

List of Possible Special Interest Group Topics

The purpose of special interest group topics is to identify important subject matter which TCI members in 60 countries world wide should know more about if they wish to move forward and deal with opportunities in their own countries or between several countries in Climate Change – Climate Innovation.

Energy, Environment, Economics, Innovation, Civilization, Prosperity, Sustainability, and yes, Competitiveness and Clusters, are all inextricably linked. There can be no competitiveness and prosperity without energy and environment. There can be no sustainability and continuity of civilization without an integrated approach to energy, environment, economics, innovation.

It is simply a matter of understanding HOW they are linked, and HOW forward thinking government policy makers, market based enterprises, academics who reach out to policy and markets, can make best use of these concepts to move forward and respond to Climate Change with Climate Innovation Solutions.

1. Document Knowledge, Concepts, Vocabulary For Climate Change – Climate Innovation.

Knowledge, Concepts, Vocabulary are all Fundamental To Identifying and Defining Issues, Articulating Responses, Developing Solution-Oriented Policy Frameworks and Business Models.

Climate Change and Climate Innovation constitutes one of the most compound-complex subjects that humankind has ever had to deal with. It encompasses BOTH Threat and Opportunity, BOTH of which are of Civilization-Defining Import.

Climate Change – Climate Innovation includes: History and Causality of Anthropogenic Climate Change; Progressive Consequences of Anthropogenic Climate Change; Externalities; Market Failure; Energy, Environment, Economics; Mitigation vs. Adaptation; Greenhouse Gas Emissions; Aggressive Carbon Emissions Reductions Targets, such as 90% relative to 1990 base year by 2020 target year; Carbon Tax; Carbon Pricing; Developed and Developing Nations; International Agreements, National Policy Frameworks; Economic Sector Strategies and Business Models; Global Cities; Individual Enterprise Strategies; Consumer Consumption and Conservation Strategies; Technological and Economic Transformation; Innovation Systems; Investment Strategies; Key Stakeholders; Triple Helix; Knowledge / Skills / Competencies; Intellectual Property Management; Full Spectrum Financing; Competitiveness; Business Clusters, Business Networks, Business Incubators, Twelve Forms of Interfirm Collaboration; Twenty Forms of New Alternative Clean Renewable Energy Sources, Technology, Strategies; Real Advanced Clean Technology Clusters; Leveraging Clusters; Advanced Market Place Leadership Strategies; Entrepreneurship and SMEs and Twelve Stages of Growth; Next Industrial Revolution; Clean Revolution; Post Carbon Economy; etc. This knowledge, concepts, vocabulary, are the essential foundation to build upon. This is NOT jargon, it is the essential lingua franca of the pathway for human survival, civilization survival, in a very, very short time frame.

2. Identify Low Hanging Fruit, Implement Climate Innovation

Low Hanging Fruit, Easy Wins, are Essential to Creating Leadership and Momentum in Implementing Climate Innovation.

The TCI Climate Change – Climate Innovation Project wants to document “easy to undertake and accomplish ways to fight Climate Change through Climate Innovation, with a focus on Energy, Environment, Economics, Civilization. These could be highly visible, low cost, high payoff, quick action, little opposition projects, where there is a win-win surround. It would be important to document each example, in order to permit to implement, improve, combine, build upon. Examples. Can be government, business, or home, large or small scale, traditional or new energy, or new technology sources, or new business strategies and models, or innovative conservation, etc. Details

should be captured in case studies, and documented, analyzed, put into accessible data bases, widely shared, reported, rewarded.

3. Identify New Alternative, Clean, Renewable Energy Sources, Technologies, Strategies, Innovation, Conservation.

The Collective Intelligence, Resources, Science, Technology, Ingenuity, Innovation, Entrepreneurship, must be brought to bear on Energy, Environment, Economics, Civilization in a Very Highly Focused, Internationally Collaborative, and Short Time Frame.

New alternative, clean, renewable energy sources, technologies, strategies represent the principal and essential, strategic and sine qua non means to meet the nexus of Energy, Environment, Economy, and Civilization, by rapidly innovating and implementing a next generation of new energy sources, technologies, strategies, to create the Next Industrial Revolution, and move to the Post Carbon Economy within the 2010 – 2020 time frame.

These leading edge alternative, clean, renewable energy sources, technologies, strategies, innovations, conservation practices, include:

- Nuclear Fission (current), moving to Nuclear Fusion (additional R&D required);
- Hydro Electric Applications (traditional);
- DC transmission lines for high efficiency;
- Ocean tide, wave, river current turbines (non-traditional hydro-electric);
- Wind turbines, both new windmills at ground level (current technology);
- High altitude wind turbines (new technology);
- Photovoltaics, including solar panels (emerging high efficiency);
- Solar collectors and solar concentrators (ground level and high altitude satellites);
- Photonics, use of high technology light and energy technologies, to provide new alternative clean and renewable high efficiency energy (continuing R&D);
- Geothermal, simple domestic furnaces / air conditioners, using short holes;
- Geothermal, deep hole geothermal energy extraction systems for major building / institutional complexes, and whole cities;
- Major urban buildings retrofit with high efficiency solar collectors, plus wind energy technology on top, to drive all HVAC systems, and sell back surplus to urban power grids, i.e., large buildings as net power generators;
- Smart Energy Grids to manage, optimize, efficient electrical energy consumption and to manage efficient contribution from diverse alternative energy sources and technologies;
- Co-Generation, use of primary clean alternative energy fuels, accompanied by thermal capture and re-cycling in a complementary technology, such as steam creation, leading to direct heating on a small scale, or turbine powering to create electricity on a larger scale;
- High speed intercity electric or electronic trains; efficient linked train hubs between medium and small cities; rapid urban surface transit systems; surface rapid transit systems are essential, to avoid high capital and operating costs of underground tunnels, and environmental costs of tunnels; surface rapid transit systems must use roads and streets currently used by cars and trucks, and such vehicular traffic must be restricted as rapid urban transit comes on line. Plan for it. Implement it.
- Smaller, hydrogen fuel powered cars, plus electric cars, chargeable at power stations;
- Conversion of transport trucks from dirty diesel to clean natural gas; create trucking networks to operate out of cities which are provisioned by rail systems;
- Alternative aviation fuels; alternative aviation design; alternative international air traffic flight patterns; alternative air traffic flight management systems;
- Linked Innovative Science and Technology (LIST), e.g., methane harvesting from urban waste management, combined with burning for electricity production, with CO₂ produced

harvested for use in greenhouse production, to support 200 km agricultural production for cities;

- Alternative efficient lighting technologies and systems;
- Alternative high energy efficiency domestic appliances, to replace current energy inefficient domestic appliances;
- Off-grid alternative energy housing, using total clean, renewable, alternative energy sources and technologies;
- Smart bio-fuels, i.e., use of pyrolysis to consume waste corn stalks to produce energy (vs. wasteful production of ethanol from corn, which is needed for food, etc.);
- Algae production and farming, use of algae to consume CO₂ in water, particularly oceans, and to harvest rapidly producing algae to convert to renewable fuels;
- Safe CO₂ Capping and Sequestration (CCS) in deep earth (safe chemical binding with salts, e.g., CaCO₃) (more R&D required for this technology);
- Atmospheric CO₂ Extraction Technologies, to remove CO₂ from Earth Atmosphere.
- Other emerging science and technology applications.

All of the above address the issue of Efficiency of Energy Use. This is merely a first step. The world must focus on issues of Effectiveness and Sustainability in the longer term.

4. Identify, Document, Share Success Stories, Best Practices, Business Case Analysis.

Success Stories, Best Practices, Business Cases are Absolutely Essential to Facilitate Rapid Deployment of Climate Innovation.

It is important to identify, document, share success stories, best practices, and business case analysis: how business persons, government persons, private consumers collect and use facts about energy, environment, economics, civilization, decision making criteria, costs, benefits, direct and indirect impacts, compliance vs. corporate social responsibility, etc. National standards should be developed and shared. Universities, Science and Technology Research Institutes, Financial Institutions should collaborate in this essential activity. Data bases should be created and maintained. There should be a vetting and challenge function to ensure honesty. Best examples should be noted, shared, publicized, rewarded, and celebrated.

5. Create REAL Advanced Clean Technology Clusters; No Imitators or Partial Models.

REAL Advanced Clean Technology Clusters are the Unique DNA of the Rapid Transformation to the Clean Revolution, the Post Carbon Economy.

Advanced Clean Technology Business Clusters which strategically focus on innovating and implementing new alternative clean energy sources and technologies, which bring together multiple individual enterprises, scientific research and technology institutes, innovation agencies, universities, financial institutions, governments, are the major multi-function strategy and player in the pathway to the Next Industrial Revolution, the creation of the Post Carbon Economy. Advanced Clean Technology Clusters will become the single most significant piece of any developed nation's National Policy Framework to address the nexus of Energy, Environment, Economy, and continuation of Civilization. National and international standards should be developed, comparisons made, and the highest quality maintained. No second class activity should be tolerated.

6 Leverage REAL Advanced Clean Technology Clusters With Regular Business Clusters, And Non-Clustered Economic Sectors.

The Great Polyvalent Capacity of REAL Advanced Clean Technology Clusters Must Become Focused and Leveraged To Great Advantage To Multiply Climate Innovation Opportunities and To Accelerate the Clean Revolution and Transition to the Post Carbon Economy.

The comprehensive breakthroughs in knowledge, competencies, radical innovation, new alternative clean energy sources, new alternative clean energy technologies, new alternative clean energy-environment-economics-civilization strategies, leading edge competitiveness, leading edge marketing, business case analysis, can all be transferred highly effectively by juxtaposing REAL Advanced Clean Technology Clusters and Other Business Clusters, and non-clustered economic sectors, first, seeking high yield opportunities, and second, more challenging opportunities, using the 80-20 rule of thumb, documenting innovative business cases progressively. The focus must be on Energy, Environment, Economy, Civilization constituting Efficiency and Effectiveness of Sustainability. Each individual, other business cluster, or non-clustered economic sector, is unique and offers tremendous opportunities for implementing Climate Innovation. It should include assessment of total life cycle costs of global supply chains, and bring manufacturing back to western countries, such as Europe and America; i.e., transportation costs saved are greater than low labour costs of production, plus net carbon footprint.

7. Leverage REAL Advanced Clean Technology Clusters With Cities, Focusing on Clean Electricity Generation, Buildings, Transportation, Food Supply, Manufacturing.

REAL Advanced Clean Technology Clusters Can Multiply and Accelerate Climate Innovation In Cities.

Cities contain 65% of global population, and are HUGE consumers of carbon fuels in five (5) major categories: Carbon-fuelled electricity production, Buildings of all kinds, Transportation of all kinds (cars, trucks, trains, ships, airplanes), Food production and supply, Manufacturing and Processing. The expertise of REAL Advanced Clean Technology Clusters can be brought to bear on the Climate Change impacts of cities, by offering a full range of Climate Innovation solutions, such as: Alternative Clean Renewable Electrical Energy Generation; Smart Energy Grids; LEED Standards for New Buildings; Building Retrofit for Existing Buildings; Urban Rapid Transport Systems; Bicycle Systems; Walking Systems; Urban Design Strategies; Urban Food Supply Strategies; Urban Forests; Urban Waste Management and Energy Recycling; Urban Composting; Secure, Clean Urban Water Supplies; Alternative Sewage Treatment Strategies; etc.

8. Create New Policy Frameworks, Business Models, Market Strategy, How to Move to the Post Carbon Economy.

Focus Nationally and Globally on Policy and Strategy to Drive Climate Innovation, the Clean Revolution, the Post Carbon Economy, and Sustainability of Civilization in the Long Term.

Policy and Strategy constitute the essential pathway to the Clean Revolution, the Post Carbon Economy. First we must envisage Climate Change as the greatest Threat that has ever confronted civilization, and then we must see Climate Innovation as the greatest Opportunity that has ever been available. Climate Change – Climate Innovation encompasses Energy, Environment, Economy, Civilization, both Efficiency and Effectiveness of Sustainability. Next, it is critical to understand Causality, Evolution, Consequences, Timing, Choices. Finally, it is absolutely critical to understand the nature of the Geometric Progression of Anthropogenic in three (3) waves, the impending Catastrophic Consequences predicted by the 2007 UN IPCC Report, and the very limited five (5) to ten (10) year horizon for strategic, comprehensive action. The essential response is Policy –Strategy, at five critical concurrent levels: Meta, Macro, Meso, Micro, Mini. The global policy and strategy objective must be three fold: First, the world must focus on implementing aggressive greenhouse gas emission reduction targets, 90% relative to 1990 base year, to be achieved by 2020. Second, implement a serious progressive Carbon Tax. Third, implement critical, rapid, comprehensive innovation and implementation of alternative clean renewable energy sources, technologies, strategies, conservation, and the rapid changeover to the Clean Revolution, the Post Carbon Economy, encompassing both Efficiency and Effectiveness of Sustainability. Fourth, address the underlying causal factors of Anthropogenic Climate Change, from population growth, to continuous economic growth, and switch to alternative civilization sustainability and

quality of life models. What is the cost of Climate Change – Climate Innovation? 1-5% of GDP per annum currently, OR 5-10-15-20% of GDP beyond five to ten years, far greater cost, far less assurance of success, and the spectre of passing the Point of No Return (PNR).

9. Linked Issues, e.g., Water Supply, Food Supply.

Civilization Cannot Survive Without Water and Food Daily.

The focus of Climate Change – Climate Innovation on Energy, Environment, Economy, Civilization generally attracts attention to rising temperatures and environmental consequences. However, two vitally important allied topics frequently go unmentioned: water supply and food supply. These are sometimes treated as “collateral damage” issues, when in fact they are central issues, equal co-components in Climate Change – Climate Innovation along with rising temperatures and environmental consequences, all three (3) flowing directly from Anthropogenic Climate Change and CO₂ – Greenhouse Gases. Civilization cannot survive without potable fresh water daily, agricultural water for crop irrigation, and dependable agricultural crops and food supply. Without daily assurance of water supply and food supply, global population mass would suddenly reduce, and civilization would be immediately imperiled. Any policy and strategies to develop and implement Climate Change should also focus equally on Water Supply and Food Supply.

10. Policies and Strategies to Support Developing Nations

Developing Nations Have Five (5) Core Needs to Adequately Address Climate Change: Financial Transfers, Carbon Credits, Professional Competence, Technology Transfers, Capacity Building.

The current stock of CO₂ – Greenhouse Gases was largely produced by developed nations. However, the populations of developing nations are about to rise rapidly, and these persons want all the prosperity and consumer goods that developed nations have had. Developing nations may thus risk creating huge volumes of CO₂ – Greenhouse Gases. To encourage developing nations to focus strategically on Climate Change – Climate Innovation, these developing nations must receive financial transfers, carbon credits, professional competence support, substantive technology transfers, and capacity building. Financial transfers are essential, and can be of different types and strategies, including progressing funding transfers of 1-5% of GDP of developed nations, and also significant carbon credits for non-pollution and preservation of old growth tropical forests. Professional competence support can be in the form of executive, managerial, and professional advisory services contributed at no cost. Substantive technology transfers can be in the area of the twenty (20) emerging alternative clean renewable energy sources, technologies, strategies. Capacity building can include infrastructure creation, strategic investments, technology development partnerships, over a twenty year period, to help ensure the Post Carbon Economy.

11. Create Longer Term Sustainability, Know the Issues That Must be Addressed.

The World Can Survive Climate Change with Climate Innovation, But This is Only Efficiency. The World Must Also Totally Re-Orient Itself, Live a Different Economic Life Globally That Embodies the Requirements of Effectiveness and Sustainability.

The move to the Clean Revolution, the Post Carbon Economy essentially deals with Efficiency of carbon fuels usage and progression to non carbon fuels usage, including the Clean Revolution, the Next Industrial Revolution, the Post Carbon Economy, a simply massive global challenge. However, in order to achieve Effectiveness and Sustainability over the longer term, of Energy, Environment, Economy, and Civilization, ALL developed and developing nations must address the fundamental underlying causes of the present crisis: global population increase, progressive industrialization, resource extraction, manufacturing including global supply chains, massive consumption tastes and patterns, throw away society, urban sprawl, etc. We have a civilization-threatening global crisis currently at 6.7 billion persons globally; can Planet Earth endure 9, 10, 12

billion persons within ten to twenty years? Can Planet Earth endure continuing of the current economic development, the GDP growth model? Can the Earth's forests, earth, rivers, oceans, biodiversity, continue to support and endure continuing economic development, GDP growth? The answer is unequivocally NO. Therefore, ALL Nations must urgently meet to address these fundamental causality issues and impacts. ALL Nations urgently need alternative energy, environment, economics, prosperity, quality of life, and equilibrium criteria and models, if we wish to have Effectiveness and Sustainability, if we wish civilization to continue.

12. Need For Multi-Disciplinary Collaboration and Solutions, and Global Collaboration in a Rapidly Evolving Era of Complexity Factors, Potential Chaos Factors and Cataclysmic Consequences.

The Complexity of Climate Change, the Challenge of Climate Innovation, the Urgency of Change, Issues of Efficiency of Energy Use AND Effectiveness and Sustainability, Absolutely Require a Multi-Disciplinary Approach, and Global Collaboration.

The survival of civilization depends on an absolutely totally focused and dedicated multidisciplinary knowledge sharing and national / international collaboration to quickly and accurately diagnose and resolve a multitude of complexity factors, touching the fields of energy, environment, economics, civilization, and a web of myriad subsidiary issues, AND above all, to collaborate globally. Issues such as rate of consumption of total global resources, and state of health and risk of global biodiversity, are all highly relevant. Global water systems, global soil systems, global food systems, are all highly relevant. Global polar ice, global oceans, global forests, are all highly relevant. Diverse science, engineering, technology, mathematics, are all highly relevant. Human population, health, condition, critical issues, quality of life, prosperity indicators, are all relevant. This subject matter must become the highest national and international priority for ALL nations, in order to avoid potential chaos factors and cataclysmic consequences. The entire world must change utterly from the current economic development and continuous annual GDP growth model. The Next Industrial Revolution must come within five years, which will lead to the Post Carbon Economy, which must come within ten years. This is only the beginning of what must become a top global priority for all nations to collaborate in order to deal with global Climate Change complexity factors, the imminent threat of chaos factors and cataclysmic consequences. For TCI members, it is important to note that Competitiveness and Clusters are inextricably linked With Climate Change and Climate Innovation, through the common elements of Energy, Environment, Economics, Innovation, Entrepreneurship, Triple Helix, Sustainability, and Civilization. Thus TCI members must strive to incorporate a multidisciplinary approach to all major initiatives, and must seek collaboration within nations, and across nations.