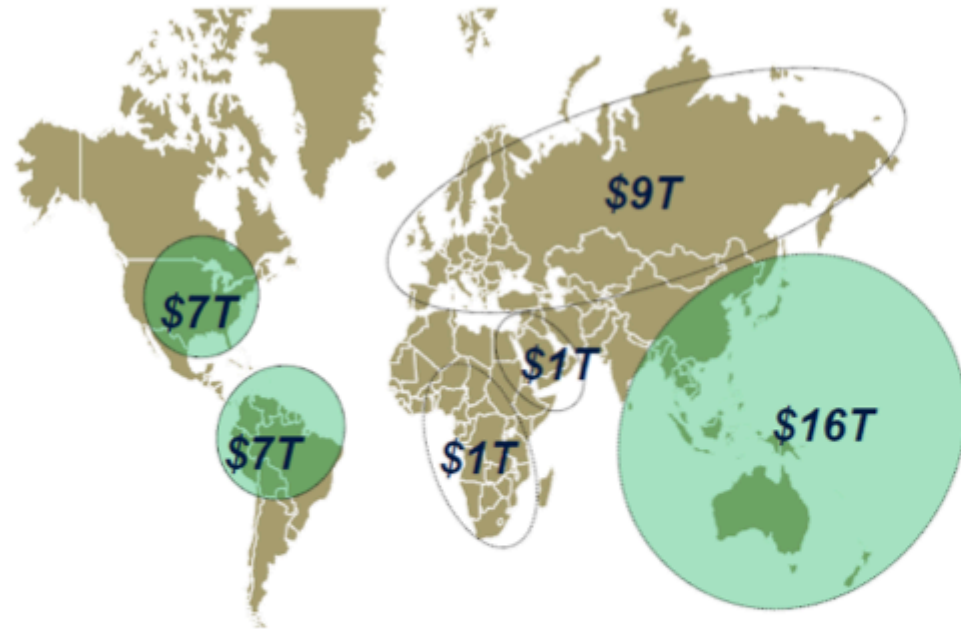


Resource + Environmental Constraints



Urbanisation and Equity

Re-thinking growth: Estimated global infrastructure spend



Budget \$ 40,000,000,000,000



Re-thinking growth: Rates of Global Urbanisation



Today

1.5 billion (about 1/5th of the world's population)

Generate **\$30 trillion**
Over 50% of global GDP

In 15 years time

2 billion (1/4 world's population)

\$64 trillion
Will Generate 60% global GDP

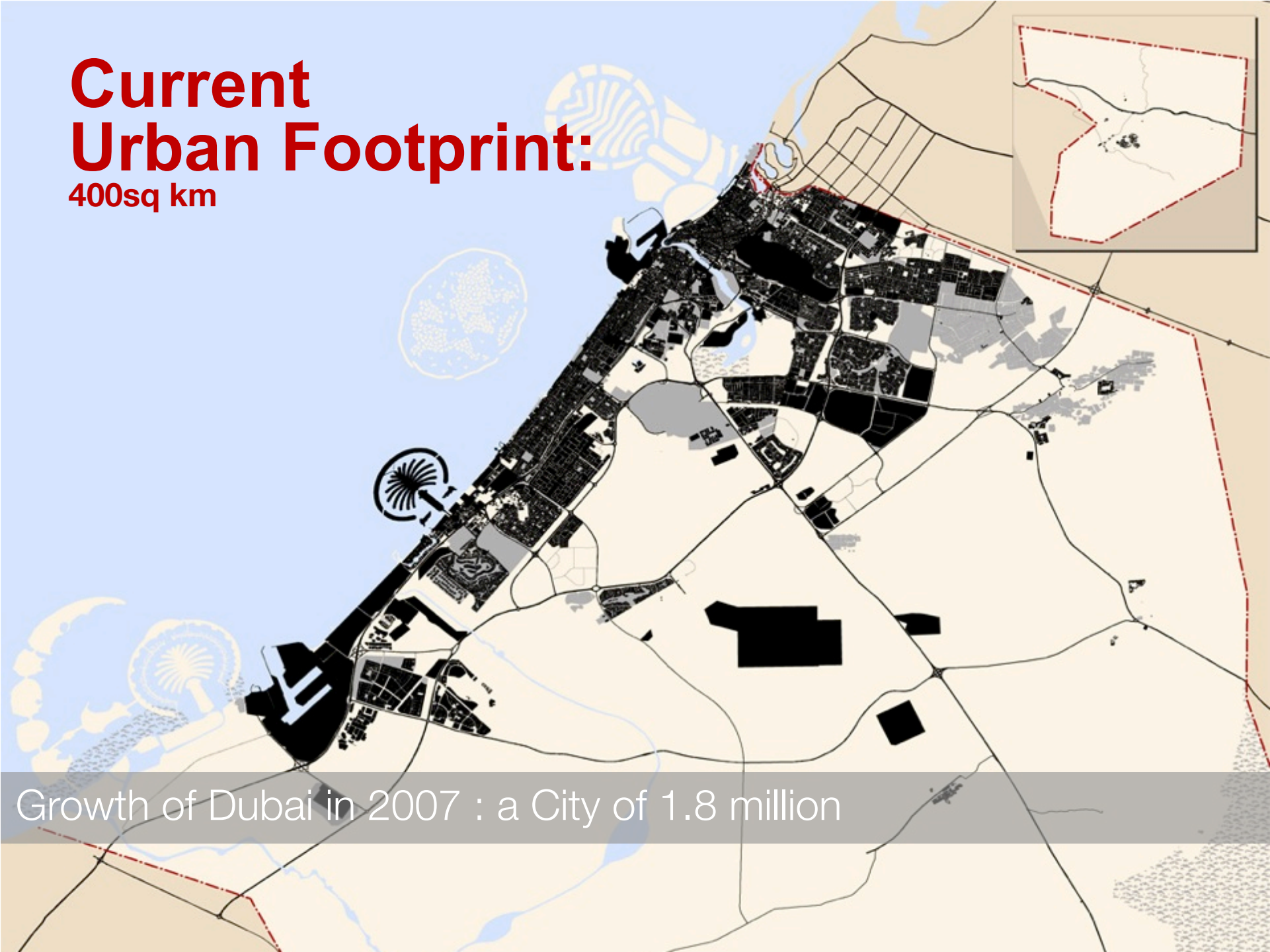
Source: Mckinsey Global Institute

Growth of the middle class

2009	1.8 billion
2020	3.2 billion
2030	4.9 billion

Source: OECD Development Centre

Current Urban Footprint: 400sq km



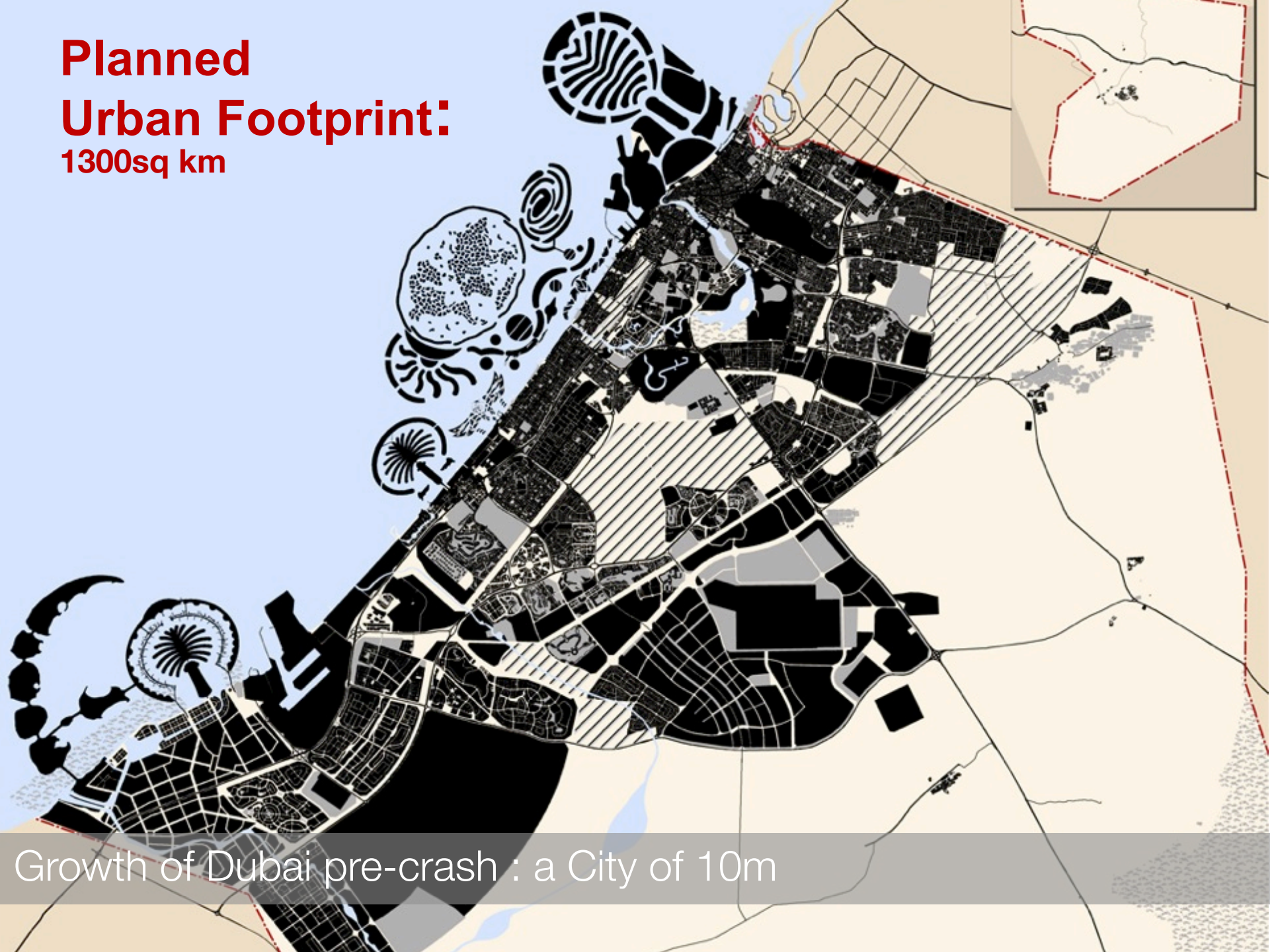
Growth of Dubai in 2007 : a City of 1.8 million

Committed Urban Footprint: 950sq km



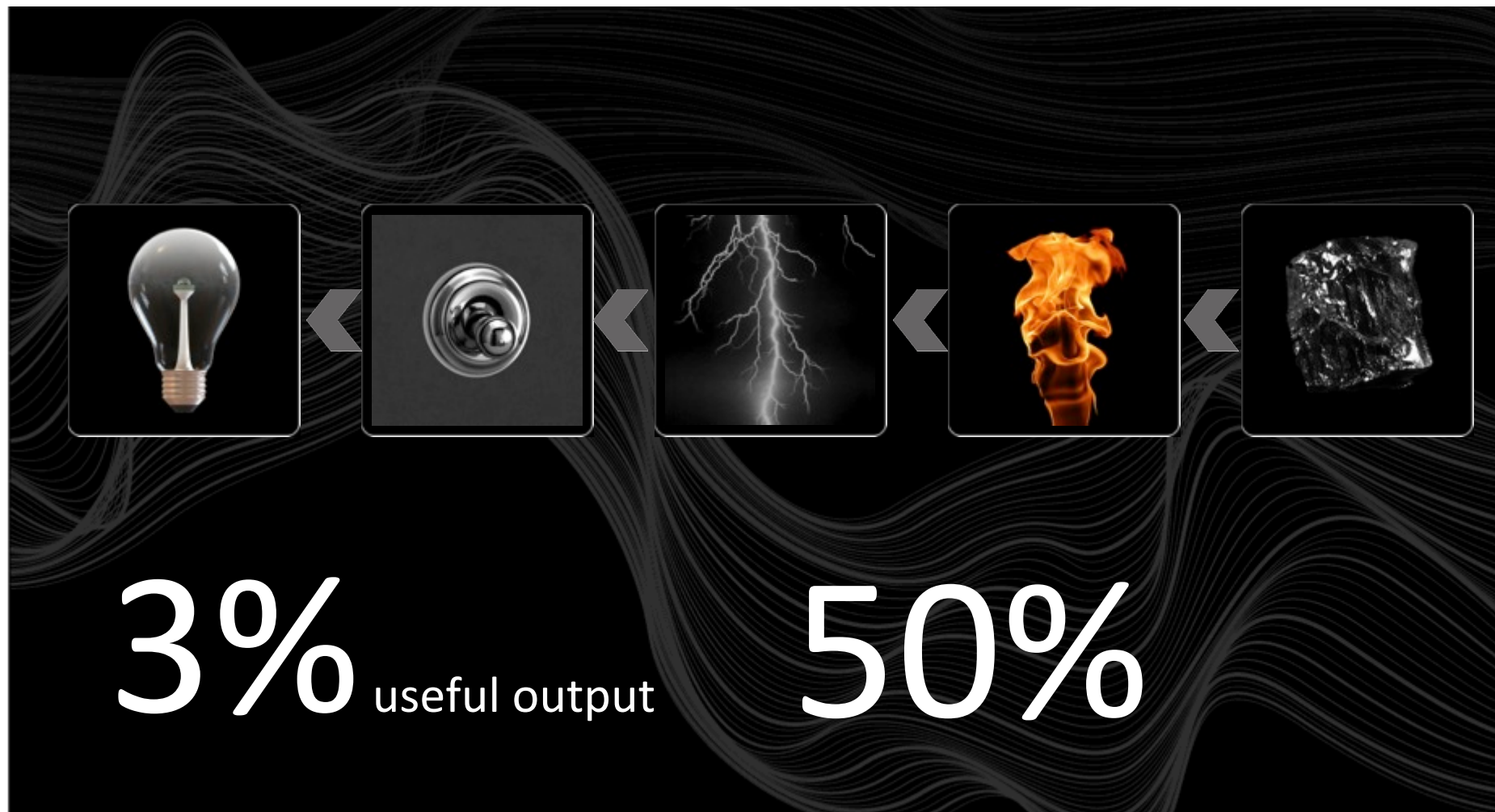
Growth of Dubai as envisaged in Strategic Plan : a City of 2.6m

Planned Urban Footprint: 1300sq km

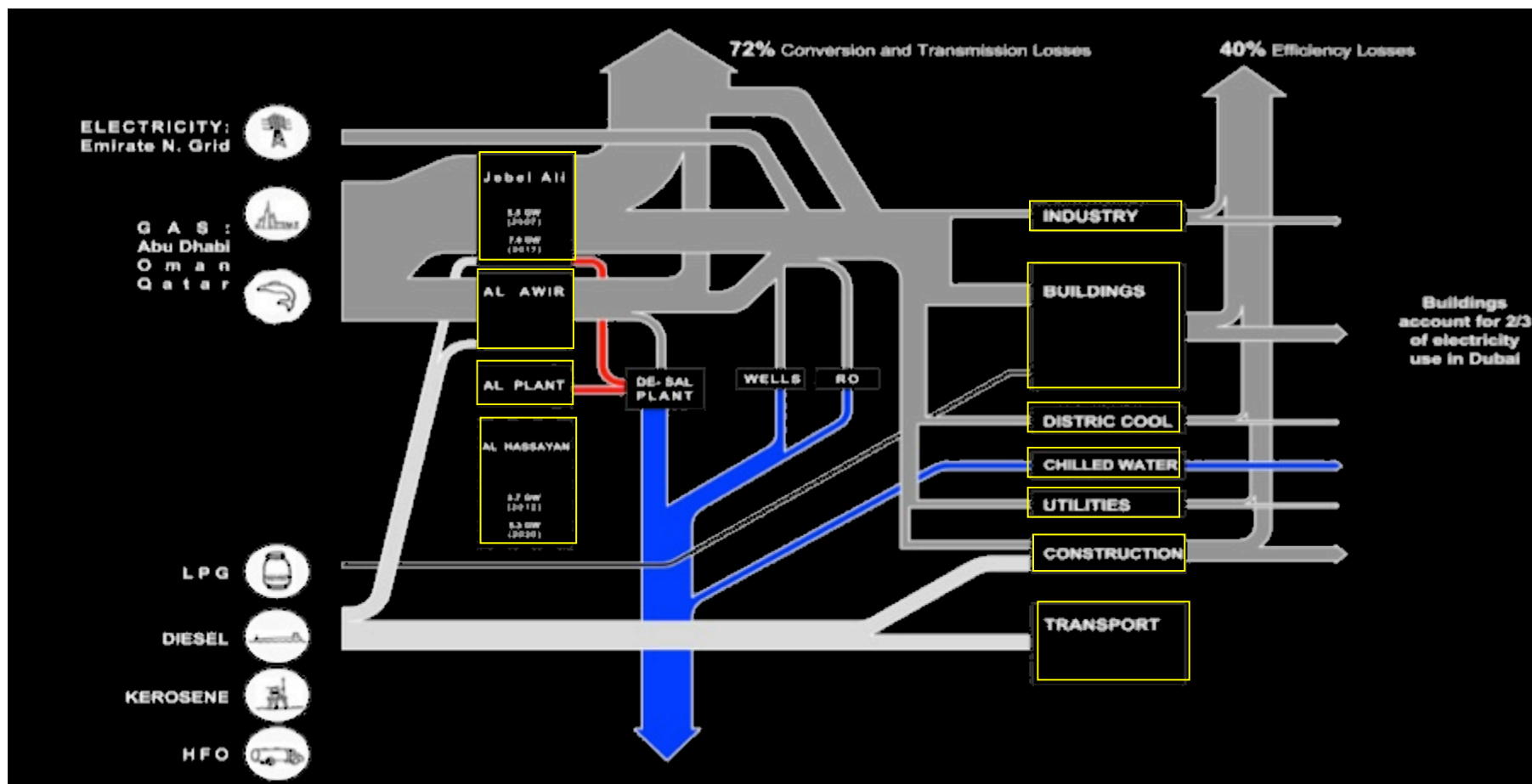


Growth of Dubai pre-crash : a City of 10m

Re-thinking growth: systems efficiency



What type of growth : CNI efficiency



Dubai, 2008

Re-thinking Growth

Designing Policy and Regulation that delivers sustainable outcomes



INTEGRATED PLANNING AND BUILDING POLICY AND REGULATION

Re-thinking growth: Saudi Arabia Understanding the Case for Action

82% Saudi's population
Live in cities and this is
Growing 2.5% pa

Saudi's Oil production accounts for:
75% national revenues
45% GDP
90% export earnings

Electricity demand is
Growing 6% pa
(twice average global rate)
GDP Growth 6% pa

**Over \$90bn investment
Required to meet demand
from conventional sources**

50% Saudi's water is
From Co-generation

In 2007 Saudi burned
\$113m worth of oil to
meet 50% of its total
domestic demand

KSA's 9th Development Plan
(2009-2014) targets Energy
Diversification and Improved
Living Standards



During Summer 60-70%
total
Electricity use is for
Buildings

75% Saudi's future
Electricity Demand
will come from it's
cities

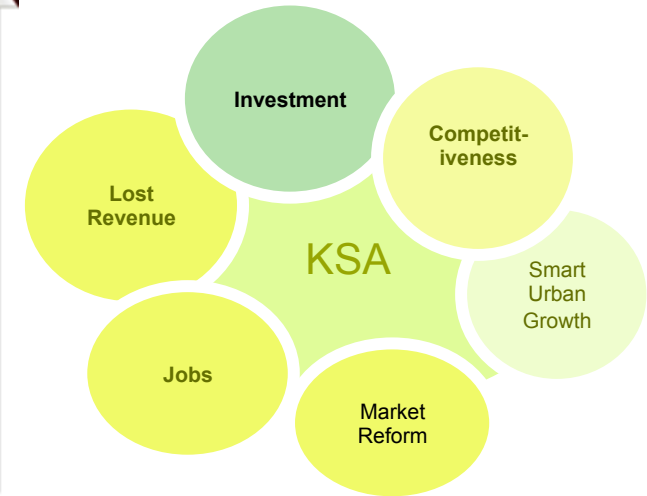
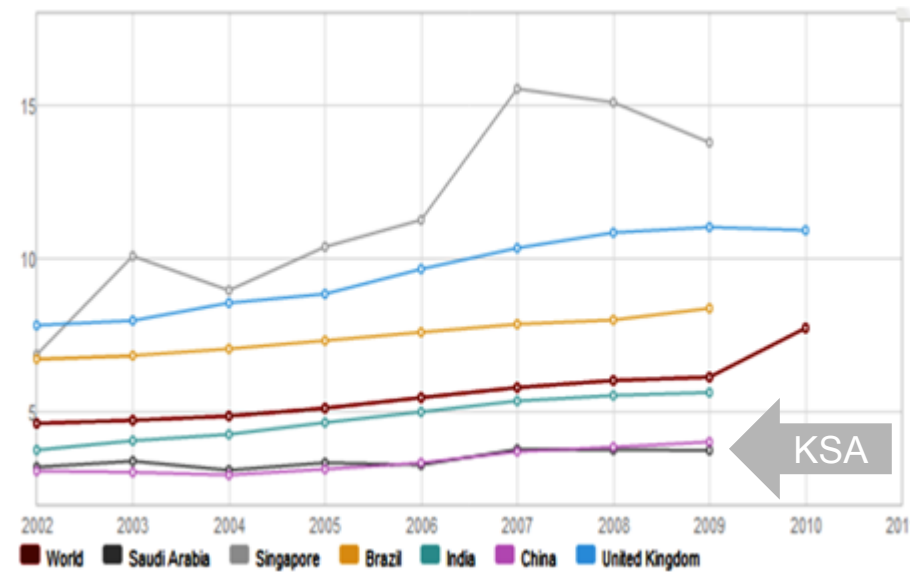
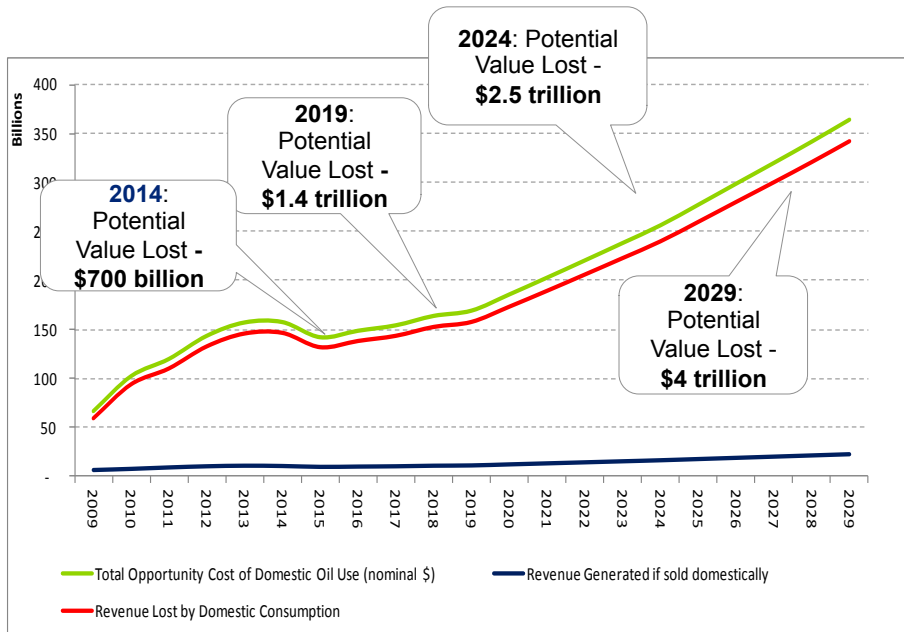
Electricity Generation
Accounts for 75% of total
Annual oil consumption

Aramco predict that in
20years 50% of national
oil production will be
consumed internally

The Kingdom of Saudi Arabia is the fastest growing consumer of electricity in the Middle East and a growing proportion of it's oil production is being consumed to power domestic growth with the potential loss of export revenues.

Re-thinking growth:

Making a case for action on the Trilemma



'Value at stake' and 'potential value retained'

\$ per annum opportunity cost of oil

GDP per unit of Energy Use

PPP\$/kg oil equivalent (purchasing power parity)

Re-thinking growth:

The 10th Five Year Plan:

Making the Case for a National Renewables,
Energy Efficiency and Integrated Sustainable
Development Programme for the Kingdom of Saudi Arabia



Re-inventing growth:
Case Study MASDAR city



... Masdar City caught the attention of the world –
how to deliver on its potential ?

Enterprise Risk + Value

Helping organisation map latent value that isn't accounted for
And better manage risks



.....creating the right dash-boards and facilitating understanding
and building consensus for action are key areas of opportunity .

Balancing Complexity: T+D and Land-use

Beaulieu Denny Overhead Power Line - SHETL



 Scottish and Southern
Energy

Treasure Island, San Francisco



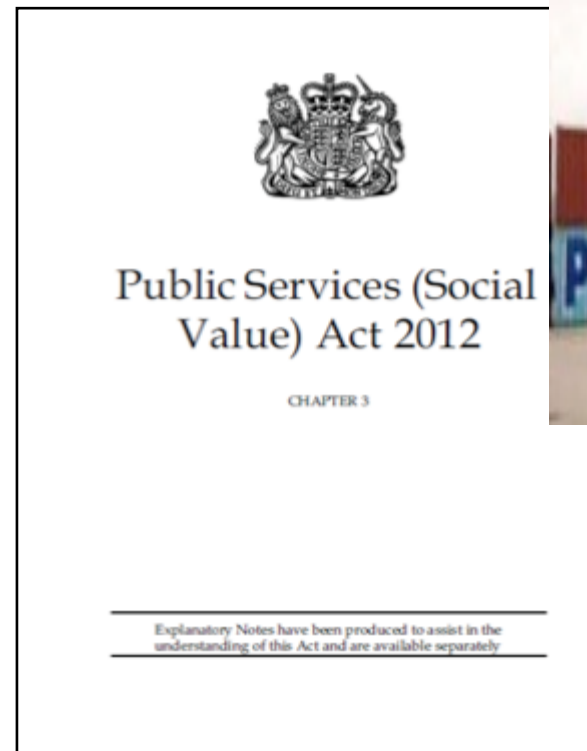
Imagining a world where
 Business is celebrated for it's
 contribution
 To society

Emerging theme



Public Services (Social Value) Act 2012

“An act to require public authorities to have regard to economic, social and environmental well-being in connection with public services contracts; and for connected purposes.”



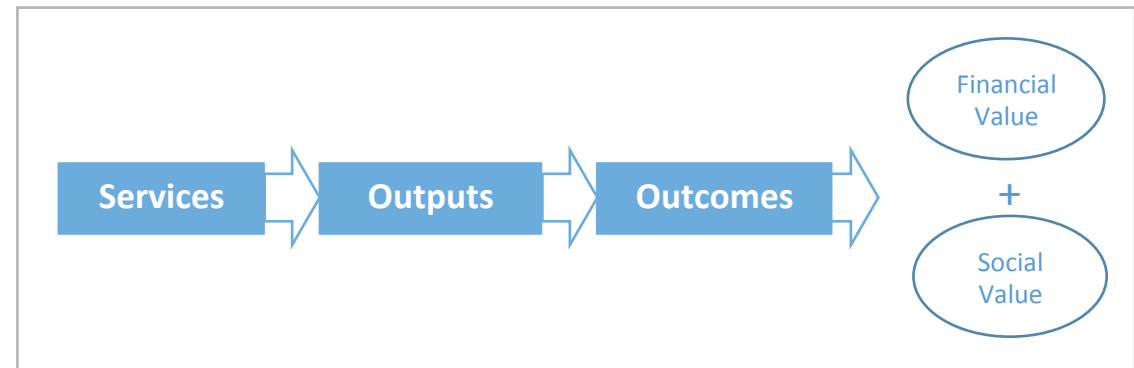
Social Return on Investment

$$SROI = \frac{\sum_{s/h=1}^{s/h=n} (NPV(stakeholder_cashflows))}{NPV(investment)}$$

Imagining a world where
Business is celebrated for it's
contribution
To society



Accounting for the social value of infrastructure



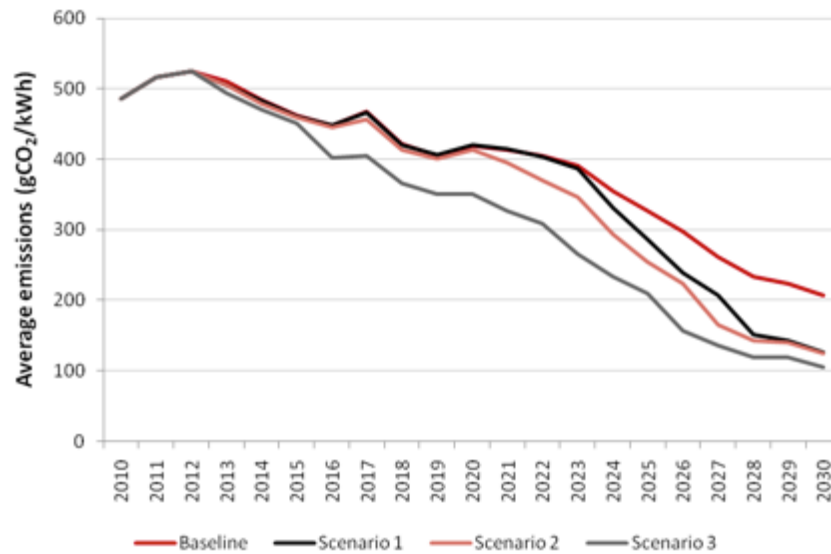
Every £1 spent creates £2.09
in social value in the London
Borough of Southwark



Every £1 spent with Veolia
creates £1.92 in social value
in the LBS.

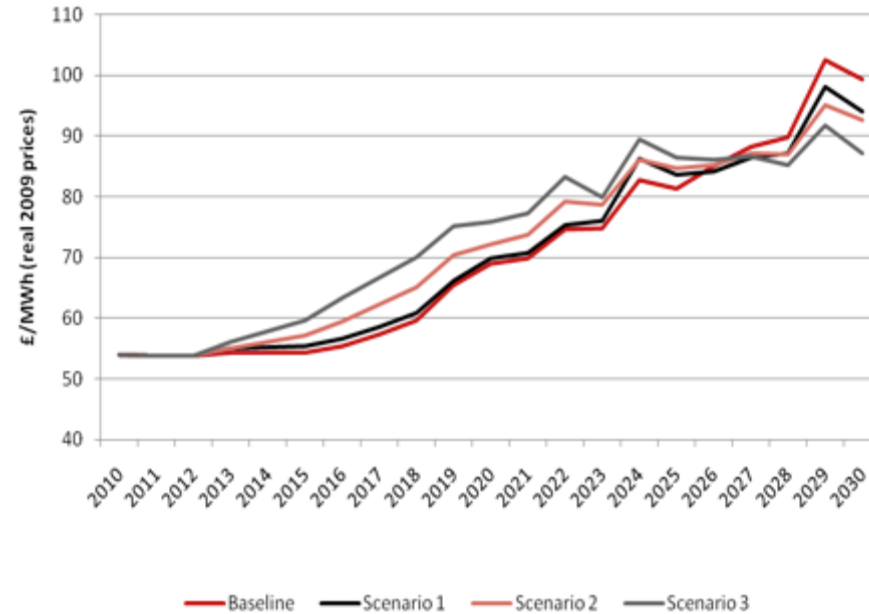
Value at stake UK Energy & CO² Performance

Carbon Intensity Forecast



Source
http://www.hm-treasury.gov.uk/d/consult_carbon_price_support_ia.pdf
 Redpoint Energy, 2010

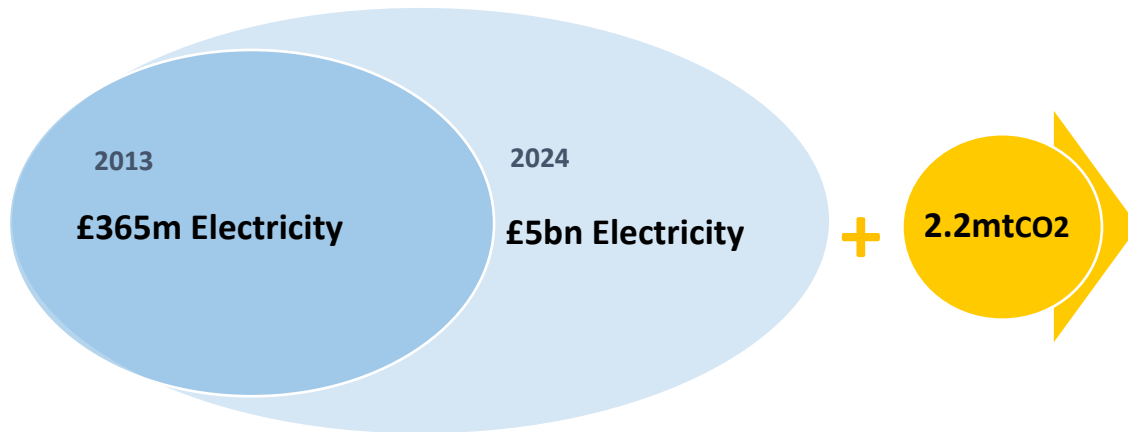
Energy Price Forecasts



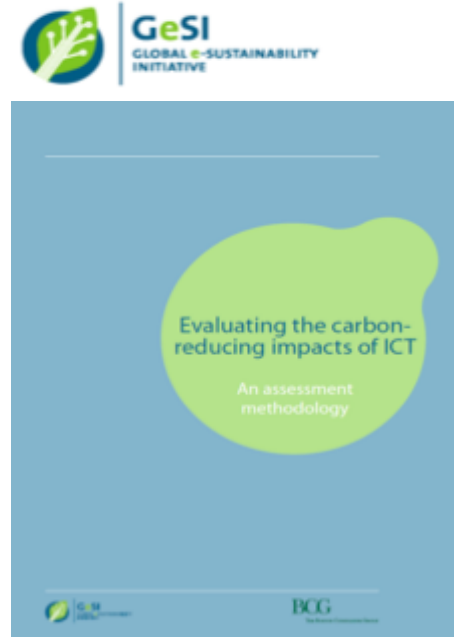
Source
http://www.hm-treasury.gov.uk/d/consult_carbon_price_support_ia.pdf
 Redpoint Energy, 2010

Value at stake: Energy and Carbon Management Global Bank

Improving energy and carbon performance of ITC and Data Management



10 year projected spend on electricity without growth in demand



‘ ICT could cut global BAU emissions by 15% and save €600bn ... across transport, buildings, power and industry sectors by 2020 ‘

Source: SMART 2020 : Enabling the Low Carbon Economy in the Information Age

TMT giants taking the initiative



US' largest privately owned onsite solar array Powering its data centre in Maiden, North Carolina, Two 20-MW solar arrays.



Altoona data centre 100% fuelled from wind energy project in nearby Wellsburg, Iowa



Research on Hybrid Renewable Energy Forecasting (HyRef) technology Improve forecasts of wind conditions Addressing the challenge of intermittent green energy sources.



Partnerships for the Solutions Economy

Helping organisations understand and design new
Partnerships to deliver wider value



Helping a global TMT business, partner with cities to meet their public service commitments in a more cost effective way by using technology platforms to drive efficiencies.

- Annual City budget of **€730m**
- **€150m** / year budget devoted to services that could be transformed to Smart
- savings **€11m** per year delivery cost saving

.....creating the right engagement frameworks supporting the case for action.

Key Contact



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