POWERING THE THIRD INDUSTRIAL REVOLUTION

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The greatest sustainability challenge, or perhaps most exciting transformative opportunity, the world faces today is how to power the third industrial revolution while simultaneously avoiding the catastrophic impacts of global warming.

In the next two decades almost 3 billion more people will move into the middle class. As a result, they will want better housing, more televisions, more cars, more food, more water, more energy and more of everything. At the same time, many studies show that we are approaching planetary boundaries, and resources (including food, water and energy) will be scarce to meet this growing demand for goods and services. The Third Industrial Revolution (TIR) is now emerging based on the integration of new renewable energy sources with Internet technology in post-carbon energy economies. This is taking place simultaneously with revolutionary digital manufacturing technology and a focus on green industry. In other words, the third new industrial revolution is about achieving sustainable production and consumption. As United Nations Secretary-General Ban Ki-moon notes, the challenge is how to grow economies and spread prosperity, while keeping the earth's thermostat below a two degrees temperature rise.

Jeremy Rifkin, President of the Foundation on Economic Trends and Professor at the Wharton School of Business, has demonstrated that industrial revolutions have been driven by a convergence between changes in the availability (and type) of energy and the changes in how society gathers and disseminates information. The first industrial revolution was driven by coal and steam power combined with the printing press, and the second industrial revolution was, "organised around centralised electricity, oil-powered internal combustion engine, combined with the telephone, radio and television." In Rifkin's view, the current third industrial revolution is an opportunity to combine innovations in distributive energy and the digital/data revolution. The integration of massive investments in decentralised renewable energy combined with information and communications technologies will create the "energy Internet," and that impulse will lead to millions of jobs in both rich and poor countries. This energy transition is also expected to help end energy poverty.

However, the World Energy Council (WEC) Trilemma report of October 2013 indicates that at the current pace of actions by governments and the private sector, ending energy poverty could take another 60-70 years (when my grandchildren are my current age). At the same time, global carbon emissions were at an all-time high in 2012, and the International Energy Agency (IEA) reported in June 2013 that the world was on a path towards 5.3 degrees centigrade by the end of the century. So we need a more rapid energy transition as part of the third industrial revolution.

Though revolutions are mostly not planned, they can be catalysed. So how do we accelerate the pace of innovations in the energy sectors around the world to meet both the demands of higher populations, higher rates of urbanisation and the desire of developing countries and emerging economies to industrialise and create wealth for their own citizens?

I propose the establishment of "Creative Coalitions" in three main action areas, namely: accelerating continued cost reductions for renewable energy technologies, forging a deal on energy efficiency among the 23 highest greenhouse-gas emitters, and supporting a group of progressive developing countries to deepen energy sector reforms to attract investments in distributive energy systems and sustainable infrastructure.

In October 2013, the Oxford Martin Commission for Future Generation, which is led by Pascal Lamy, Michele Bachelet, Nicholas Stern, Amartya Sen, Jean-Claude Trichet and others, coined the phrase Creative Coalitions to describe multi-stakeholder partnerships of governments, private firms and civil society groups that have a common interest to drive longer-term societal transformations. Such partnerships, in the energy sphere, could be forged around the three pillars I mentioned, which I will now describe in more detail.

THE SOLAR COALITION FOR INCREASED COST REDUCTION: First, we need a coalition to accelerate massive cost reductions in renewable energy technologies. We need a group of countries to come together and agree to radically drive down the cost of renewable energy within a decade. Though there are already some locations where wind and solar power have reached grid parity with fossil generated electricity, the key is to make renewable energy universally as cheap as, or cheaper than, current centralised fossil-based power generation.

Thanks to innovations in the United States, Germany, Japan and China, we have already seen a 70-80 percent decline in the cost of solar photovoltaic power generation in the past six years. Still more can be done to make sure these reductions continue and that they are available in all countries. Two eminent global leaders, Sir David King, the new Climate Envoy of the United Kingdom government, and Lord Richard Layard, call for new spending on solar energy technology improvement, "to match the spending on the Apollo project would require only 0.05 percent of each year's gross domestic product for 10 years from each G20 country" (*Financial Times,* August 2, 2013). The German government has to be recognised for already making efforts to create a renewable energy coalition along the same lines.

THE ENERGY EFFICIENCY COALITION: Second, we need a group of countries, in particular the 23 members of the Clean Energy Ministerial (CEM), to agree to act collectively to achieve the doubling of the rate of energy efficiency in their economies. Small actions on energy efficiency by a group of large countries can have major impacts. For example, energy-saving bulbs can reduce a household's total electricity consumption by up to 15 percent and could save Europe 40 billion kWh a year – a figure that is roughly equal to the current annual consumption of Romania.

The CEM countries account for about 80 percent of global energy demand, 80 percent of greenhouse-gas emissions, and also about 90 percent of clean energy investments. Greater technological co-operation, an agreement on a set of policy principles which can be concurrently translated into practical actions in their respective countries, cities, or industrial sectors, can expand markets for new energy-efficient technologies (and renewables) and drive costs down further.

This elite group will meet again in Seoul in May 2014. They have already started on some energy efficiency efforts – so this proposal would build on those. In my view, their agenda should include consideration of the Oxford Martin Commission recommendation for a "C20-C30-C40" coalition for transformations in energy efficiency and climate mitigation.

A concrete road map for this group of countries would include to "develop targets for areas including increased LED street lighting; decreased commercial energy usage; promotion of more energy-efficient buildings, transport systems, and housing improvements; ensure accelerated penetration of highly efficient vehicles and biofuels as recommended by the International Climate Taskforce in 2005." To facilitate trust and tracking of progress, membership in the coalition would be "contingent on performance and an annual disclosure process, with an accreditation system put in place to reward the strongest performers."

COALITION OF PROGRESSIVE TRANSFORMERS: The WEC Trilemma calls for each country (rich and poor) to pursue the simultaneous achievement of energy security, energy equity, and sustainability. In my view, some developing countries must seize this framework to help them leapfrog into new energy pathways in the same way they took advantage of mobile telephony. It is noteworthy that African countries embraced mobile telephony more rapidly than other regions (from about 4 million mobile phones in 2000 to 720 million in 2012).

Some countries are already on this path. China is doing this already with over $60 billion in investments in renewable energy in 2012 alone. Saudi Arabia has launched a new target to achieve 30 percent renewables in their energy mix by 2032. In Brazil, about 60 percent of energy supply is from renewables, and its "Light for All" programme has reached the milestone of 15 million beneficiaries, resulting in over 99 percent of the population now having access to electricity. Ghana, South Africa and Vietnam made tremendous strides in these areas as well. Other countries in Africa and South Asia (where most of the energy poor live) should learn from these examples to drive their own energy trilemma.

This coalition can be led by the BASIC countries (Brazil, South Africa, India and China) and Germany, Denmark and Norway in a triangular co-operation model. The Renewable Energy Policy Network for the 21st Century's (REN21) Renewables 2013 Global Status Report shows that of the $244 billion in renewables investment in 2012, BASIC countries accounted for 40-50 percent, shifting the market from United States and Western Europe. They have not only effectively domesticated the relevant technologies, they have also deployed them in ways relevant to a developing country context (by balancing energy access for the poor, and energy for industrial growth and wealth creation). Their experience through south-south co-operation, combined with German, Norwegian and Danish technological prowess (triangular co-operation) can help many of the least developed countries leap-frog into the energy Internet. The developing countries can ride the green energy wave into the energy Internet by beginning to unbundle the power sector, reforming the governance of their power utilities to make them more transparent and profitable, and by establishing robust institutions, and longer-term predictable policies to crowd-in investment into the sector.

Finally, these coalitions must inspire the broader global community of nations to take similar actions for the energy transition. This is the reason why in 2012 the UN Secretary General and the President of the World Bank launched the initiative on Sustainable Energy for All (SE4ALL). The SE4ALL objectives are designed to achieve by 2030 universal access to energy, double the annual rate of improvement of energy efficiency, and double the share of renewables.

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Thus they are aligned with my proposals here for new Coalitions. The initiative also calls for a dedicated goal of "securing sustainable energy for all" in the post-2015 international development agenda. Already, we are beginning to see some results from SE4ALL. For example, Norway has committed to support renewable energy and energy efficiency activities with about NOK2 billion in 2014; Bank of America announced that its Green Bond, the world's first of its kind, has raised $500 million for three years, as part of Bank of America's 10-year $50-billion environmental business commitment; and the OPEC Fund for International Development has announced a $1-billion fund for energy access in poor countries.

The Sustainable Energy Fund for Africa (SEFA), which is one of the African Development Bank's vehicles to assist SE4ALL, is a multi-donor facility with an initial $5-million commitment from Obama's Power Africa Initiative (through USAID) as part of a multi-year engagement complementing an initial contribution of the government of Denmark of $56 million. SE4ALL will mobilise more public-private partnerships like these to catalyse the future we want.■