[youtube:http://www.youtube.com/watch?v=HwWtgHfbV-E auto]More than $40 trillion will be spent over the next 30 years, as nations adapt to
climate change
and other environmental concerns. The future will be driven not by technology or innovation but by emotion – by the choices of ordinary men and women and the passion they feel about these things. They are already influencing companies and governments, who are changing at astonishing speed. Just 3 years ago it was hard to find a national leader who was talking about climate change
. No it is hard to find one that does not. That's today. Expect more tomorrow. So how can CIOs, software and hardware integrators, system analysts and others help turn Green into Gold?

I work with multinationals across every industry, and have spoken to audiences in over 50 nations. I am seeing tens of thousands of innovations all being rolled out at the same time in a race to make money from Green technology. Digital technology is at the heart of almost all these in one way or another – working in partnership with other disciplines.

Take British Sugar which uses the latest airoderivative gas turbines to generate their own electricity. Using sophisticated system controls they now harvest all the waste heat as steam to cook their raw sugar – with over 80% thermal efficiency. They capture every molecule of carbon dioxide and pipe it 1 kilometre to a 26 hectare greenhouse where they grow 75 million tomatoes a year – 37 million more than they would have done without the extra CO2 which acts as a bio-boost. But it is all driven by new IT architecture and control systems.

Or Johnson Controls who are saving up to 40% of energy in every large high-rise building with next-generation system controls which regulate internal temperatures much more efficiently. Remember that 35-40% of all national energy used in many nations is heating or cooling buildings so this is a huge target area for reductions. They go to building owners and offer free consulting, free software, free hardware, free control devices, free heat-exchangers and all the rest – just so long as they are allowed to claim back some of the savings in the energy bills over the following 3-4 years. Once again, it is the combination of different IT and technologies which is producing these spectacular savings.

Or Vontobel which is building one of the most sophisticated power stations in the world. They are using some of the electricity to make extract pure oxygen from air, which is injected into the furnace under complex software controls. The gas in the chimney stack is almost all pure water

vapour (which is cooled and used for irrigating crops), and CO2 which is pumped away under pressure to be stored safely back underground in rock formations which have reliably held gas for millions of years. These kinds of innovations fuse together IT specialists, innovative industrial control systems, next-generation physics, nobel-prize winning mathematicans, geologists and electrical engineers.

Or new propulsion and steerage systems for containers ships which can save up to 20% of fuel. Once again we see multi-disciplinary teams collaborating together – with new alloys, machine processes, better engineering, new designs, better understanding of hydrodynamics, complex new computer-controlled steering devices and so on.

Another example is the greening of the internet. Web servers already consume more than 1% of global electricity, growing 14-20% a year. One 50,000 square feet data centre uses around 5 megawatts – equal to needs of 5,000 homes. Servers in US data centers use the equivalent of a full year's output from **seven 1,000 megawatt power plants.** That is more power than that used by the **entire state of Mississippi** .
Cooling uses almost as much energy as the servers themselves. A server costing EU2,000 requires an additional EU350 in power every year. Half the energy can be saved relatively easily –more efficient power supplies for example (Google's are 90% efficient). Strategies will include: power management software (Windows Server 2008 boasts 10% energy savings, but Linux does better); more efficient chips; better cooling systems; better use of fibre-optics, turning additional servers on and off depending on load (200,000 servers can be powered up in less than 5 minutes); adjusting cooling systems to the numbers of servers actually active; using heat exchangers to cool server farms and heat nearby homes; more efficient data switching / networking; using solar power from local units; offsetting carbon use by investing in other schemes to reduce carbon consumption elsewhere.

But watch out – as we have seen in biofuels, government policies can change fast from subsidies to penalties if public mood changes. With the UN blaming food riots in 35 nations on food price rises caused by growth of biofuels, we can expect a complete rethink about the morality of wealthy nations burning food as fuel, when 1 billion now struggle to spend 80-90% of their income feeding themselves and their children. We need to be sensitive not just to the "next big thing" in technology innovation, but also to all the new activist movements and concerns. If we want to turn Green into Gold we have to keep watching how Green is changing, and be ready to meet every challenge.

Key Message: Green to Gold means new partnerships, industry alliances and radical rethink

about how we make produce, transport and use things. Together we can green the world – often at almost zero cost, financed by reduced fuel bills.

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