
start
ARUP

Drivers of Change 2006

constructing context

SEDEFED-REF
2006.11.08
Istanbul, Turkey

Dr Chris Luebkeman
Director for Global Foresight + Innovation
ARUP

Drivers of Change 2006

FIVE working assumptions

four GLOBAL futures

global TRENDS

Five STEEP factors

my STEEP

wrap-up

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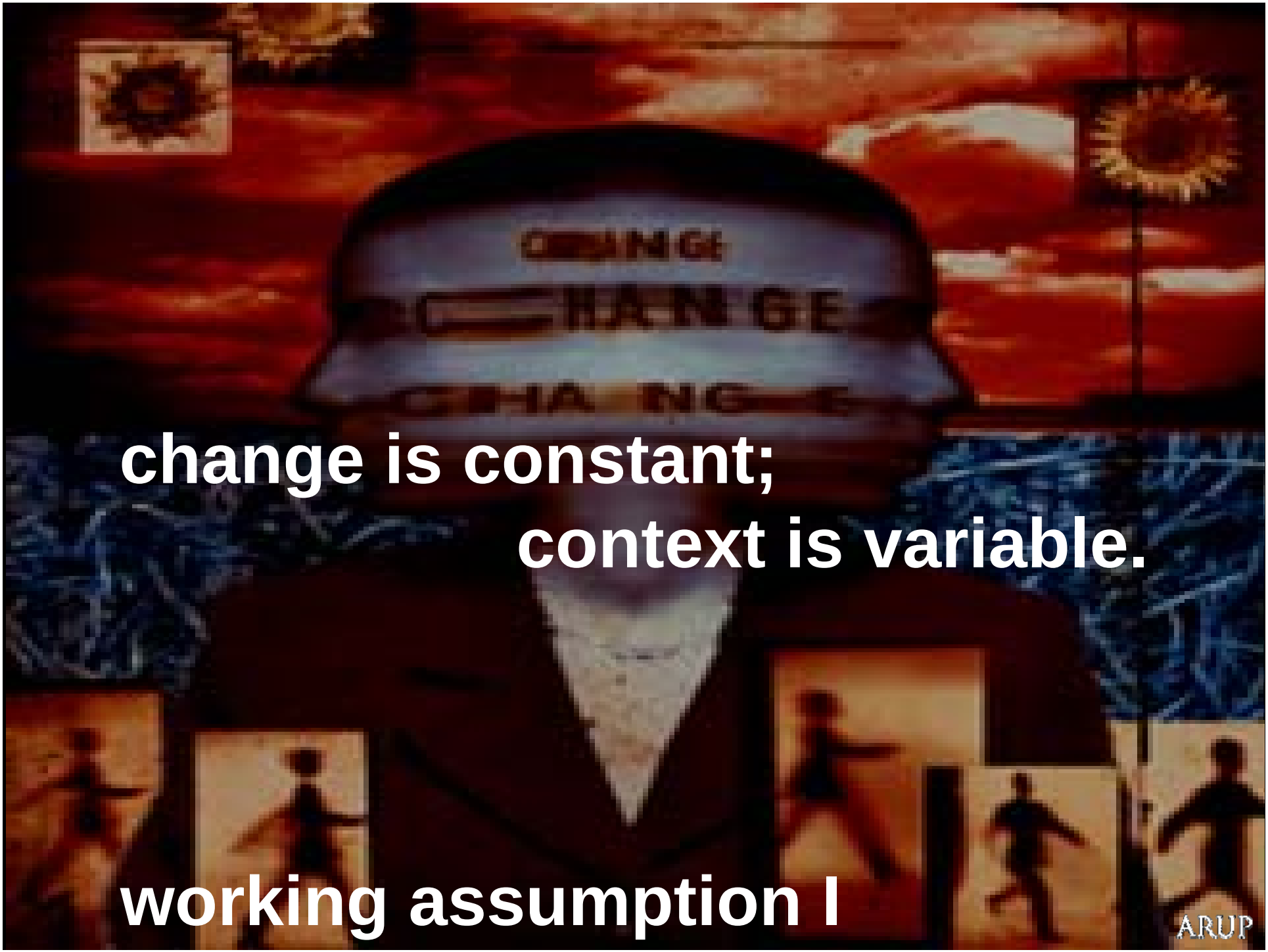
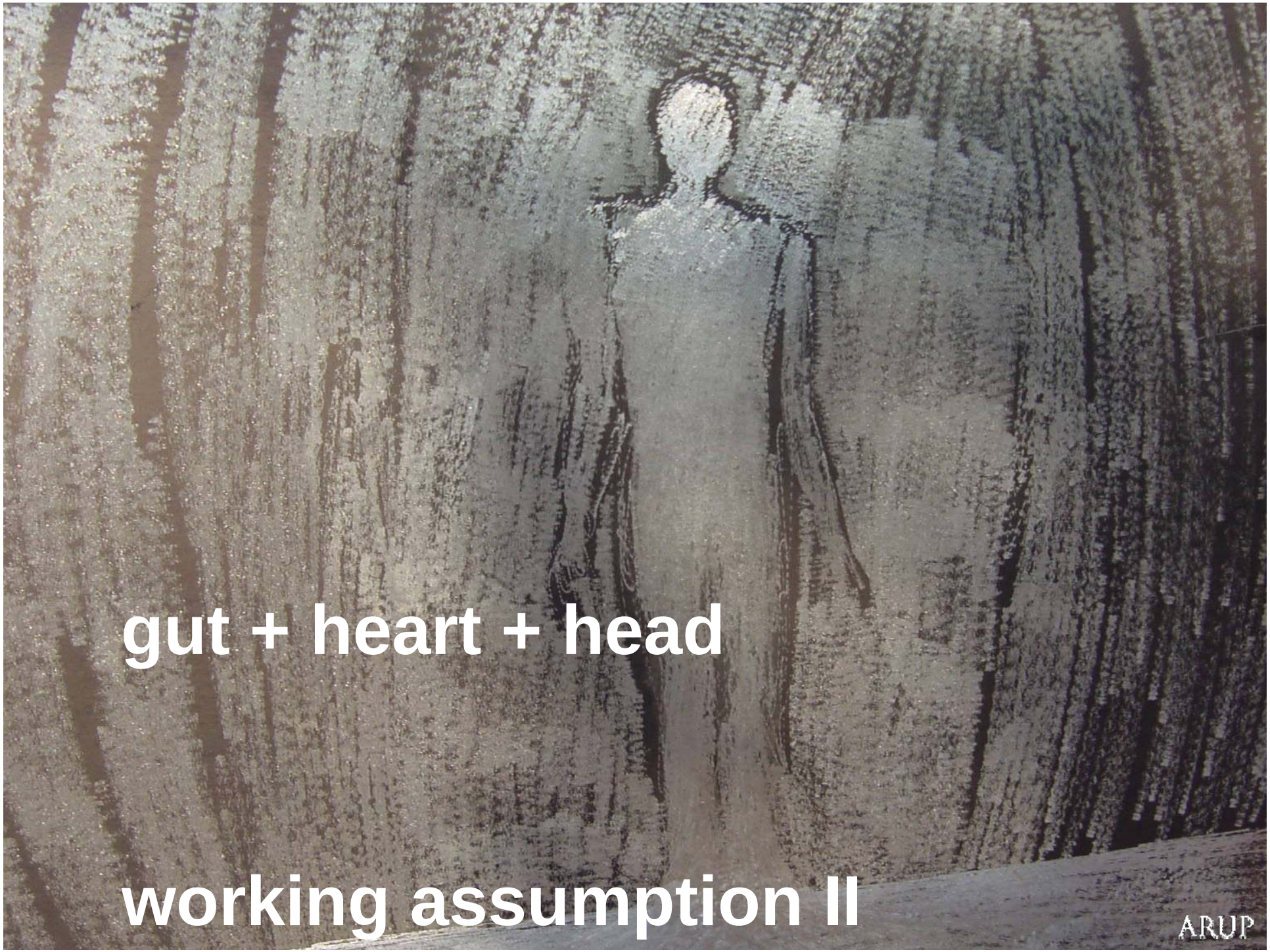

change is constant;
context is variable.
working assumption I
ARUP


gut + heart + head
working assumption II
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the wisdom of crowds
emergence
working assumption III
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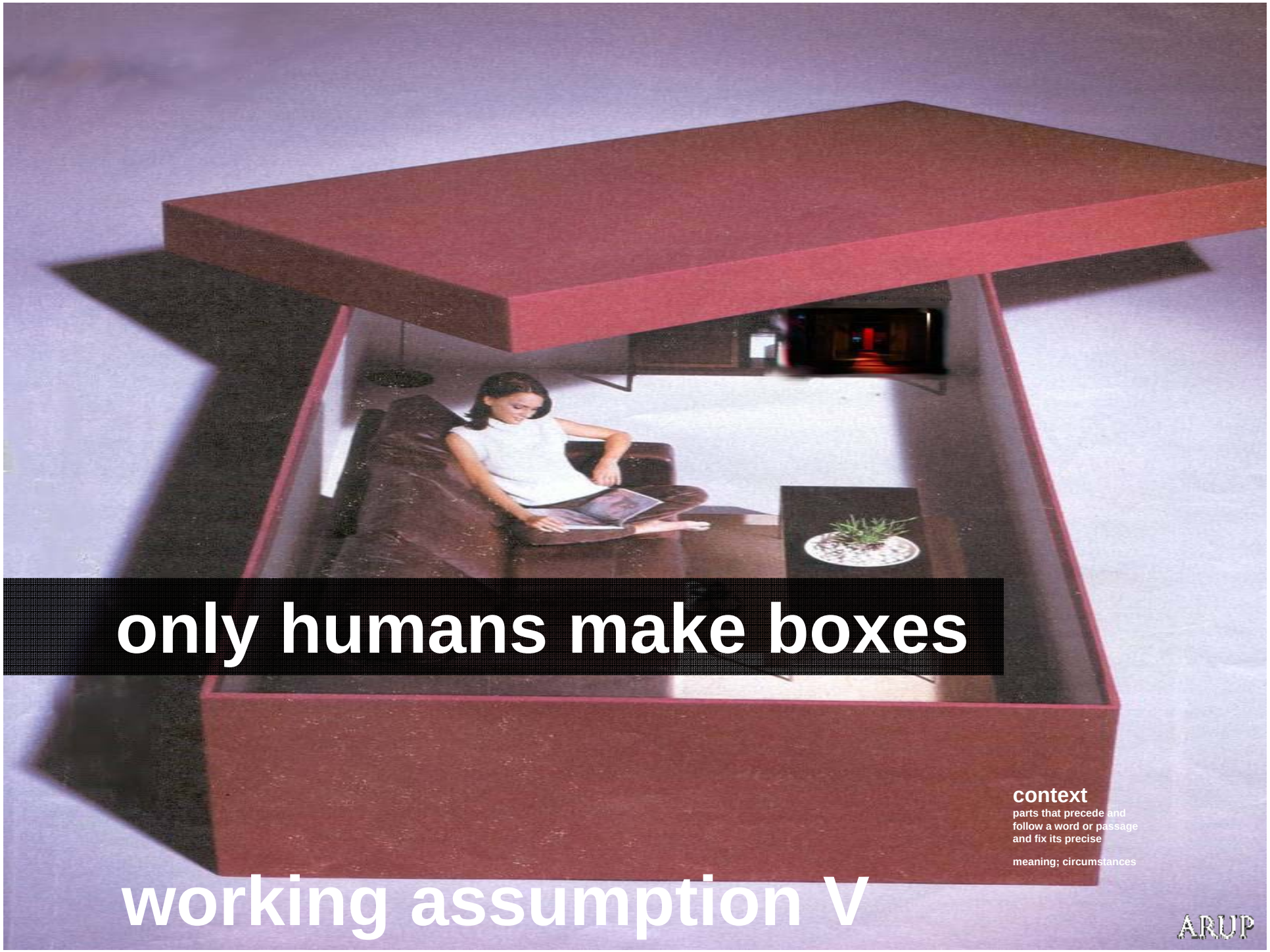
we must all share
ONE PLANET
context
parts that precede and follow a word or passage and fix its precise
meaning; circumstances
working assumption IV
ARUP


only humans make boxes
context
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meaning; circumstances
working assumption V
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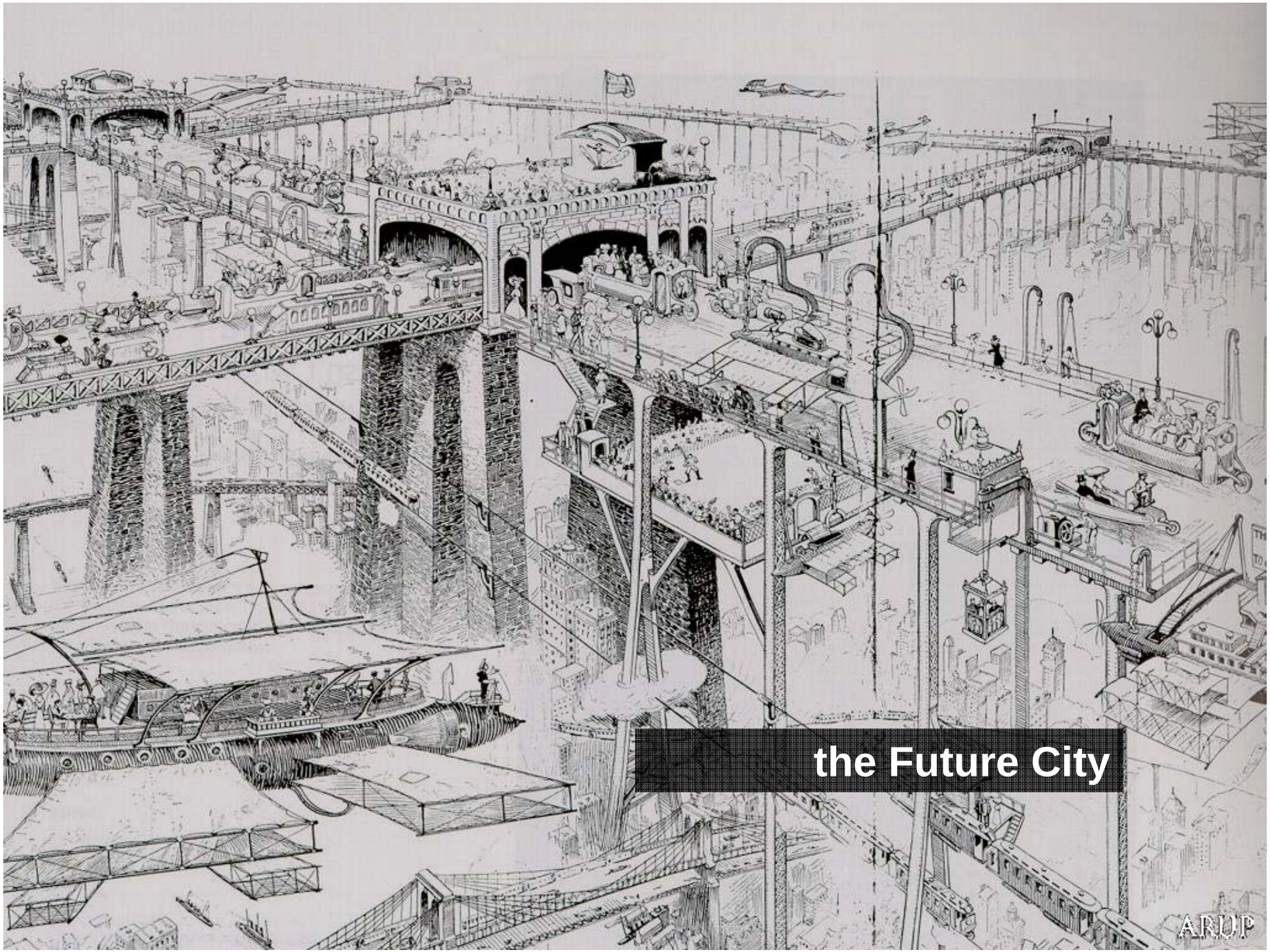
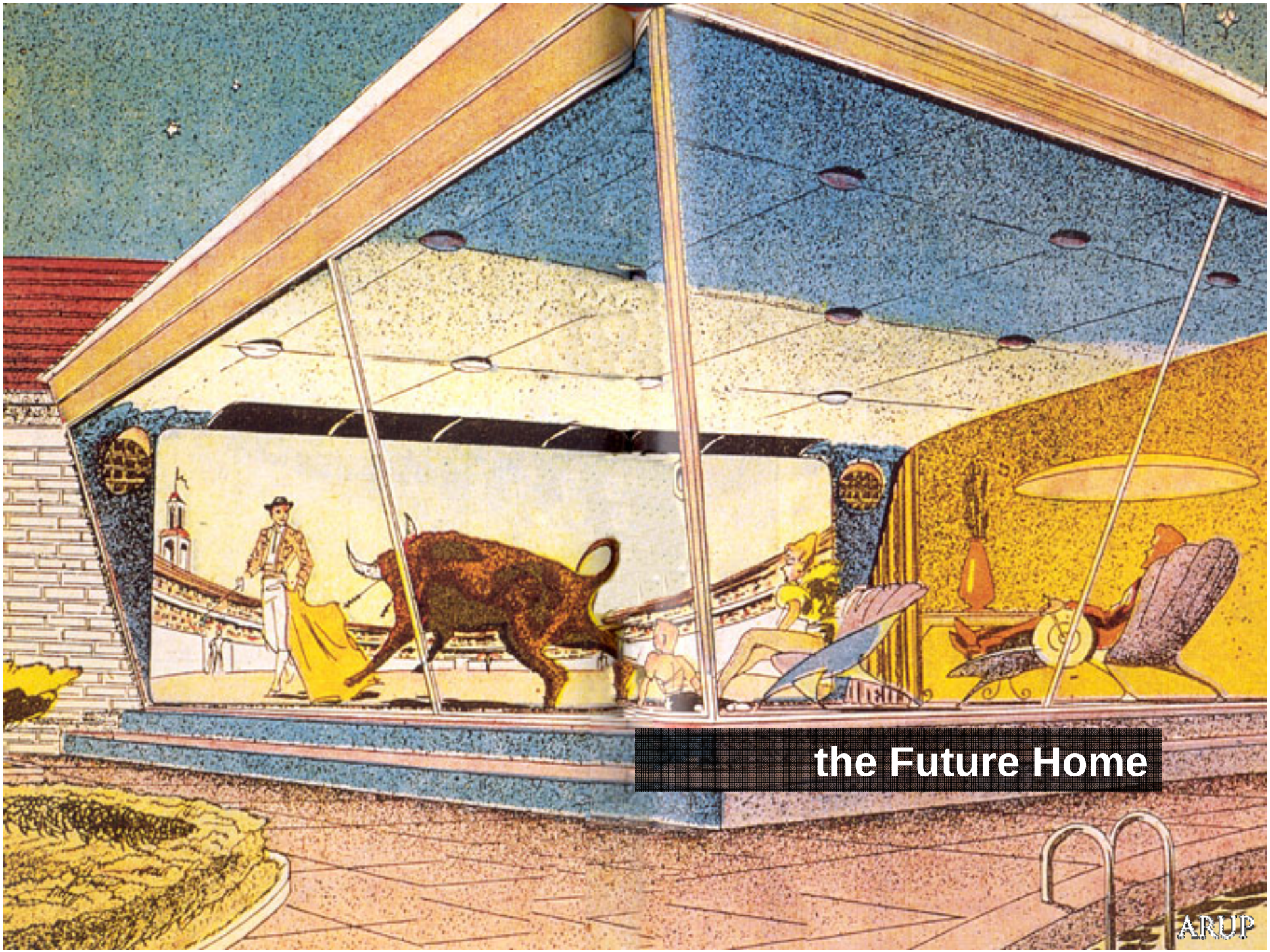
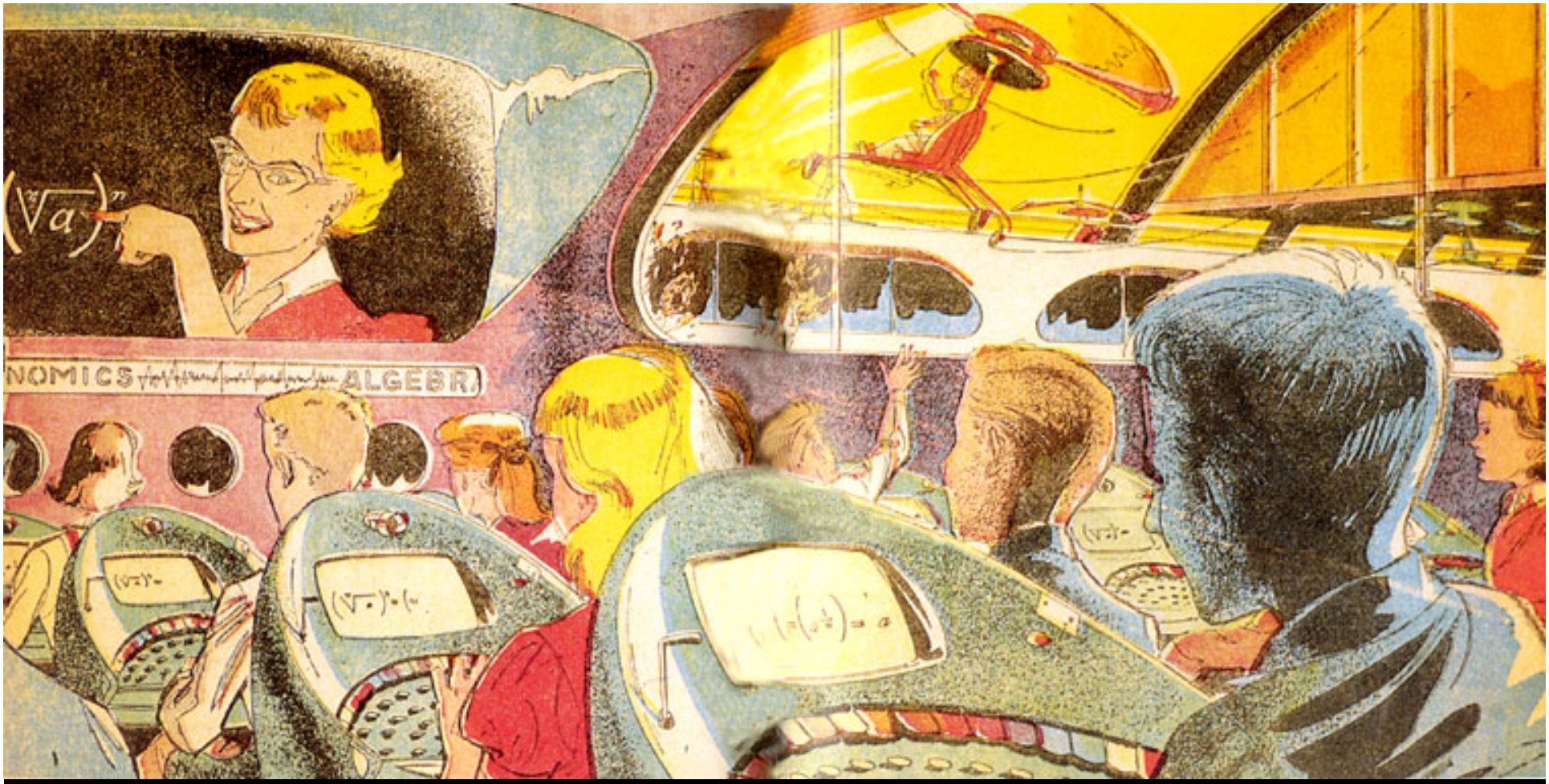
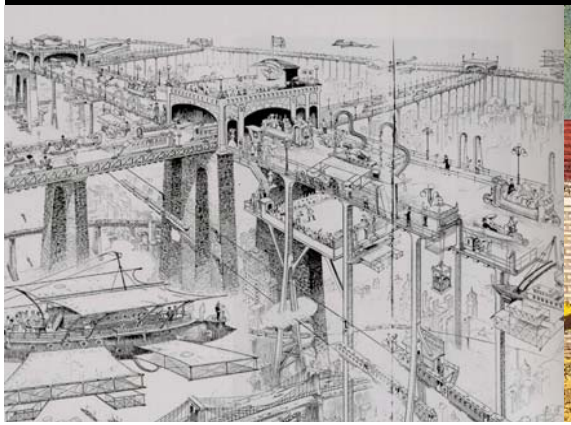
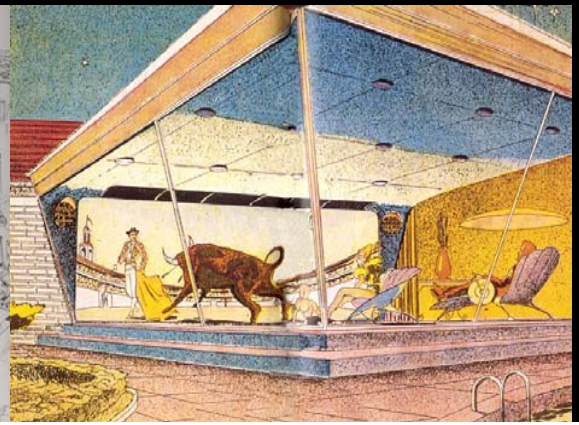

the Future City
ARUP


the Future Home
ARUP







the Future School

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the Future
is over sold and under
imagined
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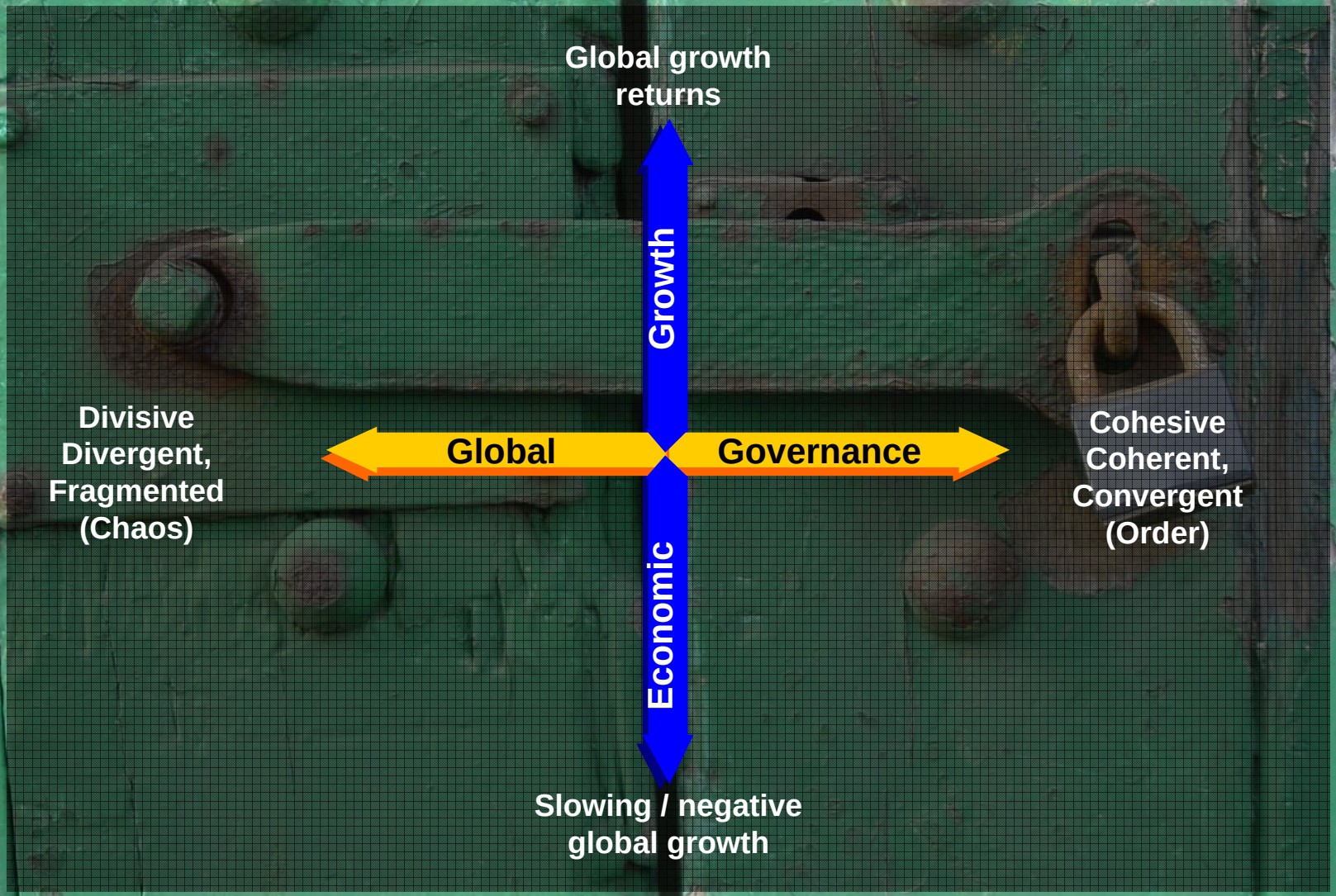
global scenarios to 2020



global scenarios to 2026

"Bloc Islands"

- World economies recover at varying speeds,
- More regional economic and trading blocs form
- Policy initiatives stimulate local/regional growth
- Global dynamics driven by ideological differences
- Labour reforms impact growth and employment
- Technology and productivity gains are strong drivers of economic recovery

"Reglobalization"

- Iran and US announce new trade agreements
- UN restructured and revitalized; new council members
- Terrorism & geo-political instability contained
- Strong global economic performance
- WTO's strength and influence increases
- Inflation growth slow, but steady
- Global dynamics driven by open economies

Growth

Global Governance

Economic

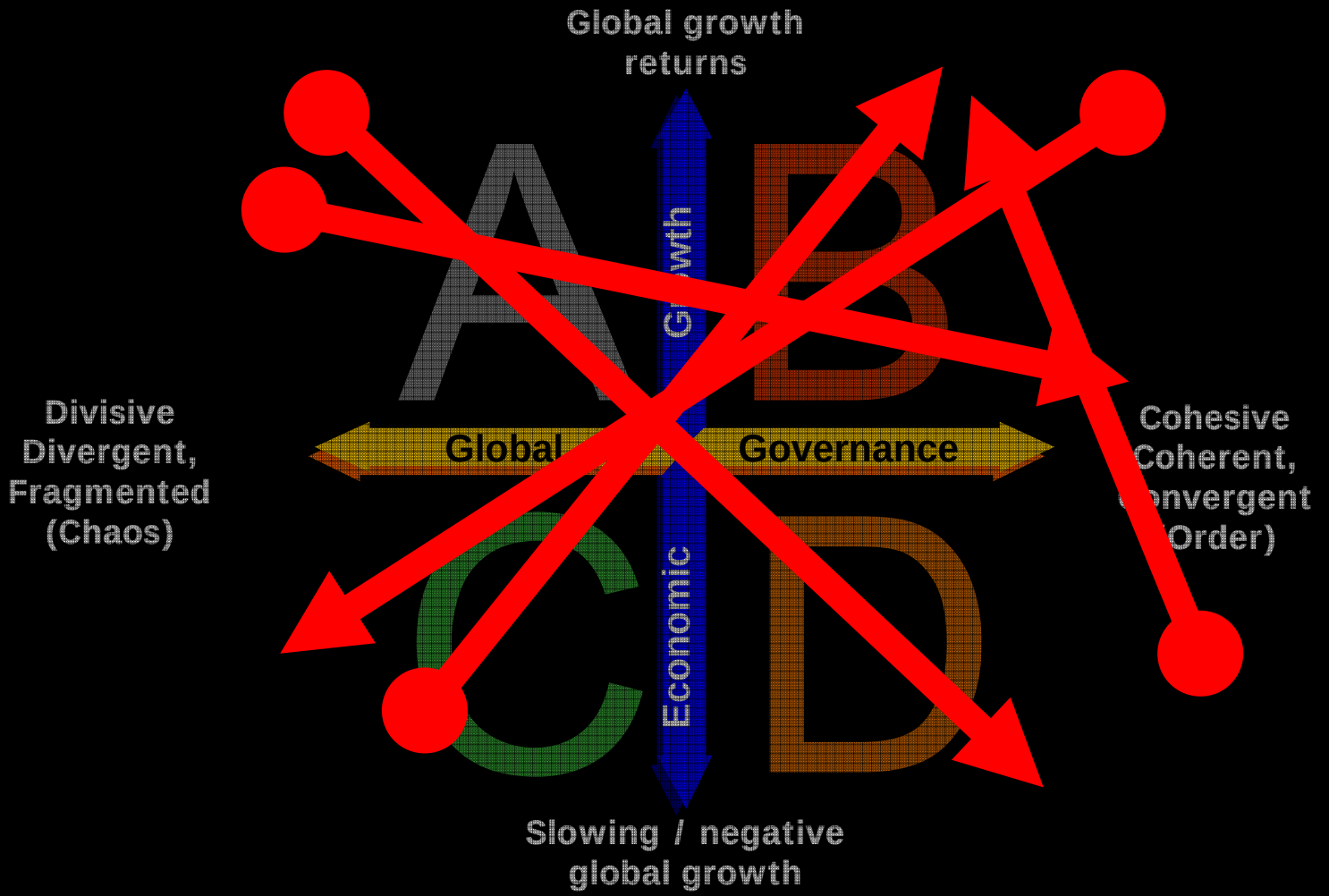
"Flat-Lining"

- "L"-shaped global economy - no growth
- Rising isolationism and protectionism
- Switzerland and Japan become the road map for an increasing number of economies
- Consumer confidence hits new lows
- Governments re-nationalize utilities
- UN / WTO significantly fractionalize

"Global Yo-Yo"

- "W"-shaped economic growth – contraction cycles
- Governments and business band together
- Financial & terrorist shocks curtail economic rebounds
- Economies labour under an expansionary public sector
- Greater risk of systemic shocks to the global financial system with rising risk premiums

this groups's opinion?



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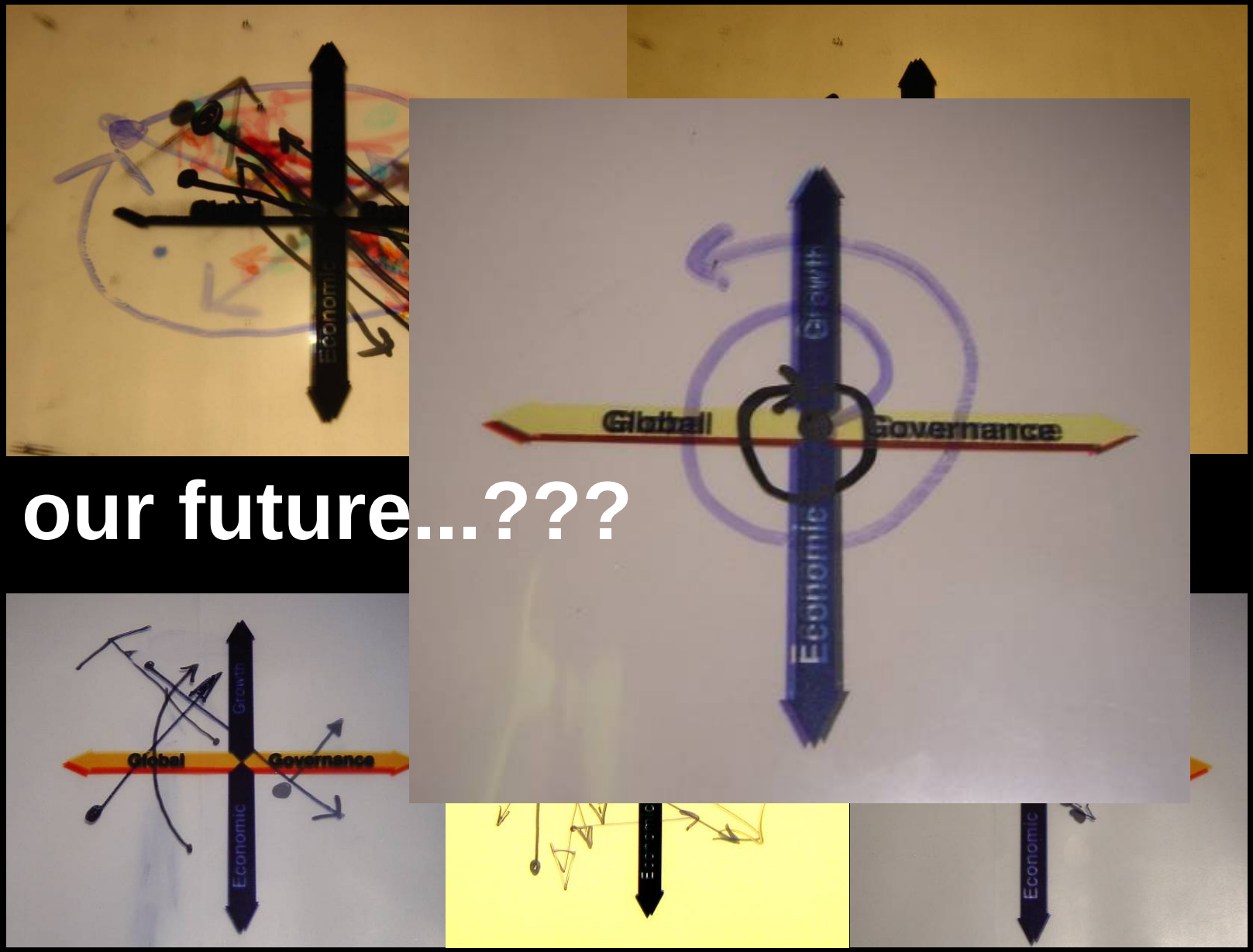

our future...???

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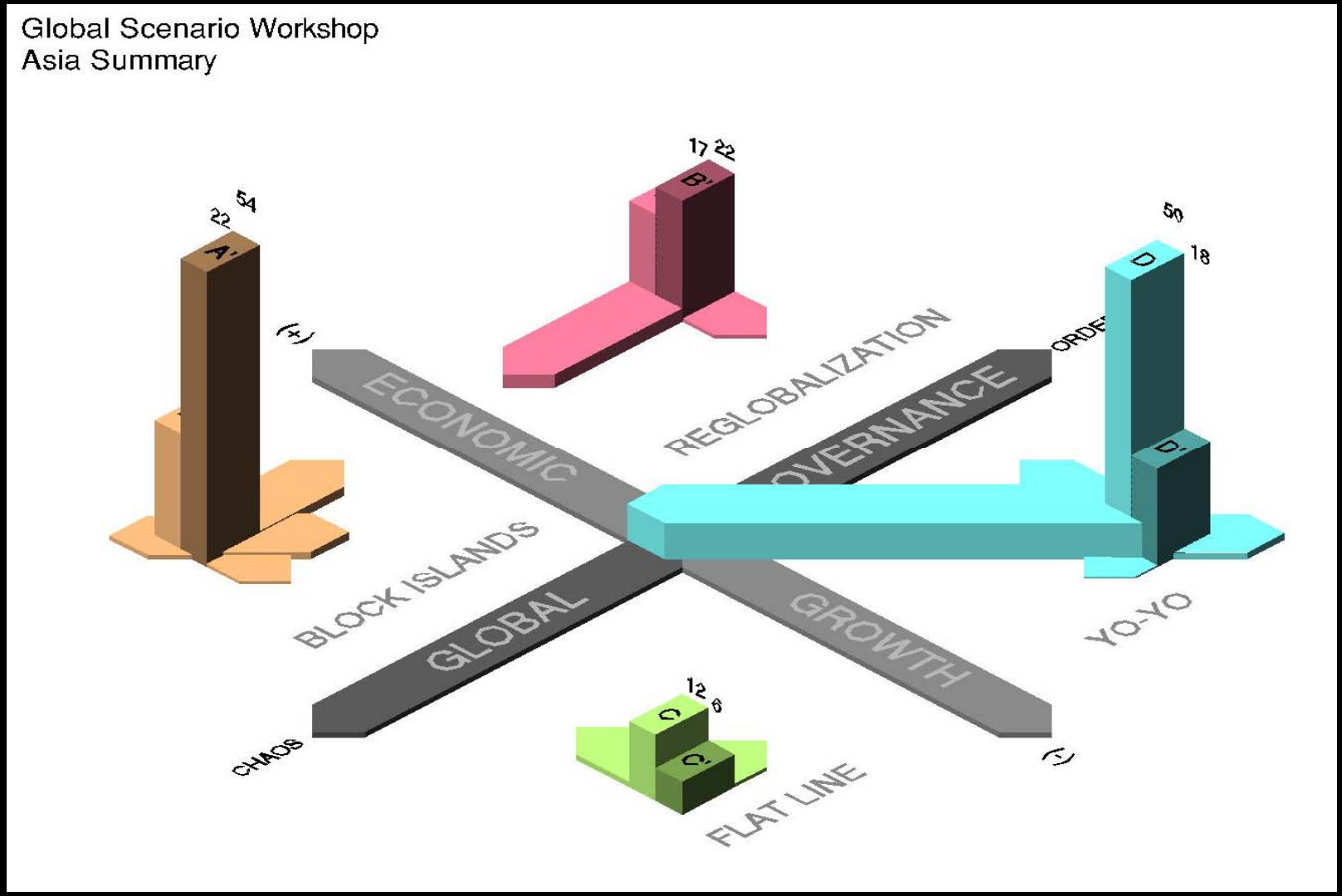
a view from Asia



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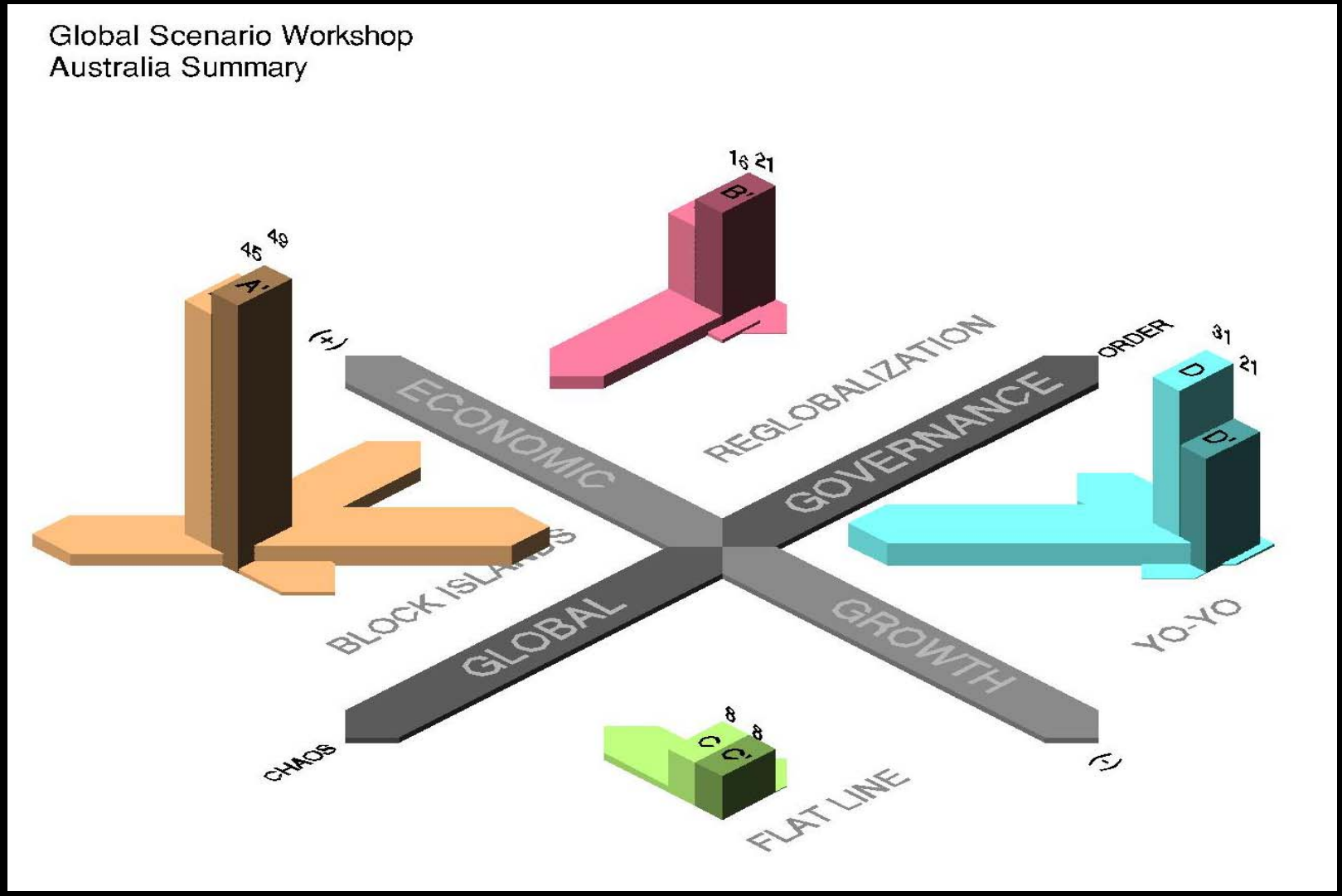
a view from Australia



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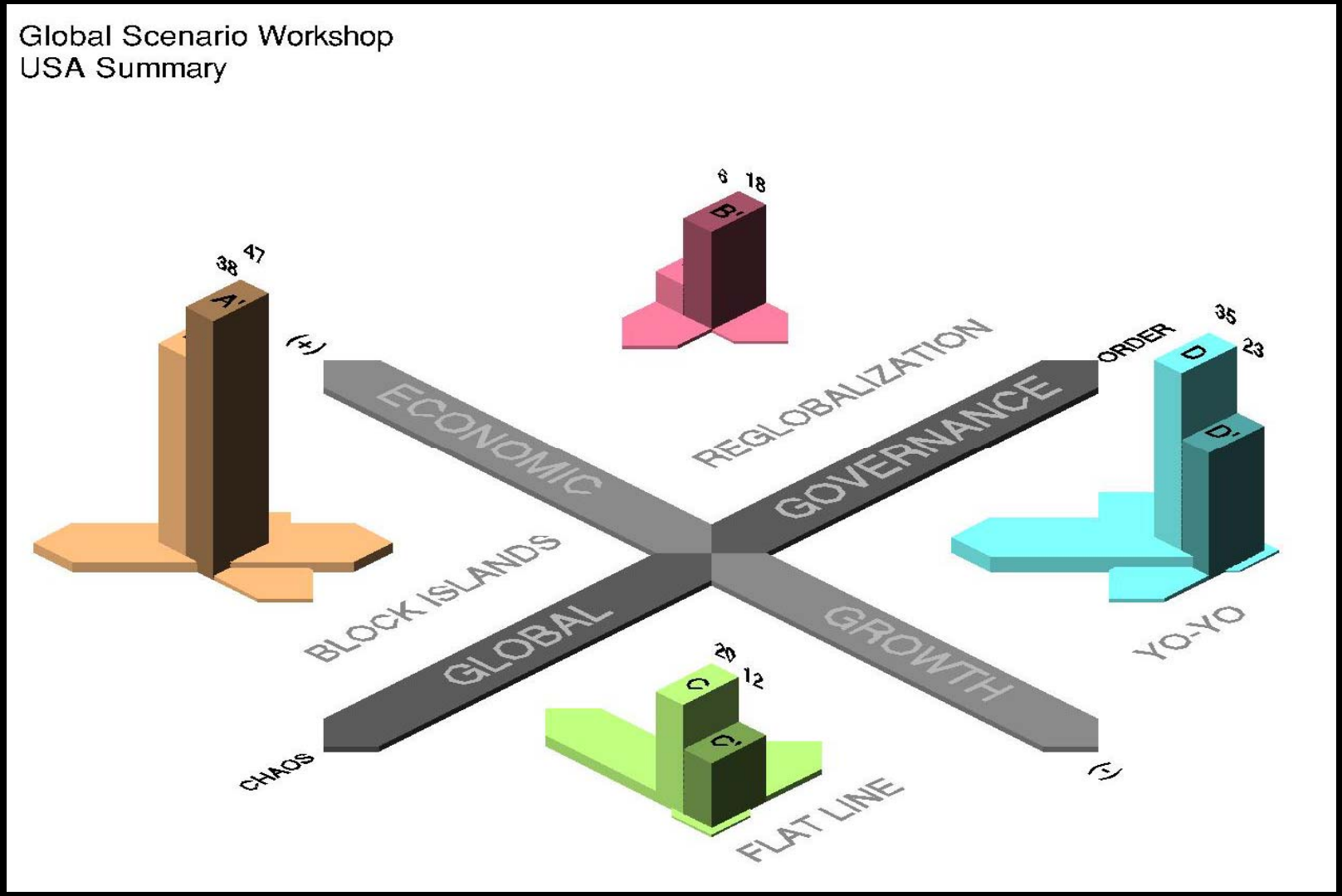
a view from USA



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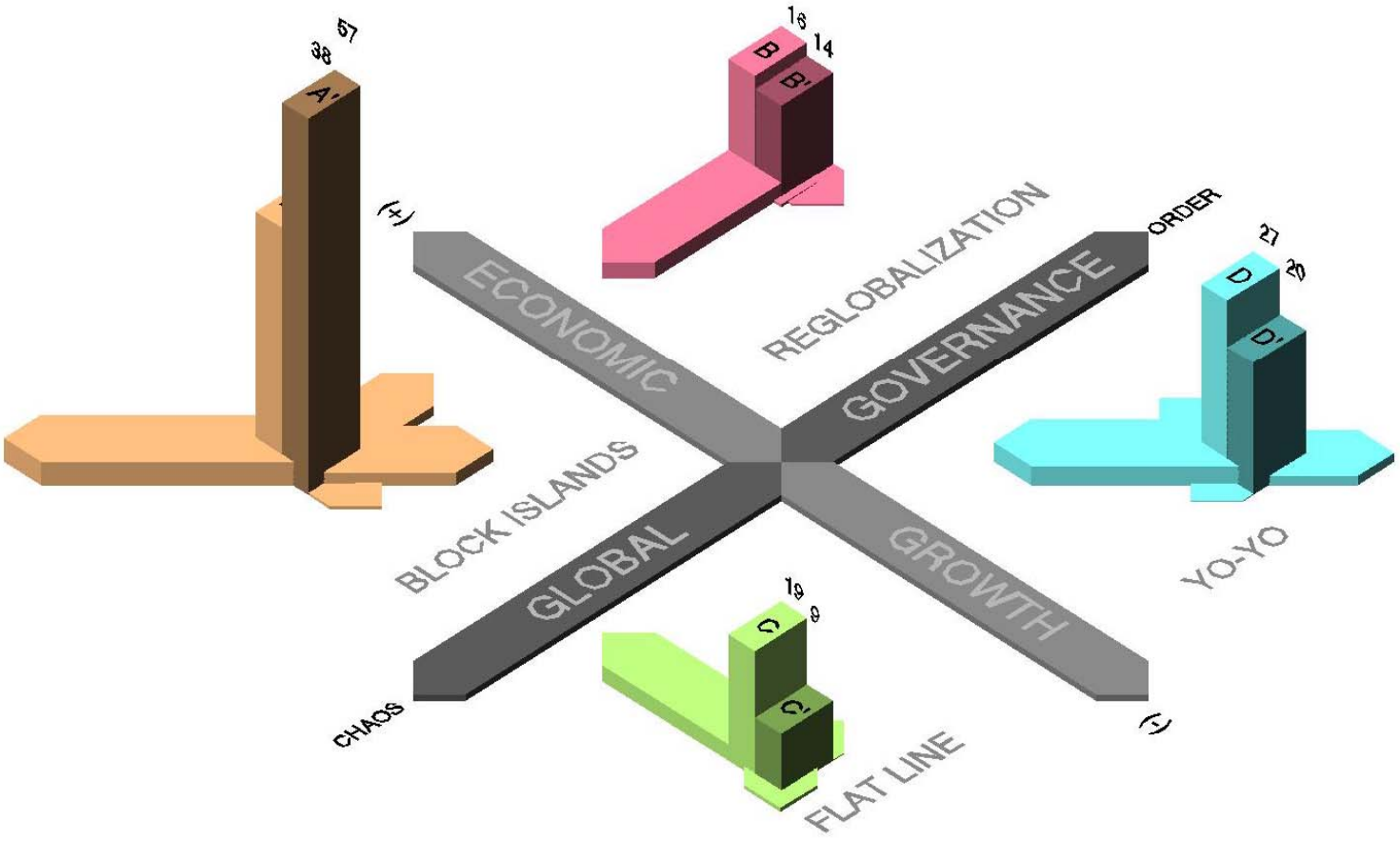
a view from Europe

Global Scenario Workshop
Europe Summary



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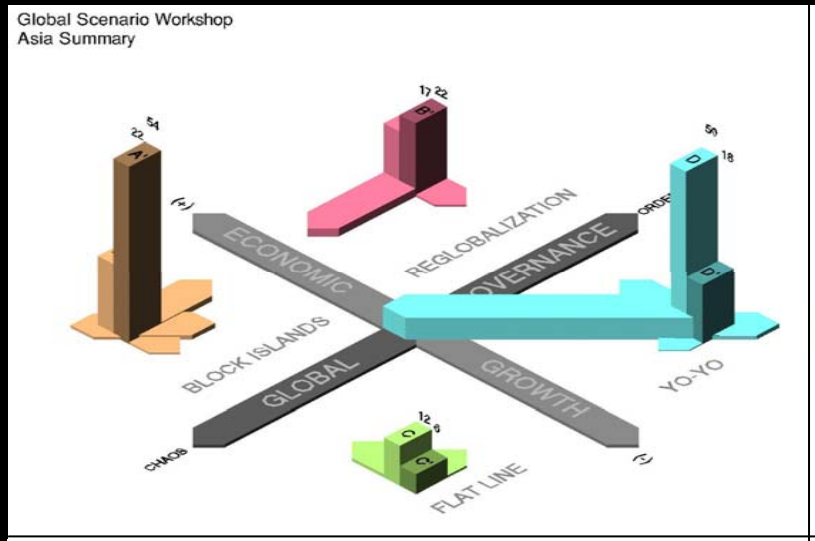
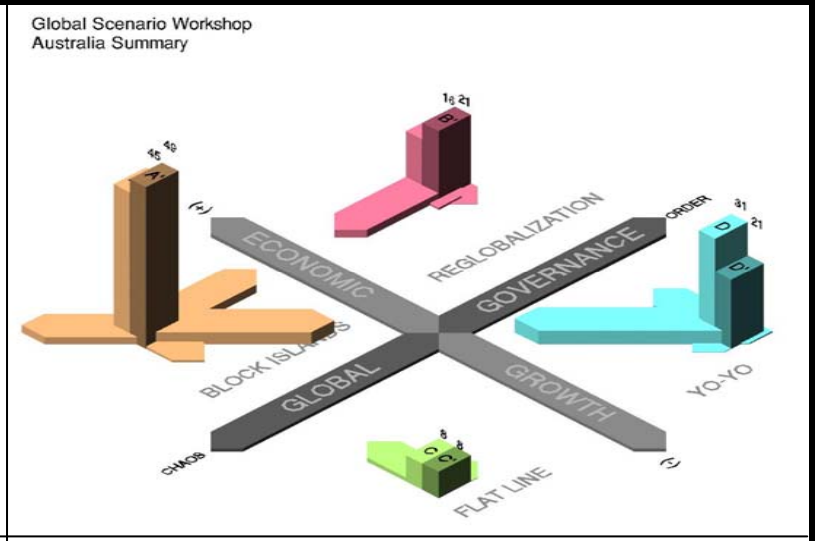
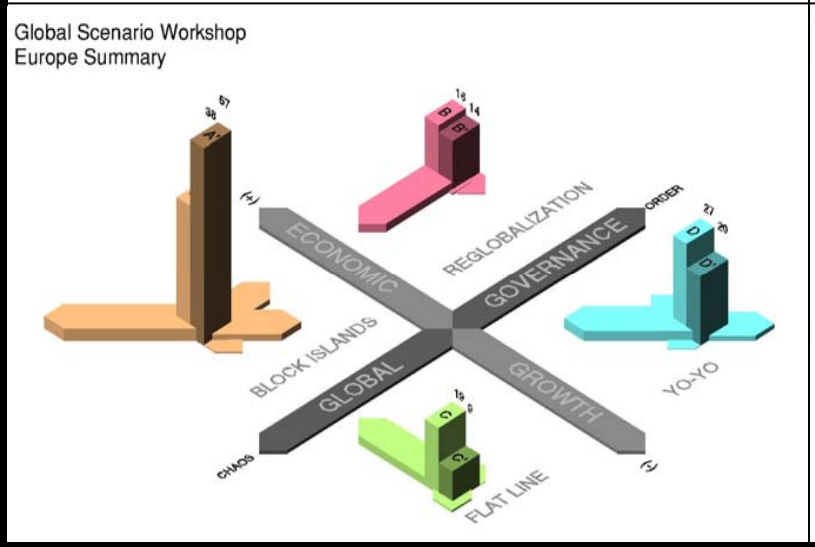
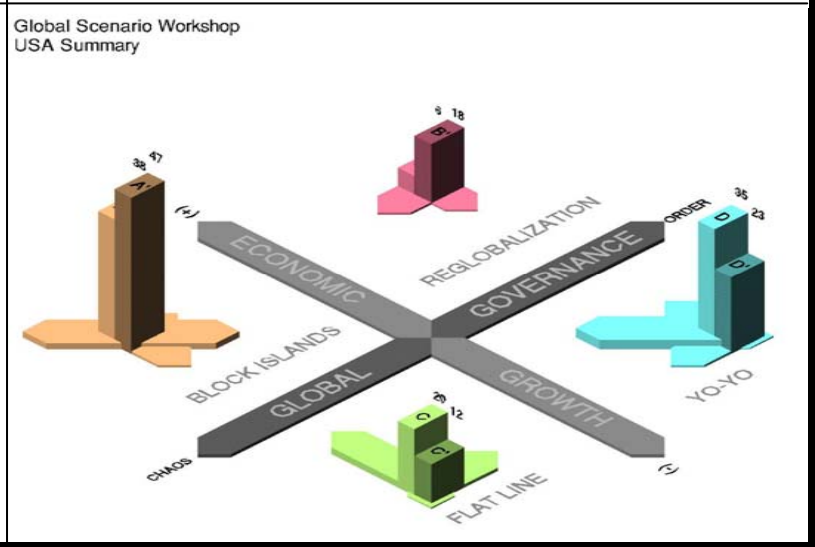
the summary view









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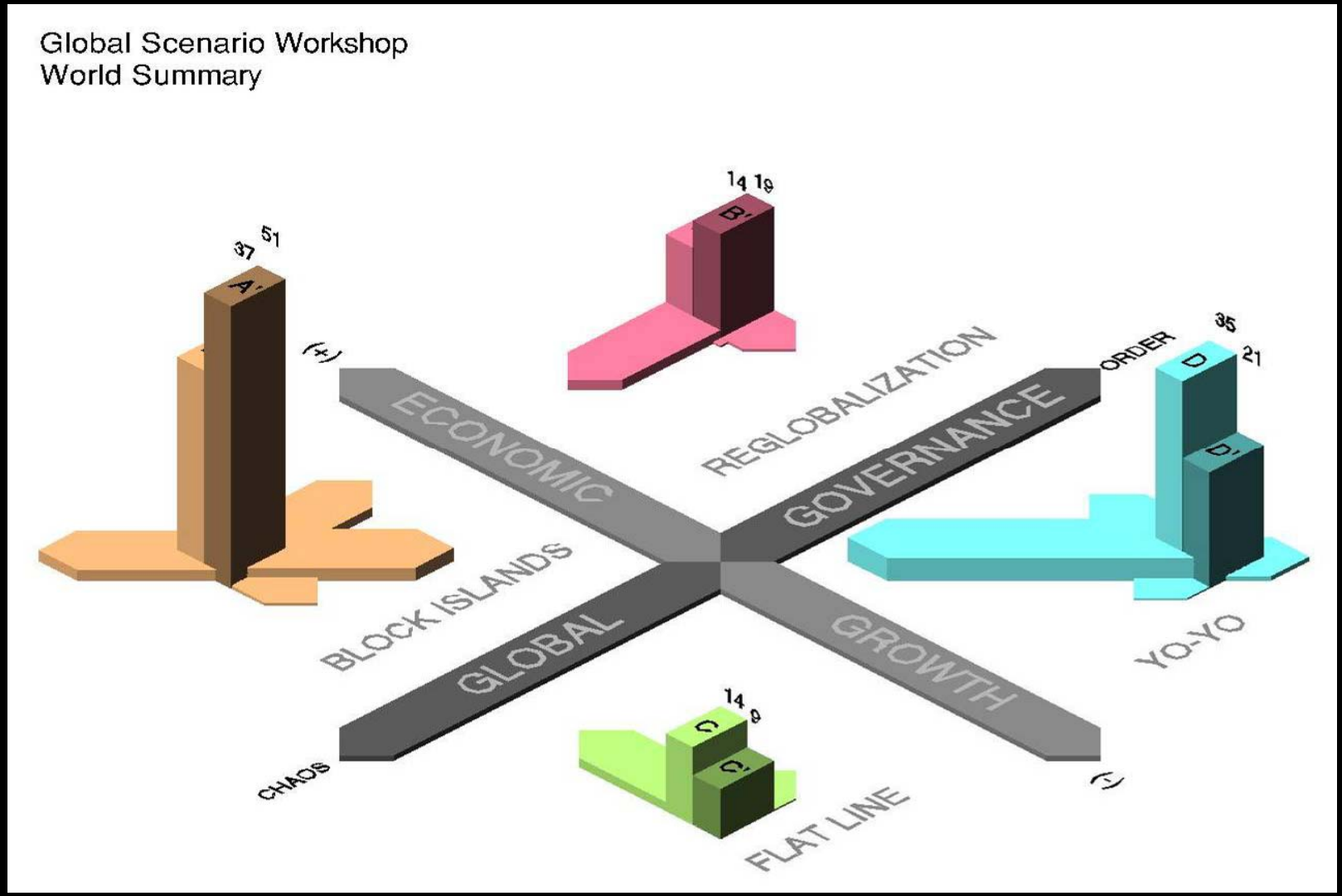
a global view



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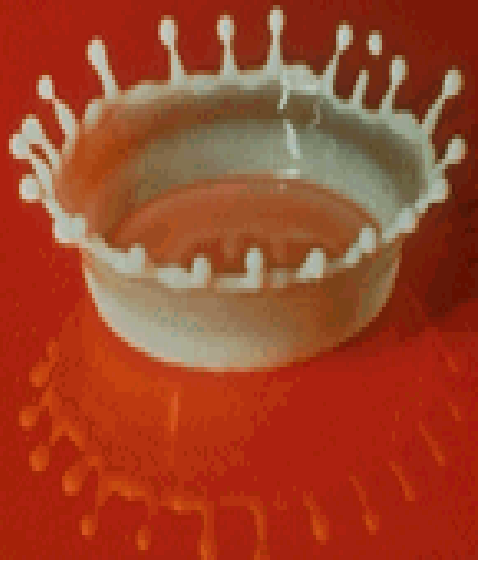
what will we do in THIS world?

SURVIVE or THRIVE

STRATEGIES FOR THRIVAL



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How will you be a trivalist in each?

1. Choose your two most sensitive issues
2. Consider their extremes
3. Make four plausible futures
4. Search for commonalities
5. Act on 4


STEEP


Singapore
STEEP
Frankfurt
Moscow
Denver
Johannesburg
Bristol
Sydney
Los Angles
Drivers of Change
Hong Kong
Zurich
San Francisco
London
Melbourne
Berlin
Perth
Warsaw
San Jose
Cardiff
Edinburgh
Boston
Copenhagen
Cape Town
Cambridge
Chicago
Durban
New York
Pretoria
Seattle
Manchester
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STEEP

What are the key external driving forces that will be important in the next 20 years?

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STEEP Drivers

S ocial
T echnological
Ec onomic
En vironmental
P olitical

What are the key external driving forces that will be important in the next 20 years?

disaggregate
prioritize
re-aggregate

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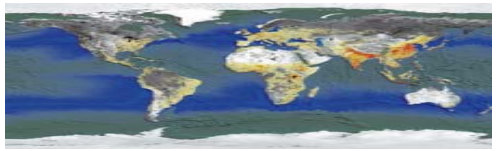
Driving Forces

Harvard Club. New York, USA 2006.05.11



Social

- **Demographic Change**
- **Education => global competition**
- **Resource depletion**

- **Race relations**
- **Immigration**
- **Security – national**
- **Urban sprawl**
- **Housing**
- **Minimum wage**
- Agriculture
- Disease
- Natural disasters
- Religious differentiation
- Healthcare
- Social security

Technological

- **Global Communications**
- **'intelligent' building systems**
- **New forms of transportation**
- **New forms of energy**
- **Nanotech**
- **New health-techs**

Economic

- **Energy Costs**
- **Growth in China, India, Russia**
- **World Terrorism**

- **Oil Supply**
- **Relative innovation in other countries**
- **Demographics**
- **Strength of US$ in global economy**
- **Deficits**

Environmental

- **New Energy Sources discovered that are self-sustaining and non-polluting**
- **Disease**
- **Water access**

- **Pollution**
- **Rising water levels**
- **Species Extinction**
- **Crop Failure leading to food shortages**
- **Larger swings in weather**
- **Increased natural disasters**
- **Land stewardship**
- **Shift to a RESORATION economy**
- **Insurance availability w/re environmental liability**
- **Developing 'Greenbelts'**
- **Shifting population patterns towards 'natural preserves'**

Environmental

- **Attitudes of younger generations**
- **Price of Oil**
- **Increasing population and their distribution**
- **Bio-Engineering**

- **Global Warming**
- **Health of fisheries**
- **Water wars**
- **Increasing emphasis + awareness of sustainability**
- **Disease**
- **Need for deeper understanding of what we are dealing with in the world**
- **Alternative energy sources**
- **Better utilization of facilities**
- **Health of soil and forests**
- **Connection between food and resource reqmts**
- **Ability to trade CO2**

Political

- **Terrorism + homeland security + civil liberties**
- **Global Issues Impacts**
- **Energy Policy**

- **Demographics**
- **Religion**
- **Pandemics**
- **Health care**
- **Immigration**
- **Social security**
- **Tort return**
- **Tax**
- **Economic polarization**
- **Hillary**
- **Isolationalism [or not]**
- **Allocation of funds**
- **Pension bailouts**

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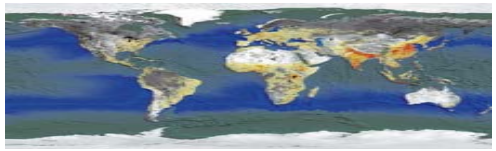

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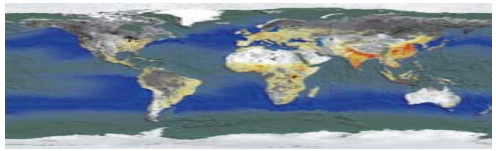

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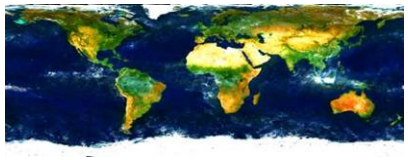
Sydney, AUS 08072004

Workshop with ** including Clients in the Arup office. Contact was Georgina Legoe



Social

- **Aging Population**
- **Expanding gap between 'haves' and 'have nots'**
- **Immigration/Multiculturism**
- Demography
- Health/Stress/Depression
- Consumerism vs environment
- Beauty Demand
- Religion
- Work/Life Balance
- Increasing need for new and repair of infrastructure
- Gender
- Household size
- Obesity
- Population Growth
- Composition of families
- Community fragmentation
- Decline in education standards

- Demise of the 'glass ceiling'
- Hedonism
- Demand for home/life location
- Drugs
- Crime (perception of security)
- Regulation vs freedom
- Demand for entertainment (the opiate of the masses)
- Longevity
- Big Brother

Technological

- **Universal connectivity**
- **Power/Technology failures will have increasing impact on work patterns or technology will change to solve the problems**
- **Technological fixes to environmental problems**
- More efficient manufacturing fabrication back to local industry
- Greater recycling new industries
- Better transport/ technologies will impact on work leisure patterns
- Medical revolution will affect demography of workforce
- Biotechnology
- Nanotechnology

Economic

- **Relationship to world economy + events**
- **Sustainable economic development**
- **Ageing population/children**
- Attitude to resources
- Consumer debts = unsustainable consumer optimism

- Efficient capital markets
- Declining middle class
- Attitudes to social welfare
- Interest rates, inflation
- Interstate trade agreements
- Tourism
- Terrorism + war

Environmental

- **Water availability and quality**
- **Climate Change**
- Political will/public response
- Population
- Global agreements (eg Kyoto)
- Consumption

Greenhouse emissions

- Fossil fuel depletion
- Resource depletion
- Full costing of resources
- Waste management
- Company Director liability
- Scientific, technological + R&D understanding

Political

- **Short termism**
- **Lack of vision**
- **Retention of Power**
- Political ineffectiveness
- Single Issue Parties
- Balance of Power

- Threat of terrorism
- Bi-LateralTrade Agreements
- Immigration/Population
- Infrastructure as it affects politics

Bold indicates a clear majority of votes and everything above the line received a minimum of one vote

Edited CHL 19012005

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Driving Forces – UKplc

London, UK 20061106

Social

- **Aging population**
- **Lack of education and skill**
- **Wealth divide**
- **Increased immigration**
- **Pressure for devolution**
- **Social exclusion**

Technological

- **Slow deployment**
- **Low investor confidence in tech projects**
- **Innovation**
- **Renewable energy**
- **Environmental improvement**
- **Finding cheaper sustainable energy solutions**
- **Renewable energy**
- **Impact of energy shortages**

Economic

- **Energy resource demand**
- **Rise of developing nations**
- **Cost of congestion**
- **International trade freedom**
- **Education work force**
- **Climate impact on world economy**
- **Long-term investments**
- **Emerging economies**

Environmental

- **Climate change**
- **Ownership of 'the problem'**
- **Energy diversity**
- **Rising sea levels**
- **Increased conflict due to lack of access to natural resources**
- **Water availability**
- **Climate change**
- **Sever weather events and insurance implications**

Political

- **Political instability in Middle East**
- **Population movements**
- **Demographic changes**
- **Impact of immigration**
- **Political will to make big decisions**
- **Political centre-ism**

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Driving Forces – my Business

London, UK 20061106

Social

- **Aging of populatio**
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- **Aging of populatio**
- **Urban migration**
- **Increased immigration**
- **Multi-cultural harmony**
- **social cohesion**

Technological

- **Technological breakthroughs supporting social change**
- **Renewable energy**
- **Energy solutions**
- **Lack of technical skills**
- **Lack of science education, or just plain ignorance**
- **Processes and materials to overcome resource shortages**
- **Internet 2.n**

Economic

- **Productivity, nutrition and health**
- **Cost of the aging population**
- **Cost of energy**
- **Emerging economies**
- **Emerging economies**
- **Access to talent**
- **Labour costs**

Environmental

- **Limited resources**
- **Regulation**
- **Climate change**
- **Climate change**
- **Climate change**
- **Aging of population**

Political

- **Uneven wealth distribution**
- **Limited horizons**
- **Efficient utilization of resources**
- **Energy security**
- **Healthcare delivery**
- **Tensions over access to resources**

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aging population	**S**	**ecducation**
stem cell research	**T**	energy
current account **deficit**	**Ec**	oil prices
sprawl/population growth	**En**	global warming
state budget **deficit**	**P**	governance

San Francisco. 2005 **Cape Town. 2005.09.30**

aging population	**S**	wealth distribution
convergence	**T**	**convergence**
wealth distribution	**Ec**	debt
fuel/energy	**En**	**fuel/energy**
integration	**P**	polarization

Zurich. 2005.06.07 **Seattle. 2005.05.18**

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S ocial

T echnological

Ec onomic

En vironmental

P olitical

Demographic Change

Convergence

ChIndia

Resource Depletion

Lack of Vision/Leadership

HOW MUCH DO YOU KNOW?

GLOBAL SUMMARY

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Implications?
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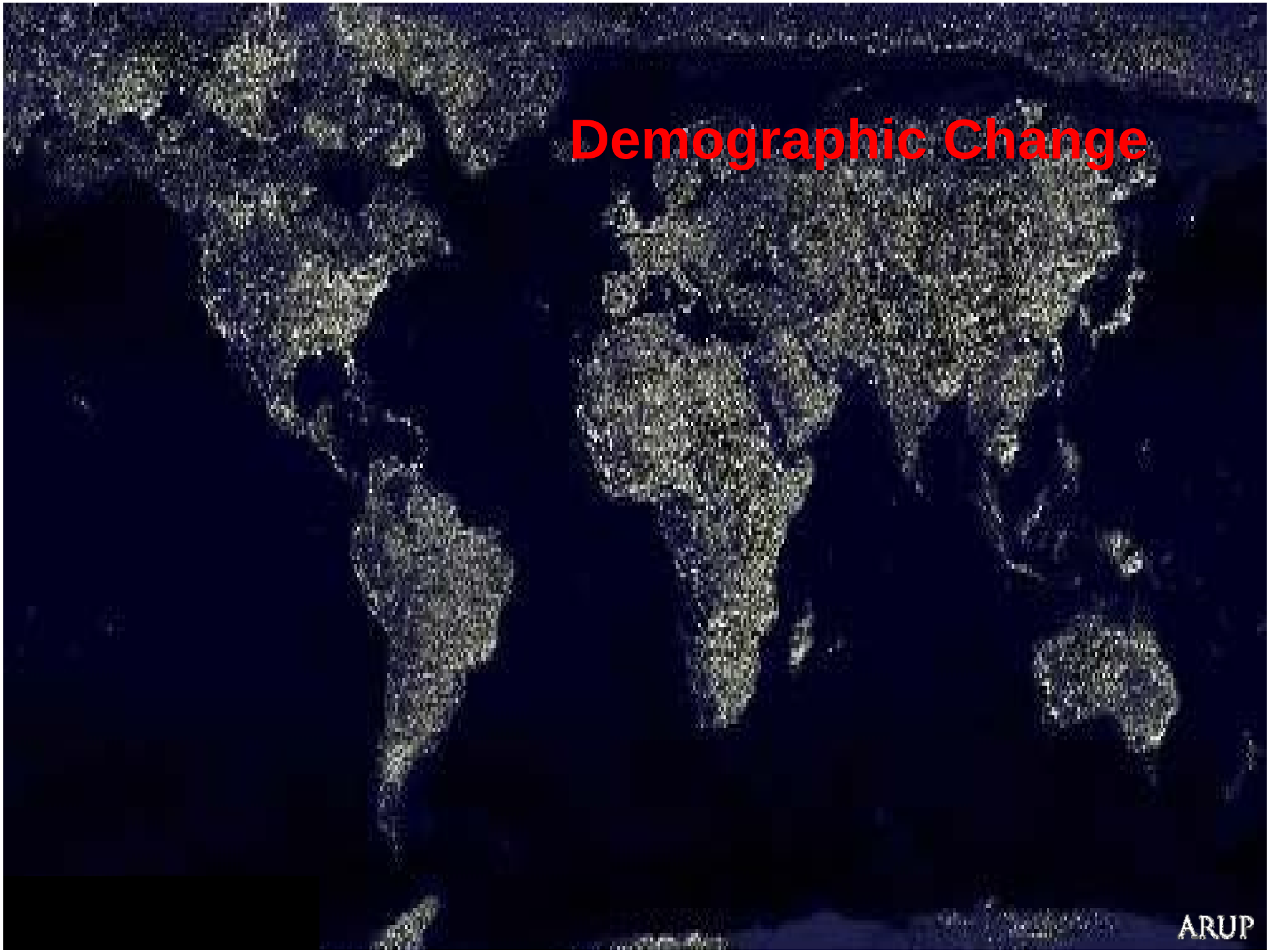
S ocial
T echnological
Ec onomic
En vironmental
P olitical
Demographic Change
Convergence
ChIndia
Energy
Dong Tang
www.driversofchange.com
ARUP


Demographic Change
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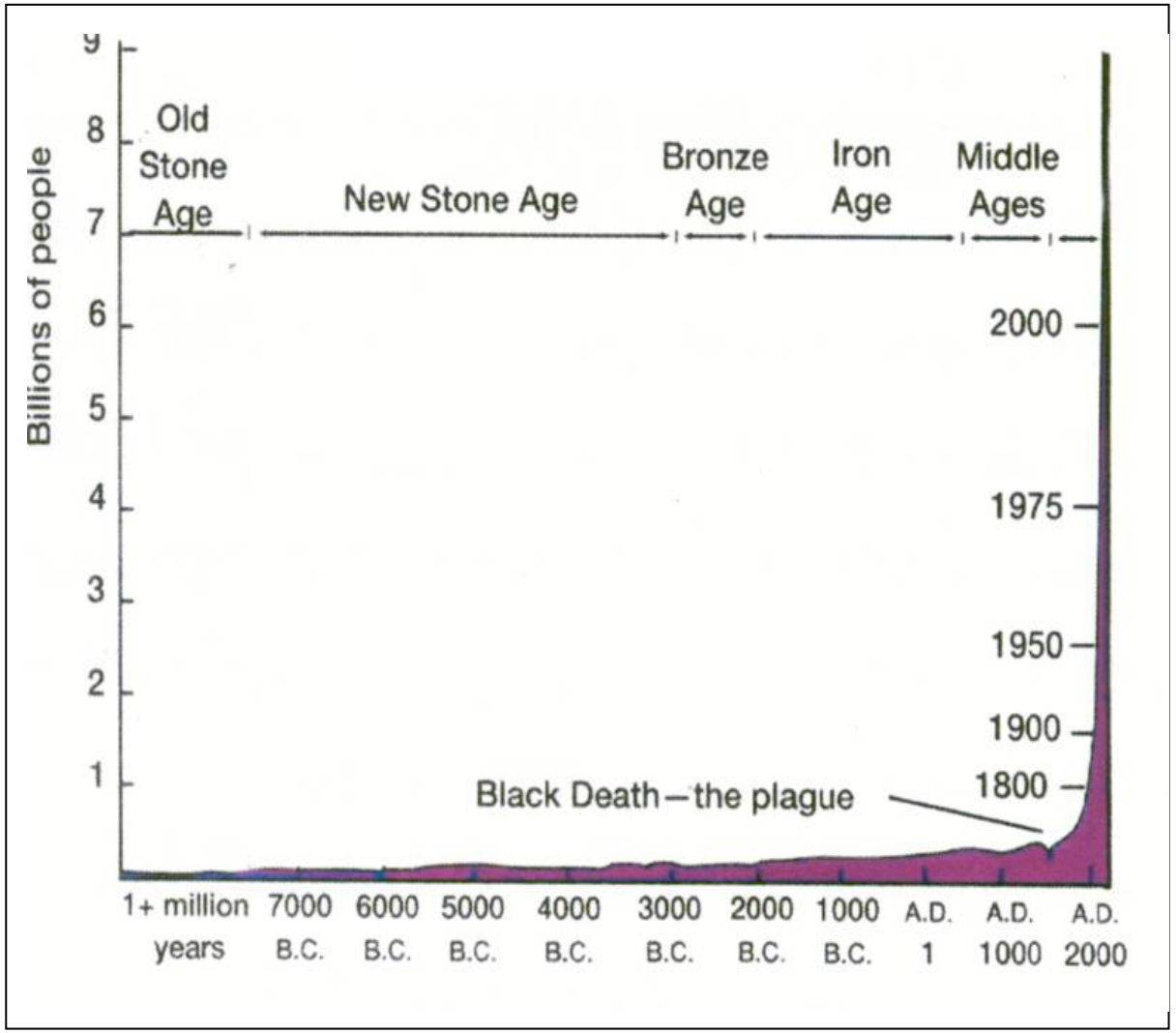
Demographic Change

Increasing

If we would observe a similar increase in population in bacteria, we would consider it an epidemic and do our best to eradicate it.



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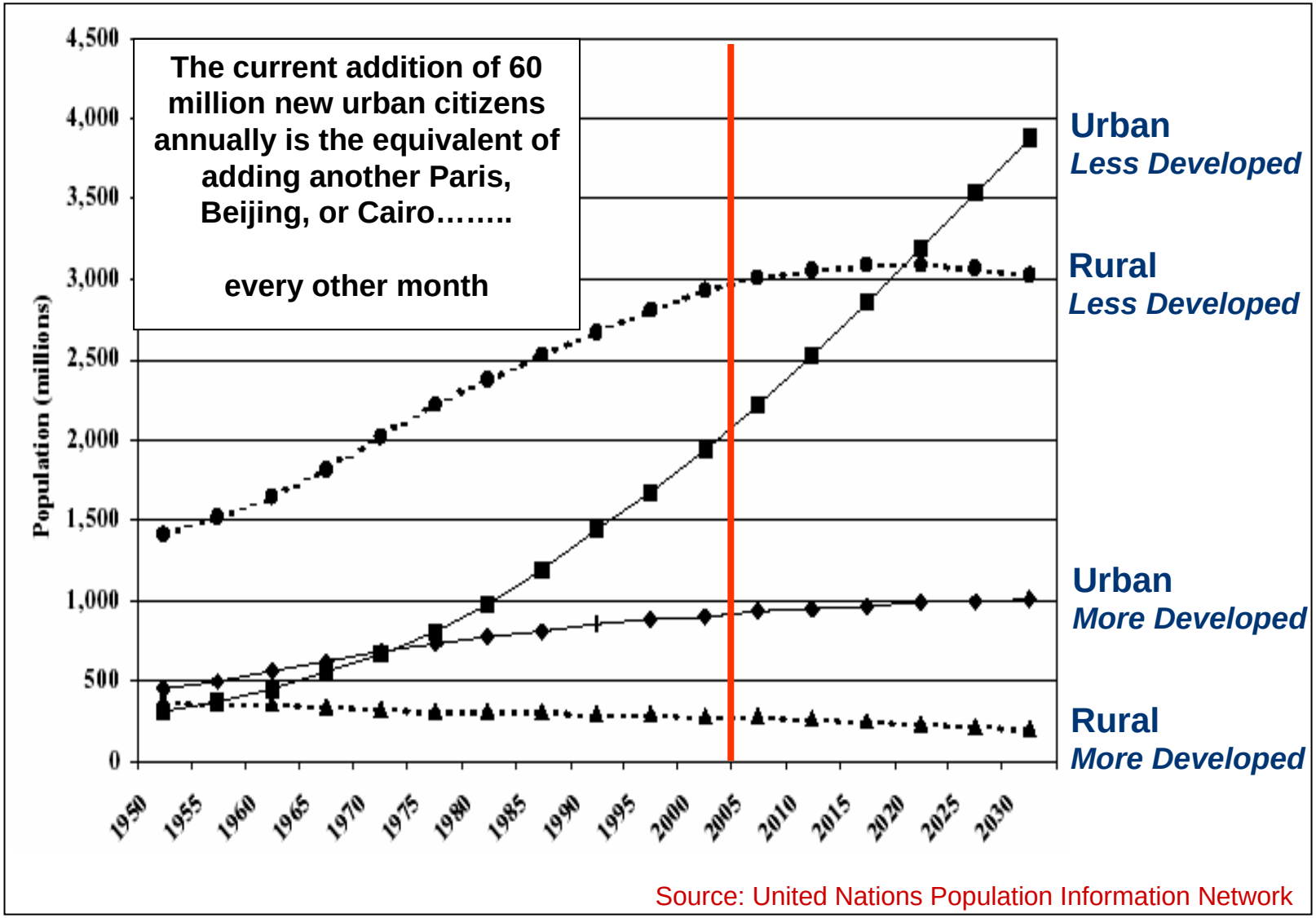
demographic change



Source: United Nations Population Information Network

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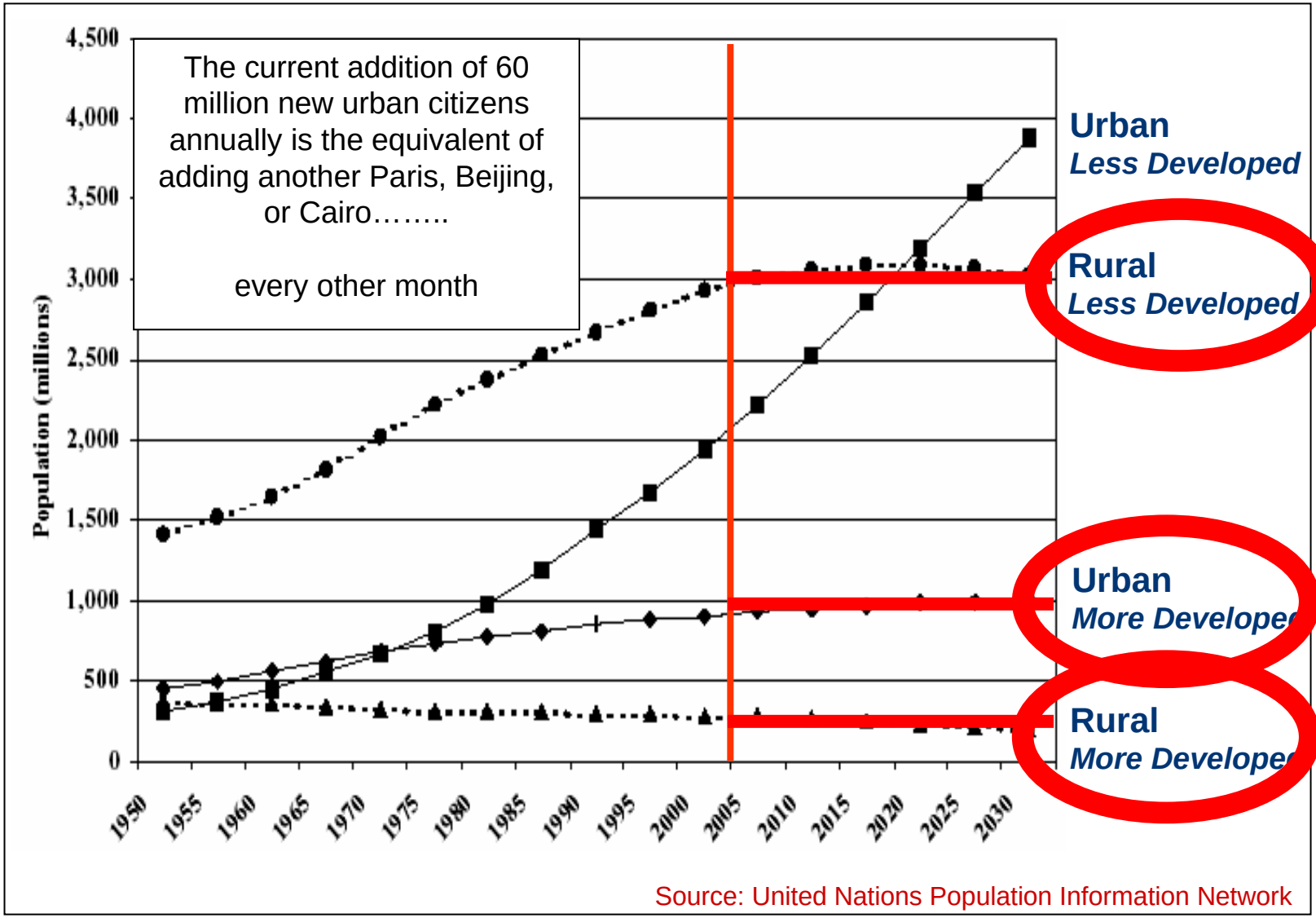
demographic change



Source: United Nations Population Information Network

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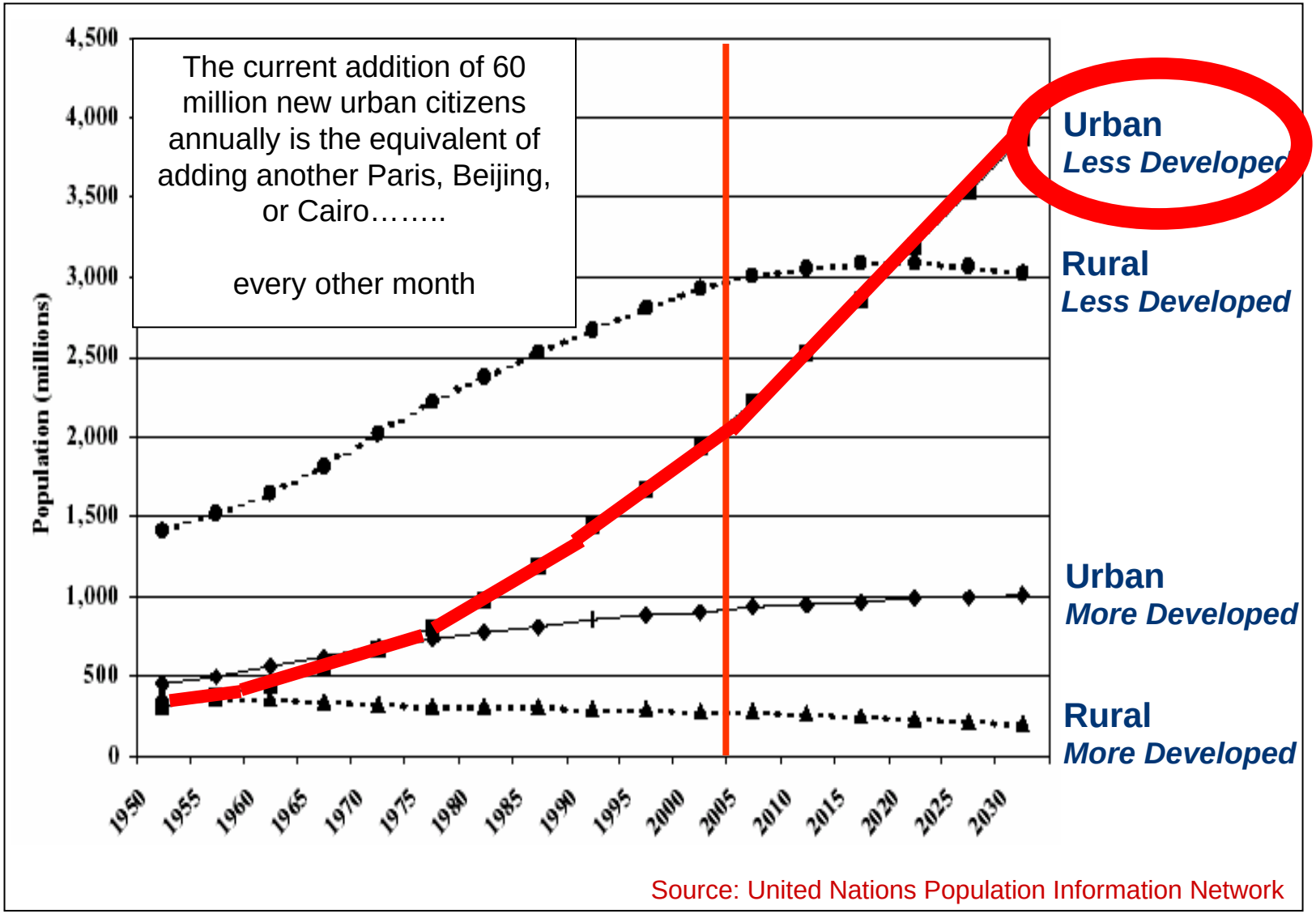
demographic change



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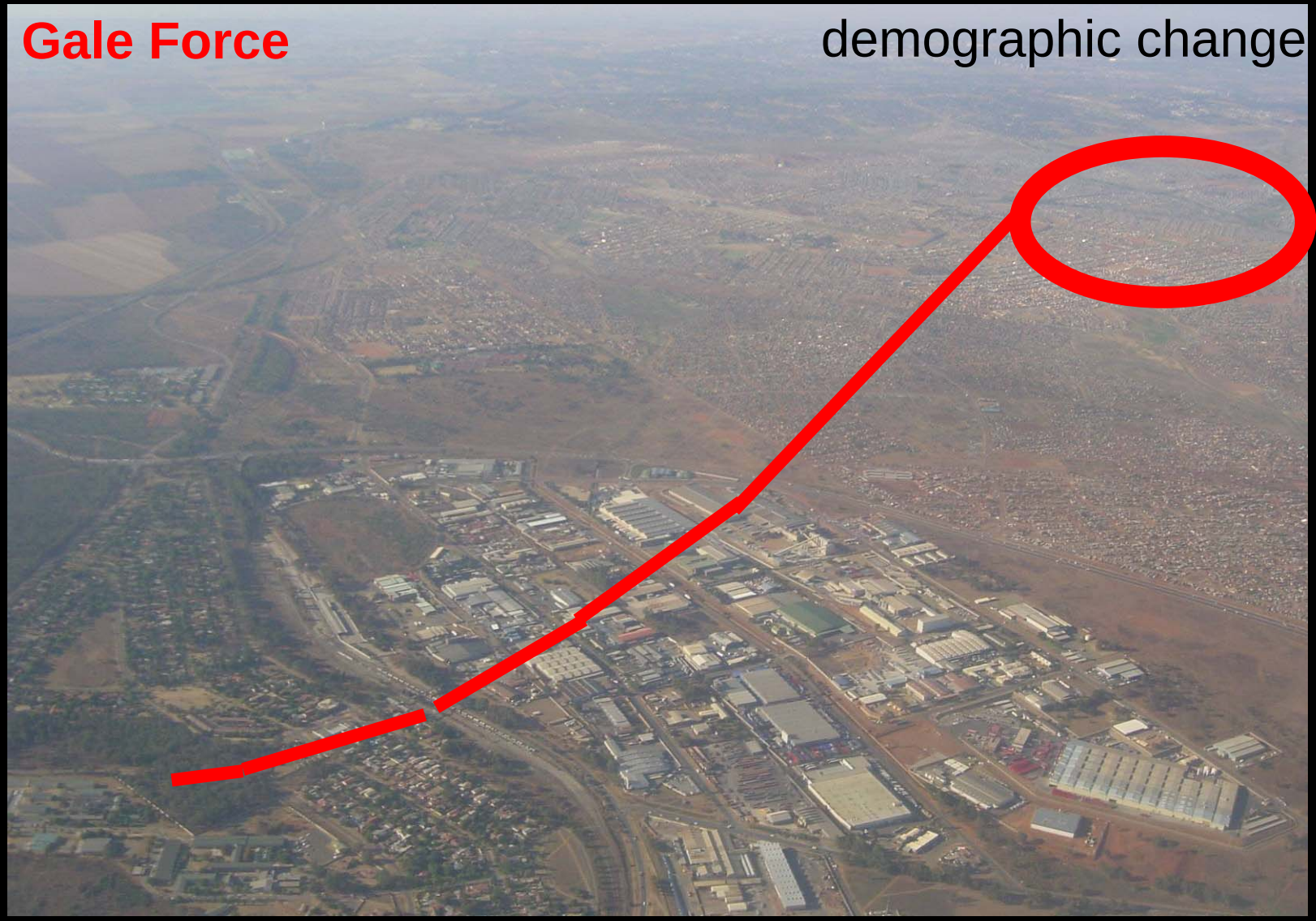

the ‘other’ 98% that have not

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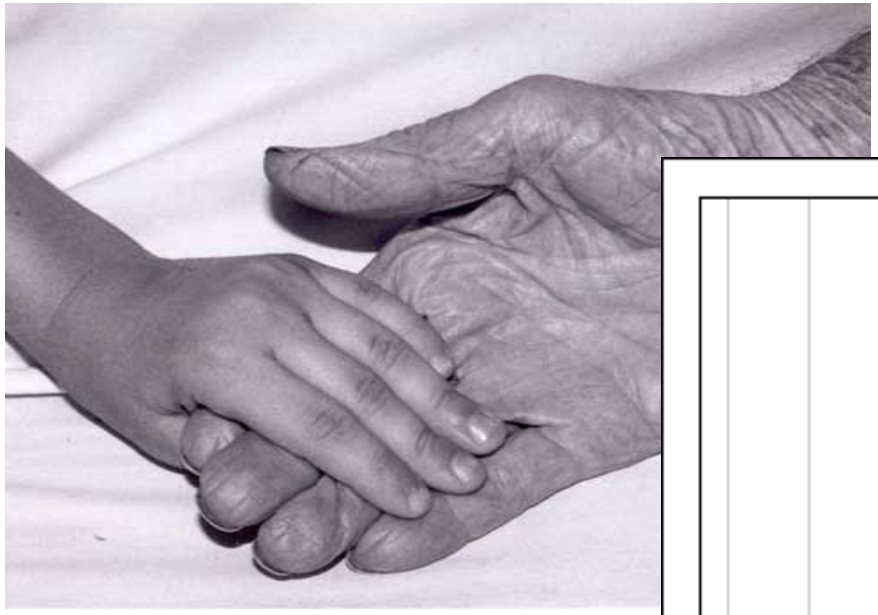
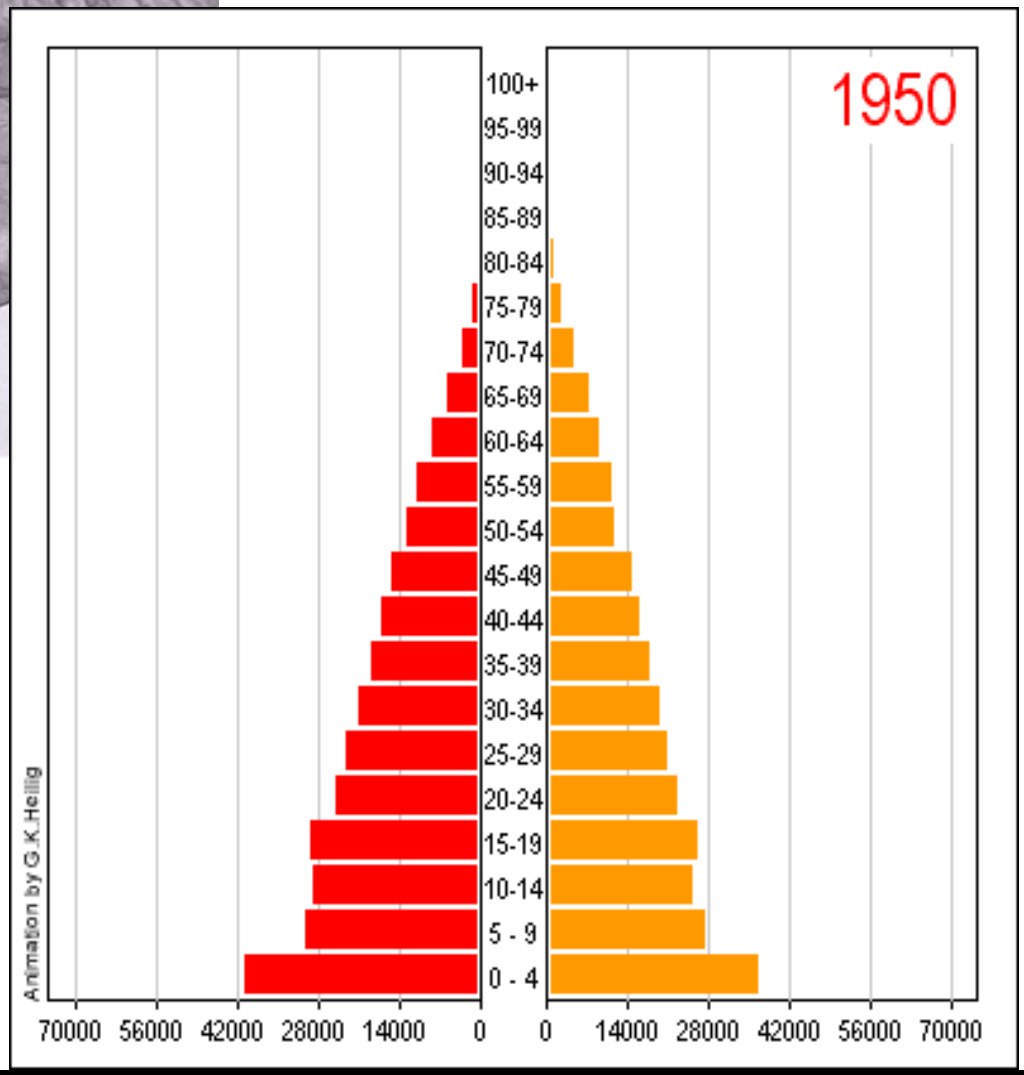
demographic change



Aging

The global population will age faster in the next 60 years than ever before. The number of people aged 60 will triple by 2050 and the world median age is predicted to increase from 27 today to 36 in the same amount of time.



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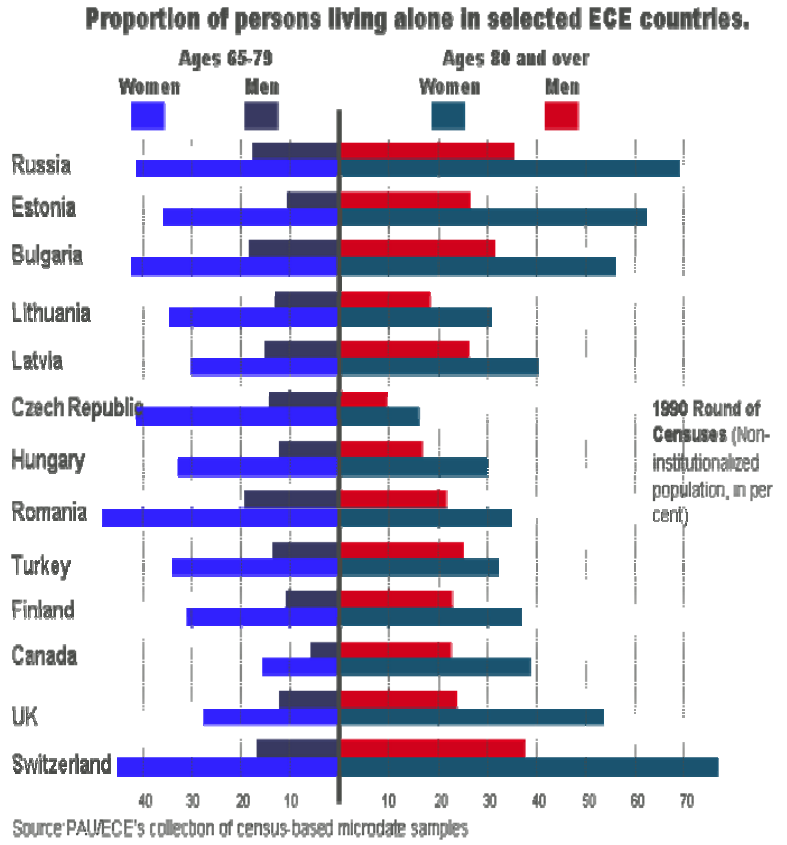
one-third of all households in Western Europe are single-person households.



Make my experience **familiar**.

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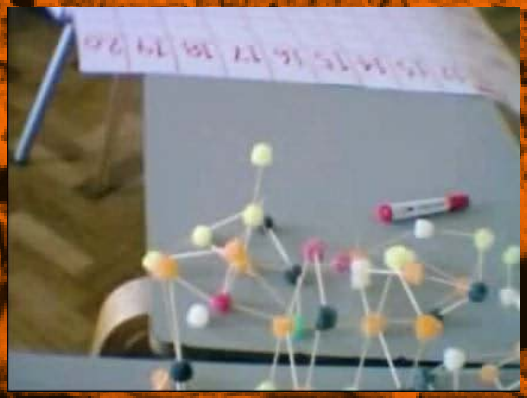
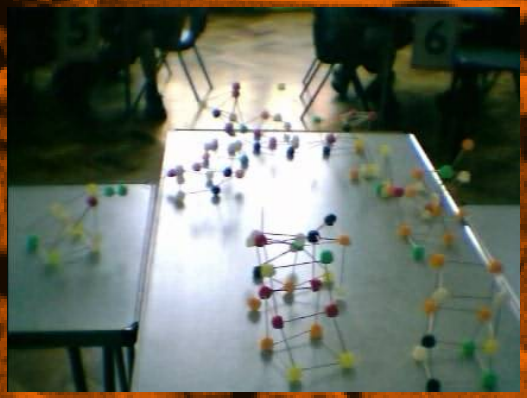
connectivity

TallTowers

Infants learning multi-media methods with connected tools at age 7.





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the customer of the future

Who will they be? What will they need? What will they desire?


eclecticism
a rapidly evolving MeWe global culture
ARUP

authenticity

an increasing need/desire to find/experience it……but what is it?

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Convergence
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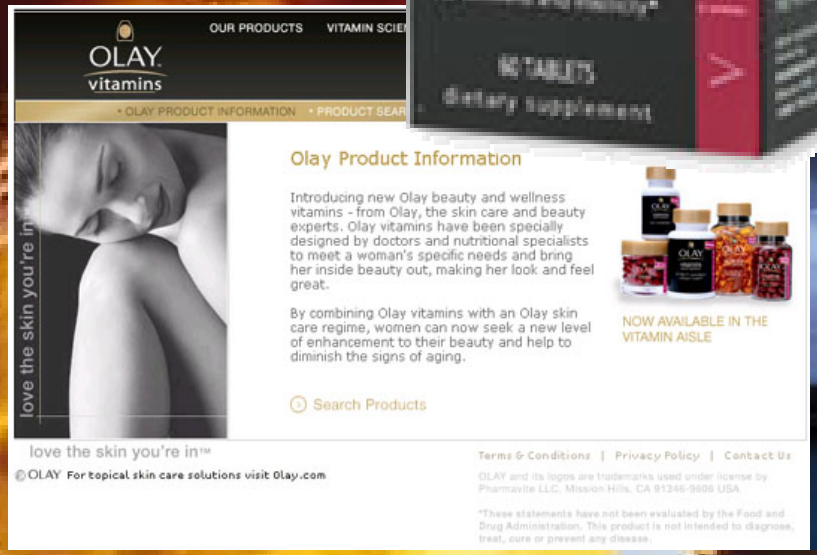
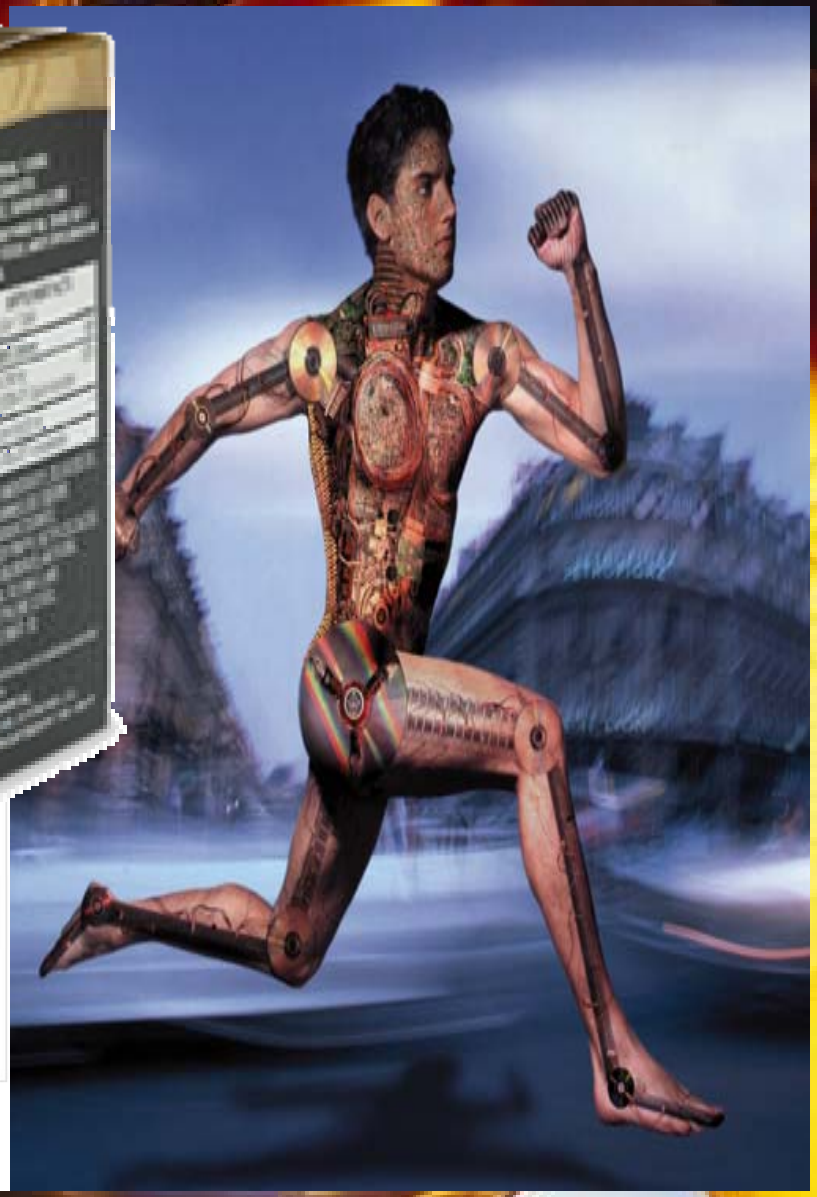
Vita-ceutical

Neutri-ceutical

Cosmi-ceutical

Nutri-beautical





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biohospitality

take care of me!

please.

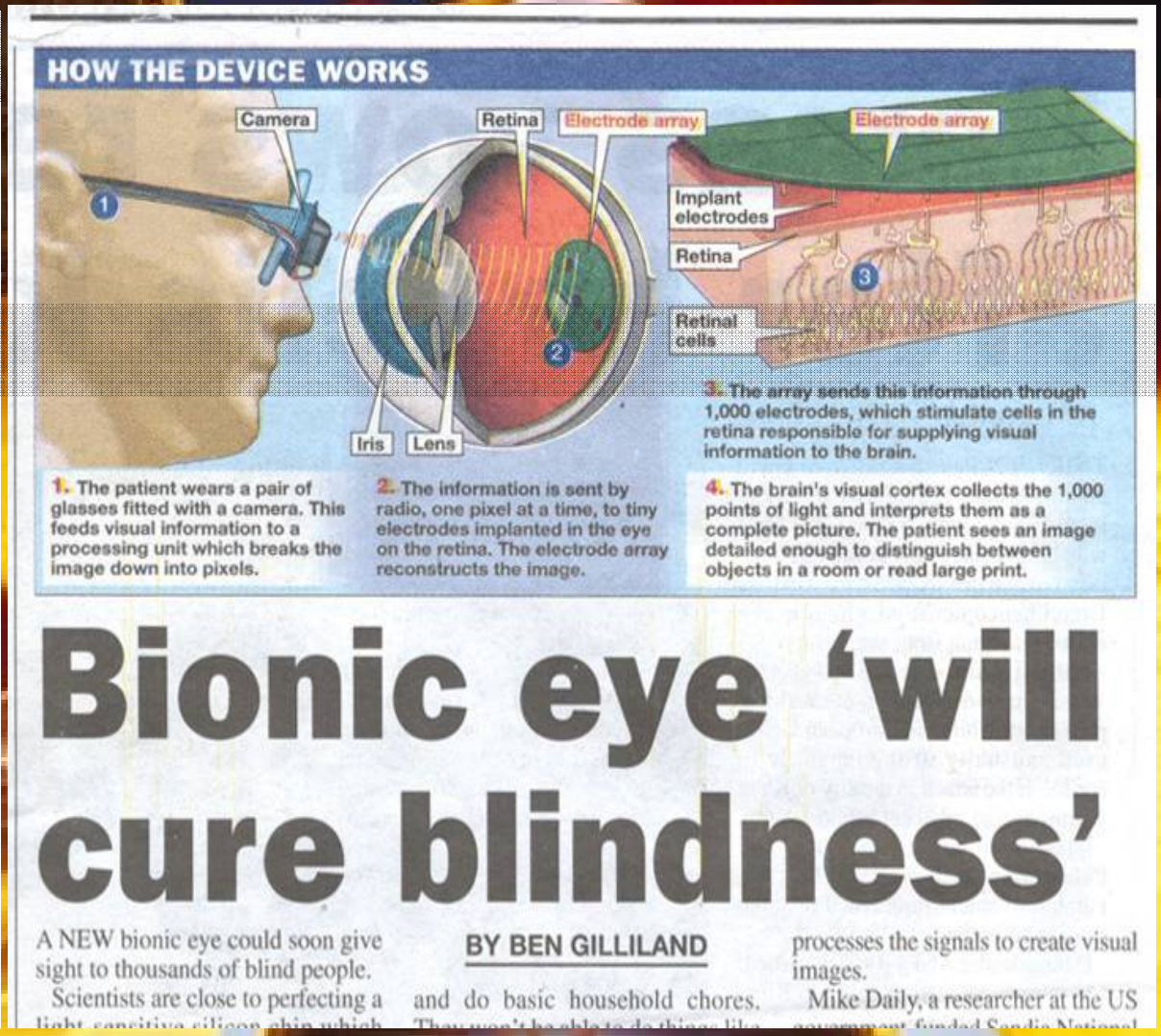
nobody else will.

bionics

inevitable

we expect assistance

when will we merge with things?



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information convergence

inevitable

2055: anonymity is only found in the dictionary.

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connectivity
Located
The Saudi Post has placed an RFID tag in every post delivery location. The postal code is the coordinates to a one metre resolution.
Nothing gets lost.
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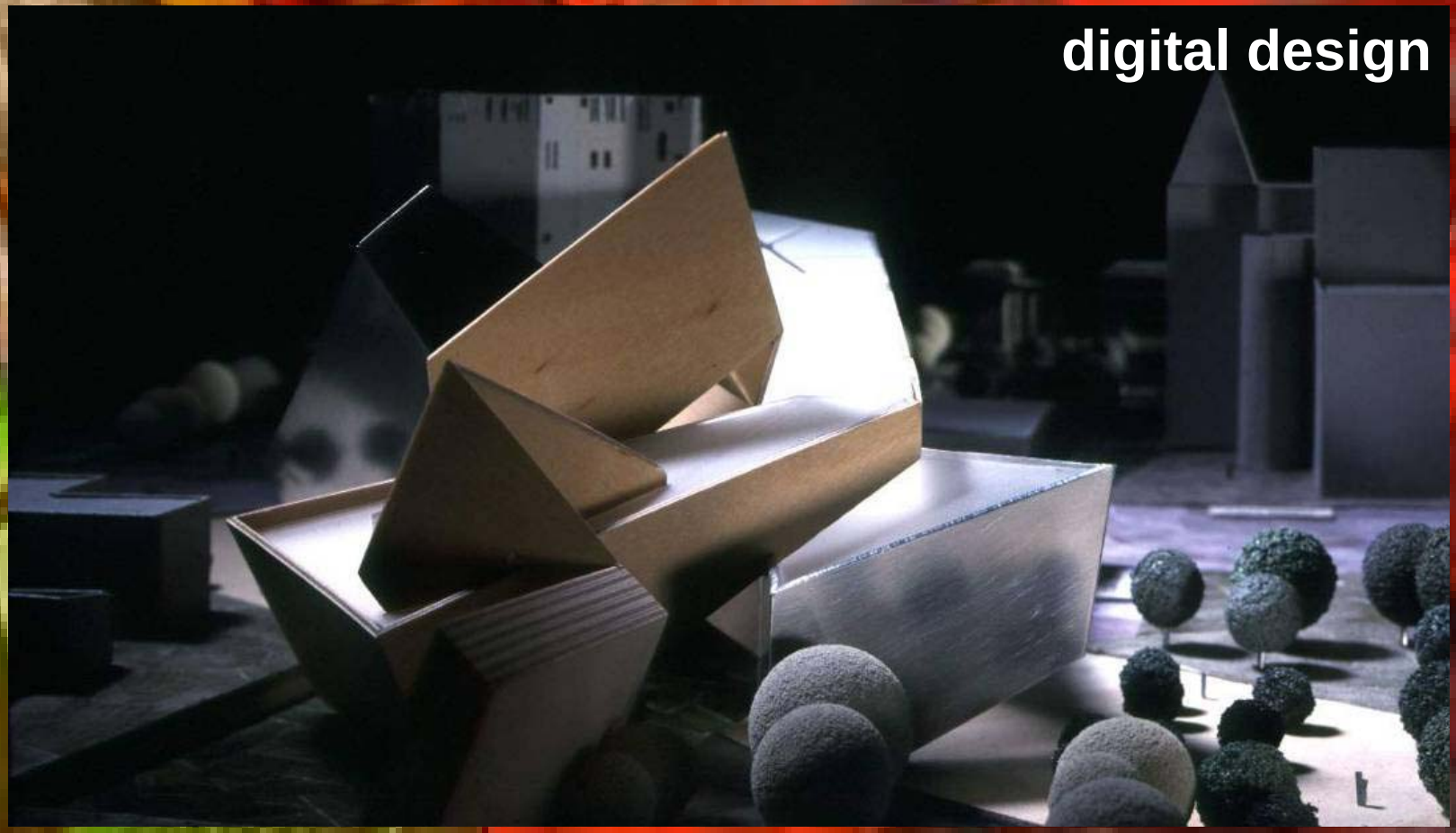

Denver Art Museum

Studio Daniel Libeskind with Davis Partnership, PC

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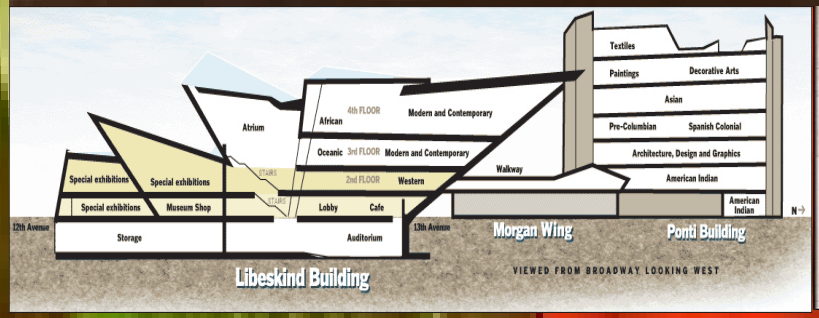

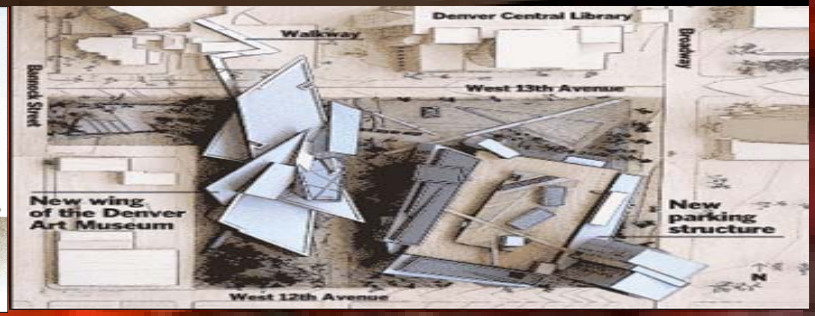

3D Design from the outset

technology enabled the systems integration

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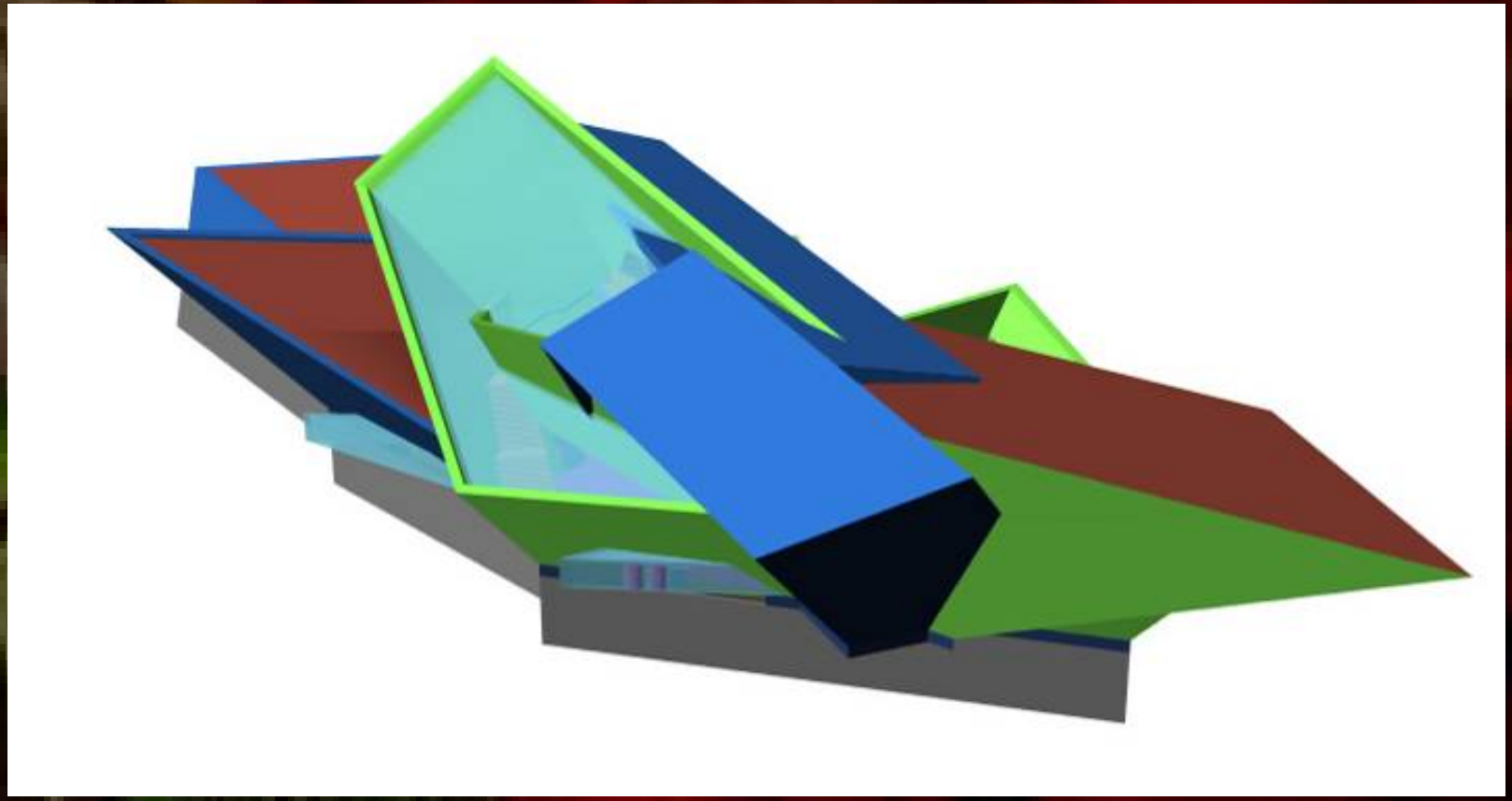

Form Z Architectural model

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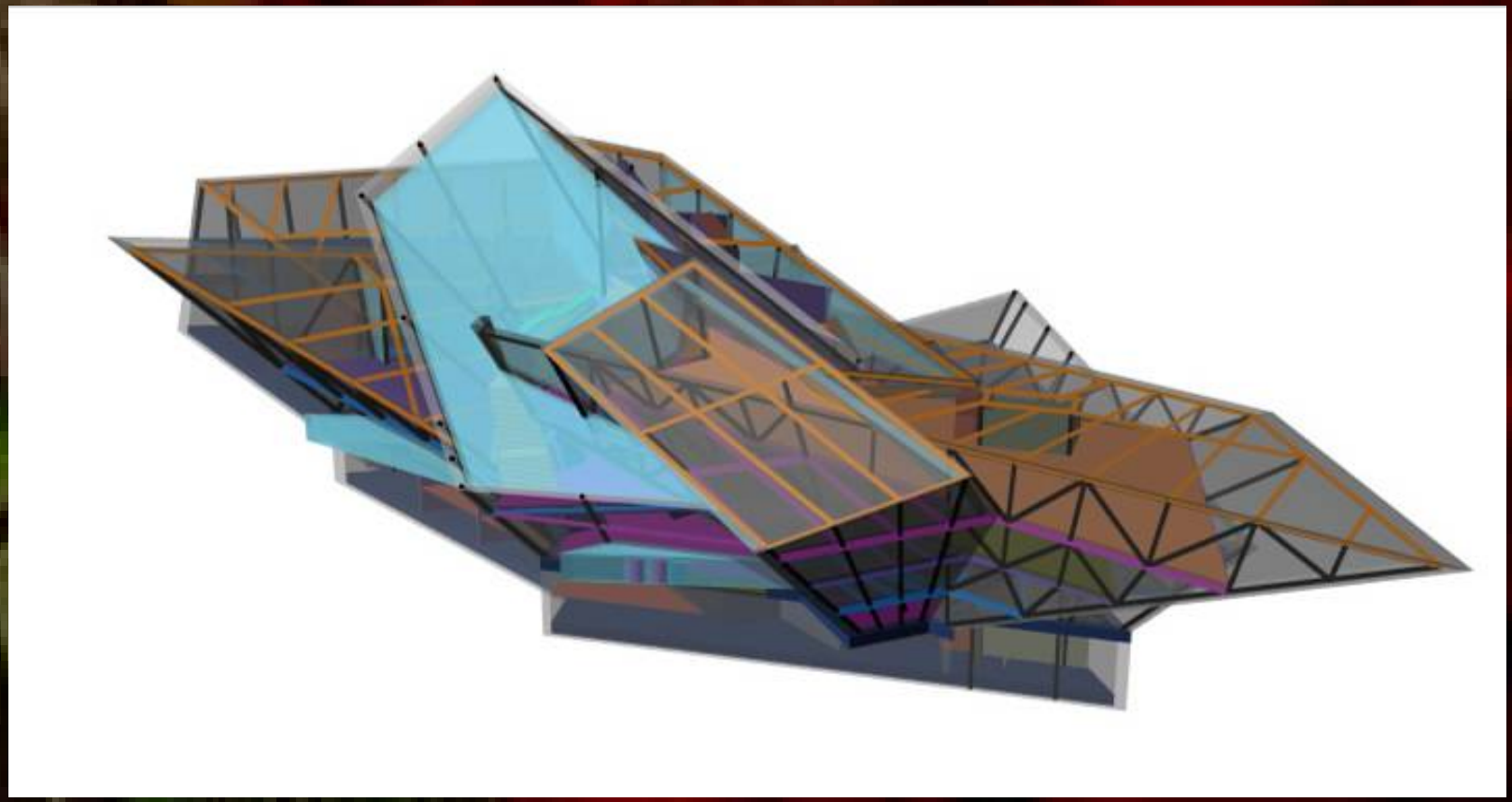
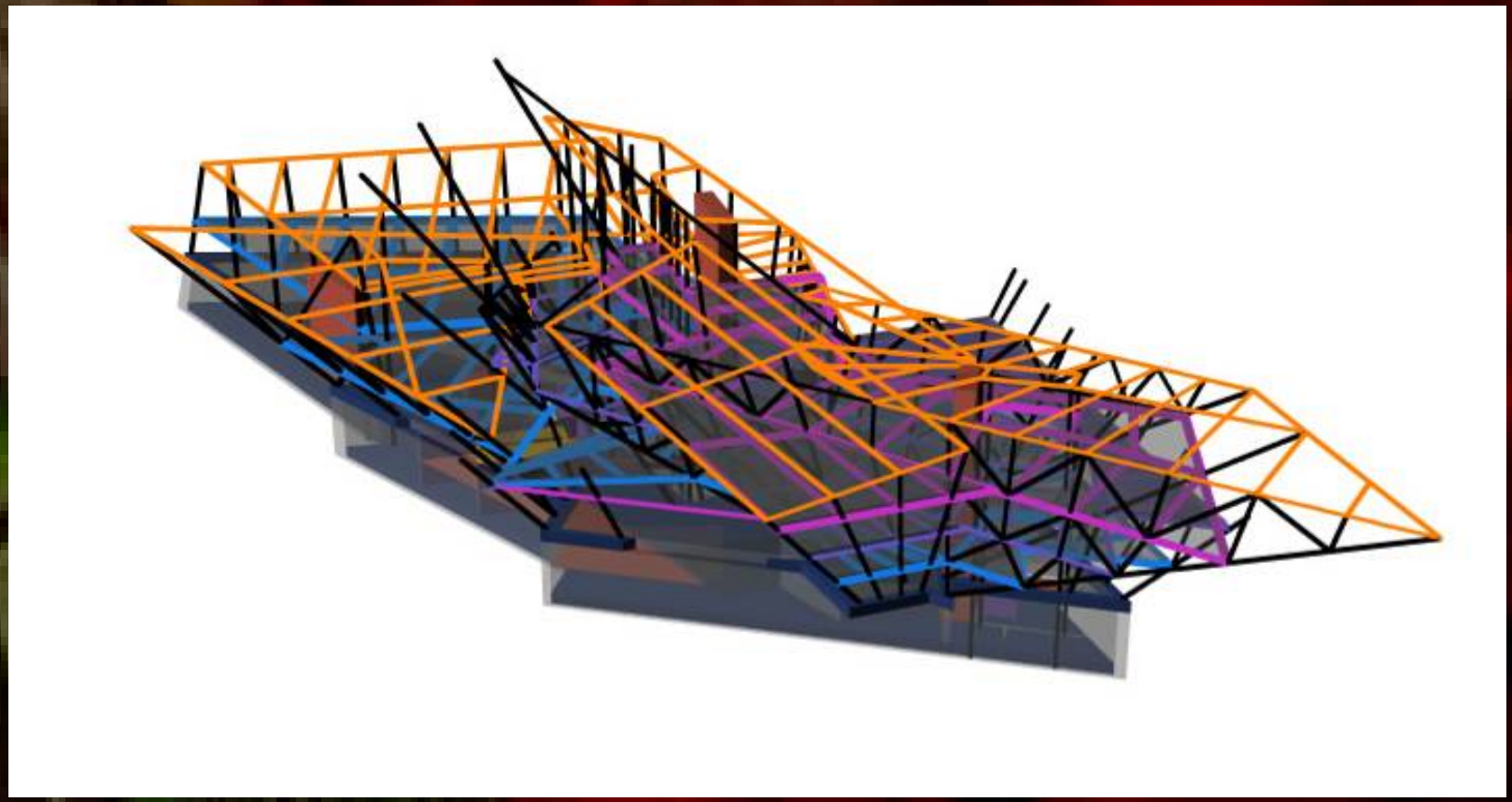


Form Z Architectural model

Structural elements on wall center lines

ARUP

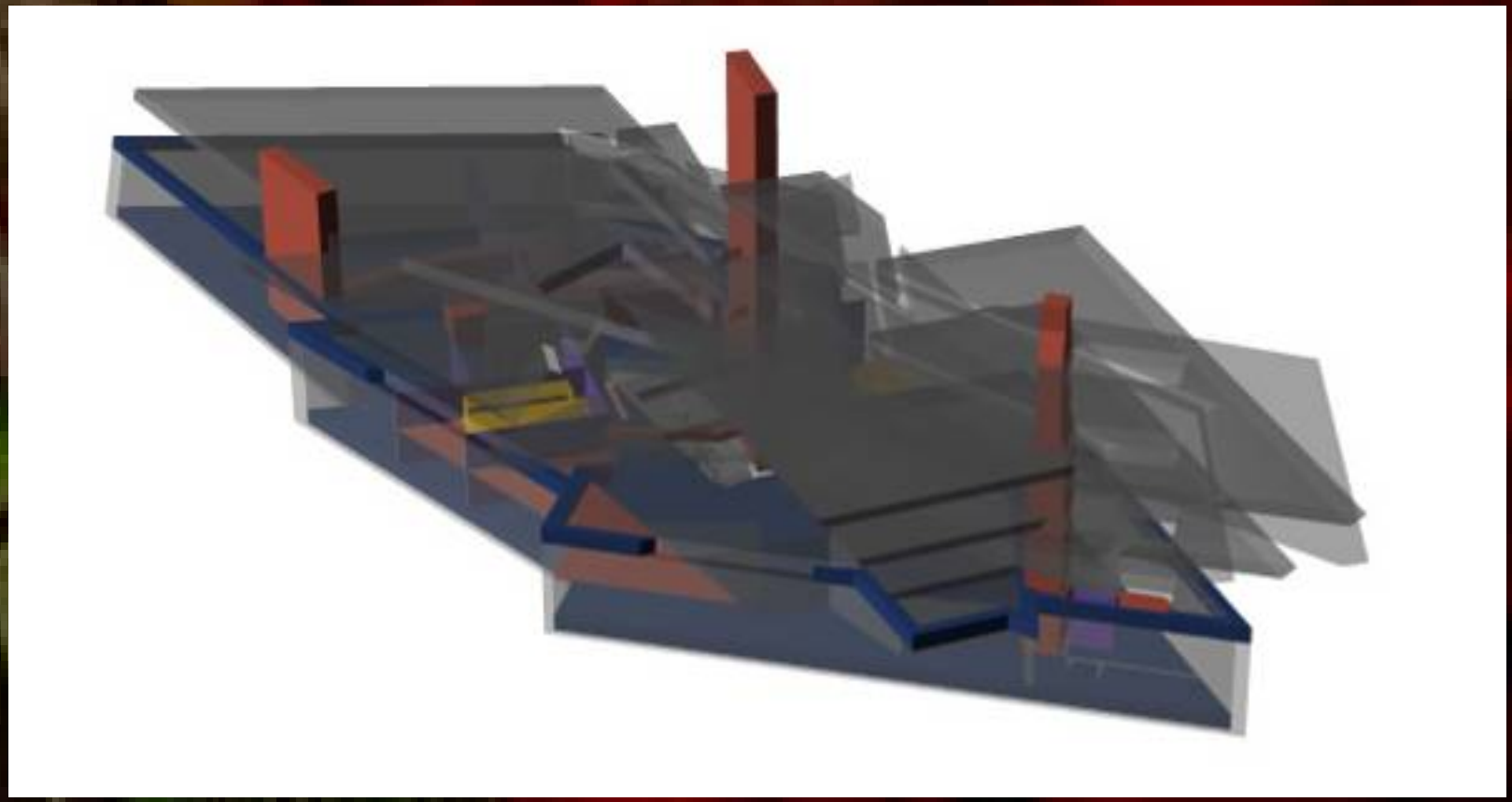


Form Z Architectural model

Structural elements on wall center lines

Structural analysis in SAP

ARUP



Form Z Architectural model

Structural elements on wall center lines

Structural analysis in SAP

Structural analysis in RamSteel

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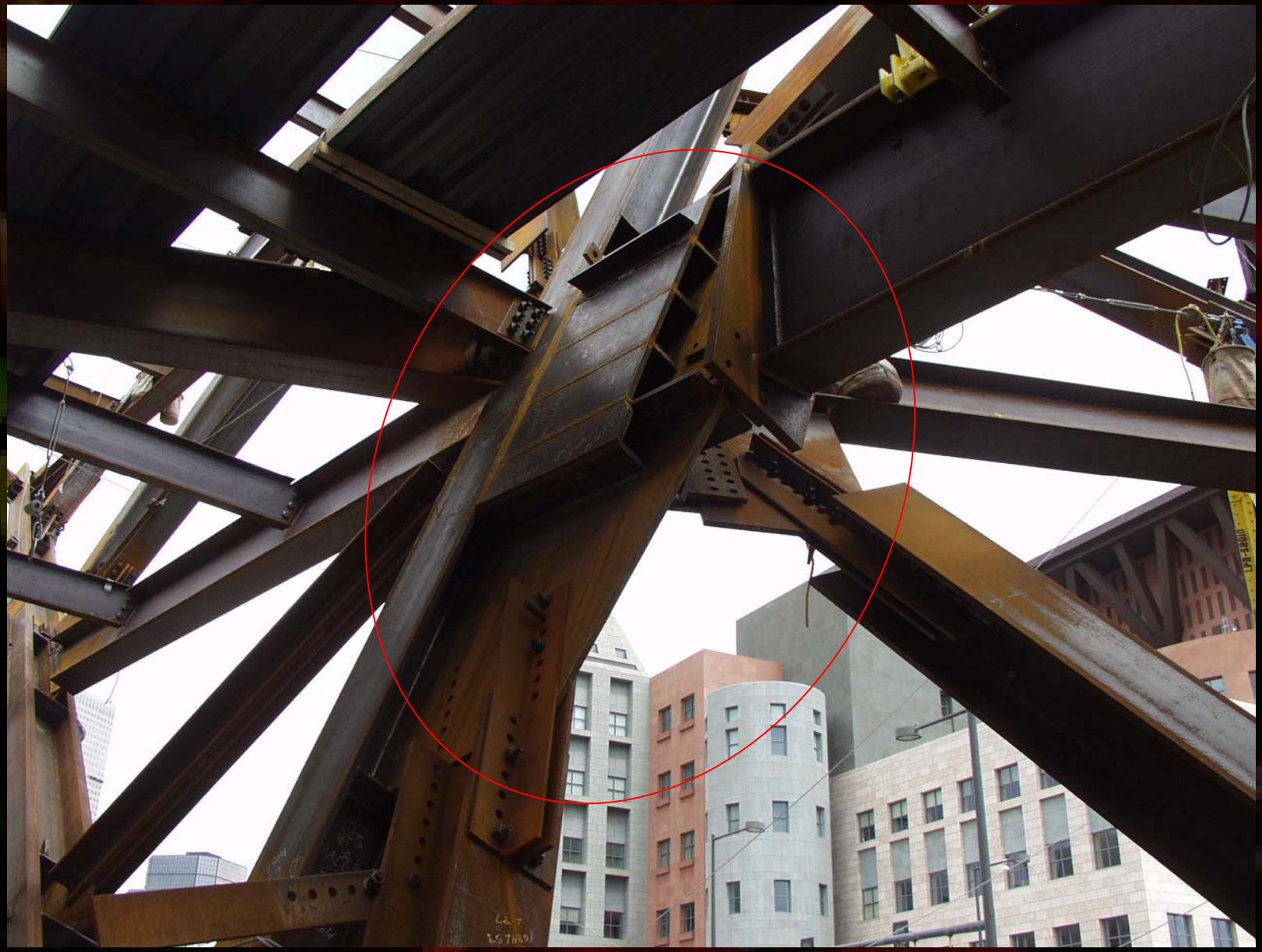
X-Steel enabled connection detail

ARUP



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ARUP

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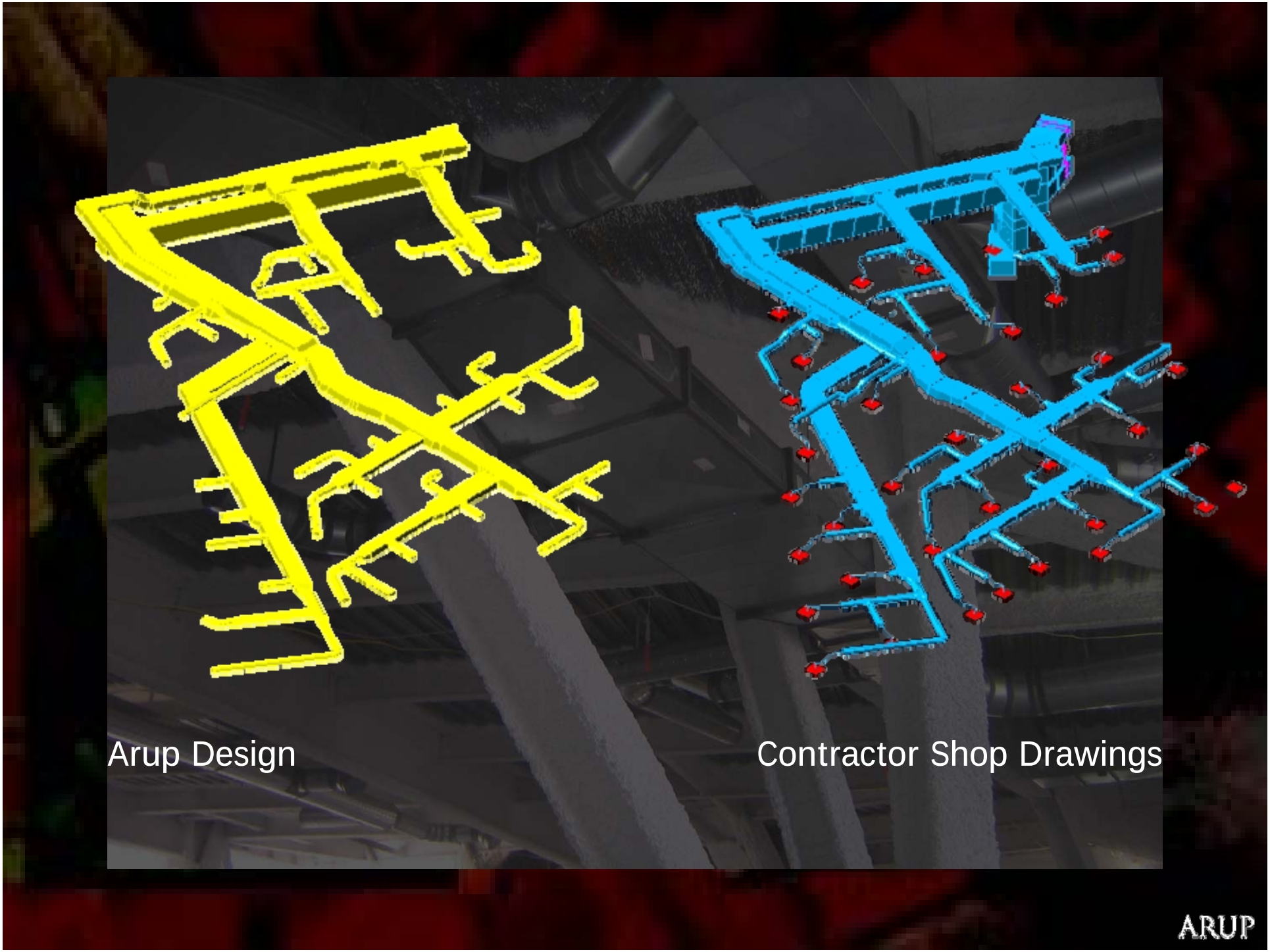
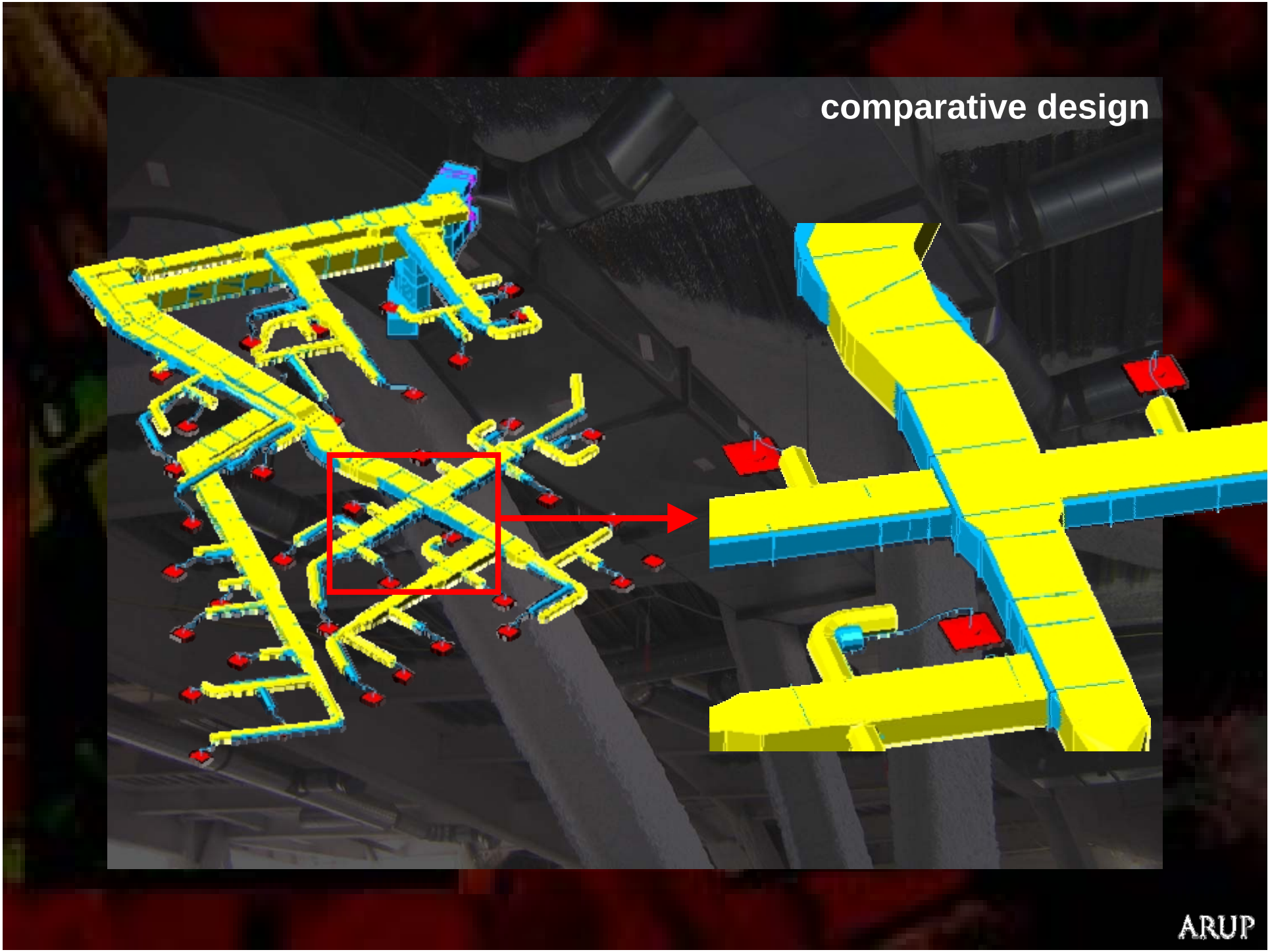
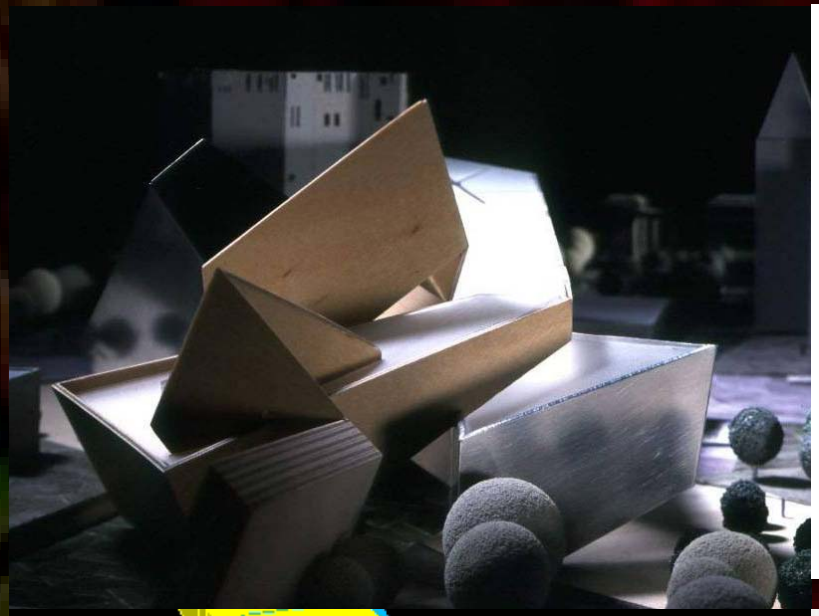

Arup Design
Contractor Shop Drawings
ARUP

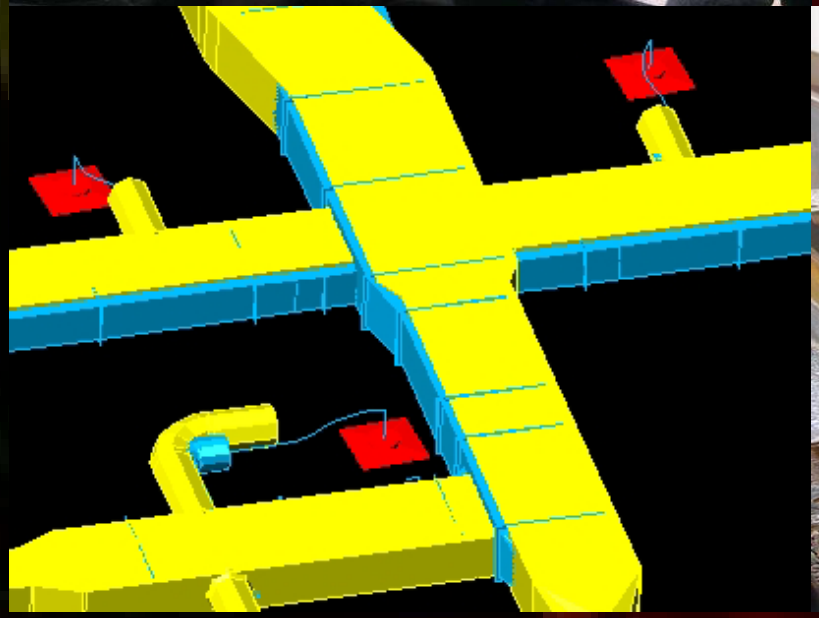

comparative design
ARUP



comparative expenditure

‘Normal’
350 rfi @ 2hrs @ £100 = **£70,000**

3D model
17 rfi @ 8 hrs @ £200 = **£27,200**



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information

What will happen when nothing and no-one can get lost?

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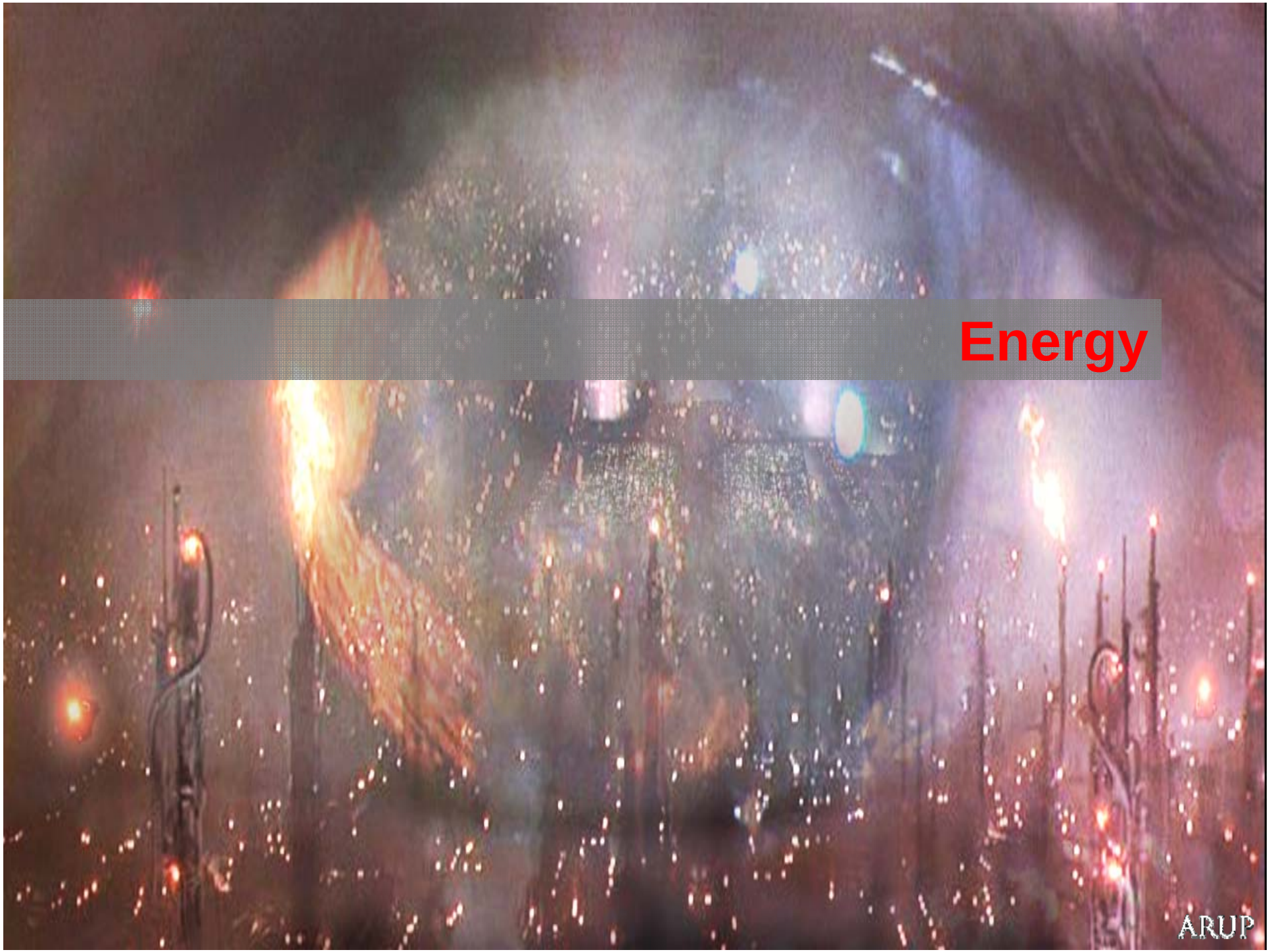
DELTA
Delta
Air Lines
ARUP


Energy
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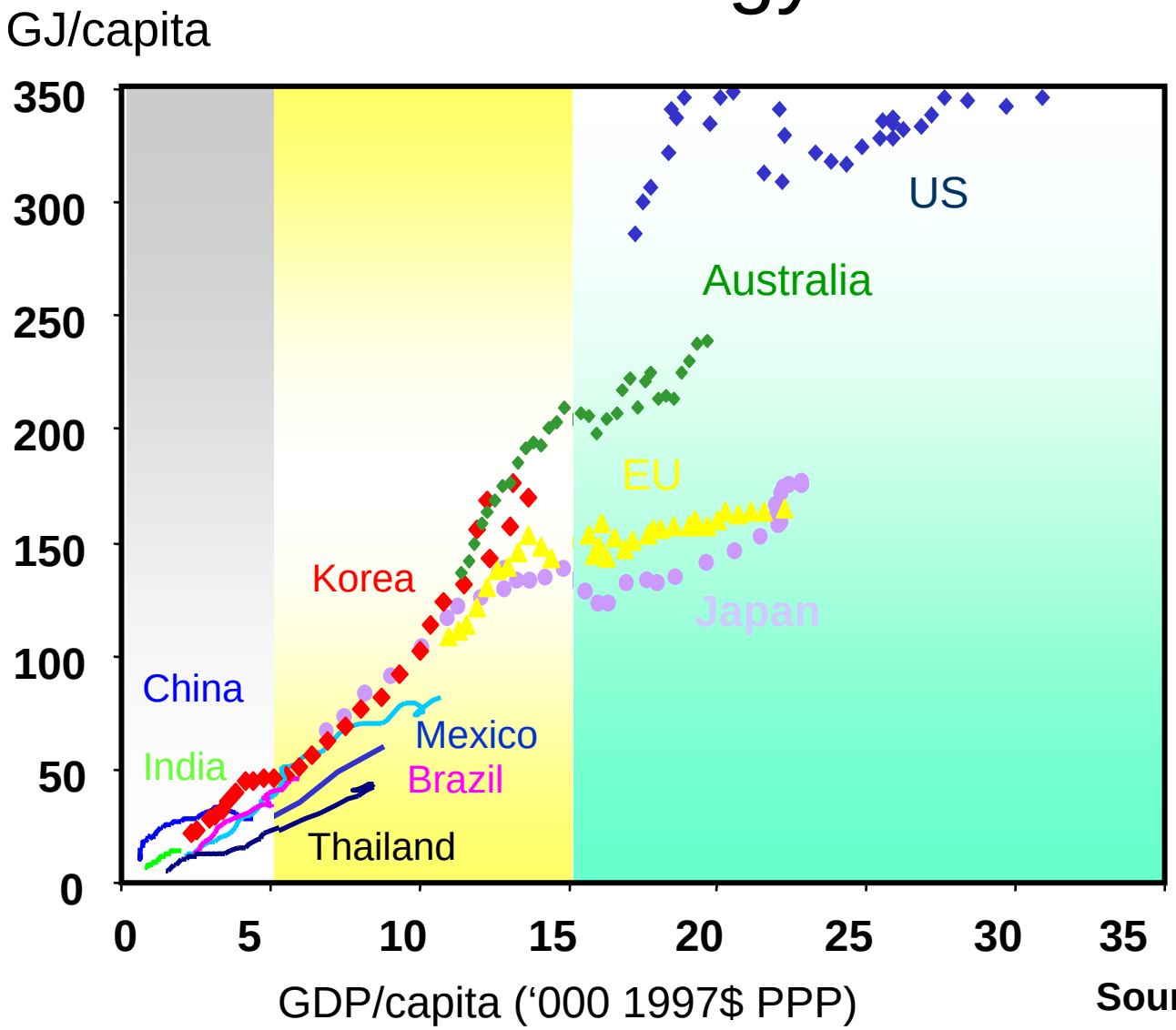
the energy / wealth ladder



+$25k/capita: little extra energy needed

+$15k/capita: services start to dominate growth

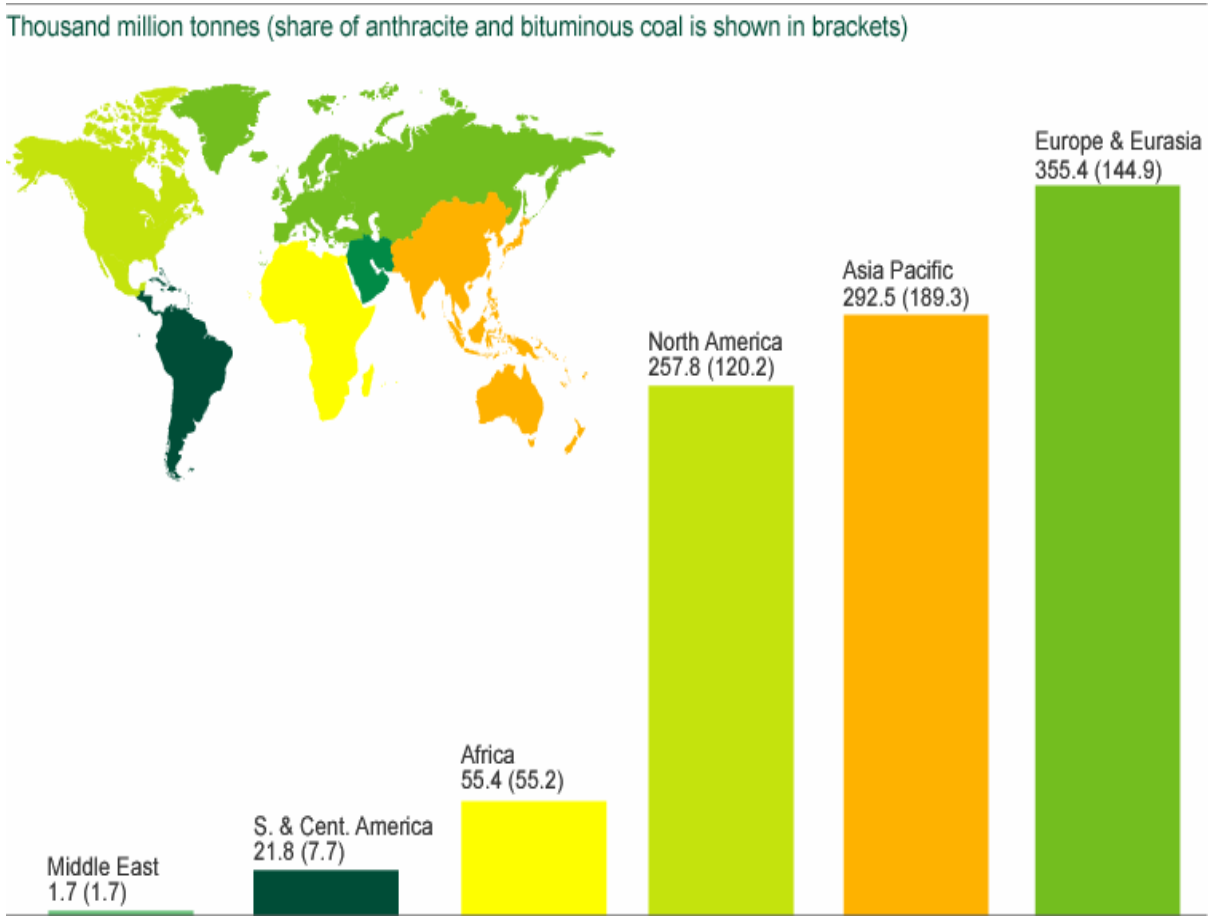
+$10k/capita: industrialisation near complete

+$5k/capita: industrialisation and mobility take off

Source: IMF, BP

ARUP

Proved **coal** reserves end 2003



BP Statistical Review of World Energy 2004 © BP

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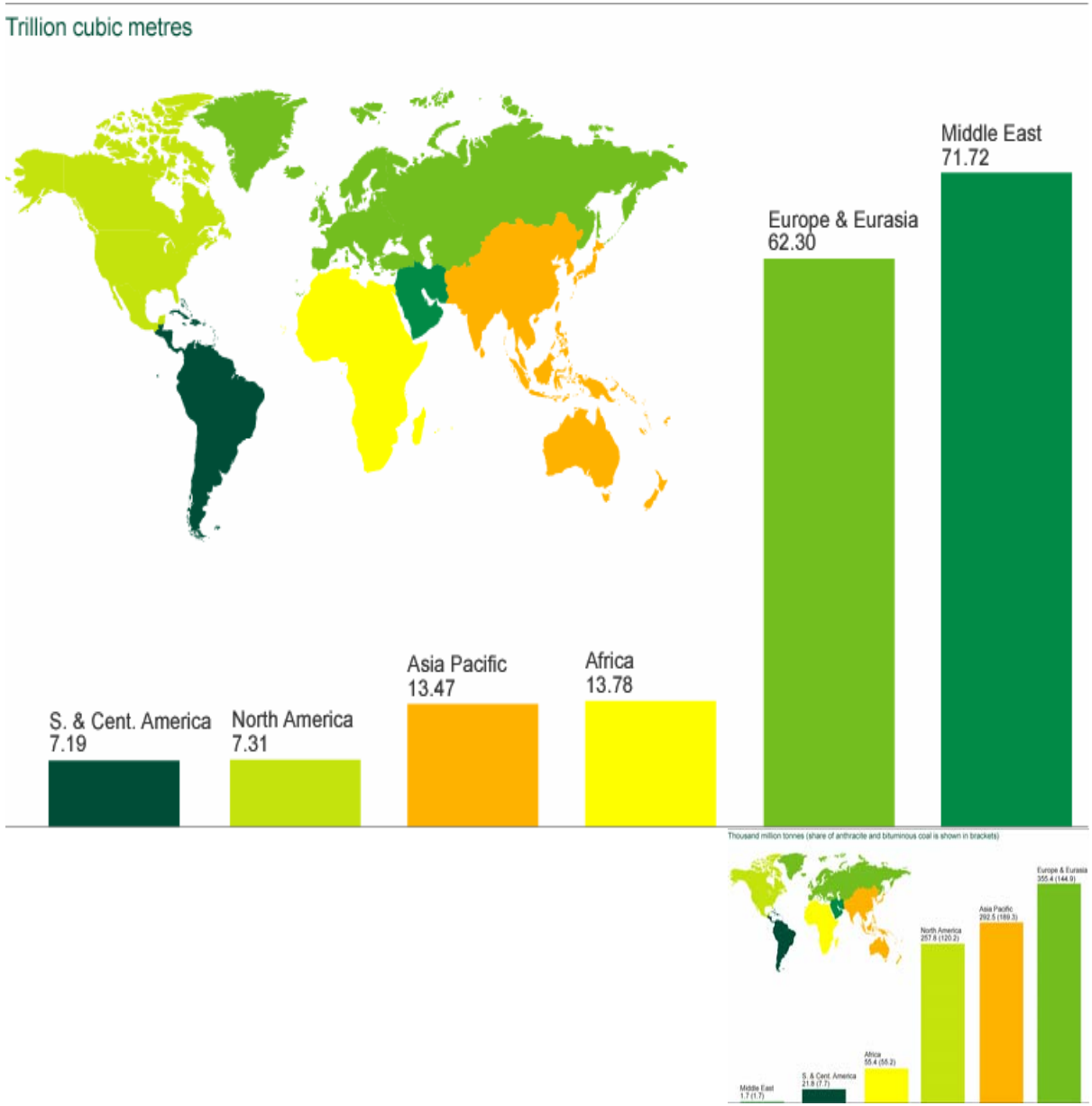
Proved **gas** reserves end 2003



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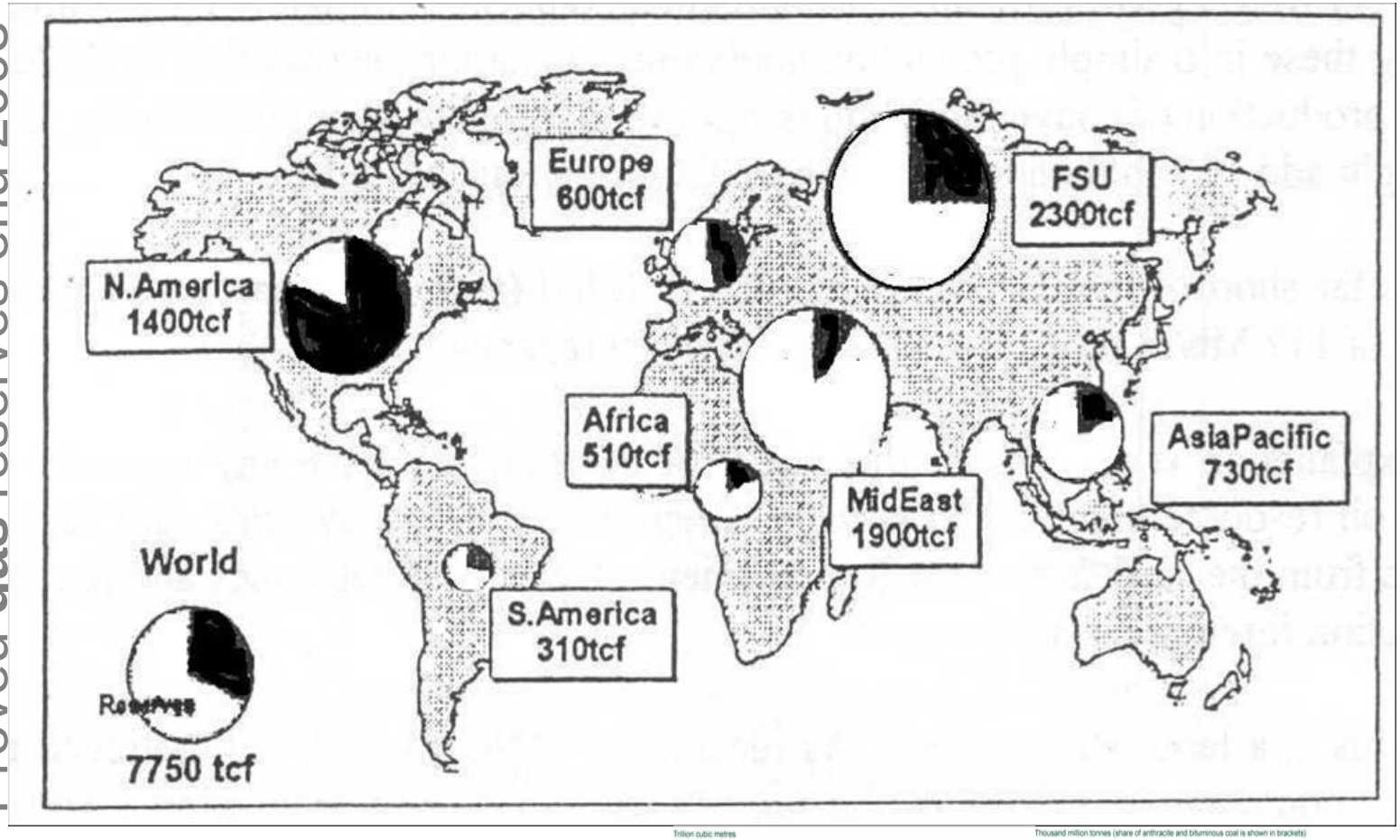
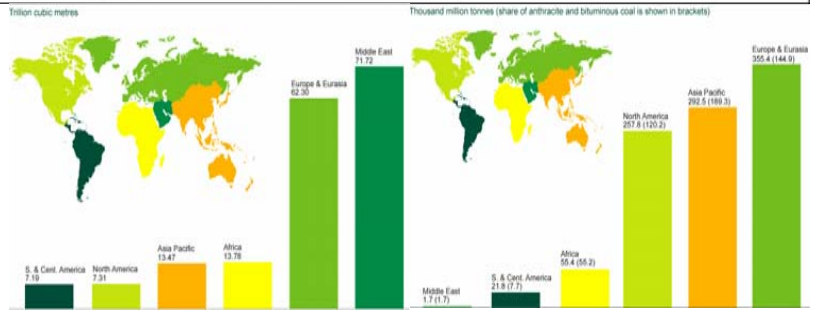
Proved **gas** reserves end 2003





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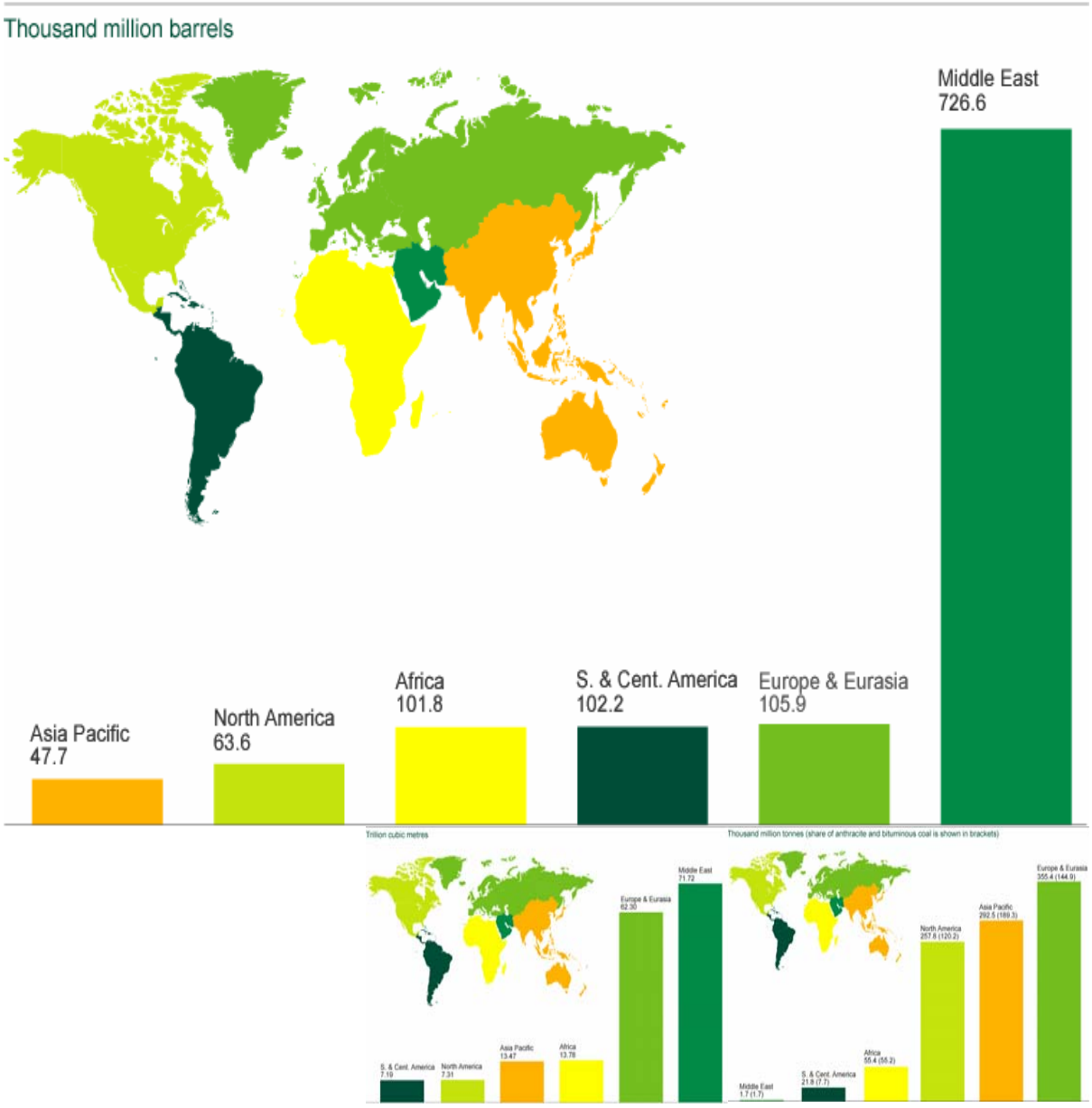
Proved **oil** reserves end 2003



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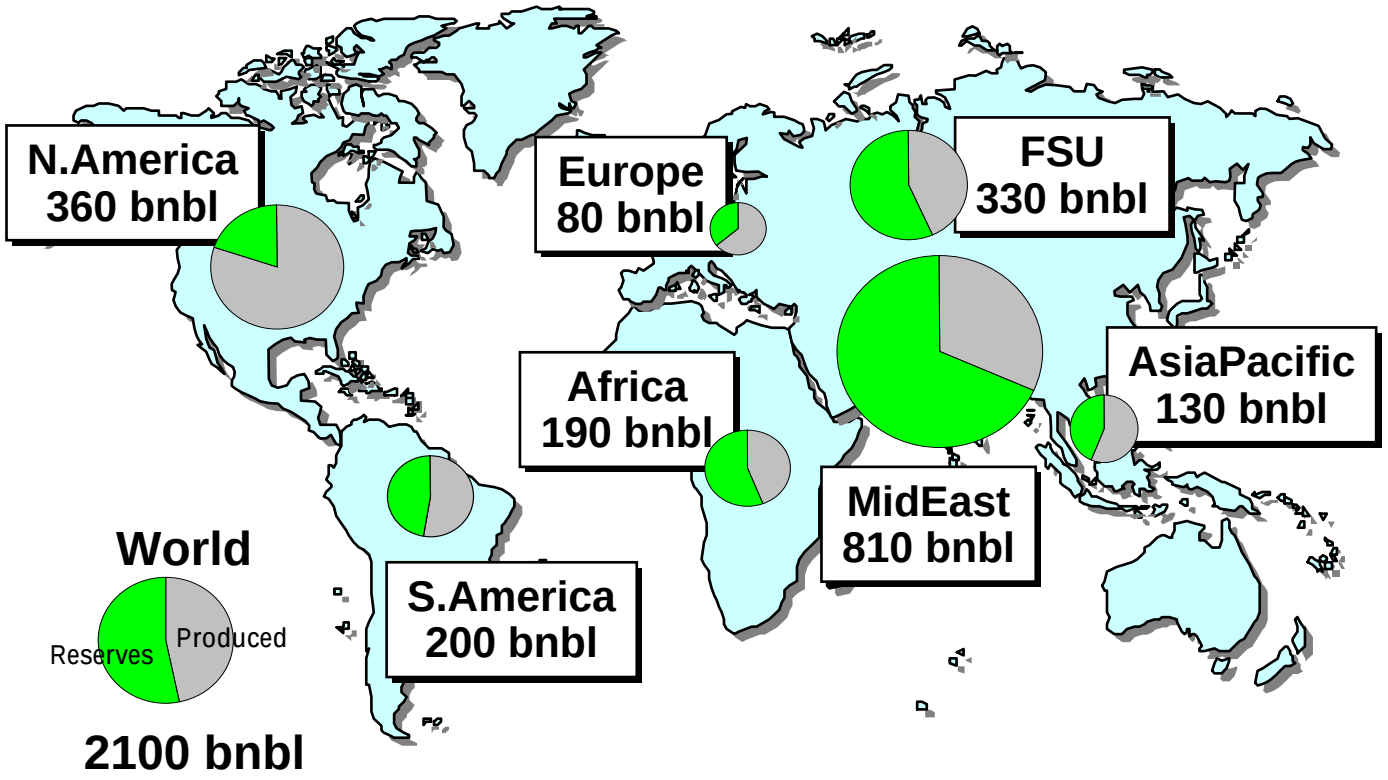
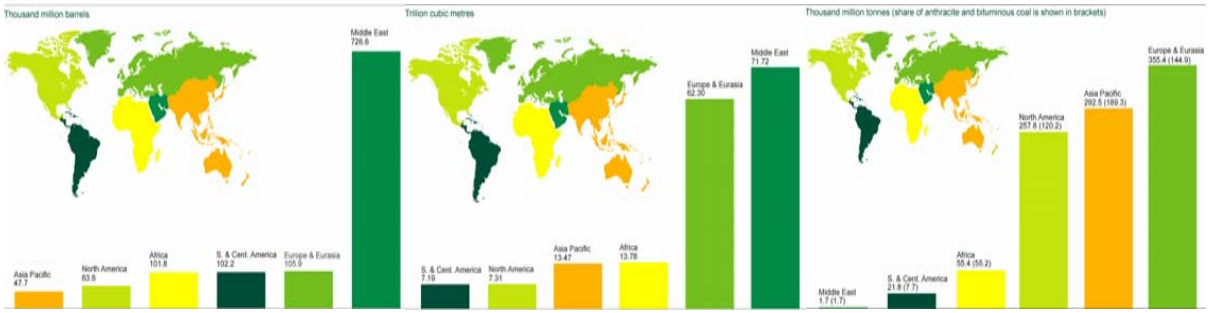
OIL reserves





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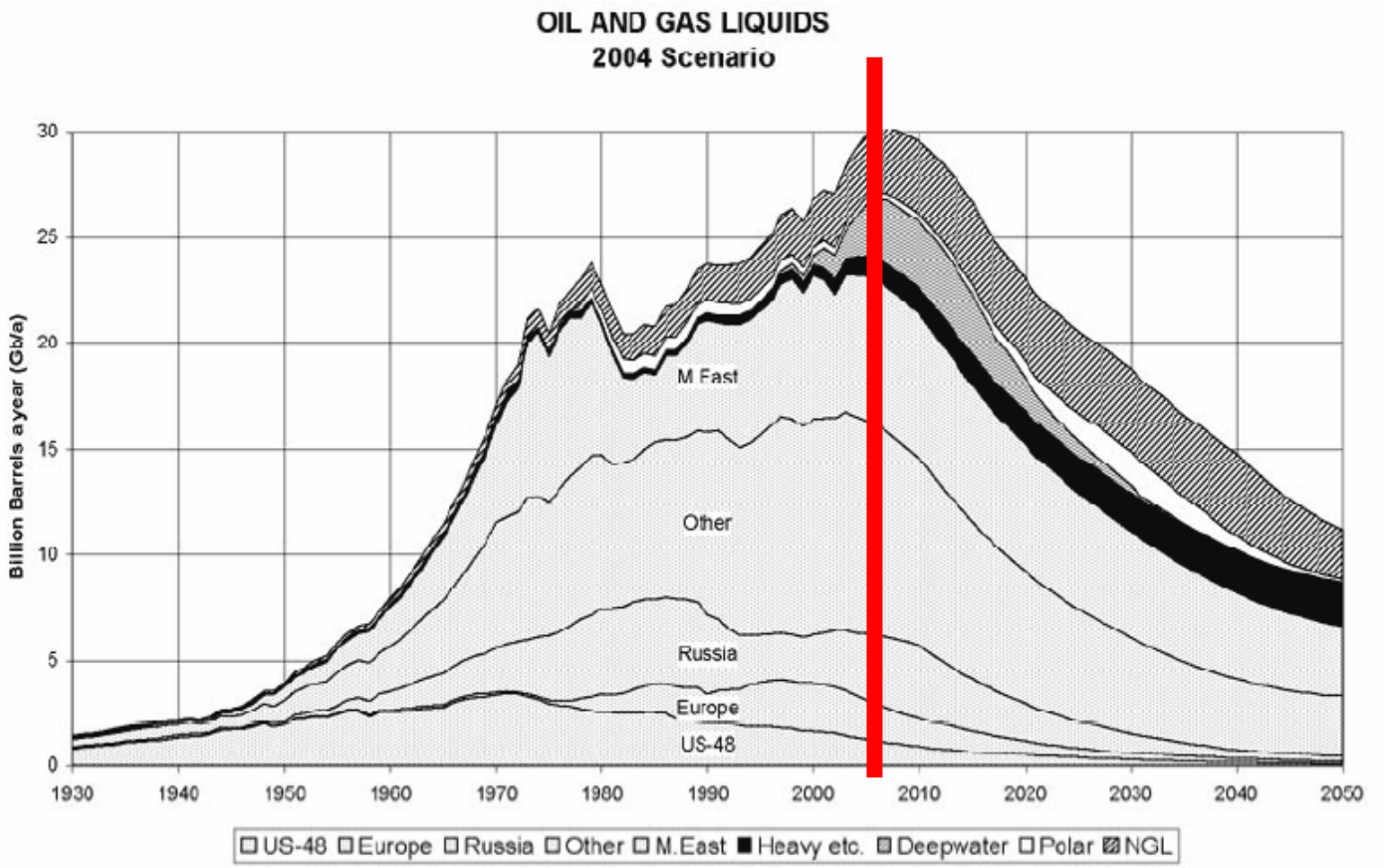
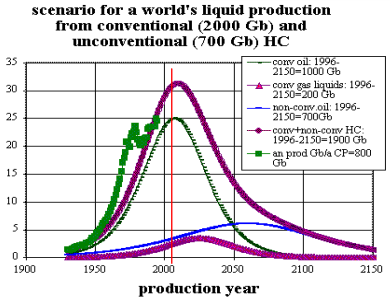
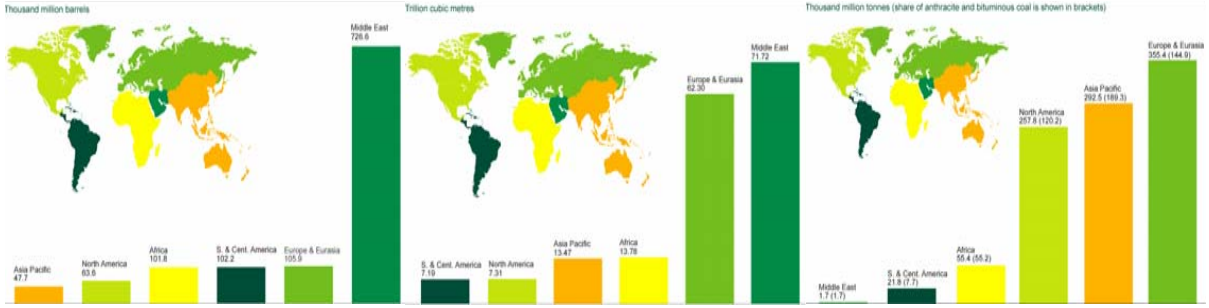
ENERGY reserves







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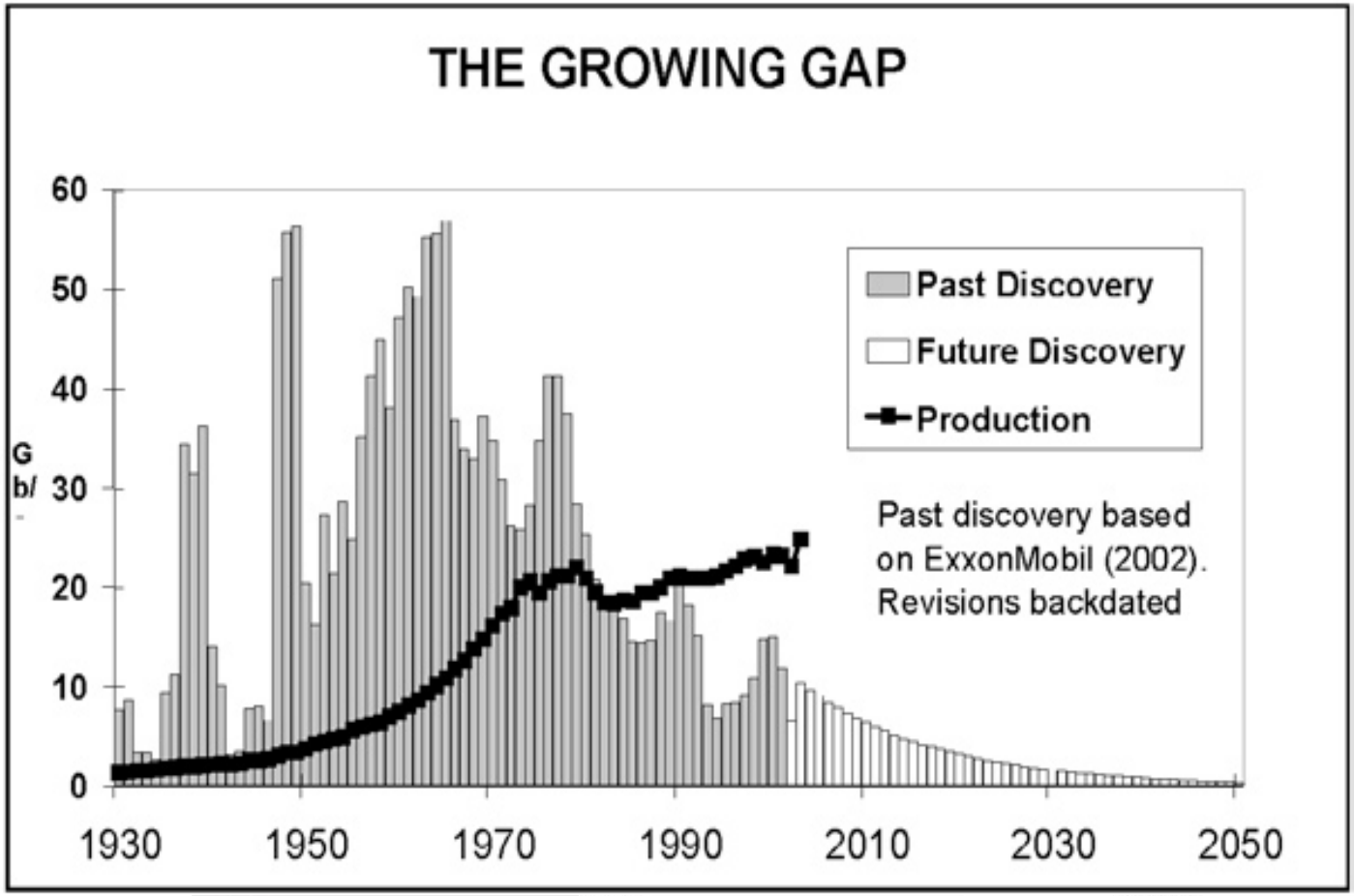
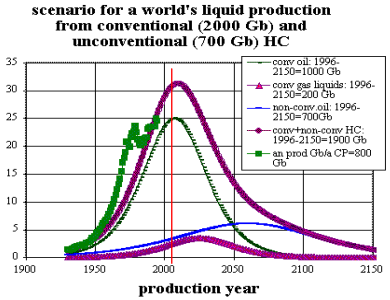
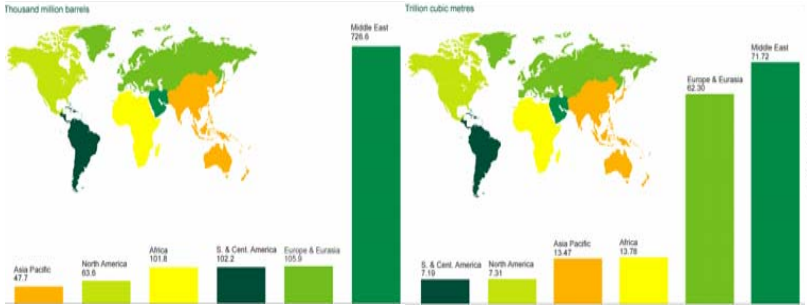
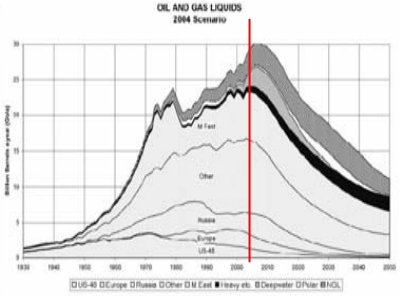
ENERGY reserves









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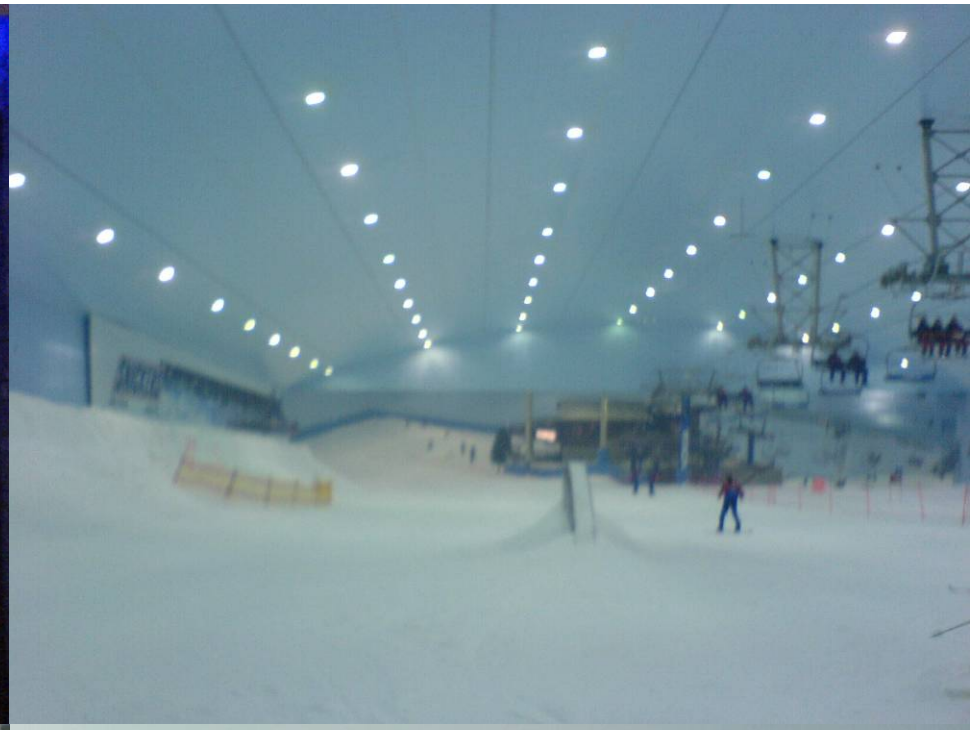

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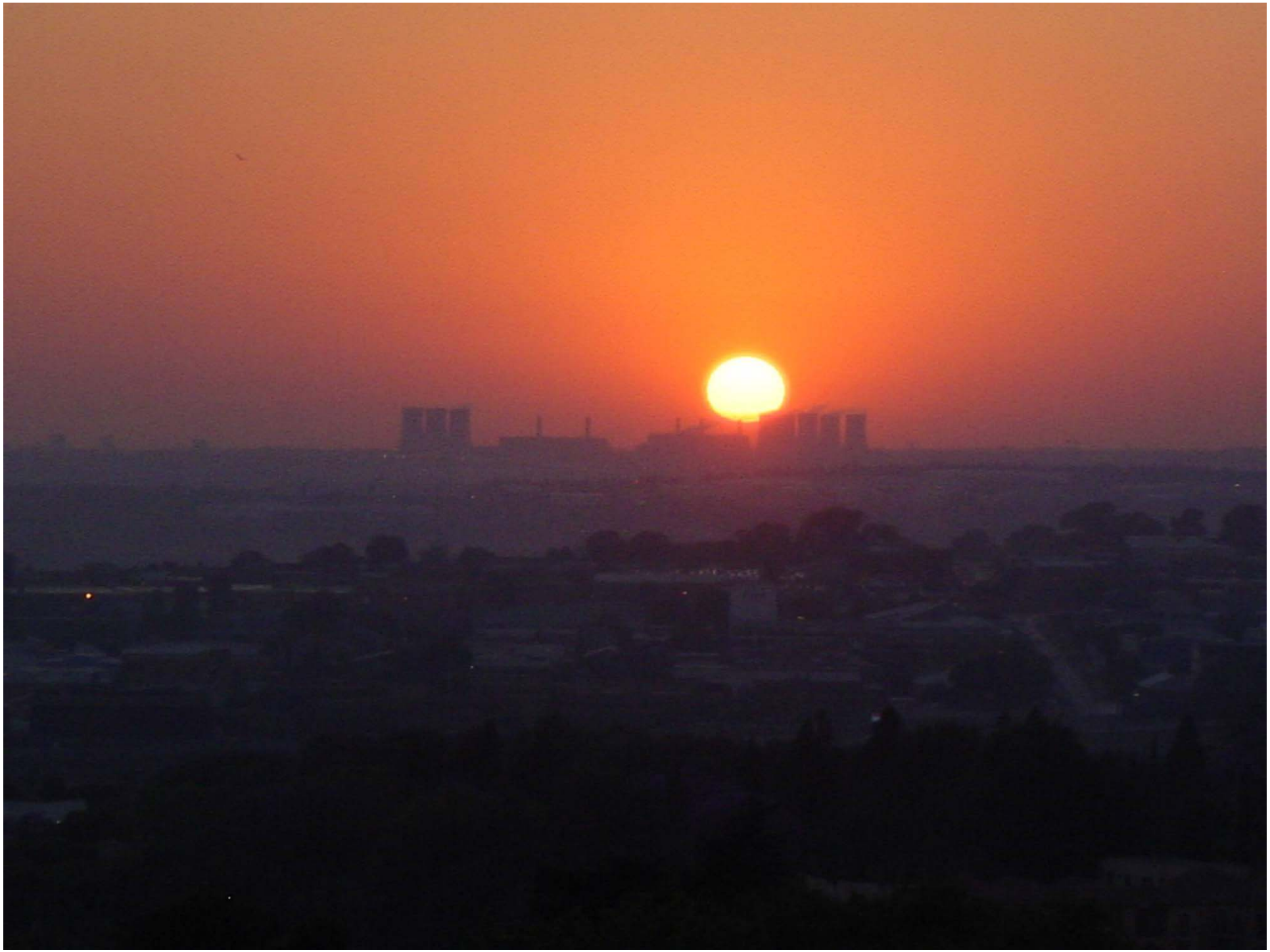

growth

are there limits to growth?

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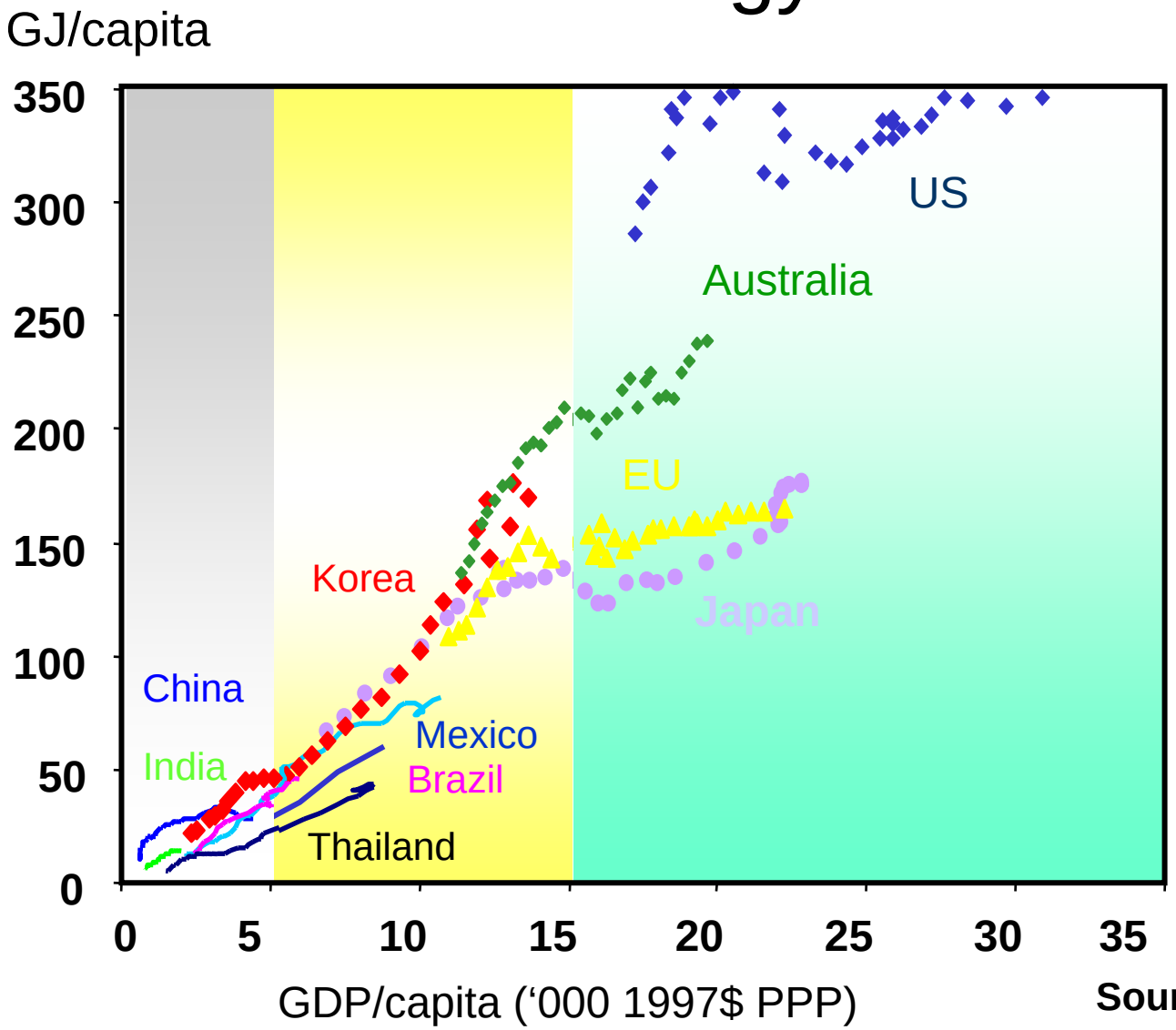
the energy / wealth ladder



+$25k/capita: little extra energy needed

+$15k/capita: services start to dominate growth

+$10k/capita: industrialisation near complete

+$5k/capita: industrialisation and mobility take off

Source: IMF, BP

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the energy / wealth ladder

GJ/capita

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ARUP

the energy / wealth ladder

GJ/capita

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+$10k/capita: industrialisation near complete

+$5k/capita: industrialisation and mobility take off

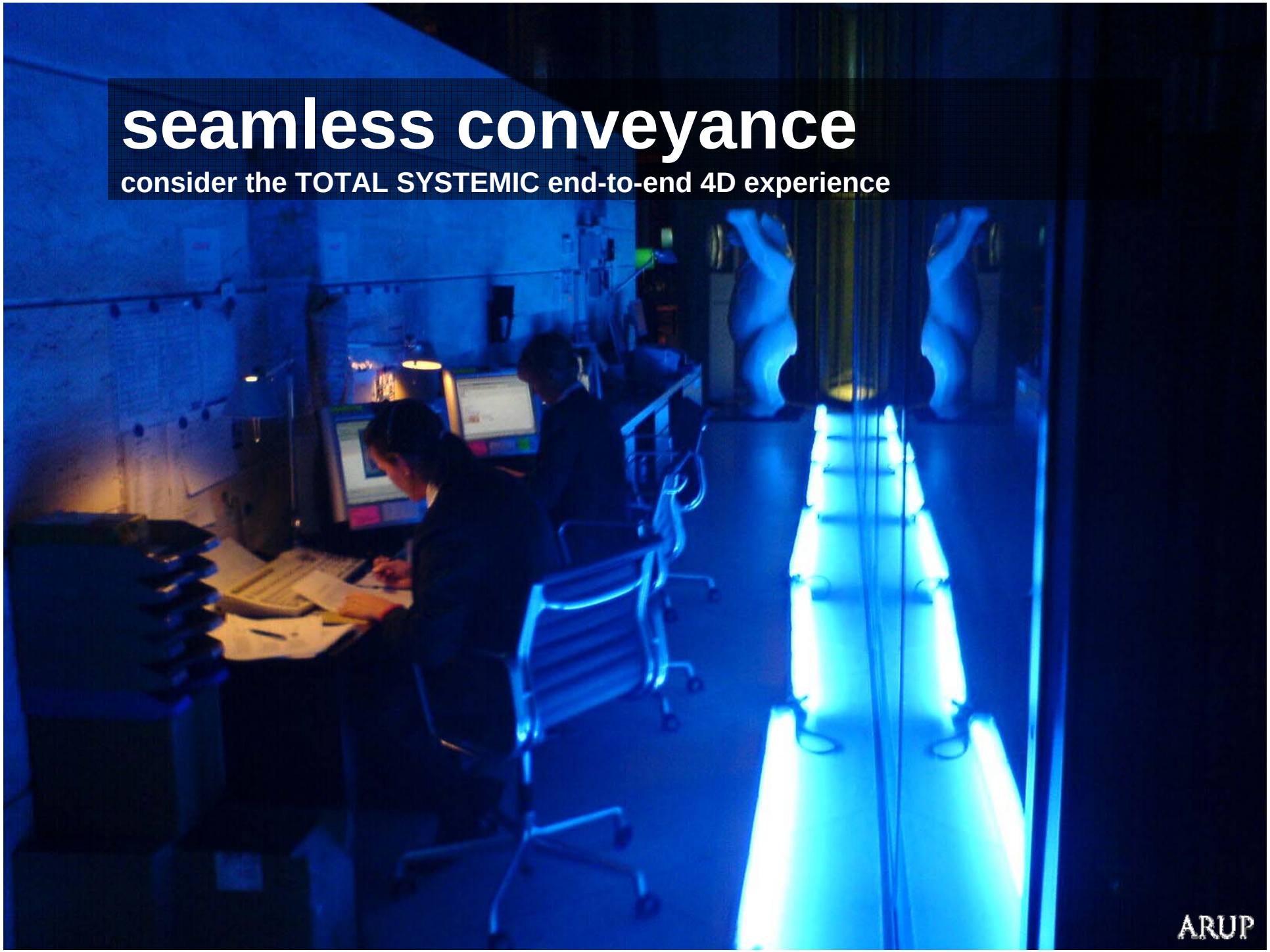
Source: IMF, BP

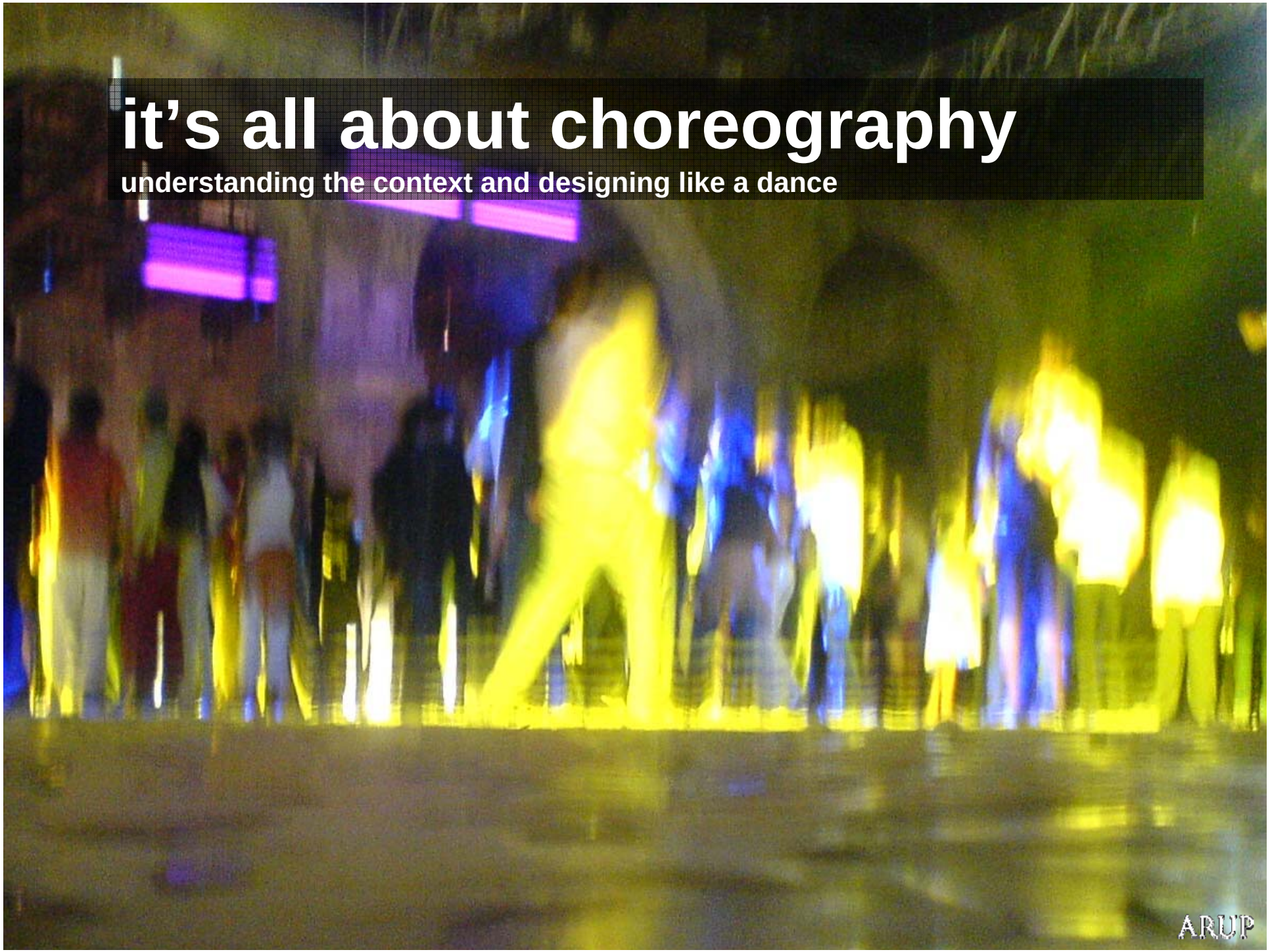
ARUP


EVERTHING inconvenient will change


EVERTHING inconvenient will change
MAERSK SEALAND
MAERSK
MAERSK
EVERGREEN
EVERGREEN
APL
K LINE
HANJIN
ARUP


Master
ARUP


seamless conveyance
consider the TOTAL SYSTEMIC end-to-end 4D experience
ARUP


it’s all about choreography
understanding the context and designing like a dance
ARUP

Drivers of Change 2006

constructing context

SEDEFED-REF
2006.11.08
Istanbul, Turkey

Dr Chris Luebkeman
Director for Global Foresight + Innovation
ARUP


end
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