

An experimental art-science cutting edge using wind power is being advanced by Japanese-French inventor-artist César Harada, who left his studies at the Massachusetts Institute of Technology (MIT) to go to New Orleans during the BP oil spill, where he worked on Lake Pontchartrain to create *Protei*, an ingenious segmented sailing robot that uses wind energy and multiple rudders to drag PVC tubes through the waves and surface currents to entrap oil spills and other man-made ocean disasters. A Japanese version is equipped with radiation sensors to identify radioactivity leaks. The diminutive unmanned sailing ship was featured in a 2013 exhibition entitled “Artists as Catalysts” at the Alhóndiga Cultural Centre in Bilbao.

What Does the Culture of Stewardship Look Like?

Despite inspiring developments, biofuels, wind and solar power together still account for only 1 percent of the world’s primary energy consumption (Smil, 2010). Any transition to renewable energy on a large scale, like all energy transitions, will require many decades of dedicated effort. The transition to renewable energy will likely be a long-range struggle for incremental growth accompanied by occasional breakthroughs, wrong-turn setbacks, and politically or economically manipulated delays—as long as big oil and big coal have as much power and influence as they do.

Yet the cultural impact of renewable energy is already being felt. It is the direction we are headed in the 21st century—just as coal was in the 18th century or oil and gas were in the 20th. What will its culture of stewardship look and feel like? This is rather like asking a Bedouin from the Arabian Gulf in 1935 what the culture of oil and gas would be like at the end of his century. Some have suggested that the culture of renewable energy must be one of scarcity. They emphasize the need for reducing our use of energy, especially in oil-gluttonous countries like Canada and the United States, and warn of impending shortages.

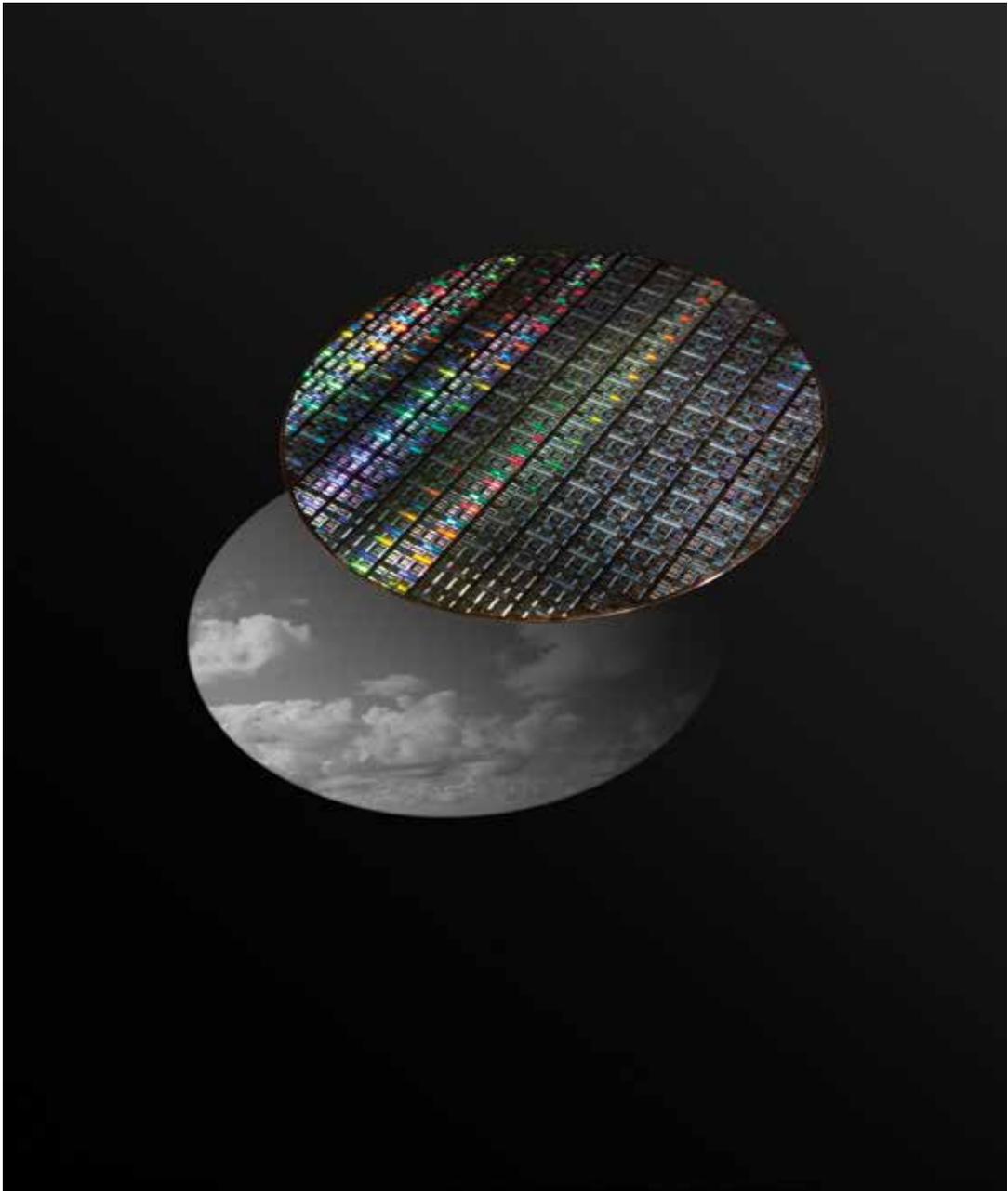
Beginning in the late 1960s, a group of southern European visual artists made a powerful case for what looked like a culture of scarcity. Their works were first called *arte povera* (poor or impoverished art) by Italian curator Germano Celant because they were deliberately made from low-cost materials that might otherwise be seen as waste. *Arte povera* was made in the style of conceptual art: its materials were used not to make attractive art for visual delight, but rather to convey content that was often politically charged and rooted in the belief that discarded, poor and rough materials are the most appropriate means of expression in our time. Italian Mario Merz and Greek artist Jannis Kounellis were among those whom Celant grouped in one of the

few exhibitions with that title. Unlike the art movements of the culture of transformation, *arte povera* had no manifestos and was not led or directed by anyone. It has nevertheless had a quietly growing influence into our century when so many people are conscious of the need for a more sustainable way of life.

Italian artist Michelangelo Pistoletto first became known in the mid-'60s for life-size, cut-out, photo-realist portraits on polished steel mirrors that were at that time associated with pop art, but he has long since been recognized as an *arte povera* practitioner. His 1967 *Rag Wall* wrapped bricks in discarded scraps of fabric, a classic *arte povera* piece. The title of his 1974 exhibition at the Tate Gallery in London, *Venere degli stracci* (Venus of the Rags), suggests his intention to integrate art with life. Over the following decades he continued to pursue this goal in performance art, theater and related pursuits, as late as 2009 rolling a huge ball of newspapers through the streets of London. He has established a foundation in a former textile factory in his home town, Biella, dedicated to research for solutions to the world's problems in the fields of work, education, communications, art, nutrition, politics, spirituality and economics. This real-world foundation entitled Citta dell'Arte has become the focus of Pistoletto's ongoing work on sustainability in art and life.

French installation artist Christian Boltanski shows the influence of *arte povera* in the low-key but unmistakable social-political content of his work. In 2010 he covered the floor of the Grand Palais in Paris with old clothes. These he sorted into carpet-like rectangles in front of a mountain of discarded garments. A huge mechanical claw repeatedly descended from the high steel frame of the Grand Palais to pick up the used garments from one pile and drop them on another. The piece was entitled *Personne*, which Boltanski pointed out can mean "somebody" or "nobody" in French. Boltanski's installation used waste material to communicate disturbing and memorable content that felt relevant to a world of potential scarcity.

The oil and gas culture of consumption assumed a world of abundance. In the 1960s, when oil first became the world's dominant energy source, few people disputed this assumption, which today we recognize as unsustainable. On the other hand, raising the specter of scarcity frightens not only the "haves," but also those who justifiably hope to have more in a world where many millions remain deprived of what most of us take for granted as the necessities of life. The culture associated with renewable energy does not need to counter consumerism with threats of scarcity. Instead, a culture of stewardship implies that we plan the use of all resources with a view to the needs of future generations as we aim to meet our current requirements as efficiently as possible.



Untitled 2, Public Studio, Archival Inkjet Print, 2013, Edition of 4. © Public Studio, Courtesy of O'Born Contemporary.
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A culture of stewardship in this sense could conceivably be aimed at constructing a possible future of abundance to meet the real needs of the vast majority of the world's people. The sun generates an abundance of energy. The challenge for renewable energy is how to store that abundance so we can use it when we need it. From the granaries of ancient Egypt and Mesopotamia to the seed banks of today, the storage of abundance and the distribution of that surplus has remained one of humanity's greatest opportunities and threats. Now storage of energy has become crucial. Just as control of access to the granaries and irrigation channels was the basis of power in the ancient world, so control of the storage of energy and of the databases of information that give access to it will become the basis of power in the 21st century. As for distribution, sustainability is the primary value that the culture of stewardship demands. To more clearly envision the emerging culture of this century, we need to look at each of these cultural values of stewardship—storage, access and sustainability.

Storage of Energy and Data

Storage of energy is a fundamental challenge for most renewable energy technologies. The energy of wind, water or the sun cannot be used entirely when it is available, but must be stored so it can be used when needed. Engineers everywhere are currently hard at work on public energy storage problems. In Denmark, renewable energy pioneer Jan Gehl has devised “the Copenhagen approach” to a wind energy program, storing wind energy in car batteries. Elsewhere, supercapacitors are being developed to store electrical energy and make it available for electric automobiles. A Dutch design group, Roosegarde, became one of the 2013 winners of the Danish government's INDEX award for ethically and environmentally responsible design by developing a prototype of its “Smart Highway” that will imbed technology in existing roads to recharge electric cars (Rawsthorn, 2013).

Storage, as archivists and museum curators know, is of value only if we can document what is where and can find what we need when we need it. Storage of information with a view to its ultimate retrieval and use is a central concern of the culture of stewardship. Digitization of images of the collection together with data and information about those images has become a major museum function, upgrading the former job description of a museum registrar into the far more active role of a collection manager.

Data storage systems and the knowledge management that goes with them have become an integral part of most public and private enterprises. There are serious concerns about privacy and

security, but no one doubts the importance of storage systems to enable us to preserve and access information—which is just as important today as harvested grain was to the ancient kingdoms of Egypt or Mesopotamia.²

The Cultural Impact of Storing Digitized Data

Storing digitized data has affected the way we write, read, study, learn and store information, changing what it means to know something, or to be an expert in any subject. Knowledge can now be stored for access by everyone. The expert's role is now its interpretation, and what we can do with that knowledge.

Storing digitized data has resulted in a dramatic speed-up of all private and public business, and of all scientific and humanistic research. In less than four decades, it has become impossible for most of the world's governments or universities to operate without it. Today we simply cannot get the world's work done, let alone practice any of our cultures, without it. A computer crash can stop anything. A global crash could stop everything.

Digitization has amplified Marshall McLuhan's projections a million times over. The medium has become the message in ways that even he could not have anticipated. The analogue world now appears in what he would have called "the rear view mirror" (McLuhan, 1962 and 2001).

Just as Marx saw that commodities in the culture of production were really congealed labor, we need to recognize that digitized data in the culture of stewardship are congealed energy. When we look at a database, we are looking at stored energy, and we can use that energy to a more or less infinite range of cultural purposes. Electronic archives are becoming creative "media centers" that provide access to this energy. Whatever happens to the book, public libraries are vibrantly alive as we use them to access information, constantly creating more data as we work and play there. Museums, which also rely on the digital storage of information about their collections, are challenged to offer equivalent participation and access.

Just as Sumerian pictographs first encoded Mesopotamia's agricultural surplus, so digital storage media are providing a language for the renewable energy culture of stewardship. While libraries and museums are encouraging access to this language, many governments are prepared to restrict it. That is why hacking has become such a serious crime. Hackers can make data available to the general public. They are a threat to the power base vested in surveillance systems and control over stored data. Hackers are similar to the peasants of the Middle Ages who dared to steal firewood—the stored energy of the trees in their masters' forests.