



Infrastructure Needs to 2030: Telecom, Land Transport, Water and Electricity

By Pierre-Alain Schieb

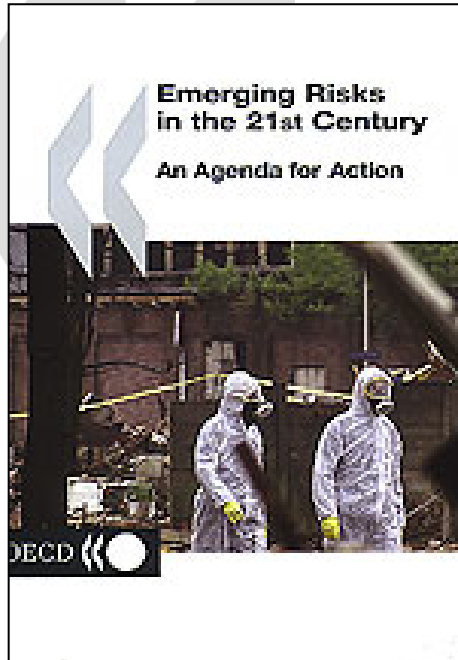
29th October 2007
OECD Centre, Tokyo

Who are we?

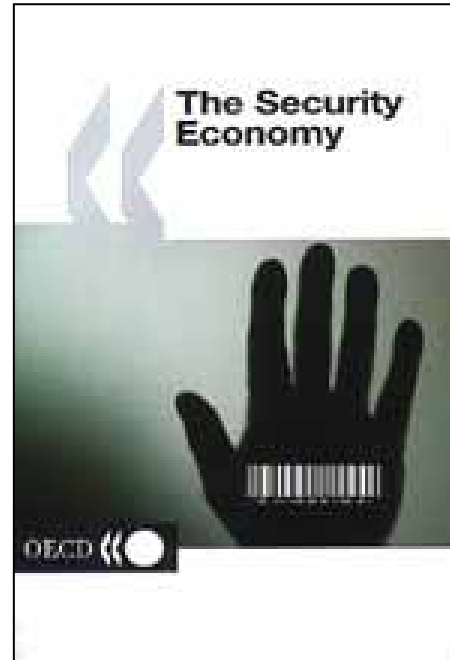
Advisory Unit to the Secretary-General (SGE/AU)
International Futures Programme (IFP)

- **Multidisciplinary team**, created in 1990, reporting directly to the Secretary-General of the OECD
- **Mission** = Identify and explore emerging policy issues (management of new emerging risks, the security economy...)
- **Participation / Project Funding** = Involvement of governmental bodies and private sector actors in each (self-financed) project

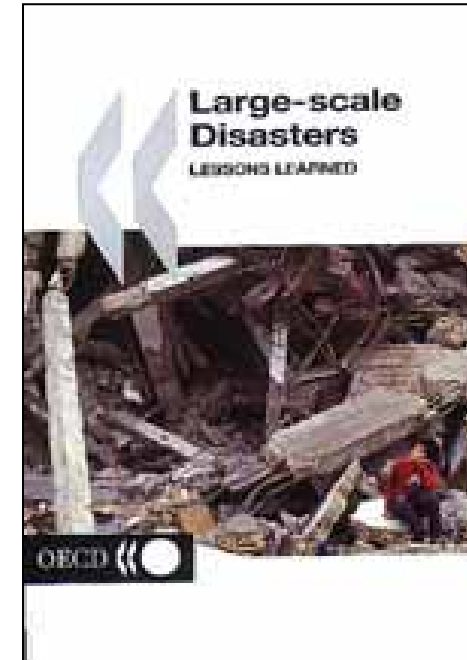
Other OECD/IFP projects



Risk Management
2003



Security Economy
2004



Managing Disasters
2004

Examples of OECD/IFP projects



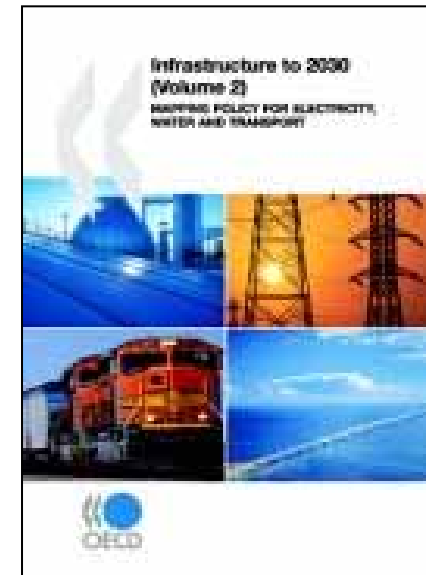
Space
2004



Space
2005



Infrastructure
2006



Infrastructure
2007

Operational definition

- *infrastructure needs* is intended to cover tangible infrastructure in the fields of energy, water, transportation and telecommunication, and also...
- We have defined the scope of the OECD Project as:
 - Electricity/power and not the whole energy field
 - Surface transportation (roads, urban mass transit, railways) and not all transport systems
 - Telecom: intelligent, smart tools
 - Water: water and sanitation

This coverage fits the definition provided by C. Vander Ploeg : what he called a classical definition of “tangible” and “hard” infrastructure.

VIEWS FROM EXPERTS AT THE WORLD BANK

Annual Investment Needs 2005 – 2010

OECD Countries → 384 US\$Bn

All Developing
Countries → 464 US\$Bn

TOTAL → 848 US\$Bn

VIEWS FROM IEA (2030)

World Energy Investment 2001 – 2030

TOTAL 16 trillion dollars

Electricity	9.5		PG = 4.1
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Oil	3
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Gaz	3
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Coal	0.4
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IEA : by Regions

Cumulative Energy Investment by Region, 2001-2030

TOTAL 2001-2030

OECD → 6.5 trillion

Transition Economies → 1.7 trillion

Developing Countries → 7.8 trillion

Total World → 16 trillion



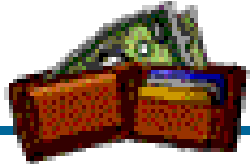
Water: « Camdessus Report », 2003

Annual Worldwide Investment Requirements for Water Resources

Area	Billions of USD	
	1995	2025 ¹
Agriculture	30-35	30
Environment and Industry	10-15	75
Water Supply and Sanitation	30	75
TOTAL	70-80	180

¹Estimates

Source: Cosgrove and Rijsberman



Potential bottleneck: static approach

- ODA trend is on the down side
- Private sector funding (particularly in non OECD Countries) is on a declining path
- Public deficits are important or raising

*How to re-ignite the engine ?
How to channel the funds into infrastructure?*





Potential bottleneck: dynamic approach

Financial needs will be on a raising trend:

- catch up, new capacity
- replacement
- upgrading existing infrastructure
- maintenance/operational costs

The OECD Futures Project: 2005-2006

- A platform for a multilateral dialogue between stakeholders
- An opportunity to raise awareness about the infrastructure sector issues, potential benefits and opportunities
- The identification and promotion of emerging responses
- An option to speed up the multilateral process and shape policy issues



Full-fledged Participants

Secrétariat du Conseil du trésor, Government of Québec

Réseau de Transport d'Électricité, France

Infrastructure Canada

CEMEX, Mexico

Département fédéral de l'environnement, des transports, de l'énergie et de la communication, Switzerland

Macquarie Bank Group, United Kingdom

Ministry of Transport and Energy, Denmark

Statnett SF, Norway

Ministry of Transport, Public Works and Water Management, Netherlands

Ministerio de Fomento, Spain



Consortia Participants

British Department for Transport
British Department of Trade and Industry

French Ministry of Equipment and Transportation
French Ministry of Economy, Finance and Industry

Alstom Transport, Réseau Ferré de France, SNCF

Swedish Rail Administration
Swedish Road Administration
Vinnova

CMM, CERIU, FMC (Québec and Ottawa)

Governmental Participation

Ministries: transport activities	Ministries: energy activities	Ministries: industry, IT or economy	Ministries: horizontal role
France Netherlands Denmark U.K Spain	France Denmark	France U.K	Canada Switzerland Government of Quebec Portugal Sweden

Business Sector Participation

Banks, Financial institutions	Equipment supplier	Networks	Industry, Operators
Macquarie Bank Group	Alstom Transport	RFF RTE Statnett SF SNCF	CEMEX

Phase 1: Assessment of needs, potential demand and the future evolution of the sector

- Critical assessments of existing reports
- What are the key factors driving the future evolution of the sector?
- Longer term prospects for needs and potential demand
- Cross sectoral interdependencies/synergies



Drivers and key trends

Covering long term trends in 8 areas:

1. Geo-political developments
2. Macro-economy
3. Public Finance/financial markets
4. Population
5. Mobility
6. Environment
7. Technology
8. Governance

Electricity Sector Investment to 2030 (IEA, Trevor Morgan)

- Reference scenario:
- OECD: 3,940 trillion \$
- Transition economies 0,653 trillion \$
- Developing countries: 5,205 trillion \$
- Total: 9,798 trillion \$

IEA

Electricity sector investment to 2030

- Alternative policy scenario: - 15,7 %
- OECD: 3,184 trillion \$ (-19,2%)
- Transition economies 0,515 trillion \$ (-21,2%)
- Developing countries 4,564 trillion \$ (-12,3%)
- Total: 8,263 trillion \$ (-15,7%)

IEA, February 2006



Water investment to 2030 (R. Ashley, A.Cashman, Sheffield, UK)

OECD and « big five » only :

- to 2015: 772 billion \$ a year
- to 2025 1 trillion \$ a year



Transport Investment to 2030 (David Stambrook, Canada)

- Road transport: 220 to 290 billion \$ a year
(2/3 in OECD countries)
- Rail transport: 50 to 60 billion \$ a year
(2/3 in OECD countries)
- *Policy matters: potential shift of 10% from road to rail*



Telecom Investment to 2030

(Erik. Bohlin, Simon Forge and alii., Sweden and UK)

Global investment needs:

- 2005: 650 billion \$
- 2010: 745 billion \$
- 2020: 572 billion \$
- 2030: 148 billion \$

Lessons learned:

- *Change of ranking:*
 - Water comes first (OECD +Big five): 770 Billion\$/year, 1 trillion \$ by 2025
 - Telecom: range of 650, 745 and 572 Billion\$/year (global)
 - Electricity: 350 Billion\$/year (global)
 - Transport: 220-290 Billion\$/year (Road) + (50-60 Billion\$/year Rail) on a global basis

The Case of Japan

Source: Volume 1, *Infrastructure to 2030* (OECD, 2006) and recent updates by OECD IFP

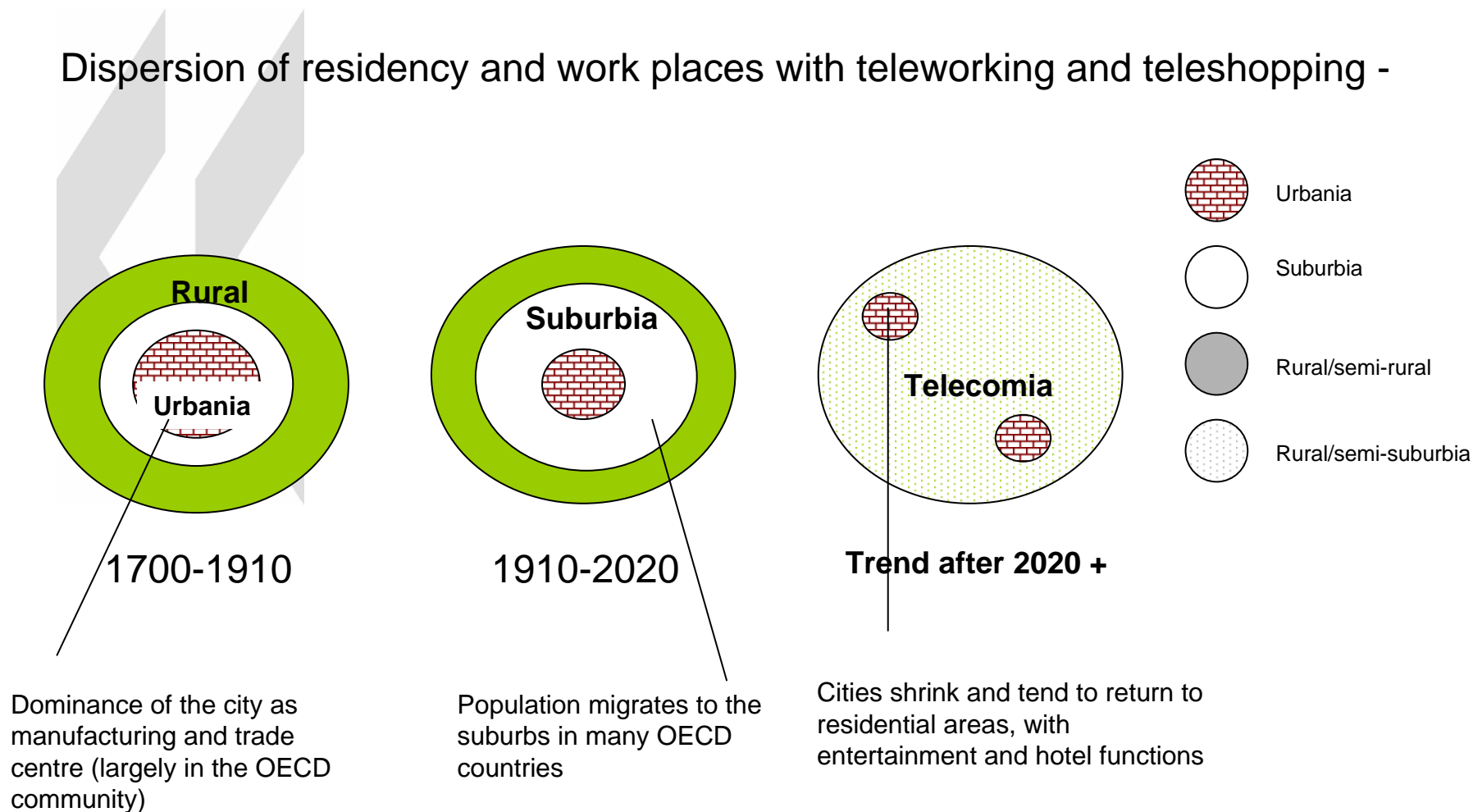
Sector/Period	2000-2001	2010-2020	2020-2030
Electricity	20bn US\$/year	16 bn US\$/year	16bn US\$/year
Water and sanitation	28bn US\$/year	47bn US\$/year	63bn US\$/year
Road Transport	6,1bn US\$/year	14,2 bn US\$/year	15,1 US \$/year
Railways	3,1bn US\$/year	3,4 bn US\$/year	3,7bn US \$/year



Other implications:

- 1- New urban patterns
- 2- Interdependencies, partial substitutions, enhancement effects...
- 3- New scenarios for urban systems
- 4- Smaller scale interconnected infrastructure and possible implications

Dispersion of residency and work places with teleworking and teleshopping -

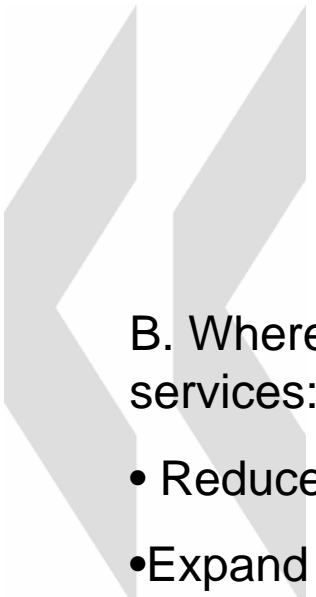


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A. Where telecommunications may substitute for physical infrastructure :

- Reduce usage and need for private and public transport
- Lower demand for roads expansion
- Reduce demand for airports, grand infrastructure, flights and ATC
- Reduce consumption of vehicle hydrocarbon fuels and need for their distribution networks, and subsequent pollution from direct and indirect causes
- Redistribute land usage, reducing urban concentration, attached transport and land use demands

E.Bohlin, S Forge and alii.



B. Where telecommunications may augment or extend infrastructure services:

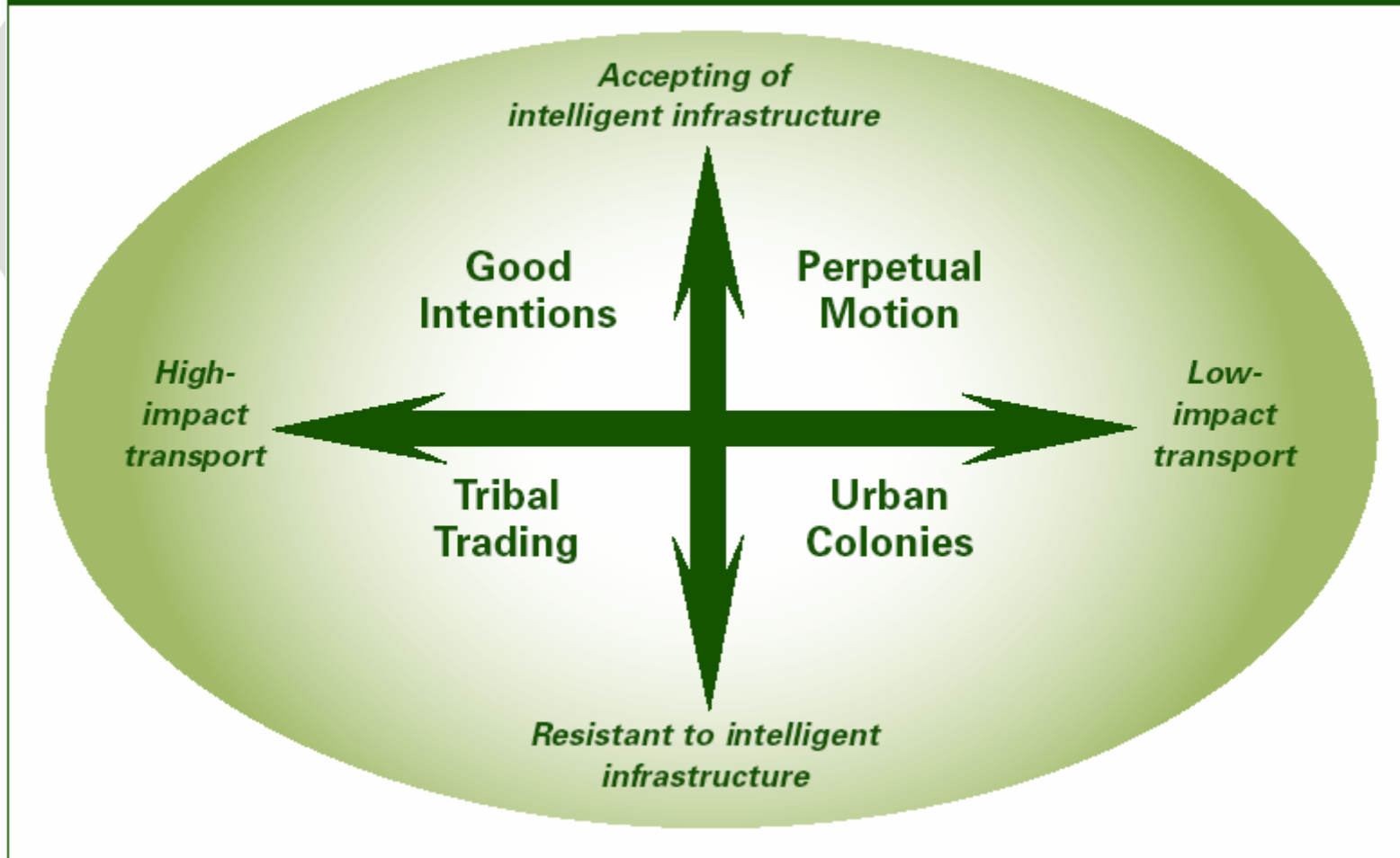
- Reduce health care and elderly care spend yet improve quality
- Expand educational reach, by distance, age, variety of subjects and materials, for same spend
- Improve emergency services in efficiency and cost

E.Bohlin, S Forge and alii.

Extremes of exchanges in infrastructure changes with telecommunications substitutions

Infrastructure element	Investment increase or decrease	First estimate % change increase (+ve) or decrease (-ve)
Road transport infrastructure	--	-5 to -10%
Air travel (business) infrastructure	--	-5 to 10%
Fuel oil – car, air transport	-	-5%
Health care	--	-10%
Education	- or same	-5 to -10%
Justice	---	-20%
Electricity supply	+	+5%
Gas supply	+	+5%
Heating oil	+	+5%
Water supply	+	+5%
Sanitation	+	+5%

Figure 1: The axes of uncertainty and the four scenarios defined by combinations of those axes



Source : Intelligent Infrastructure Futures / The Scenarios – Towards 2055

Office of Science and Technology

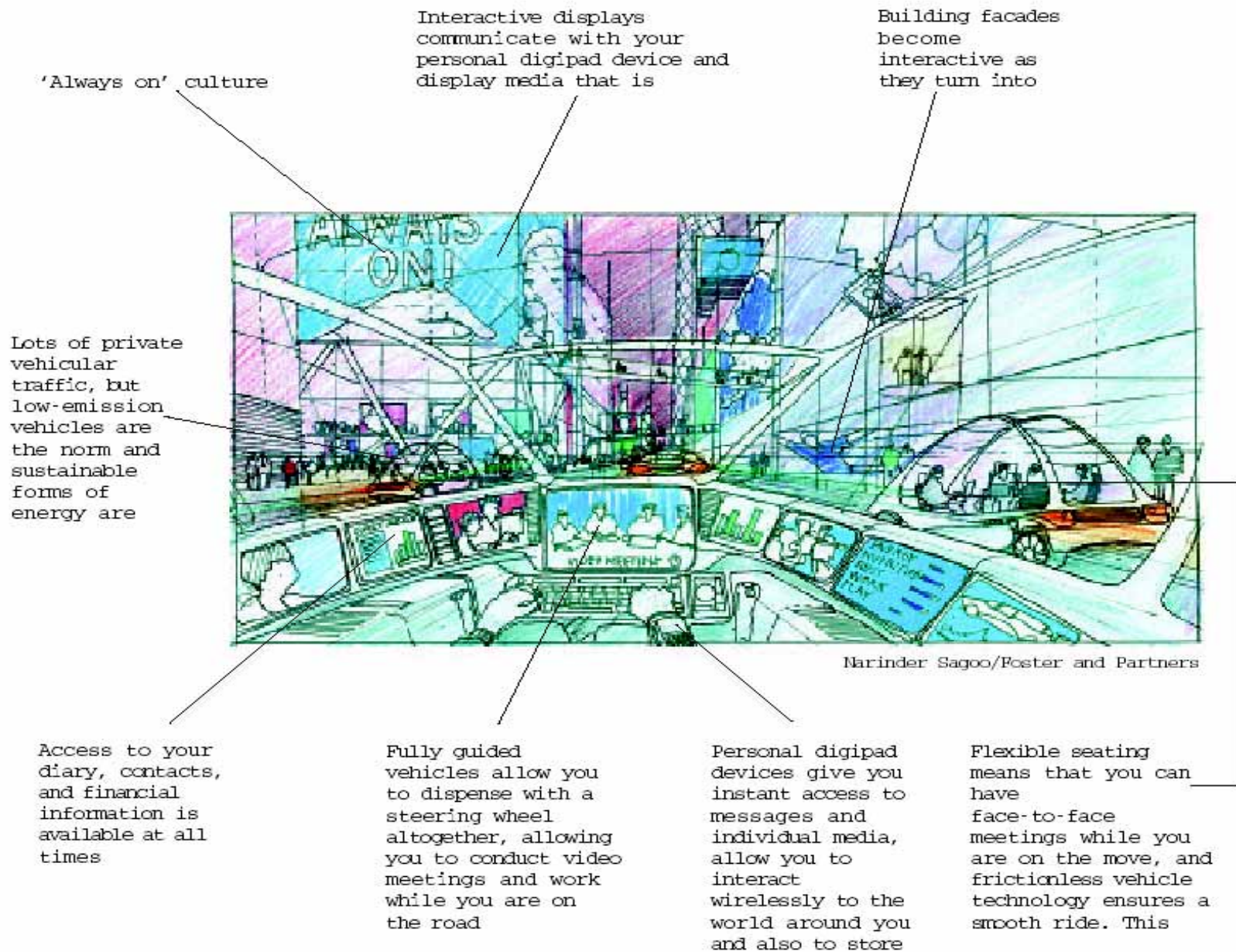
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	Good Intentions	Perpetual Motion
Economics	Continued economic growth, but not within environmental limits	Globalisation and technology drive economic growth
Society	Slow to accept the need to change its behaviour	'Always on' society - growing divide between
Environment	Concerns force governments to collaborate to minimise damage	Clean energy leads to reduced environmental damage, but the
Safety	High - though some concerns due to ageing infrastructure	Investment creates high level of (automated) safety systems
Robustness	Patchy investment affects interoperability	High - standardised, interoperable systems

Source : Intelligent Infrastructure Futures / The Scenarios – Towards 2055

Office of Science and Technology

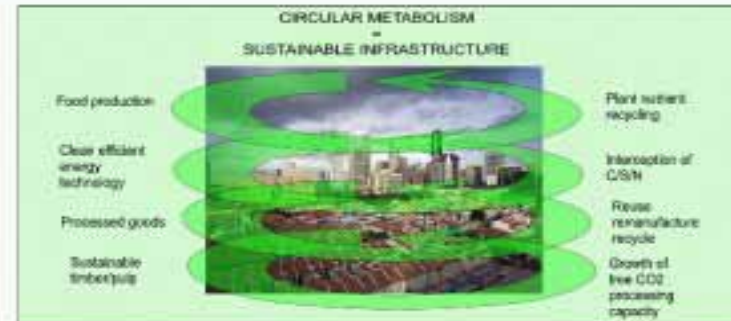
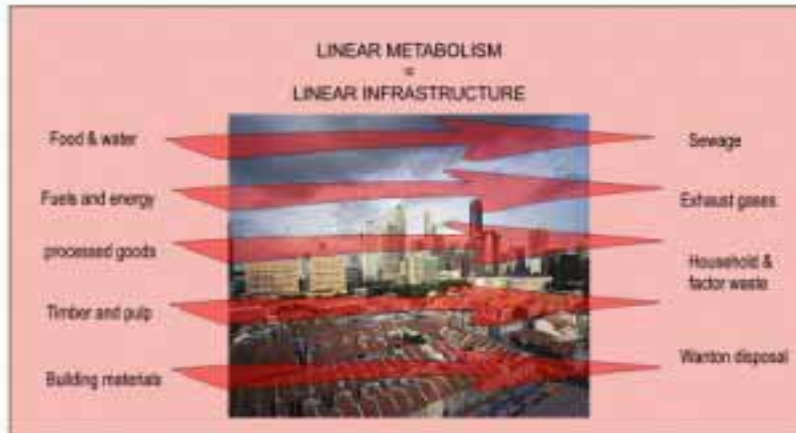
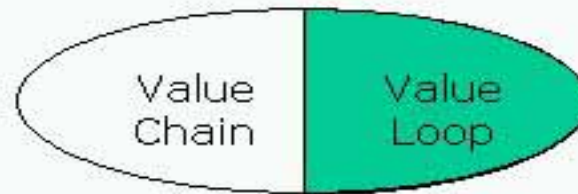
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Source : Intelligent Infrastructure Futures / The Scenarios – Towards 2055

Office of Science and Technology

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See The Green Book of Cities
by Herbert Goldes
"the dynamic city"





Possible challenges for project design?

- Huge opportunities but a financial gap
- From centralised to decentralised, smaller scale
- From large equipment to small equipment and perhaps different suppliers
- From ground to mobile/on board networked systems
- From « conventional » to new policy challenges (funding, back up systems, safety, liabilities..)
- Shortage of human capital (quantitative and qualitative basis)

17 policy recommendations

Source: Volume 2, Infrastructure to 2030 (OECD, 2007)

- 1- Innovative approaches to finance
- 2- Improving the regulatory and institutional framework conditions
- 3- Strengthening governance and strategic planning
- 4- Developing and integrating technology
- 5- Expanding and improving the toolkit

Selection of recommendations

- I-Innovative financing:
PPs, pension funds, user charges..
Explore land value capture
- II-Regulatory framework:
Competition *in* the market versus competition *for* the market
Regulating for reliability
- III- Governance:
Long term co-ordinated approaches versus reduced length of planning to implementation

Next steps for Japan?

- I- Using the OECD IFP reports to:
 - Send messages to policy makers
 - Identify « best practices », promising business models
 - « check » existing procedures for planning/funding...
- II- Asking the IFP for:
 - A self-assessment, «peer review process » of infrastructure policies about...
 - Continuation of the work on business models...

Ongoing work and next steps with the IFP

- ***OECD Futures Project on Risk Management Policies: Floods and Earthquakes in Japan*** - ongoing 2007 (CAO and MLIT)
- ***OECD Futures Project on the Bioeconomy to 2030*** – ongoing 2007-2008 (AIST)
- **OECD Global Forum on Space Economics** -ongoing 2006-2008 (not yet with Japan)
- ***The Future of International Migrations to OECD Countries*** (October 2008) but preparation needs to be financed on a voluntary basis by participating countries or the private sector



Thank you.

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www.oecd.org/futures