New economic models to preserve natural resources and to limit pollutants discharged into the oceans

VEOLIA ENVIRONNEMENT

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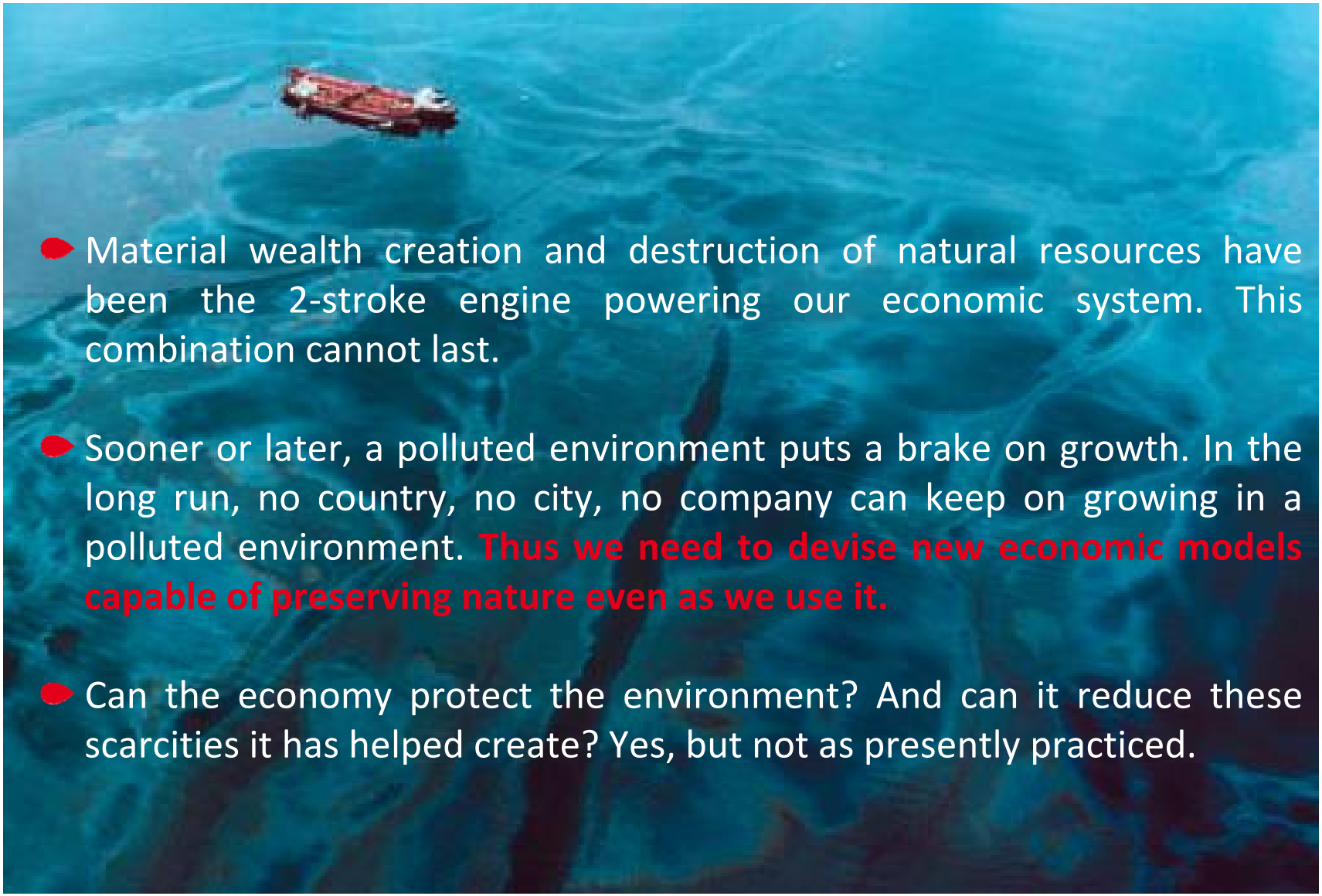
Foreword (1): we need to invent new economic models that have a less consumption-driven relationship with nature



- Material wealth creation and destruction of natural resources have been the 2-stroke engine powering our economic system. This combination cannot last.
- Sooner or later, a polluted environment puts a brake on growth. In the long run, no country, no city, no company can keep on growing in a polluted environment. **Thus we need to devise new economic models capable of preserving nature even as we use it.**
- Can the economy protect the environment? And can it reduce these scarcities it has helped create? Yes, but not as presently practiced.

Foreword (2): How to regain our lost friendship with continental and marine environment?

- We have to change the existing natural resource and space-hungry growth into a thriftier form of growth. This implies a three-pronged approach to **decarbonating our economy, dematerializing it, and dehydrating it.**

1) **Decarbonating the economy, so as to break free from the world of oil, gas and coal:**
2) **Dematerializing the economy, so as to consume fewer natural resources.**
3) **Dehydrating the economy, in order to reduce the amount of water we draw from rivers and underground sources.**

Part I - Instituting new methods of remuneration and making economic models "*independent*" of nature

Dismantlement of offshore platforms

Sober growth cannot be achieved by mechanisms that encourage consumption

- **2 broad families of solutions** are emerging for reforming the model for water, energy and waste services:
- **The 1rst one goes to the very heart of economic models, namely the method of remuneration that generates and underpins productivism.**
  - The recent need to limit our demands on nature is undermining the prevailing commercial logic: far from seeking to sell more, operators are requested to sell less, although they are paid by their selling! They are asked to promote best practices that will reduce their revenues!
  - We need to design an economic architecture that does not clash with the general interests of the community, since no activity will last long if it conflicts with the long term interests of the territory in which it operates!
- **The 2nd family of solutions sets out to change the value chain's starting point**, by switching from an initial and limited store of fossil energies and raw materials to renewable and hence inexhaustible resources.

Option 1: Instituting performance-based remuneration, partially disconnected from volumes sold

- **In this economic system, there is no point in selling more m^3 of water or kWh if an operator wants to boost its revenues: the aim rather is to meet the objectives set by the client.**
  - Operators commit to results in terms of service quality, reliability, cost controls, etc., with a system of bonuses and penalties to sanction outcomes.
- This economic mechanism, **which is more qualitative**, exists already in some water or wastewater services in the United States.
  - The operator's remuneration comprises a fixed and a variable portion (usually up to 25 % of the fix part), with the latter dependent on meeting a number of performance targets.
  - A set of indicators evaluates performance, covering key criteria such as water quality, environmental protection, managing assets, customer satisfaction, and so forth.

Option 2: Shifting from a volume-based economy to one based on "non-volumes" that remunerates natural resources saved

- The goal is **to make savings for the client,** and that is what gets remunerated under the contract.
  - This is a performance-based remuneration, except that here the main performance expected is a saving in energy, water or materials.
  - E.g., energy performance contracts remunerate "*negawatts*", as opposed to megawatts. Their underlying economic logic is simple: they consist in financing initial investments via the energy savings they will achieve later.
  - The contract splits the gains between the owner and the service operator, to encourage both parts to cooperate well.
- Potential gains are huge. *"In 2005, it was reckoned that if all of China's urban buildings were built to energy conservation standards, the load on the grid could be cut by 80 GW, equal to the capacity of 4 Three Gorges dams" **

** Message from the Director General of the French Development Agency, March 11, 2011*

Option 3: Changing raw materials and energy sources, rather than the method of remuneration (1)

- **Renewable energy is inexhaustible, so when we use it to produce electricity we leave problems of scarcity and its constraints behind.**
- **Using recycled waste or recycled wastewater separates volumes sold from volumes drawn from earth and sea.**
  - In this model, the raw materials used are no longer "raw", having been used once already. **Consequently the commercial imperative to "*sell more*" no longer conflicts with the ecological imperative to "*conserve natural resources*".**
  - Recycling gives wastewater and "used" materials umpteen additional lives. In so doing, **it multiplies the productivity of the resources borrowed from nature.**
  - But much remains to be done to exploit the potential of these models. Out of the 4 billion t. of waste the world produces annually, only 1 billion are recycled: a further 3 billion await their turn. On a planetary scale, barely 2% of wastewater is recycled.

Option 3: Changing raw materials and energy sources, rather than the method of remuneration (2)

- **The waste sector is gradually becoming a raw materials industry:** stocks of household waste are turning into mines, and wastewater is coming to be a well filled with new resources.
  - These economic models are leading us in the direction of a society where we continually reutilize the same raw materials in an unending cycle.
  - **Indeed, the recourse to "*renewable*" raw materials and to renewable energies is a powerful driver of economic change.**
- **But there is a key difference between a "*used*" product and a "*new*" product: in general, no one is actually asking for the former!**
  - Therefore we need incentives, either financial or standards, to encourage recycling and reuse.
  - But steadily rising prices for virgin raw materials are helping this move, making secondary raw materials more attractive.

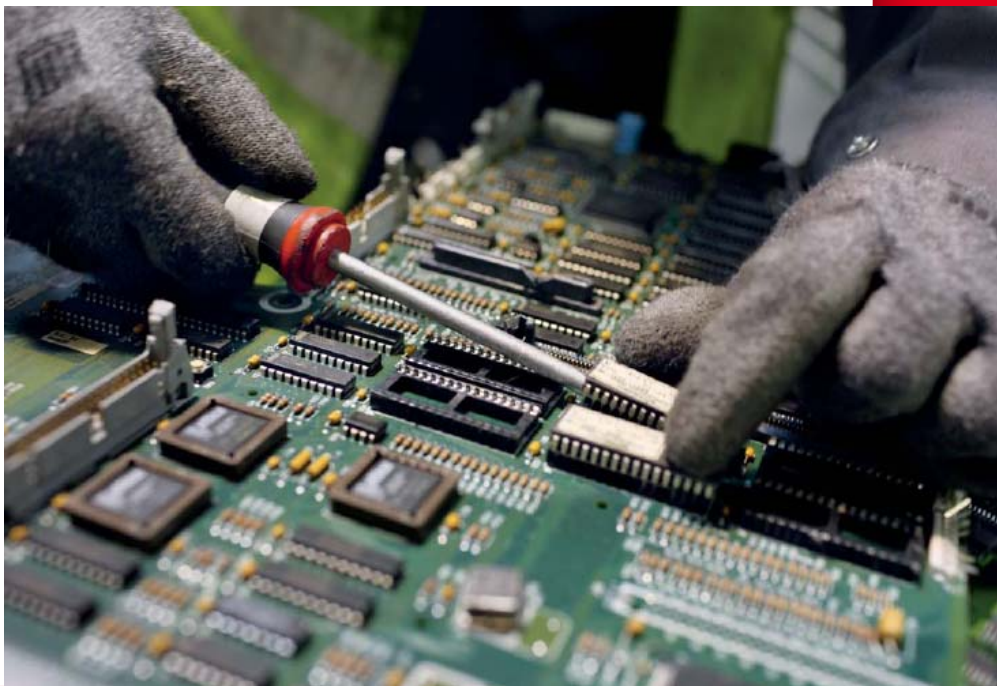
These new business models reflect many of the demands ecology places on modern humans

- **Using each molecule of fossil fuel, each m^3 of water and each kg of material drawn from sea and earth as efficiently as possible.**
- **Turning useless items into something useful, or in other words bringing more waste into economic circuits.**
- **Making dirty things clean.**
  - E.g., the Fresh Kills landfill, near Manhattan, was long the largest open-air landfill in the world. It was closed in 2001. In 2030 it will become a public park.
- **Being local** (see next chapter).

Part II – Towards local economic models

Local economic models rely first on local sources of energy, materials and water.

- **The 20th century saw the triumph of large infrastructures. The 21st century will see a proliferation of decentralized equipment at the local level,** (solar panels, waste recycling centers, wastewater reclamation plants...)
- It is these "*local energies*", "*local materials*", and "*local water sources*" that will allow to Decarbonate, Dematerialize and Dehydrate the economy
- Tomorrow's economic models will largely be local models, **blending local resources with local uses.** They will promote a local economy and minimize long-distance exchanges.



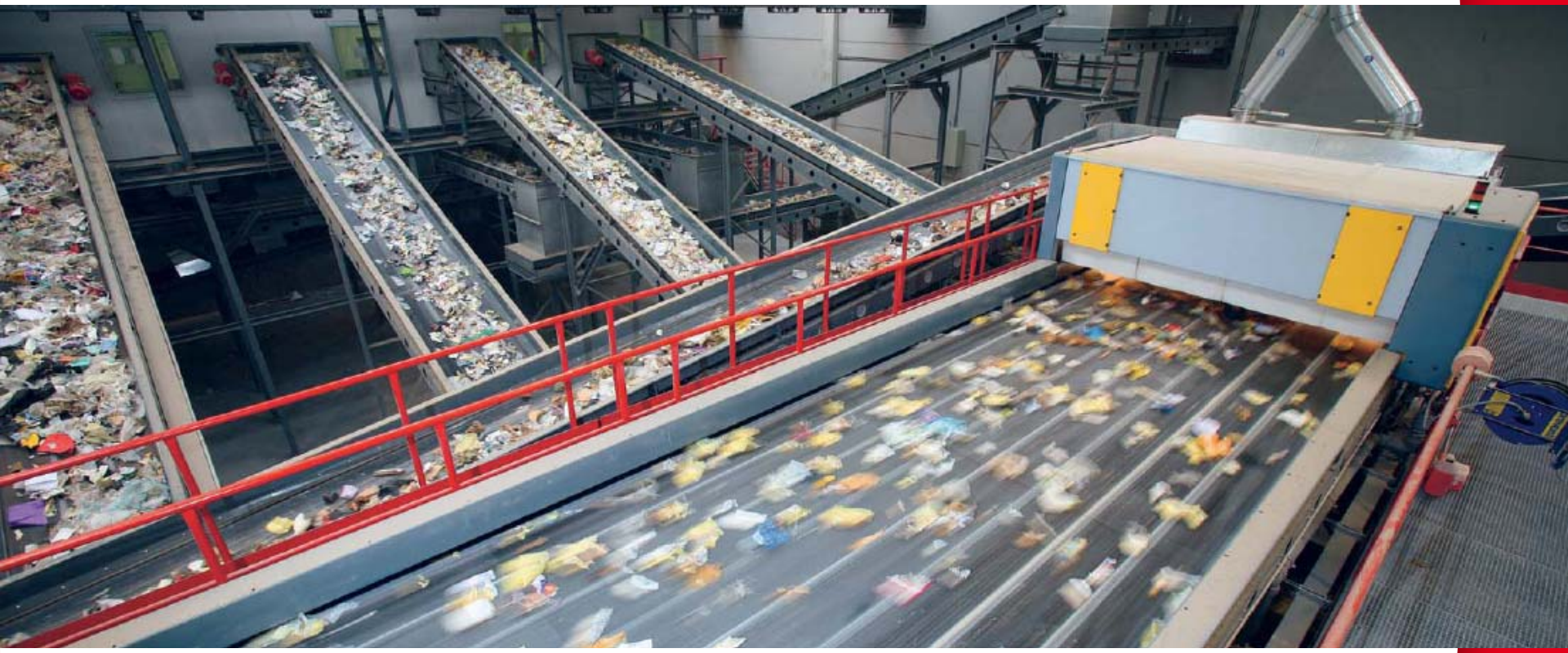
Recycling wastewater vs. recycling solid waste

- **Recycling wastewater is always a local economic model:** water is heavy yet low in value, which makes transporting it over long distances uneconomical.
- **This is not the case with solid waste recycling**, where products can be used either locally or on the other side of the planet, depending on their nature, because the recycling markets have gone global.
  - While sources of secondary raw materials are located in countries with high living standards, demand stems mainly from the emerging countries.
  - In the last century, the United States built its prosperity with the natural resources of the developing countries, the Asian countries among them.
  - Now it is the Asian countries, China especially, which are industrializing and buying secondary raw materials from the developed countries—so much so that secondary raw materials are one of the American largest export items!

The city has a central role to play in shaping new economic models

- **Most wealth originates in cities and most cities are located close to the sea, since 40% of the world's people live less than 70 km from a coast. Therefore cities have a crucial role to play in defining new models to break the link between GDP growth and the consumption of natural resources.**
- **New economic models will favor function over ownership.**
  - Car sharing is an idea whose time has come, showing how a service can replace a good. This has spread widest in the United States, though even there it is still marginal compared to other transportation means.
  - The economy of function has yet to become firmly established. Indeed, **the rule of "*renting rather than buying*" can only take root in a climate of solid confidence between user and provider, and between successive users**. This last condition is not always easy to meet: some City's cycle hire schemes suffer from rampant vandalism.

Part III – Will more recycling be enough?



Decoupling growth and raw materials consumption (1)

- The economic models of scarcity above described offer solutions for dealing with the widening gap between supply and demand for natural resources. **Yet will these solutions be enough?**
- If global use of raw materials continues to grow exponentially, and given the length of time during which each material remains in the economy, **then unfortunately recycling will have only a marginal impact on the volumes we extract from the sea and the earth.**
- When we recycle 80% of a material, we draw 5 times less from nature *. Consequently, the degree of scarcity we would otherwise have reached in a century will in fact be reached only after 5 centuries.
- Unfortunately, this is misleading. Or, rather, **it is correct only if consumption remains unchanged or grows in a linear fashion.**

** Le découplage croissance / matières premières (Decoupling growth and raw materials), François Grosse, Futuribles no. 365, July-August 2010*

Decoupling growth and raw materials consumption (2)

- **The conclusions diverge when consumption grows exponentially: even with high recycling rates, humanity is depleting its resources quickly.**
  - For example, if consumption of a material grows by 3% annually and if the residence time of the material in the economy is 7 years, the degree of scarcity reached after 100 years without recycling will, with an 80% recycling rate (which is a huge percentage!), be reached not in 500 years but after only 135 years.
- It is therefore vital **to break the link between economic development and total consumption of raw materials, whatever virgin or recycled.**
- **For the economy to become economical once more, we need to "*do more with less*".**

Part IV – Why are economic models so far from internalizing the issues of scarcity and pollution?

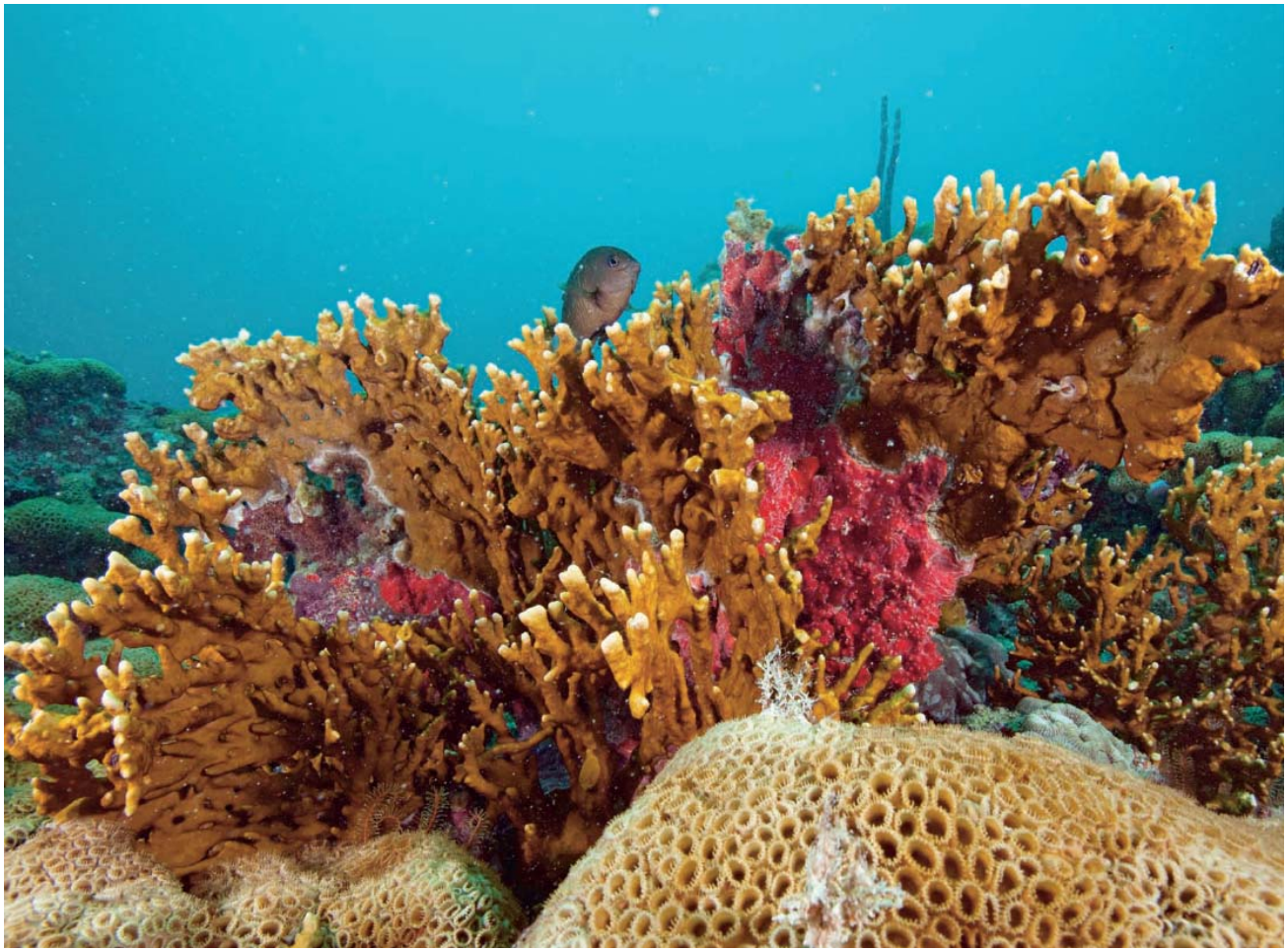
Why has so little changed, when so much needs to change? (1)

- **The illusion of immensity of the sea.** The sea, which is the final garbage of the world, is still suffering from this illusion.
- **The very long lifetime of some equipment** (10 years for a car, 100 years for a building), which delays their renewal and the deployment of clean technologies.
- **Manufacturers' reluctance to use secondary raw materials**. We need to offer them the same guarantees of quality and reliability of supplies as for virgin raw materials.
- **Penalization of virtuous behaviors** in fixed-cost activities that bill by volume.
  - 80% of drinking water service's costs are fixed, whereas 80% of its revenues are variable.
  - Consequently, when total consumption falls, the average price per cubic meter rises! The more consumers act virtuously, the more they pay for their water! (i.e. their total bill remains unchanged);
- **New markets' lack of solvency**.

Why has so little changed, when so much needs to change? (2)

- **The unwillingness or difficulty to change inappropriate habits**: How can we dematerialize production if customers are persistently materialist, wasting marine or continental resources?
- **Pricing policies pursuing conflicting goals:**
  - i) holding prices down in order to promote economic growth and make public services available to all,
  - ii) using price signals to express the scarcity of natural resources, which implies raising prices.
- **Regulations propping up outdated economic systems**. In China, heating operators bill according to floorspace (m^2), as is the custom. Thus there is no incentive to conserve energy, as opposed to billing per kWh consumed.
- **The "*rebound effect*",** i.e. an increase in traffic or output that cancels out the benefits of policies to improve environmental efficiency. For example, more fuel-thrifty cars, and hence lower energy costs, have encouraged many motorists to use their car more…

Conclusion – Economy & ecology



- **Ecology need not be expensive. On the contrary, it can be profitable thanks to the savings it achieves or additional revenues it generates.** Just look at the way the recycling of waste and wastewater can restore value to things that no longer had it!

- **The economy is not the enemy of the environment, but its ally, provided that:**

  - It discards formulas that subsidize pollution and waste. Abolishing the $300 billion per year in fuel subsidies would save enough energy to meet the needs of Japan, South Korea and New Zealand (*Les Echos, July 1, 2011);*
  - It takes negative externalities into account and sets a price on pollution. This is the principle behind carbon taxes, which charge people who use the atmosphere as a "*greenhouse gas landfill*".
  - It allows price to reflect scarcity. The aim is to use prices as a mean to regulate demand, making bad behavior costlier than good behavior;
  - It keeps economic incentives in place for long enough to develop clean technologies on a large scale. In many countries, renewable energies (in particular marine ones) have yet to find their place in a viable economic model without relying on subsidies.

Thank you for your attention