

Speculating About a Purposeful Future: Challenges and Opportunities

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“**T**he trouble with our times is that the future is not what it used to be.”

P. Valery

Life just isn't that simple anymore.



INTERLOCKING CRISES

- **CLIMATIC SHIFTS**
- **MEGARUPTURES**
- **METABOLISM**
- **SOCIO-POLITICAL CONTEXT**
- **TRANSBOUNDARY DEPENDENCIES**
- **FAST PACE OF TECHNOLOGICAL
DEVELOPMENT**

The Grand Transformation

- Globalization
- Interdependence
- Vulnerability
- Complexity
- Uncertainty
- Turbulence



Complexification

Complexification

- A. **Conceptual** = shifting paradigms/complexity/
chaos/heterarchization
- B. **Methodological** = multi-/GIS, ES, AI, DSS/
systems/computational prowess
- C. **Organizational** = participatory/anticipatory/
contingency emphasis
- D. **Substantive** = new focus/areas of concern

The 3 Revolutions

- **The Green Revolution**
= tradition vs. modernization
→ complex organization
- **The “Geek” Revolution**
= Guttenberg vs. Gates
→ data and information
- **The Gene Revolution**
= Malthus vs. Mendel
→ bioengineering

APPROACHING AGRICULTURAL CHANGES

- ***As “crises” (. . . and discontinuities)***
- ***As challenges***
- ***As trends and developments***
- ***As strategies and tactics***

JIM BISHOP



As “Crises”

- **Crises 1: Farm and Ranch Survivability**
- **Crises 2: Modernization**
- **Crises 3: Feeding a Growing World**
- **Crises 4: Safe Food and Drinking Water**
- **Crises 5: Stewardship and the Environment**
- **Crises 6: Urbanization and Land Use**
- **Crises 7: Country and Urban Conflicts**

Source: D. Hoag, *Agricultural Crisis in America* (1999)

As “challenges”

Challenges for Public Agricultural Research

- **Globalization of the food economy**
- **Emerging pathogens and other hazards in the food supply chain**
- **Enhancing human health through nutrition**
- **Improving environmental stewardship**
- **Improving quality of life in rural communities**

Source: NRC, *Frontiers in Agricultural Research* (2003)

As “trends and developments”

- = **Structural transformations**
 - rurality and urbanization
 - operation size
- = **Technological changes**
 - automation, “closed system agriculture”
 - genetics
- = **trade and global competition**
 - interdependence and global forces
- = **Social changes**
 - economic base
 - “rurban” and boutique farms
- = **Environmental impacts**
 - monoculture and biodiversity
 - pollution, pesticides, erosion

As “strategies and tactics”

- = An agricultural system highly competitive in the global economy
- = A safe and secure food and fiber system
- = A healthy, well nourished population
- = A greater harmony between agriculture and the environment
- = Enhanced economic opportunity and quality of life for all
Americans

UNDERLYING TRANSFORMATIONS

VOLATILITY

- TURBULENCE AND UNCERTAINTY

VULNERABILITY

- INTERDEPENDENCIES AND RISK

VIGILANCE

- ENVIRONMENTAL SCANNING AND PREPAREDNESS

The Politics of Transformation

- Building Data / DSS
- Expanding Knowledge / Judgement
- Creating Institutions / Capacity Building
- Mobilize Resources
- Articulate Values

50 Reasons Not To Change



Stop.
Look inward.
Listen.
To yourself.
To others.

ALTERNATIVE WORLD FOOD SITUATION ENVIRONMENTS

[supply - demand emphasis]

I. TECHNOLOGY INDUCED ABUNDANCE

= technology driven plentiful, low cost food

II. SUPPLY - DEMAND REASONABLE BALANCE

= problem of both abundance and scarcity,
periodic crises, some reasonable management

III. SUSTAINABLE DEVELOPMENT

= conservation, ZPG, demand-managed future

IV. MALTHUSIAN NIGHTMARES

= starvation, famines, ecocatastrophes, geopolitical,
upheavals, disequilibrium

Emerging Operational Principles

Envisioning

= Share the dream, share the goals

Empowerment

= Joint decision making, power sharing

Enactment

= Implementation, civic engagement



FORENSICS FIGHTBACK

Scientists, not police,
should take charge

NERDBOTS

Can computers outsmart
mathematicians?

CHICKENOSAURUS

Hatching a dinosaur
from a hen's egg

NewScientist

WEEKLY February 28 - March 6, 2009

Earth 2099

Population crashes

Mass migration

Vast new deserts

Cities abandoned

**How to survive
the century**

US\$5.95 CAN\$5.95 No 2697



Science and technology news www.NewScientist.com US jobs in science

LOSING GROUND

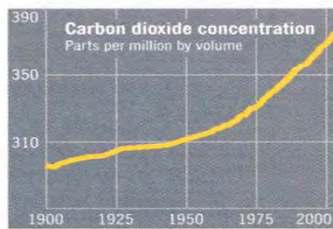
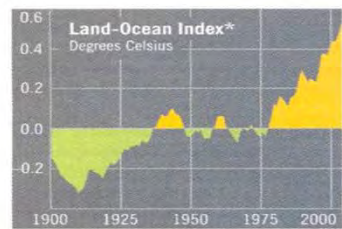
COLORADO'S VANISHING AGRICULTURAL LANDSCAPE



Environment Colorado Research And Policy Center | March 2006

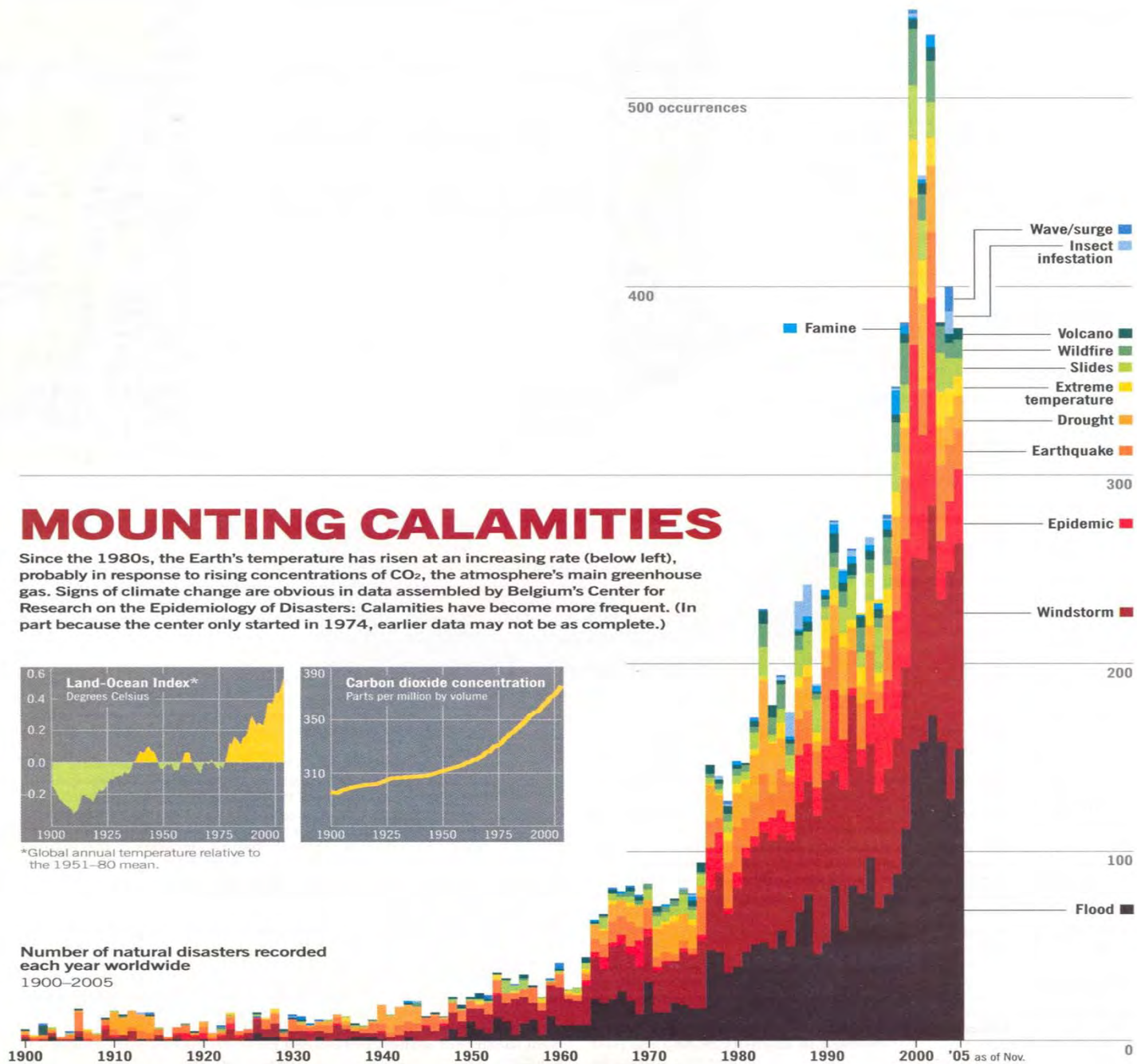
MOUNTING CALAMITIES

Since the 1980s, the Earth's temperature has risen at an increasing rate (below left), probably in response to rising concentrations of CO₂, the atmosphere's main greenhouse gas. Signs of climate change are obvious in data assembled by Belgium's Center for Research on the Epidemiology of Disasters: Calamities have become more frequent. (In part because the center only started in 1974, earlier data may not be as complete.)



*Global annual temperature relative to the 1951-80 mean.

Number of natural disasters recorded each year worldwide 1900-2005



The world: 4°C warmer

No one knows exactly what this world will look like, but models provide insights into forced human migrations and our future power generation

Arctic passage

With no sea ice, this valuable shipping route is open all year, providing transportation links between habitable zones in Canada and Russia

Canada

Reliable precipitation and warmer temperatures provide ideal growing conditions for most of the world's subsistence crops

South-west US

Desertification led to the last inhabitants of this region migrating north. The Colorado river is a mere trickle. The land is used for solar farming and geothermal energy

Peru

Deglaciation means this area is dry and uninhabitable

Western Antarctica

Unrecognisable now. Densely populated with high-rise cities

Greenland

Greenland's ice sheet will be melting rapidly

Scandinavia/UK/Northern Russia/Greenland

Compact high-rise cities would provide shelter for much of the world's population

Siberia

Reliable precipitation and warmer temperatures provide ideal growing conditions for most of the world's subsistence crops

Southern Europe

Deserts have encroached on the continent, rivers have dried up and the Alps are snow-free. Goats and other hardy animals are kept at the fringes

North Africa/Middle East/Southern US

Solar Energy Belt stretches for thousands of kilometres, employing a mixture of photovoltaic and solar thermal energy. At frequent intervals a high voltage direct-current substation sends power north

Southern China

Dried rivers and aquifers mean this region has been abandoned. Intense monsoons have helped erode the land, leaving a dustbowl

Amazon Desert

Desert

Africa

Mostly desert, though some models show greening of the Sahel

Asia

Most of the Himalayan glaciers have melted, with repercussions for many of the major rivers in the region. Bangladesh is largely abandoned, as is south India, Pakistan and Afghanistan. Isolated communities remain in pockets

Polynesia

Vanished beneath the sea

Patagonia

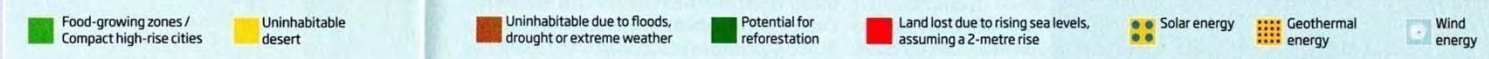
Melted glaciers revealed a new arable zone, although the poor soils needed preparation

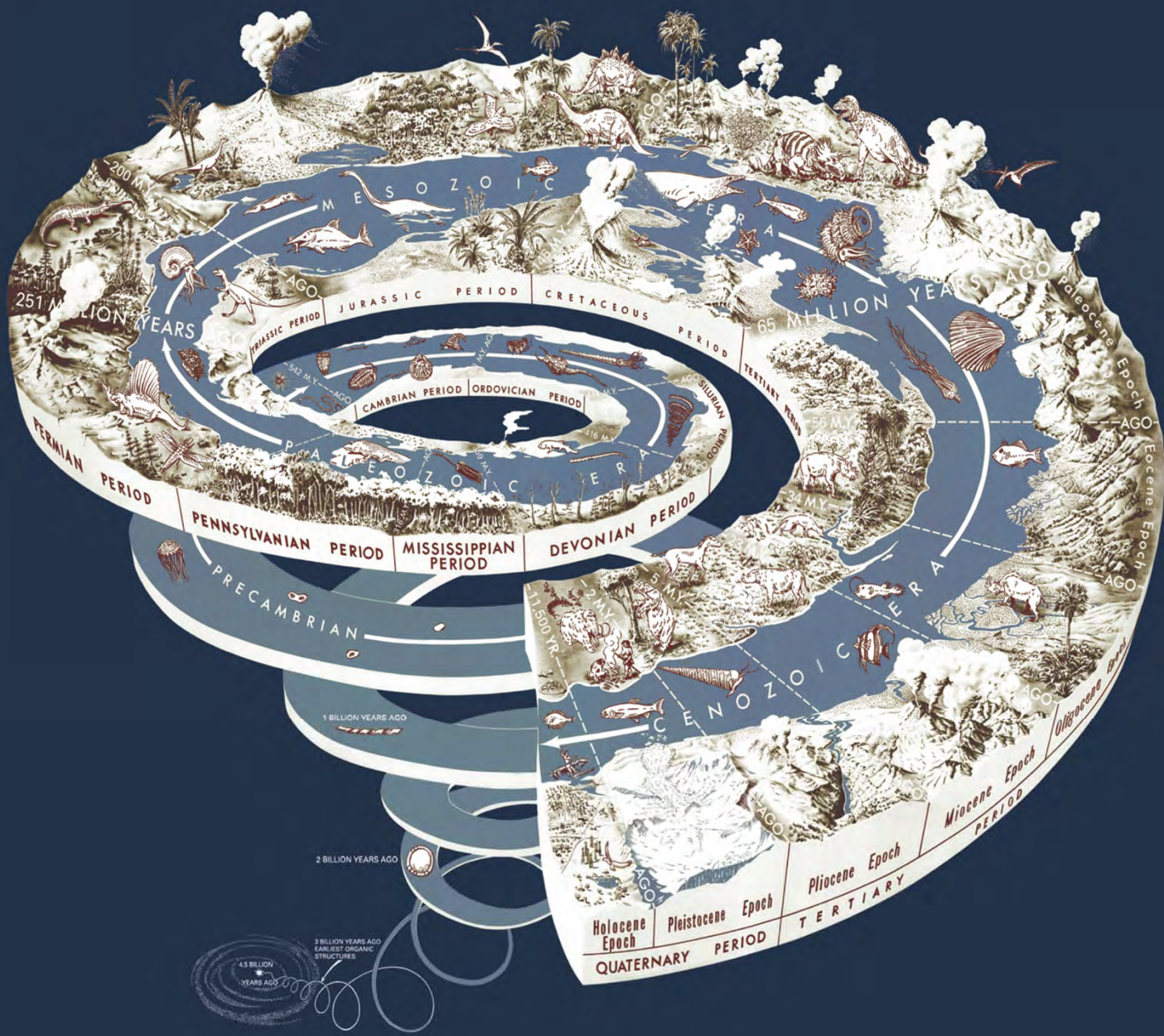
Australia

In the far north and Tasmania, compact cities house people and crops are grown. The rest of the continent is given to solar energy production and uranium mining for nuclear power

New Zealand

Unrecognisable. This densely populated island state has high-rise cities and intensive farming





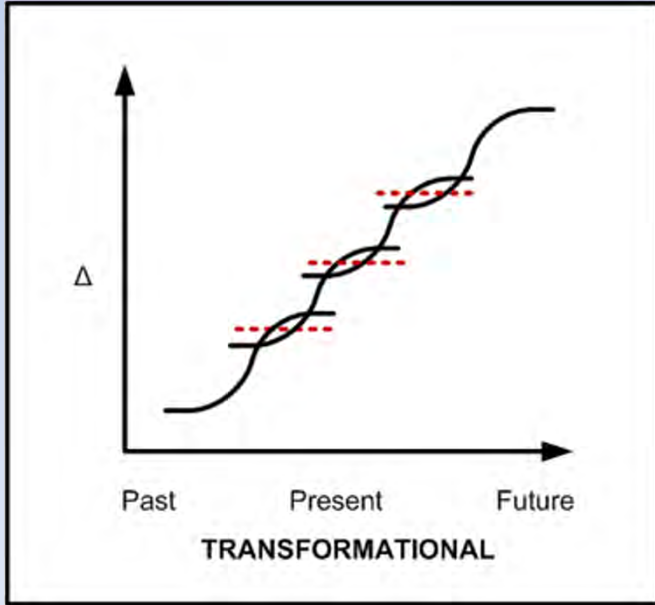
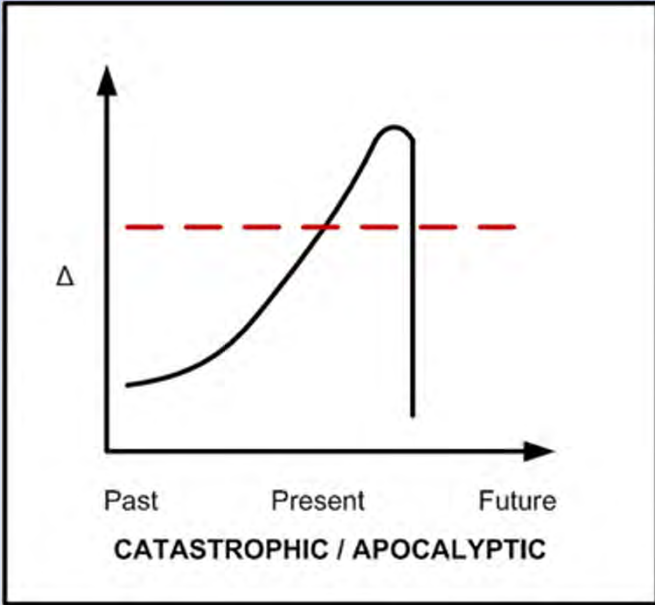
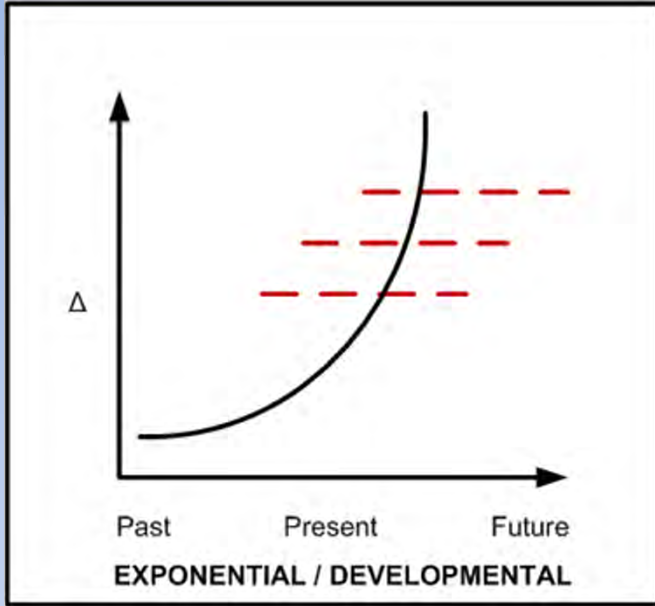
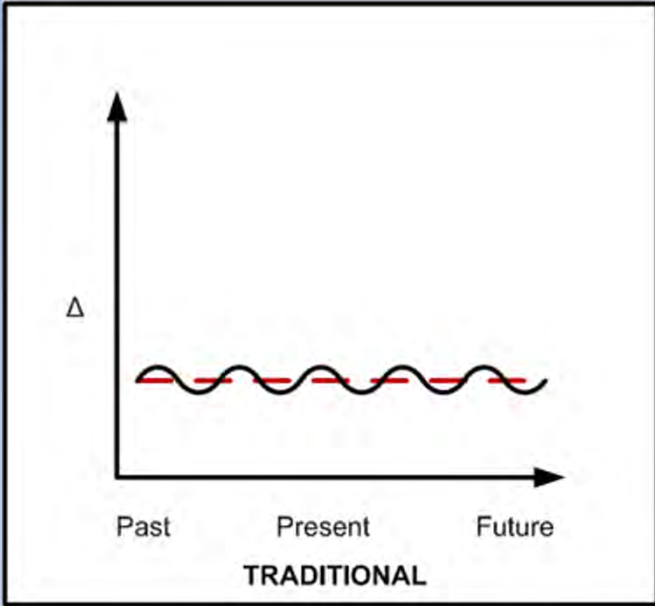
An aerial photograph of Dubai, United Arab Emirates, showing the Burj Khalifa as the central focus. The city is densely packed with skyscrapers and modern buildings, surrounded by a desert landscape. A large artificial lake is visible in the middle ground. The sky is clear and bright.

Oil transformed Dubai in the 1970s. The city now boasts the world's tallest building, giant malls, and some two million residents, who depend on desalinated seawater and air-conditioning—and thus on cheap energy—to live in the Arabian desert.

JENS NEUMANN / EDGAR ROOTMANN

ENTER THE ANTHROPOCENE AGE OF MAN

It's a new name for a new geologic epoch—one defined by our own massive impact on the planet. That mark will endure in the geologic record long after our cities have crumbled.



Premises of Foresight

1. Trend is not destiny
2. Those who live by the crystal ball are bound to eat groundglass
3. It is better to be approximately right rather than precisely wrong

Requisites for the Transition

- **The Need for New Paradigms**
 - Sustainability, heterarchy, co-evolution
- **The Understanding of New Contexts**
 - “Raplexity,” interdependence, globalization
- **The Emergence of New Methodologies**
 - Cumulative, synergistic, diachronic impacts
 - Indicators, DSS, data-information, judgment
 - Computational prowess

危 中 机

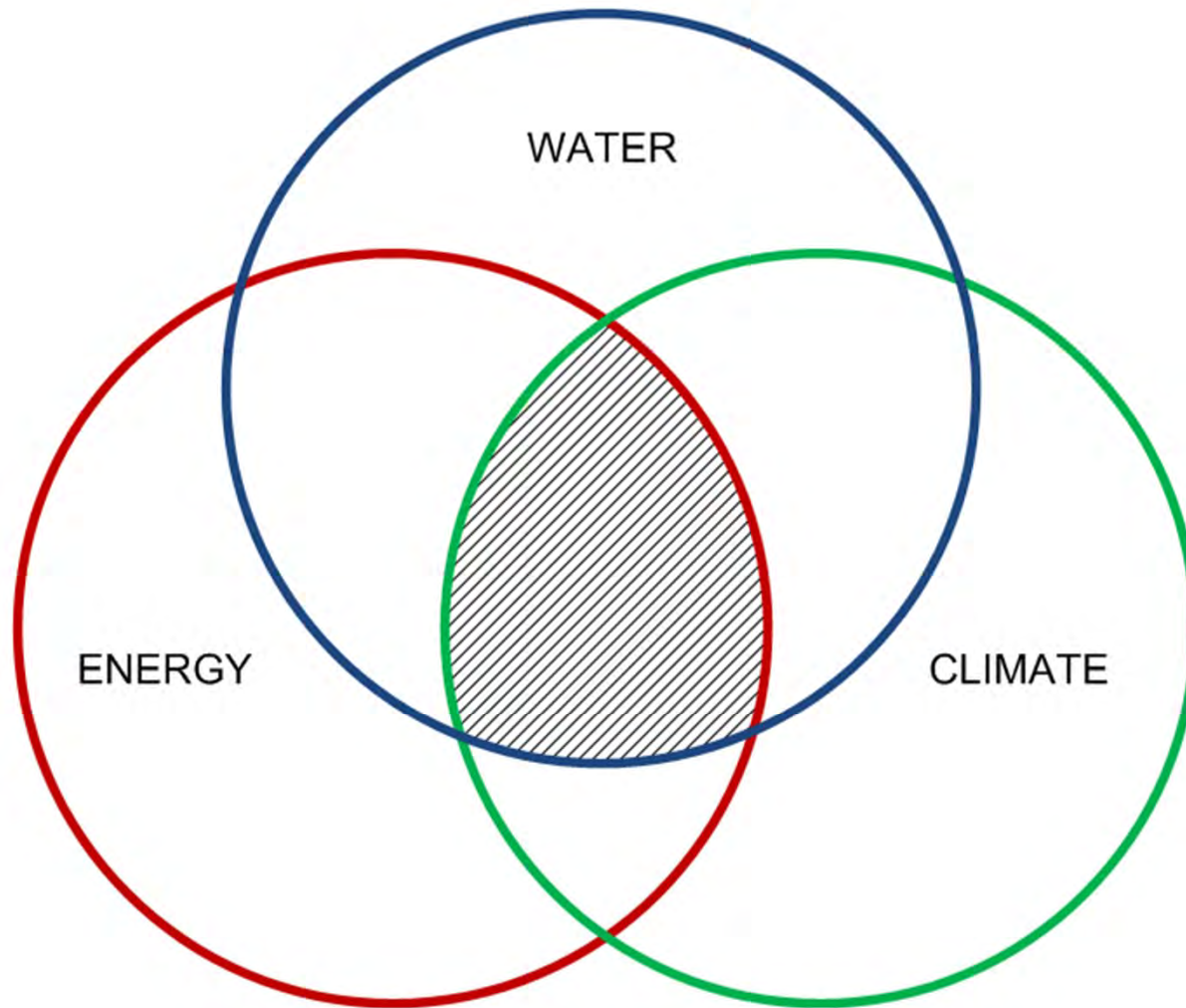
The image features a large-scale calligraphic rendering of the Chinese characters '危中机' (Wēi Zhōng Jī) in a bold, expressive cursive style. The characters are arranged horizontally, with '危' on the left, '中' in the center, and '机' on the right. A vertical stroke runs through the center of the '中' character. Below the main text, there are two red seals: a square seal on the left and a circular seal on the right.

CRISIS & OPPORTUNITY

"Opportunity in the Midst of Crisis" is the literal translation of this Chinese phrase. The Chinese word for "crisis" (危机) is comprised of two parts: "danger" (危) and "opportunity" (机 or 機), and the character "中" means "center". The ancient form for "danger" is "𪔐" depicting a person on the edge of a precipice. The ancient form for "opportunity" is "𪔐": "𪔐" is believed to depict the cocoon – a symbol of transformation.

[Pronounced "wēi - drōng - jī"]

- Words and Calligraphy by Yunn Parrn



“The future is not result of choices among alternative paths offered by the present, but a place that is created --- created first in mind and will, created next in activity. The future is not some place we are going to, but one we are creating. The paths to it are not found but made, and this activity of making them changes both the maker and the destination.”

John Schaar