Finance, Development & The Sustainability Equation

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I started my day by walking to the DC Metro, 9 minutes from my house, then Taking Metro to Amtrak's Union Station, then Taking Amtrak to Philly's 30th St Station, then Jumping in a PhillyCarShare at 30th St. to get to this conference

Sustainability and the ladder of awareness

- Mindset awareness of how things are connected
- **Process** integrative design, dynamic planning
- **Tools** metrics, benchmarks, modeling
- **Stuff** products, technologies, techniques



Story 1: Earth

Ecology (from the Greek oikos + logia meaning "the study of one's home")

The science dealing with the relations and interactions between organisms and their environment, including other organisms.





The History of Earth

(in 6 days)

NASA

THE EVOLUTION OF THE EARTH One day = 750 million years

DAY 1 - MONDAY:

Formation of Geology

The Pre-Cambrian Period has begun

DAY 2 - TUESDAY 8:00 AM - Life first appears Blue-green algae is the dominant life form

DAY 3 - WEDNESDAY

Complex life forms evolve All life is restricted to the sea

THE EVOLUTION OF THE EARTH

One day = 750 million years

DAY 4 - THURSDAY

Half of the history of Earth has elapsed

First photosynthetic plants appear



DAY 5 – FRIDAY

 Free oxygen forms the ozone layer paving the way for life on land

THE EVOLUTION OF THE EARTH

One day = 750 million years

DAY 6 – SATURDAY

1:00 A.M. – Amphibians come onto land
4:00 P.M. – Giant reptiles appear and survive for almost 6 hours until 9:55
10:00 P.M. – Primates appear
11:44 P.M. – Grand Canyon begins to form
11:59:54 P.M. – Homo sapiens arrive
1/40th of a Second Before Midnight - Humans begin to burn fossil fuel

In the past 1/200th of a second, Earth's population has doubled to over 6,000,000,000 people.

In the past $1/300^{\text{th}}$ of a second, the combustion of fossil fuels has emitted 135,000,000,000 tons of CO₂ into the Earth's biosphere.


WORLD ENERGY CONSUMPTION PROJECTIONS

+62% (276 QBtu by 2030)



110000 New Power Plants







The Great Modern Myth

"We know what we're doing, and we are in control."











Chile



ally know what we want?

Calcutta



Ethiopia

Bhopal

What does all this have to with planning, development, or finance?

New Fil



Everything.

The fundamental increment for change are the decisions that each of us make every day in our professional and personal lives.

What is development?

"The act of bringing out the capabilities or possibilities of something to a more advanced or effective state."

Oxford English Dictionary



What is capital?

Accumulated assets used to generate wealth

Story 2: Economy

Economy (from the Greek oikos + nemein = oikonomia meaning "management of one's home")

1 the state of a country in terms of the production and consumption of goods and services and the supply of money.

2 careful management of available resources.

It's a finite world and getting smaller





But Not Everything is Getting Smaller...

1950 3.37 people per household - 297 s.f. per person 1970 3.14 people per household - 478 s.f. per person 2000 2.62 people per household - 840 s.f. per person









Our families and our lives are fragmented.

A typical American mother spends 76 minutes per day in her car (more time than she spends bathing, feeding and clothing a child).

The average American spends about 80 hours per year stuck in traffic.

America spends \$80 Billion per year on health issues related to poor air quality.

The U.S. is depleting the world's precious resource of stored solar energy at the rate of 20,000,000+ barrels per day.

The values to which people cling most stubbornly under inappropriate conditions are those values that were previously the source of their greatest triumphs

Jared Diamond - Collapse



Cockeyed Accounting?





It depends...

The problem of cost...


Looking through the Microscope of Cost

First Cost "Bricks and Mortar"

Widening the field of view...





The problem of risk...





USGBC LEED Neighborhood Development Key Drivers

Where? What? How?

The

Smart Location Neighborhood Pattern

Green Technology

What it could mean

Using 40% energy reduction as a benchmark:

If all housing starts and commercial buildings over the next 10 years were built using green building standards:

- 12,166,000,000,000,000 Btu saved
- 1,270,000,000 metric tons of CO₂ emissions eliminated
- \$1,906,000,000,000 consumer savings

U.S. Department of Energy + CBECS

What it could mean

Location Efficiency as the missing piece of the Energy Puzzle

If all housing starts over the next 10 years were built using smart growth standards, assuming 50% greenfield and 50% infill

- 977,000,000,000,000 miles of vehicle travel reduction
- 5,690,000,000,000,000 Btu saved
- 595,000,000 metric tons of CO₂ emissions eliminated
- \$2,180,000,000,000 consumer savings

NRDC/Sierra Club Study, 2004

What it could mean

The 10 year potential for Sustainable Communities (Smart Growth + Green Building)

- 977,000,000,000,000 miles of vehicle travel reduction
- 17,823,000,000,000,000,000 Btu saved
- 1,866,000,000 metric tons of CO₂ emissions eliminated
- \$4,087,000,000,000 consumer savings

The future of green building is not buildings, but planning. Community is the architecture that will enable the human family to make the transition from its current state of crisis to a sustainable future.

Planning in this respect does include buildings and infrastructure and their very important relationships to each other, but it also includes careful attention to the fundamentals of local economies and the organizing principles that improve the quality of everyone's life in a community

Sandy Wiggins

Story 3: Equity

Equity (from the Latin aequus meaning "equal") The quality of being fair.









Where will we find these other planets?

If every person on Earth consumed resources & generated wastes at the rate of the average American, we would need at least four planets to sustain human existence.

Sustainability

"The ability to meet the needs of the present without compromising the ability of future generations to meet their own needs."

United Nations

World Commission On Environment and Development

Sustainability

"The ability of society to continue without being forced into decline through the exhaustion or overloading of the resources on which it depends"

American Institute of Architects

Sustainability

A state of perpetual vitality supported by resources local to a place

Sandy Wiggins

"The best way to predict the future is to design it."

-Buckminster Fuller

Sustainable design...

... the intelligent integration of technology with nature



Sustainable finance...

... the intelligent integration of technology with nature







A Tale of Two Cities

A story of sustainable finance and development

Which makes more economic sense?....





... \$1.6B for a system that works with nature, distributes cost on the basis of impact, and will over time permanently improve the quality of life for everyone in the city...

Breaking ground with a \$1.6 billion plan to tame water

By Sandy Bauers

Inquirer Staff Writer

Philadelphia has announced a \$1.6 billion plan to transform the city over the next 20 years by embracing its storm water - instead of hustling it down sewers and into rivers as fast as possible.

The proposal, which several experts called the nation's most ambitious, reimagines the city as an oasis of rain gardens, green roofs, thousands of additional trees, porous pavement, and more.

All would act as sponges to absorb - or at least stall - the billions of gallons of rainwater that overwhelm the city sewer system every year.

The plan's complex funding formula would raise rates somewhat but also attract grants and encourage private investment.

The Washington Post

... or \$2.2B for 12 miles of tunnels full of sh...t?

12 Miles of Tunnels for D.C. Sewer

Written by Randy Post Thursday, 10 September 2009 21:00



In Washington D.C., the D.C. Water and Sewer Authority (D.C. WASA) finalized a lont-term plan in 2002 aimed at reducing combined sewer outfalls into the Potomac River and its tributary, the Anacostia River. A major portion of this plan is a \$2.2 Billion (US) deep tunnel program to handle excess stormwater flows and prevent the combined sewage from being discharged into the environment. Read on for a map and more info. (Photo of Anacostia River, by D.C. WASA)

According to TBM: Tunnel Business Magazine, the tunnel system

will be broken into 4 projects consisting of tunnels from 15 to 23-ft diameter tunnels and will include approximately 17 vertical shafts and various diversion structures. The tunnels will be approximately 100-ft deep, primarily constructed in soft ground. They will most likely be constructed by earth-pressure balance TBM's.

The map below shows the alignment of the tunnels and the separation of the four projects based on a figure in TBM. The green lines are the NE Boundary Branch Tunnels, the purple line is the NE Boundary Tunnel, the red line is the Anacostia River Tunnel and the yellow line is the Blue Plains Tunnel. The circular dots are the vertical drop shafts.

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What do you control?