

ASIA CLEAN ENERGY FORUM 2019

PARTNERING FOR IMPACT

MANILA | 17–21 JUNE 2019



Deep Dive Workshop

Integrative Design for Radical Energy Efficiency



Point of Contact:

Ethan Wampler, Rocky Mountain Institute

ewampler@rmi.org

Roy Torbert, Rocky Mountain Institute

rtorbert@rmi.org

Background

Efficient use of energy (as also of water, metals, and other resources) is usually assumed, based on economic theory, to be a dwindling and increasing-resource resource—the more energy you save, the greater the marginal cost of that saving. However, strong empirical evidence across all energy-using sectors and diverse applications now reveals the opposite. If energy-using systems—buildings, vehicles, industrial processes and equipment—are designed as whole systems for multiple benefits, not as a pile of isolated parts for single benefits, the resulting energy savings total several times larger, as well as cheaper, than previously assumed. The extra energy savings revealed by such “integrative design” often cost less than past or current savings, so the more you save, the less the savings cost—the same sort of “increasing returns” that drive the renewable power revolution. Greater savings’ costs often decrease because they come not from using more or fancier devices, but from using fewer and simpler devices—but more artfully chosen, combined, timed, and sequenced.

Integrative design has been most widely applied in passive, net-zero, and net-positive buildings (those that over a year produce more energy than they use). However, similar opportunities have been demonstrated in mobility and energy too. For example, analyzing automotive efficiency for whole-vehicle designs and actual market products, rather than part-by-part, reveals a severalfold larger (and cheaper) efficiency potential. Similarly, integrative design of major and diverse industrial plants has confirmed surprisingly large energy savings with short paybacks in retrofits and generally lower capital cost in newbuilds.

Integrative design, by greatly expanding the energy-efficiency resource, is thus an important new tool for speeding the global energy transition, protecting climate, environment, and health, and improving equity and resilience. Especially when the energy saved is electricity—the most capital-intensive form, whose supply uses roughly one-fourth of global development capital—investing instead in cheaper end-use efficiency can

free up enormous amount of financial capital to fund other development needs. This may be the most powerful known lever for global economic development. Tools are emerging for making integrative design not rare but common. Societies still building extensive infrastructure, hence able to build it right more easily than fixing it later, could be especially advantaged if they quickly spread this practice through their design professionals, skilled tradespeople, business leaders, and design/technical educational and policy institutions.

Objective

This DDW will present practical evidence from diverse sectors, end-uses, climates, and geographies showing how integrative design can radically increase energy-efficiency opportunities, decrease their cost, and expand their scope and benefits. Participants will be invited to share relevant experience, concerns, questions, and suggestions. The main benefits of applying integrative design include profitable protection of climate, health, and environment, lower societal costs of energy services, improved resilience and energy security, greater economic competitive advantage, and more-effective reallocation of capital currently misallocated to unnecessary energy supply.

Agenda

60 Minutes	Amory B. Lovins illustrated lecture
90 Minutes	Discussion

Speakers



Amory B. Lovins

Co-founder and Chief Scientist,
Rocky Mountain Institute (USA)

Physicist Amory Lovins (1947–present) has authored 31 books and over 630 papers, advised major firms and governments for 45 years in more than 70 countries on advanced energy efficiency, and designed superefficient buildings, vehicles, and industrial plants. He received the Blue Planet, Volvo, Zayed, Onassis, Nissan, Shingo, and Mitchell Prizes, MacArthur and Ashoka Fellowships, 12 honorary doctorates, the Heinz, Lindbergh, Right Livelihood, National Design, and World Technology Awards, and Germany’s Officer’s Cross of the Order of Merit. A Harvard and Oxford dropout, former Oxford don, honorary US architect, Swedish engineering academician, and 2011–18 member of the US National Petroleum Council, he has taught at ten universities (most recently Stanford University’s School of Engineering and the US Naval Postgraduate School). In 2009, Time named him one of the world’s 100 most influential people, and Foreign Policy, one of the 100 top global thinkers.

Preparation / Additional Information for Participants

Technical background need not be pre-read, but is freely posted at: <https://doi.org/10.1088/1748-9326/aad965> together with a 4-minute video abstract.

About the Organizer

Rocky Mountain Institute (www.rmi.org) is an independent, apolitical, nonprofit think-do-and-scale tank whose more than 200 staff help transform global energy use to create a clean, prosperous, secure, low-carbon future. RMI's offices are in Basalt and Boulder, Colorado; New York City; Washington DC; San Francisco; Beijing; and Delhi. Its main recent projects have included preparing the US synthesis Reinventing Fire showing how to triple US energy efficiency and quintuple renewables by 2050, \$5 trillion cheaper than business-as-usual; supporting the Energy Research Institute of China's National Development and Reform Commission in the landmark synthesis Reinventing Fire: China, which strongly influenced the 13th Five Year Plan, and then its implementation across China; helping the Government of India, then State and City governments and the private sector, to make India's personal mobility shared, connected, and electric; speeding the transition off fossil fuels in Caribbean island nations and sub-Saharan Africa; and testing diverse scaling vectors that can spread RMI's integrative design methods to practitioners across the world.