



The City as a Sustainable System

GreenGov Symposium

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George Washington University Office of Sustainability

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Defining Sustainable Cities

Cisco IBSG Urban Innovation Practice



The Cisco Internet Business Solutions Group (IBSG) Urban Innovation practice is a dedicated team of urban experts spread globally with a impressive track record of urban innovations and thought leadership.

The practice was spawned from within IBSG when it was tasked with shaping and leading the Connected Urban development program which was part of the Clinton Global Initiative.

The Urban innovation Practice of IBSG provides:

- A unique urban innovation team of professionals with deep expertise in the urban arena
- Unrivalled history of urban innovation projects
- Global presence and regional experience
- A dedicated team with access to worldwide research and innovation network within Cisco & partner organizations
- Unique insights and proven thought leadership in the urban innovation field

So Cisco created the Connected Urban Development (CUD) program

- Five year Cisco Commitment under the Clinton Global Initiative, initiated in 2006
- Public-Private partnership with Seoul, San Francisco, Amsterdam and Madrid, Lisbon, Birmingham, Hamburg – innovative pilot schemes launched
- Developed innovative solutions using ICTs to reduce CO2 emissions and created blueprints, models ... influenced policies and practices that help to create successful, connected, competitive, attractive and sustainable 21st century cities



Three founding cities:



Seoul



San Francisco



Amsterdam

In 2010 the CUD program became the Smart 2020 Initiative with the Climate Group as steward

THE CLIMATE GROUP

Many ways to evaluate Sustainable Cities

Many factors to consider in defining a sustainable city – many indices worldwide such as EIU European City Index, Centre for Liveable Cities, Sustain Lane (US) and the ULI Awards, which have different definitions and categories such as:

- Energy
- Waste production and management
- Waste water treatment
- Water consumption
- Availability of local public open areas
- Environmental management
- Noise pollution
- Air Quality
- Sustainable land use



Livability for a City has to be considered

Mercer's City Ranking Tables

	City	Country	Rating
1	Vienna	 Austria	108.6
2	Zurich	 Switzerland	108
3	Geneva	 Switzerland	107.9
4	Vancouver	 Canada	107.4
	Auckland	 New Zealand	107.4
6	Düsseldorf	 Germany	107.2
7	Frankfurt	 Germany	107
	Munich	 Germany	107
9	Bern	 Switzerland	106.5
10	Sydney	 Australia	106.3

The Economist's World's Most Livable Cities 2010 (Top 10)

	City	Country	Rating
1	Vancouver	 Canada	98.0
2	Vienna	 Austria	97.9
3	Melbourne	 Australia	97.5
4	Toronto	 Canada	97.2
5	Calgary	 Canada	96.6
6	Helsinki	 Finland	96.2
7	Sydney	 Australia	96.1
8	Perth	 Australia	95.9
	Adelaide	 Australia	95.9
10	Auckland	 New Zealand	95.7

Monocle's Most Livable Cities Index 2010

	City	Country	2009
1	Munich	 Germany	(04)
2	Copenhagen	 Denmark	(02)
3	Zürich	 Switzerland	(01)
4	Tokyo	 Japan	(03)
5	Helsinki	 Finland	(05)
6	Stockholm	 Sweden	(06)
7	Paris	 France	(08)
8	Vienna	 Austria	(07)
9	Melbourne	 Australia	(09)
10	Madrid	 Spain	(12)

Many qualitative indices and of note is that highly ranked “sustainable cities” tend to rank highly also in “livability indexes”.



2

Challenges for Sustainable Cities

Many looming issues in cities

- More than 50% of the world population in cities and getting bigger)
- Buildings - Cities consume between 50% to 75% of all energy & Cities cause more than 80% of all CO2 emissions
- Infrastructure – Emerging markets need \$30 to \$40 Trillion spent in infrastructure & housing by 2030
- Transport - Car usage increasing faster than population growth – distance between employment zones and living areas. Freight to increase massively. Avoidable traffic congestion costs \$ Billions
- Climate Change - Rising sea levels are a major threat considering proximity to world's major cities
- Water – infrastructure in established cities old and inefficient



Four megatrends will change the world



**1. Labor Forces
Substantially Ageing &
declining**



**2. Population Growth
Increasingly Concentrated
in Emerging Countries**



**3. World's Population
Becomes Urbanized**



**4. Energy, material &
information efficiency**

The world will need to adapt

Source: Council on Foreign Relations, Jan.- Feb. 2010, Korea Green Growth 8th Forum, May 2010

Different challenges for city types

Greenfield Cities – new cities have the luxury of a clean slate to start from but still have challenges :

- Can plan fresh without legacy infrastructure
- Infrastructure confuses standard real estate developers
- Correctly phased integration / timing of real estate, infrastructure and utilities
- Unclear Partnership / Business models for asset classes
- Stakeholder Alignment – different visions / different aims / different financial models
- Live Lab / Foreign Direct Investment is tricky but can be done

Retrofitting Cities – “brown field” city work is often complicated with multiple asset owners & unclear business cases:

- Complex ownership / legislative and regulatory framework of real estate, infrastructure and utilities
- Different stakeholders business models are fundamentally different and returns on capital and opex diametrically opposed & Public Sector role more crucial to defines policy and attempts to stimulate change



The City as a System encompasses different assets and entities

City Sector Overview (simplified)

Utilities



Transportation



Real Estate



City Operations

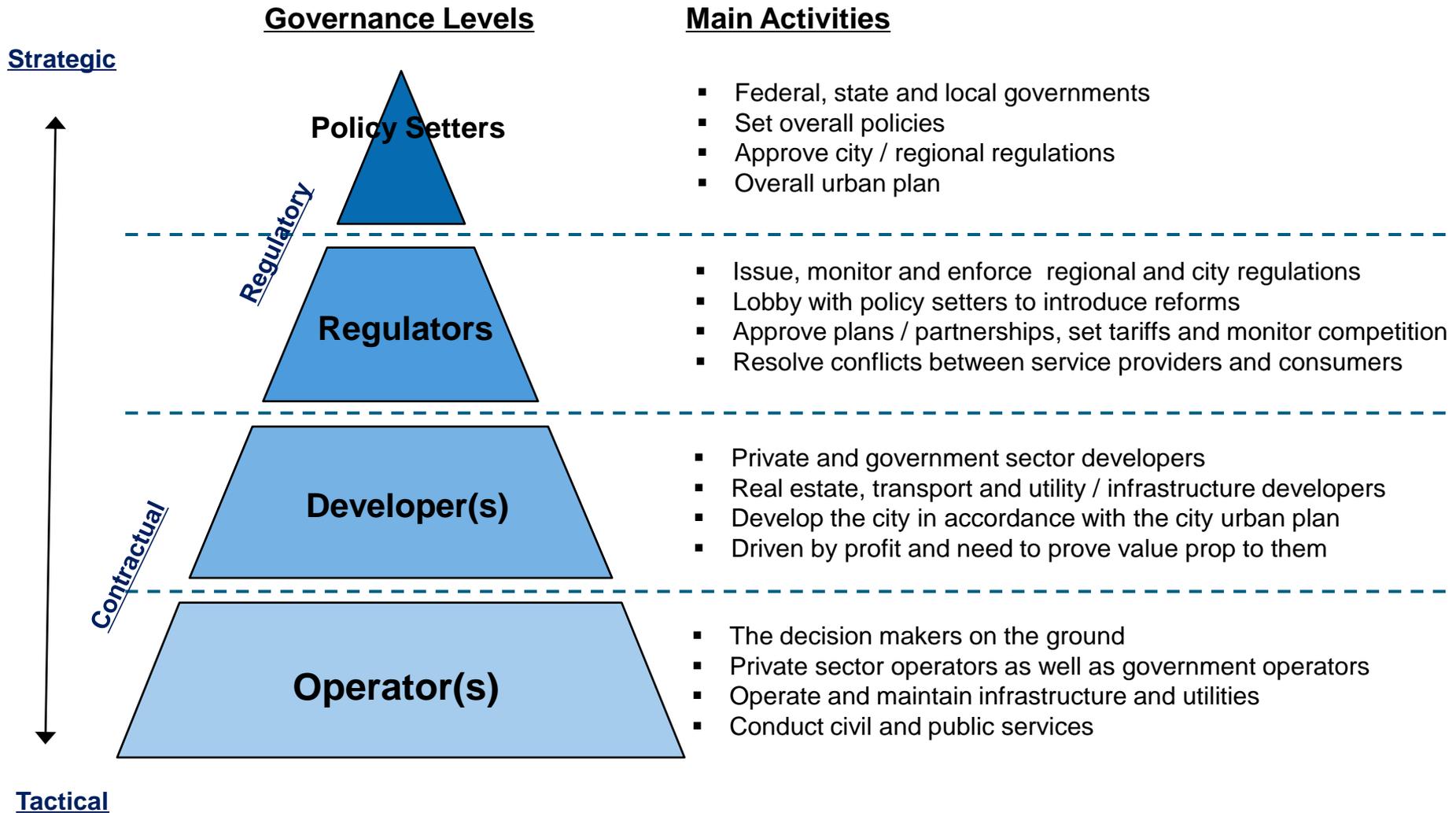


Governance Framework for the city

Capital Expenditure, Operating Expenses, Revenue Collection

City Services support all areas

A complex governance framework to be navigated to achieve sustainability measures





3

Solutions & Case Studies

Solutions – Approaches

The issues and approach to achieve sustainability measures in cities worldwide:

- **Governance** – environmental plans and policies can be introduced across all areas based on a comprehensive plan which most cities are doing on an ongoing basis – breaking through layers of government crucial
- **Technology** – currently the technology to meet 70% of the worlds climate targets is already in existence - further work to refine the business case for the deployment of technology is key
- **Behavioural change** – immediate demand reductions in water and power can be achieved by raising public awareness. This can be done via education and motivation of the private sector and is already resulting in bottom up solutions from the public
- **PPPP** – public private people partnerships are crucial as a sustainable city is the sum of so many parts and it requires buy-in from all stakeholders
- **Innovations / Economic Growth** – many cities are driving innovation and new economic growth in their cities as part of the move to a sustainable low carbon economy (“live lab” approach) such as

Pilots and Proof of Concepts – are a established way to engage government, private sector and the public in sustainability measures by using “baby steps” – a few from Cisco in cities:

Masdar City – Abu Dhabi, UAE

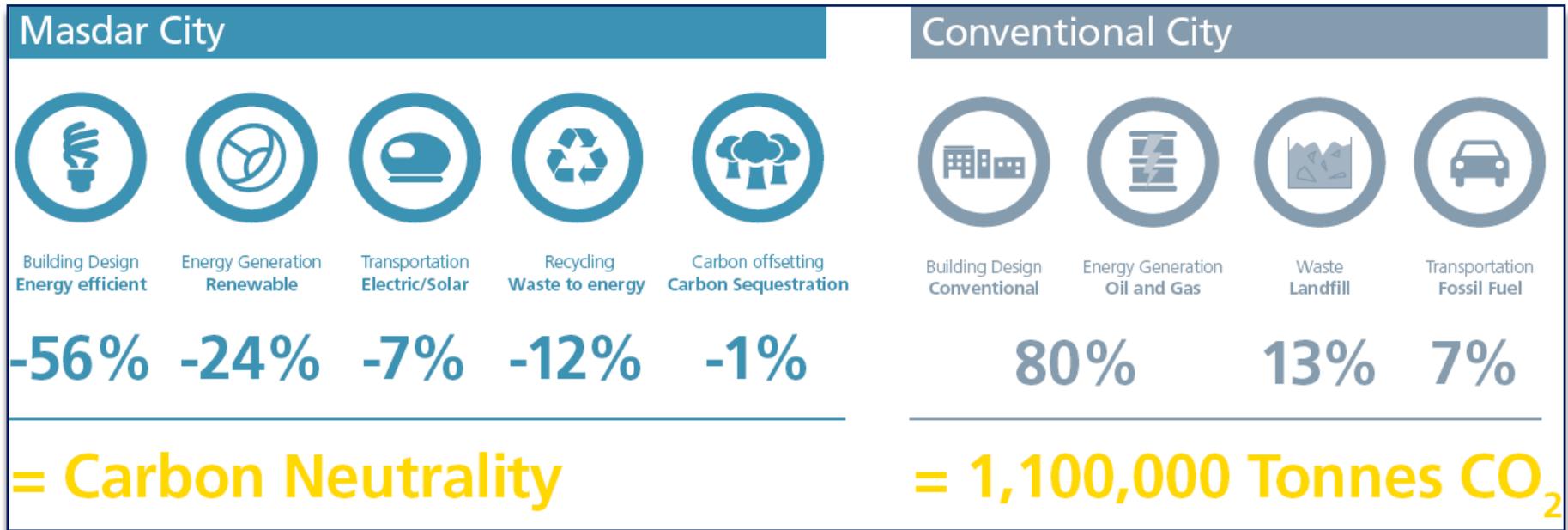
Capital Budget
USD \$22 Billion



Building Area
55 million ft²

- To create a sustainable city that incorporates the highest quality of life with the lowest environmental footprint
- To develop a city which is carbon neutral, uses only renewable energies and produces zero waste
- To partner with global leaders and innovative companies in the cleantech industry
- To drive foreign direct investment and emerge as the global hub for cleantech education, research, development and production

Masdar City - Carbon Abatement



Reducing Demand versus Clean Supply

One of the most time consuming parts of the planning for the city was the involvement with other government authorities and regulators – coming up with technology that worked was only the start

Masdar City – Original Images 2005



Masdar City – Actual Images Sept 2010

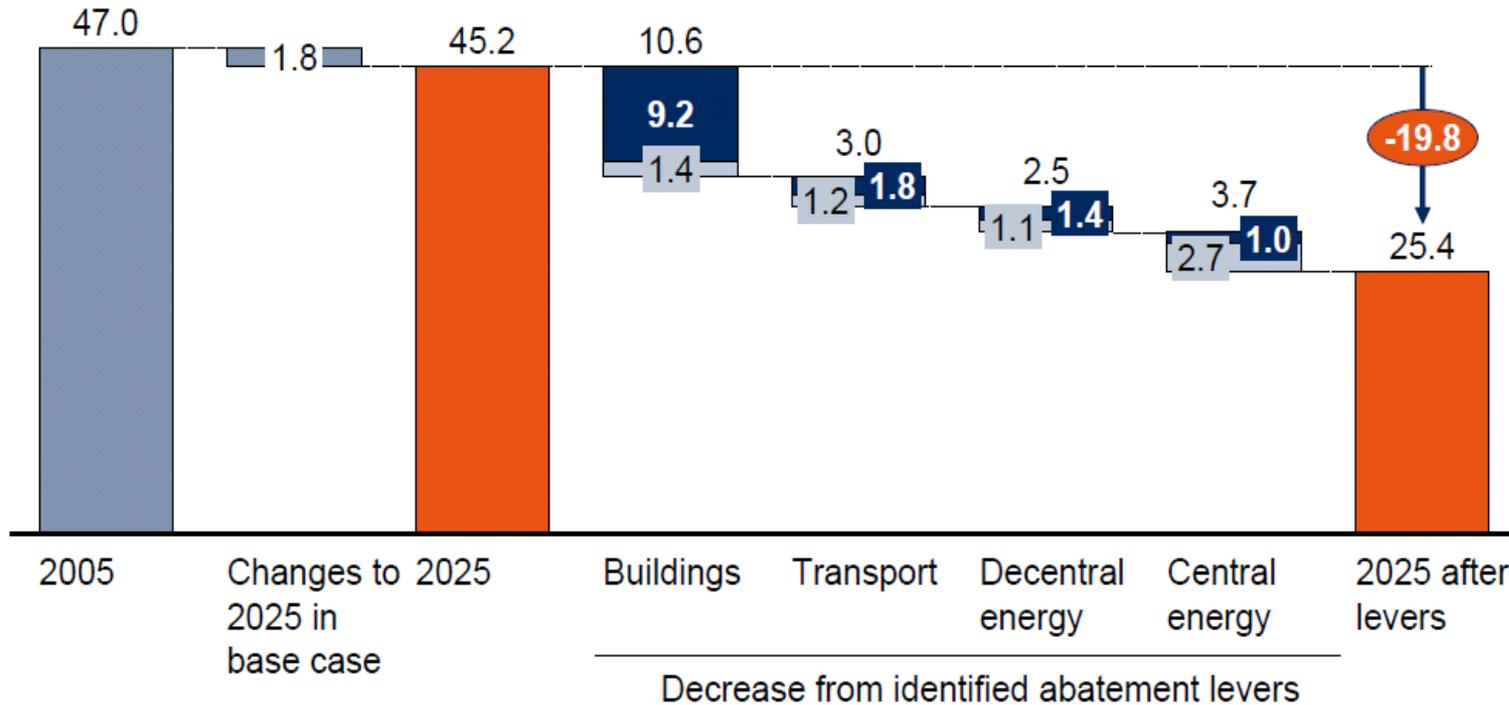


London – Carbon Abatement guide

Buildings are the sweet spot

Mt CO₂

■ Cost < 0 EUR/t CO₂*
 ■ Cost > 0 EUR/t CO₂*



Source : McKinsey & Company – Sustainable Urban Infrastructure 2008

Benefits of a smart sustainable community

Within 20 years, a Community of 5 Million:

Community
Revenues

+\$15B



GDP
Growth

9.5%



Energy
Efficiency

+30%



New
Jobs

375,000



Urban Innovation Blueprint for Sustainable Cities

Smart Work / Health



Work
Fostering sustainable work environments to meet the needs of existing, new, and future workforce ecosystems

Smart Connected Buildings and Homes



Buildings and Homes
Driving an evolution of how people increase quality of life, along with participate and contribute to sustainability

Smart Connected Urban Mobility



Mobility
Personalizing the mobility experience and enhancing urban sustainability management through accessible and efficient services

Smart Connected Energy



Energy
How electric power is generated, delivered, stored, and consumed within communities

Sustainable Socio - Economics



Engagement
Modular and adaptive approaches to urban management, along with virtual and physical community engagements for improving behaviors

Sustainable Planning

Sustainability Collaboration Framework and Platform

Broadband and ICT Platform – 4th Utility

IP-Enabled Homes and Offices, Roads, Utilities, Workplace Design

From CUD to Smart+Connected Communities

Connected Urban Development

metropolis

Amsterdam: Smart Working Centres

Seoul: Personal Travel Assistant

San Francisco: EcoMap, Connected Bus

City Projects

Toronto

NYC: Yankee Stadium

Barcelona

Singapore: EPIC

Nth Carolina: Smart Grid

Greenfield Cities

China: Chongqing

South Korea

India: Lavasa

Globalisation Centre East

Smart+Connected communities

Pilot to reality – Amsterdam distributed workplace



Waar wilt u werken?
Amsterdam

Wat wilt u reserveren?
Werkplek

Wanneer wilt u werken?
Selecteer de datum
Selecteer het tijdstip

Hoeveel personen zijn er aanwezig
1

Extra voorzieningen (0)

[← Ga terug](#)

2 vestigingen gevonden in: Amsterdam
[« Terug naar de zoekresultaten](#)



[« Terug naar de zoekresultaten](#)
[Terug naar de zoekresultaten](#)



Waar wilt u werken?

Wat wilt u reserveren?

Werkplek

Wanneer wilt u werken?

Selecteer de datum

17-09-2009

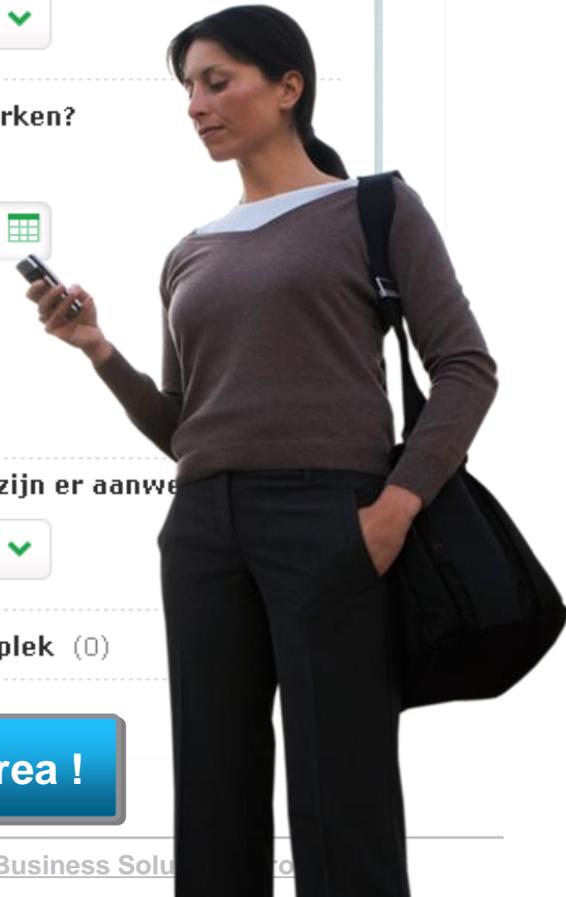
Selecteer het tijdstip

10:00
12:00

Hoeveel personen zijn er aanwezig

Onbekend

Extra voor uw werkplek (0)



Now in France & Korea !

A true collaboration PPP

The map displays several Smart Work Centers across the Netherlands, marked with green pins containing a white 'W'. The cities labeled are Amsterdam, Almere, The Hague, and Rotterdam. A large white box in the bottom right of the map contains the Smartwork logo and text: **SMARTWORK** Platform voor Smart Work Centers.

Logos and Partners:

- ZUIDAS A'DAMBRIGHTCITY
- Touchidown CENTER
- FlexOffice
- Gemeente Amsterdam (indicated by three red 'X' marks)
- Logo with a house icon inside a green circle
- iGluu work space for professionals
- DIALOGUES PORT office by the hour
- World Trade Center Almere Association
- International Business Club

Pilots - Seoul Personal Travel Assistant & San Francisco Green Connected Bus - Trip Planning

Seoul Personal Travel Assistant

My Today / Travel Planning

My Today: May 19, 2009

- 1 Seoul PTA 업무협의 []
- 2 Meeting [무학동 7]
- 3 PTA 회의 [쌍림동 1-1]

Travel Option

	Carbon Emission	Travel Distance	Travel Time
Route1 : GreenRoute1	[Bar]	[Bar]	[Bar]
Route2 : GreenRoute2	[Bar]	[Bar]	[Bar]
Route3 : Shortest-Time Route	[Bar]	[Bar]	[Bar]

Virtual Assistant

Transcript

You have selected 'Green Route 1'. It is the route which has the least carbon impact.

Selected Route



You cannot manage what you don't measure - Urban EcoMap

ecomap SAN FRANCISCO

Home Explore Act Resources

Working Together to Improve San Francisco's Environment
Understand the challenge. Become part of the solution.

What's The Problem?
We hear a lot about greenhouse gas emissions and the need to reduce them. The first step is to understand where they originate.

- 50% TRANSPORTATION
- 30% ENERGY
- 20% WASTE

John Rides His Bike to Work
On average, transportation is responsible for 50% of green-house gas emissions. By using alternative forms of transportation, Joe is part of the solution.
Are You?

Do It Now!
Want some quick suggests for how you can reduce your environmental impact? Tell us what's most important to you, and we'll show you the best options.

- Low Cost
- Lowest Effort
- Greenest Option

Go

See What's Happening In Your Neighborhood
Use our interactive map to better understand the environmental impact of your neighborhood, relative to others. Compare two zip codes, or compare your zip code to the current City average and the future City goal.
Compare Neighborhoods >

Are You Part of the Solution?
Use the "Action Advisor" to learn more about available environmentally friendly options. Identify what is most important, and the "Action Advisor" will build a list of suggestions and resources that are right for you.
Take Action >

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- Challenge: Currently, no universal collaboration, visualization, and measurement tool exists for greenhouse gas emissions from city activities.
- Solution: Develop an open source collaboration web 2.0 platform that will enable citizens and business to see the collective results of their individual climate change behaviours, aggregated by zip-code, to take actions to mitigate environmental impacts, and track the results of these actions.
- Results: CUD prototype. 10+ cities in North America, Europe, and Asia are engaged, with the City and County of San Francisco & City of Amsterdam taking the lead.

www.urbanecomap.org

Link to flash demo at:

http://www.connectedurbandevlopment.org/connected_and_sustainable_ict_infrastructure/eco_map/multimedia

Urban EcoMap

Working Together to Improve Urban Environments

Urban EcoMap is an interactive decision space that empowers individual citizens to make informed decisions about their daily lives, along with how to participate in the vitality of their communities. We aim to build awareness, fostering a sense of community, and provide actions for citizens to take to enable the reduction of greenhouse gas emissions in cities. Please join us.

Amsterdam

Population: 746,935



Residential CO2 Emissions:



Transportation: 30.2%



Energy: 63.7%



Waste: 6.2%

Explore

Residential CO2 per capita: 3.4 t

Total CO2 per capita, Netherlands: 11.2 t *

San Francisco

Population: 762,611



Residential CO2 Emissions:



Transportation: 78.1%



Energy: 19.4%



Waste: 2.5%

Explore

Residential CO2 per capita: 8.2 t

Total CO2 per capita, United States: 19.1 t *

Together we can strive to achieve a reduction in carbon emissions to 2 metric tonnes(t) per capita. [Learn More](#)

Sustainability – lets keep it real

“

We need real solutions, not examples of technology for technology's sake, not digital pies in the sky, ... tech utopia

Hector Ruiz AMD

”

“

That sir is like fitting wheels to a tomato.. time consuming and completely unnecessary

Dr Samuel Johnson, Blackadder BBC

”





CISCO

CISCO

CISCO

CISCO

CISCO