# A2: Carbon Tax CP

## AFF

### Carbon Taxes Bad – Laundry List

#### Carbon tax unpopular, isn’t modeled globally, and hurts the economy

Leybovich 9 (Ilya, NewsWeek, <http://news.thomasnet.com/IMT/2009/03/17/carbon-tax-versus-cap-and-trade-system-debate-heats-up/>) IGM

“The taxpayers may pass the cost of the tax on down the chain of purchasers, and the behavioral effect of the tax will depend on how the price signals influence decisions by the taxpayers and subsequent purchasers, but the mechanism itself is implemented directly just between taxpayers and the IRS,” says Janet Milne in the [Bulletin of the Atomic Scientists](http://www.thebulletin.org/web-edition/roundtables/carbon-tax-vs-cap-and-trade). Concerns remain about whether a carbon tax would actually reduce emissions or if companies would simply pay the tax and continue to produce the same amount of carbon dioxide. However, as Gregg Easterbrook notes, “[t]his is possible, but unlikely: experience shows that individuals and firms change behavior to reduce taxation.” According to carbon tax proponent the [Carbon Tax Center](http://www.carbontax.org/blogarchives/2009/03/06/new-larson-bill-raises-the-bar-for-congressional-climate-action/), a first-year tax rate of $15 per ton of carbon dioxide coupled with incremental rate increases of $10 per ton each year would lower emissions to 25 percent below 2005 levels by 2022. These figures reflect a new carbon tax bill recently introduced to Congress. However, many people have voiced serious doubts about the feasibility of a carbon tax program. “If you were a pure economist, the most logical thing is taxation. It is the simplest. But ‘taxation’ is a word that makes people choke in normal times. And these are not normal times,” the director of the United Nations’ climate change program recently told the [New York Times](http://www.nytimes.com/2009/03/07/us/politics/07carbon.html). In addition to the widespread reluctance for additional taxation (in the midst of a recession, no less), critics argue that a carbon tax would not foster international participation due to the difficulty of coordinating global taxation efforts. For a carbon tax to work, Wagner and Keohane argue, “it would be necessary to achieve a harmonized tax structure across countries.”

#### Lack of global modeling just outsources jobs and emissions

Cormann 11 [(Mathias, WA Liberal Senator, http://liberal.org.au/Latest-News/2011/10/12/Cormann-Op-Ed.aspx](file:///C:\Users\Kenneth\Downloads\(Mathias,%20%20http:\liberal.org.au\Latest-News\2011\10\12\Cormann-Op-Ed.aspx)) IGM

Its findings are based on evidence from a wide cross section of experts and, unlike the government sponsored shotgun inquiry, held hearings across metropolitan, regional, Eastern and Western Australia. The findings of the Senate Committee’s twelve month inquiry are clear. The carbon tax will impose economic pain on Australia for no environmental gain. It will not reduce emissions but will reduce our international competitiveness and cost jobs. According to the government’s own modelling domestic and global emissions will continue to grow, while the cost of living will go up and up and up and real wages will be lower than they would be without a carbon tax. Electricity prices alone will go up by 10 percent in the first year of the carbon tax. Lower emitting Australian businesses forced to pay the carbon tax will become less competitive than their higher emitting international competitors not facing a carbon tax. Higher emitting businesses overseas taking market share away from even the most environmentally efficient equivalent business in Australia, means jobs and emissions will shift overseas.

### No Solvency - Generic

#### No solvency – inefficient, and misuse of funds

Tielman 11 (Bill, president of West Star Communications, <http://thetyee.ca/Opinion/2011/07/12/CarbonTax/>) IGM

Why the carbon tax isn't reducing consumption is simple. Increasing the price without providing drivers with more options on how to reduce their use of fuel doesn't work. The B.C. carbon tax introduced with great fanfare by former B.C. Liberal premier Gordon Campbell is supposed to be revenue neutral, offsetting the increased cost of gas and other fuels with personal and corporate income tax cuts. That means the nearly $1 billion in extra gas taxes annually doesn't fund public transit at all, nor does it provide financial incentives to buy more fuel-efficient vehicles, make your home more energy efficient or fund other environmental projects.

#### Carbon Taxes would raise other bills

Australian Associated Press 7/13 ("GST ON CARBON TAX IS INEFFICIENT: HOCKEY" au.yahoonews, http://au.news.yahoo.com/nsw/latest/a/-/article/14222426/gst-on-carbon-tax-is-inefficient-hockey/) BSB

Putting the GST on a carbon tax is inefficient and revisits the old era of hidden wholesale sales taxes, shadow treasurer Joe Hockey says. News Ltd reported on Thursday that energy companies, waste disposal firms and appliance repairers are among businesses charging consumers GST based on carbon tax costs. Mr Hockey said the "taxes on taxes" scenario revisited the pre-GST era of hidden wholesale sales taxes and would make the economy inefficient. "The only area where you still have taxes on taxes is insurance which is the most hideous area of tax," Mr Hockey told the Seven Network on Friday. "The best way to get efficiency in the economy is to have only one tax on a product, not an embedded tax and then another tax on top of it which is what's happening with the carbon tax." But cabinet minister Tony Burke said GST charges have been levied in the same way since it was introduced in 2000. "The mechanics of how the GST works across the entire economy have been set down for more than a decade now," Mr Burke told the Seven Network. News Ltd reports that NSW electricity companies have confirmed the 10 per cent GST would be applied to power bills, after the carbon tax had been added to the bill.

Carbon taxes would make the economy inefficient

Herald Sun 7/13 ("Bills skyrocket with GST on top of carbon tax" http://www.news.com.au/money/cost-of-living/bills-skyrocket-with-gst-on-top-of-carbon-tax/story-fnagkbpv-1226424870255) BSB

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#### Carbon taxes inefficient - Ireland proves

Rapple 9 (Colm, economist by training and a journalist by profession, "Carbon tax is a nonsense, inequitable and economically inefficient" Colm's Columns, http://colmrapple.com/?p=118) BSB

The carbon tax is a nonsense. It will have scant impact on our carbon emissions. It’s inequitable, in so far as it will bear heaviest on low income earners. And it is economically inefficient in that it will adversely affect the competitiveness of many Irish businesses. It will also give a massive boost to cross border shopping, not for groceries and drink but rather for solid fuel. It’s another example of the good intentions and woolly thinking that has informed much of the Green Party’s input to Government. With some honourable exceptions, there seems to be a reluctance to criticise this tax, perhaps because of a fear of being accused of killing polar bears. Or perhaps there was so much in the budget that it has just got sidelined. There was widespread opposition to the tax when it was first mooted by Charlie McCreevy some years ago, some of it from within the civil service. In a submission presented to Charlie McCreevy at the time, the Department of Transport maintained that a carbon tax could cause significant economic damage without any corresponding economic benefits. It argued that the tax would have little or no impact on the behaviour of transport users or on the level of emissions from the transport sector. That latter point is not even disputed by Green Minister, Éamon Ryan. Demand for fossil fuel products is, as he put it himself, relatively inelastic. In other words even a large increase in price doesn’t have much impact on the amount purchased. That’s particularly true of motor fuels, which will be bearing almost two-thirds of the carbon tax burden.

#### Carbons taxes fail – laundry list

Swezey 11 (Devon, contributor for Forbes, “The Carbon Tax, Then and Now,” <http://www.forbes.com/sites/energysource/2011/09/20/the-carbon-tax-then-and-now/>) KA

In the debate over climate legislation in 2009 and 2010, it was conventional wisdom that a price on carbon was the sine qua non of effective climate policy. All Very Serious People knew that you could not reduce carbon emissions or drive clean energy innovation without a price on carbon, either through a carbon tax or a cap and trade system. Indeed, leading venture capitalist John Doerr used to travel around the country hammering home the three top things that the government needed to do to catalyze a clean energy revolution. In order, they were: 1) put a price on carbon, 2) put a price on carbon and 3) put a price on carbon. How the times have changed. In a piece posted over the weekend, Tyler Cowen, a prolific blogger and card- carrying economist at George Mason University, writes that there are a number of reasons–10, in fact–why the case for a carbon tax is not as airtight as its advocates claim: 1. Other countries won’t follow suit and then we are doing something with almost zero effectiveness. 2. It may push dirty industries to less well regulated countries and make the overall problem somewhat worse. 3. There is Jim Manzi’s point that Europe has stiff carbon taxes, and is a large market, but they have not seen a major burst of innovation, just a lot of conservation and some substitution, no game changers. Denmark remains far more dependent on fossil fuels than most people realize and for all their efforts they’ve done no better than stop the growth of carbon emissions; see Robert Bryce’s Power Hungry, which is in any case a useful contrarian book for considering this topic. 4. Especially for large segments of the transportation sector, there simply aren’t plausible substitutes for carbon on the horizon. 5. A tax on energy is a sectoral tax on the relatively productive sector of the economy — making stuff — and it will shift more talent into finance and other less productive sectors. 6. Oil in particular will become so expensive in any case that a politically plausible tax won’t add much value (careful readers will note that this argument is in tension with some of those listed above). 7. A carbon tax won’t work its magic until significant parts of the energy and alternative energy sector are deregulated. No more NIMBY! But in the meantime perhaps we can’t proceed with the tax and expect to get anywhere. Had we had today’s level of regulation and litigation from the get-go, we never could have built today’s energy infrastructure, which I find a deeply troubling point. 8. A somewhat non-economic argument is to point out the regressive nature of a carbon tax. 9. Jim Hamilton’s work suggests that oil price shocks have nastier economic consequences than many people realize. 9b. A more prosperous economy may, for political and budgetary reasons, lead to more subsidies for alternative energy, and those subsidies may do more good than would the tax. Maybe we won’t adopt green energy until it’s really quite cheap, in which case let’s just focus on the subsidies. 10. The actual application of such a tax will involve lots of rent-seeking, privileges, exemptions, inefficiencies, and regulatory arbitrage.

#### Cap-and-trade means carbon taxes wont be implemented

Climate Lab 9 (Climate Lab, “Carbon Tax,” <http://climatelab.org/Carbon_Tax>) KA

Cap and trade programs have gained the recognition worldwide, which makes it difficult for the implementation of a carbon tax. After the implementation of the Kyoto Protocol, a global cap and trade program, the cap and trade system became well-recognized worldwide. In the United States, the voluntary cap and trade market – the Chicago Climate Exchange and a successful cap and trade program on sulfur dioxide emissions have made capped programs the norm.

#### Carbon tax is neither necessary nor sufficient to solve global warming

Mandy 11 (Kyle, PwC National Tax Technical,

<http://www.businesslive.co.za/southafrica/2011/12/02/the-case-against-a-carbon-tax-in-sa>) IGM

Carbon emissions are a global problem, not a local one. SA's contribution to total global emissions is negligible in comparison to the largest emitters. Nearly half of global carbon emissions emanate from the United States and China, while SA contributes about 2% of global emissions. Even on a per capita basis, SA's emissions are far below those of most developed countries. The scope for SA to make reductions in carbon emissions and the extent to which any reductions would contribute to the reduction of global emissions are therefore limited. If SA introduces a carbon tax it will be the first developing country to introduce such a tax of any significance. This will place the country at a significant competitive disadvantage relative its competitors. It would also result in SA placing a price on carbon before many developed countries, most notably the United States. - Most countries that have introduced a carbon tax or are planning to introduce a carbon tax are far less carbon intensive than SA, primarily as a result of SA's heavy reliance on coal for energy relative to other countries. Notwithstanding the fact that SA's economy is relatively carbon intensive, it is not exceptional in terms of energy intensity. The reason for the difference between SA's energy intensity and its carbon intensity is that coal emits far more carbon than other fossil fuels. As a result, a carbon tax would have a far greater economic impact in SA than in other countries. - SA's undertakings to reduce emissions are subject to financial and technological support from developed countries for the implementation of adaptation mitigation action in developing countries. The introduction of a carbon tax in the absence of binding commitments by developed countries to provide such support is questionable. - Carbon emissions are a global problem requiring a global solution and any unilateral action by SA will be totally ineffective in reducing global emissions while coming at great cost to the economy. - Carbon tax is only one of a number of possible policy interventions available to reduce carbon emissions and would not be a panacea to the problem. Other instruments that can be used to achieve the same objective include incentives and subsidies, regulation of emission quotas and energy efficiency standards and voluntary agreements with emitters.

### No Solvency - Emissions

#### Carbon tax don’t solve emissions

Cattaneo 10 (Olivier, Senior Trade Specialist with the World Bank<http://www.theepochtimes.com/n2/opinion/carbon-taxes-may-be-ineffective-in-discouraging-emissions-38582.html>) IGM

Enthusiasm of Sens. John Kerry and Joseph Lieberman to “create millions of jobs that cannot be shipped abroad” contrasts sharply with the cold reception for President Nicolas Sarkozy and Prime Minister Silvio Berlusconi’s proposal in Brussels. For promoters, the tax aims to protect domestic industries against unfair competition by countries that fail to adopt measures to reduce emissions. Such bills also aim to prevent domestic efforts to reduce global emissions being undermined by production relocations and rising emissions elsewhere.

#### Carbon taxes increase emissions - empirics

The Economist 9 (“Binge and purge”,

<http://www.economist.com/node/12970769>) IGM

Yet for all its environmental piety, Norway is also a prodigious polluter. Its greenhouse-gas emissions have grown 15% since it adopted the carbon tax. They are still rising, and are likely to continue to do so until 2012, according to Mr Stoltenberg. As it is, Norway spews out more emissions per head than many other countries in Europe. And, in the eyes of many environmentalists, these statistics understate the damage Norway is doing to the atmosphere. It is the world's third-biggest exporter of gas and fourth-biggest exporter of oil. The process of extracting these fuels from below the North Sea releases some greenhouse gases within Norway itself. But when the oil and gas Norway exports are burned abroad, they generate far more emissions.

#### Counterplan kills tech to solve emissions – plan solves best

Lomberg 11 (Bjorn, Copenhagen Business School, <http://www.abc.net.au/environment/articles/2011/03/09/3158295.htm>) IGM

The current solution is to make fossil fuels so expensive nobody will want them. That sounds like a great idea but it's not only economically inefficient but it's also politically impossible. What we need is a better solution. It's about innovating green energy to be so cheap that everybody will want it. If you look at data from the International Energy Agency from 1974 until 2009 on how much OECD countries spend on energy R&D as a percentage of GDP, you can see that we had a huge boom in investment research and development in the late 70s and early 80s. Since then it's declined and it has not picked up since we started talking about global warming. This is because everybody talks about cutting carbon emissions, and how much they need to reduce in the next five or 10 years. Whereas the real solution has to be about making sure we get new, breakthrough technologies in the next 20 to 40 years. There's a significant under-investment in the solutions that are going to carry us through.

### Carbon Tax Kills Competitiveness

#### Carbon tax fails and kills competitiveness

Folseth 5/27 (Alan, Sales / Marketing, <http://kamloopsthompsonbcconservatives.blogspot.com/2012/05/carbon-tax-was-really-nothing-more-than.html>) IGM

The carbon tax was never was going to do the job government said it would … which was to reduce our carbon footprint. On top of that, no other North American jurisdiction has it, which also increases manufacturing costs for businesses in BC … which in turn reduces their competitiveness. I find it deeply disturbing that this government continues to find more and more ways to pry more and more of my money from me. Let me keep more … and let me spend it in the real economy where it will actually do some good. The carbon tax was really nothing more than a tax grab, designed as a phoney green initiative, and the government knew that from the start. As to how we can make up the lost revenue from this so-called revenue neutral tax? I have an idea. In his budget speech this Spring, Finance Minister Kevin Falcon said we would have another deficit – this time in the amount of $968 million … maybe instead of having another 1 BILLION dollar deficit for this year they can find a way to reduce their spending, and then they won’t have to worry about the loss of revenue from eliminating the so-called 'revenue neutral' Carbon Tax.

#### Carbon tax kills competitiveness

Anderson 7/13 (Peter, The Australian, <http://www.theaustralian.com.au/national-affairs/opinion/no-carbon-tax-compo-for-small-and-medium-business/story-e6frgd0x-1226424858875>) IGM

For small and medium businesses the tax is especially unfair. Like households, they get higher energy costs imposed with no bargaining power against the big energy companies. But unlike households, small businesses get no compensation, not an iota. They are left fully exposed to the extra costs. None of these small business blows were costed by the government or parliament before the carbon tax was made law. Independent research the private sector commissioned to fill the gap said that energy intensive small businesses would face reductions in profitability of between 10 per cent and 20 per cent at the starting $23 per tonne carbon price. For our trade exposed industries, the tax is not just a rise in electricity costs but also a drain on competitiveness. As a member of the Gillard government's Business Roundtable on Climate Change I heard loud and clear the calls for compensation by globally competing industries. Their calls were understandable, but compensation only masks the symptom, not the cause. Most compensated industries now prepared to accept or go quiet on the carbon tax are only doing so because of the compensation. If and when the compensation dries up, they're exposed, like my small business members. What this means for Australia is more pressure on jobs. The carbon tax lowers incomes, reduces living standards and weakens job security. That's why it's objected to by business. And the broader community doesn't believe that governments should trade off Australian jobs for the environment, or vice versa. Governments are elected to do the right thing on both fronts and we should hold them to that expectation.

#### Carbon taxes kill the economy and competitiveness – Australia proves

AAP 12 (Australian Associated Press, “Businesses plan carbon tax price hike,”http://news.smh.com.au/breaking-news-national/businesses-plan-carbon-tax-price-hike-20120701-21ag4.html) KA

More than 40 per cent of businesses will put up prices immediately now the carbon tax has come into effect, Australia's peak industry association says. Australian Industry Group (Ai) says it has found that 40 per cent of manufacturing businesses, 40 per cent of services businesses and 44 per cent of construction businesses will try to pass the tax on to consumers from Sunday. "(Our) survey marking the start of the carbon tax has found a big proportion of businesses (42 per cent) ... will try to put up their prices immediately following the introduction of the scheme today," Ai Group chief executive, Innes Willox, said in a statement. He said the results were based on a survey of members in the second half of June in which they were asked about their plans to increase prices in response to the carbon tax. Mr Willox said 60 per cent of construction material suppliers, 82 per cent of communications services businesses and 48 per cent of retail traders planned to increase their prices. To a lesser degree, 11 per cent of food and beverage makers and 22 per cent of finance, insurance, accommodation, cafes and restaurant businesses said they would pass on the costs. Mr Willox said there was also uncertainty over what role the consumer watchdog, the ACCC, would play in determining whether price hikes were fair. Businesses need to be careful not to overstate the impact of the carbon tax in raising prices, he says. Earlier, the NSW Business Chamber urged businesses in the state to go online and share stories about how the carbon tax was affecting as part of a campaign against the tax. The chamber has launched an online portal where people can share their experience. Manufacturing Australia said the tax would make Australian business less competitive and be detrimental to the economy. "This reduced competitiveness will ... result in job losses in Australia," the organisation said in a statement. "It may also force our manufacturers to pursue opportunities overseas where permitted emissions are much higher, thereby increasing global pollution." The organisation said Australia's price of $23 per tonne of carbon dioxide was almost three times as high as the price in Europe and New Zealand. It also said Australia would be out of step with the rest of the world. The US, Canada, Japan and Russia are not introducing a carbon scheme in the near future and China and India are unlikely to act until as late as 2020.

### No Solvency – Emissions, Plan Key

#### Carbon tax doesn’t solve warming – innovating key

Lomberg 11 (Bjorn, Copenhagen Business School, <http://www.abc.net.au/environment/articles/2011/03/09/3158295.htm>) IGM  
Demanding to cut carbon emissions is politically not going to happen, either. If you look at the economic growth and the CO2growth over the last quarter century there is a very strong correlation. That's why most politicians realise that a promise to cut carbon emission growth, is a promise to cut economic growth. It doesn't cut it back to zero but it does have a real cost. So when we talk about the Australian carbon tax, we need to recognise any realistic carbon tax will do very little to solve global warming. The damage cost of a tonne CO2 emitted is about $7 per tonne. Any economist would say CO2 should therefore be taxed in principle. But the carbon tax in and of itself is something that's not going to have a major environmental impact. A carbon tax really is about realising that the revenue raised can be used to fund green research and development which will be the significant part of the solution. We should focus on innovating cheap, green energy rather than the current solution of making fossil fuel so expensive nobody wants it. It's 500 times more effective than the current approach. It's $11 back on the dollar rather than two or three cents back in the dollar. It would actually fix global warming in the medium term.

### AT: Economy

#### Carbon taxes can’t solve competitiveness—other provinces and too high

Schultz 12 (Stacey, National Geographic News, *British Columbia Rethinks Its Pioneering Carbon Tax*, 5/3/12, http://news.nationalgeographic.com/news/energy/2012/05/120503-british-columbia-reviews-carbon-tax/) LA

Consumers and businesses receive tax breaks and credits to offset the price of the carbon tax, in a government effort to make the carbon tax "revenue neutral." In practice, the tax has been revenue negative, with the value of the tax cuts and credits exceeding the carbon tax receipts. In 2011, the losses amounted to $192 million (U.S. $194.6 million)—with $1.15 billion in tax cuts and credits swamping the $960 million in tax revenue. Future increases in the carbon tax could close this gap, said Lake. The early government modeling on the carbon tax suggested that the rate increases planned through this year would reduce British Columbia's emissions by 3 million tons, or about 4 percent relative to business-as-usual (BAU) in 2020. But to reach the targeted goal of a one-third reduction at 2007 levels, the tax eventually would have to go up further, because it would need to generate a reduction relative to BAU of 40 million tons, according to a Canadian Centre for Policy Alternatives report, Fair and Effective Carbon Pricing: Lessons from BC. The most recent government figures show a 2.3 percent decrease from 2008 to 2009 in overall GHG emissions in British Columbia, from 69.2 Mt to 66.9 Mt CO2e. But Lake notes that the economic recession was likely a factor. "Reduced economic activity usually results in reduced greenhouse gases," he said. The government plans to release emissions figures from 2010 sometime this year. To reach the 2020 targeted goal, Marc Lee argues in favor of a steep hike in the carbon tax. "I actually think we should be driving the carbon tax up to about [Canadian] $200 per ton by 2020, which would essentially close the gap between prices here and what you pay typically in Europe," he said. But some industries argue that any increases in the carbon tax will put them at a competitive disadvantage. "The problem for B.C. is that no other provinces or U.S. states have chosen to follow the same path since B.C.  instituted its carbon tax in 2008," said Jock Finlayson, executive vice president of the Business Council of B.C.  in an email. "So while the 'cost' of carbon is rising in B.C., it is not rising in tandem in our principal competing jurisdictions." Michael Sweeney, president of the [Cement Association of Canada](http://www.cement.ca/) testified last September to the Select Standing Committee on Finance and Government that the carbon tax will cost his industry more than $20 million (U.S. $20.7 million) by July 1, 2012. Since the carbon tax was instituted in 2008, he told the committee, imports of cement have risen from 4 percent to 23 percent of market share, slicing into the share produced within the province.

#### Carbon tax kills economy and competitiveness – Australia proves

Packman 3/30 (Ben, The Australian, <http://www.theaustralian.com.au/national-affairs/climate/outgoing-future-fund-chairman-david-murray-says-carbon-tax-will-be-veryvery-bad-for-economy/story-e6frg6xf-1226314215514>) IGM

[Mr Murray](http://www.theaustralian.com.au/top50/2012/david-murray/story-fnbtudzs-1226264498242), who has also lashed the Gillard government's mining tax, warned the tax would undermine the nation's competitiveness and damage the economy. “If you want me to tell you my view, it is the worst piece of economic reform I have ever seen in my life in Australia,” he told [ABC radio](http://www.abc.net.au/radionational/programs/breakfast/david-murray/3922216) this morning. “The consequence of introducing that tax at that level in Australia today is very, very bad for this economy, particularly in terms of international competitiveness.

#### Carbon tax kills the economy

Moran 6/29 (Alan, Director, Deregulation Unit<http://www.ipa.org.au/sectors/economics-deregulation/news/2692/carbon-tax-final-straw-in-a-lethal-energy-plan>) IGM

On Sunday the carbon tax will be implemented. This tax is the latest and most lethal of the suite of carbon-reduction measures delivering crushing blows to businesses and households. We already have the cancer of the Commonwealth's Renewable Energy Target. This requires an increasing proportion of electricity to be supplied from high-cost wind and solar generators. As well as dotting unsightly giant windmills around the countryside, wind and solar renewable facilities are hopelessly uneconomic. The RET presently adds 6 per cent to consumers' electricity bills and the scheme is only halfway to its goal. On top of this, taxpayers are carrying the additional taxation weight of about $3 billion a year to finance green schemes and subsidies to exotic energy developments. None of this spending will ever prove worthwhile. And the Government has also created a $10 billion green-energy bank to fund business proposals that private-sector banks and venture capitalists have rejected. The taxpayer will pick up the costs of its failures. The carbon tax builds on these injurious policies by adding 40 per cent to the wholesale price of electricity. This crushes the profitability of many of Australia's most productive businesses, especially exporters and those facing import competition, which are unable to raise their prices to cover additional costs.

#### Carbon tax kills economy – private sector growth

Dodds 6/4 (Troy, Editor, <http://www.westernweekender.com.au/index.php/news/742-o-farrell-slams-carbon-tax>) IGM

NSW Premier Barry O’Farrell says the carbon tax will cost jobs and has maintained his opposition to the plan. Speaking to the Weekender in Penrith last Friday, Mr O’Farrell said he was concerned about what the impact would be on jobs in western Sydney and Australia’s manufacturing industry as a whole when the tax is introduced next month. “It’ll be bad for consumers because everything is going to go up in price, it’ll be bad for employees because it’s going to cost jobs, it’s bad for the state and it’s bad for the nation,” he said. “In one fell swoop on July 1 we do away with one of Australia’s greatest competitive advantages for our economy, which is low cost energy based on coal.

#### Carbon taxes can destroy the global economy

Carr 12 (Adam, leading market economist, “SCOREBOARD: Rattle and shake,” <http://www.businessspectator.com.au/bs.nsf/Article/markets-Wall-Street-European-crisis-AUD-gold-oil-pd20120711-W3T4X?opendocument&src=rss>) KA

For the calendar today, we get Westpac’s consumer confidence series at 1030 AEST. The data is for July and I guess there is no shortage of reasons why confidence would deteriorate further. It’s a sad state of affairs. Following the RBA’s ill-fated cuts, confidence is actually lower and we saw that again yesterday as business confidence fell further. As it stands, consumer confidence is already about 6 per cent below average. Obviously the carbon tax and the deep unpopularity of the government are weighing heavy, but interest rate cuts are not helping. The truly amazing thing is that we still have economists calling for more rate cuts. The worry of course is that we may actually need rate cuts one day – but the RBA has jumped the gun and in a world where psychology and confidence are so important, you actually have the situation where rate cuts are detrimental (at this stage of the cycle). There are downside global risks and of course the damage the carbon tax will wreak on the economy (and it will damage the economy) is unknown at this stage – let's save the rate cuts until we need them. Then, if the worst doesn’t happen we are in a better position to deal with the upswing. There are significant upside risks to global and domestic growth that most policymakers seem blissfully unaware of. At 1130 AEST we get ABS home loans data. Prior to the RBA’s cuts home lending had been on the path to a solid recovery, but the pace of that has slowed considerably of late. Indeed, so far for 2012, home lending has fallen on average by 0.7 per cent per month – and that’s with 125bps worth of rate cuts. Prior to the RBA’s easing cycle, home loans were rising on average by almost 2 per cent every month. This may seem counterintuitive, but only if you assume that policy responses are linear. The Federal Reserve does, which is why it falls into crisis after crisis. It doesn't know how policy works. For Australia, rate cuts would work if the price of money was the problem in the first place – but it wasn’t. Confidence was (and is) the only problem. That’s why lending has slowed subsequently, because if the RBA are cutting something must be wrong, right? Wrong. Don't forget that RBA Deputy Governor Philip Lowe speaks this morning at 900 AEST. Then this afternoon we see German consumer prices, and the expectation is that inflation will moderate in line with CPI elsewhere, following the fall in commodity prices. Tonight, the key data is US trade and the FOMC minutes.

#### Carbon tax would hurt the economy

Loris 9 (Nicholas, Policy Analyst at The Heritage Foundation's Roe Institute for Economic Policy Studies, "A Carbon Tax Is An Economy Killer, Too" Heritage Foundation, http://blog.heritage.org/2009/05/14/a-carbon-tax-is-an-economy-killer-too/) BSB

In response to the Waxman-Markey cap and trade bill to reduce carbon dioxide and other greenhouse gas emissions, GOP lawmakers Bob Inglis of South Carolina and Jeff Flake of Arizona are set to introduce carbon tax legislation. A carbon tax is a direct, more predictable tax on carbon emissions, but that does not make it any more acceptable. Proponents argue that it is better than a cap and trade because it will not unpredictably fluctuate with the ebbs and flows of the market as evidenced by Europe’s carbon trading problems. Regardless of the efficiency of a carbon tax, any tax to reduce carbon dioxide similar to those proposed in cap and trade would cause significant economic damage and would do very little to reduce global temperatures. Furthermore, the economic pain of higher energy prices will reduce disposable income for other goods and services. Once the economy expands, bureaucrats would likely raise the tax on businesses, which would ultimately be passed on to the consumer. As with a cap and trade bill, America’s poorest would be hit the hardest. Congress would likely tinker with income tax policy further, making it even more regressive to compensate while increasing the overall burden on Americans in the same way Europe has tinkered with its systems to compensate for the regressive effects of its insidious value-added tax.

#### Carbon taxes hurt lower and middle class citizens

Loris 7/12 (Nicholas, Policy Analyst at The Heritage Foundation's Roe Institute for Economic Policy Studies, "A “Conservative Carbon Tax” Is $0" Heritage Foundation, http://blog.heritage.org/2012/07/12/a-conservative-carbon-tax-is-0/) BSB

Instead of rallying together to fight the Obama Administration’s backdoor environmental regulations, which have exorbitant costs and minimal benefit, some conservative organizations are working with liberal groups to push costs higher by piling on a carbon tax. This would be nothing more than an enormously high, regressive energy tax that would needlessly destroy jobs and economic growth. The abundance of shale gas and the potential for stably low natural gas prices have energy-intensive industries champing at the bit to come to the United States. The combination of onerous, duplicative regulations and a carbon tax would reverse that immediately. And all for no noticeable change in the earth’s temperature. Since an overwhelming majority of our energy needs are met by fossil fuels, these rules directly raise the cost of electricity, gasoline, diesel fuel, and home heating oil. Since low-income families spend more of their budgets on energy, a tax that increases energy prices would disproportionately eat into the income of the poorest American families. As Congress of Racial Equality chairman Roy Innis says, “The civil rights challenge of our time is to stop extreme environmental policies that drive up the cost of energy and disproportionately hurt low income Americans and the working poor.” The higher energy costs of a carbon tax would dwarf any type of rebate low-income families would allegedly receive.

#### Carbon tax doesn't help anyone

Green 7/13 (Kenneth P., an environmental scientist by training, studies public policy at the American Enterprise Institute, where his primary focus is on energy and climate policy, "Dissecting the Carbon Tax" The American, http://www.american.com/archive/2012/july/dissecting-the-carbon-tax) BSB

There would be virtually no environmental benefits to unilateral greenhouse gas emission reductions by developed countries (whose GHG levels are already flat and slowly declining), while developing countries are pouring out virtually every kind of pollutant with joyous abandon. Some argue that we'll get "co-benefits" from reducing other pollutants, such as particulates. Well, we already have highly effective (if economically damaging) regulations for conventional pollutants. If they're not working, they should be fixed. Establishing a new set of controls based on ancillary benefits is not simply wasteful, it's dishonest. A carbon tax would also have limited impact: If $4-per-gallon gas won't reduce consumer demand, how is adding another 10 cents, 50 cents, or dollar going to do so? Low carbon taxes won't have a significant effect, and high carbon taxes won't retain political support long enough to provide environmental benefits. That's not surprising: Houses, cars, and energy-consuming appliances are long-term investments that can't easily be changed when fuel prices fluctuate. Jobs are also not abandoned lightly, so commuting distances aren't easily adjusted.

#### Carbon taxes are worse for the economy than beneficial

Green 7/13 (Kenneth P., an environmental scientist by training, studies public policy at the American Enterprise Institute, where his primary focus is on energy and climate policy, "Dissecting the Carbon Tax" The American, http://www.american.com/archive/2012/july/dissecting-the-carbon-tax) BSB

Studies continue to show that carbon taxes, through their influence on energy prices, would cause considerable harm. They're recessionary: High energy costs reduce economic productivity and are passed along to consumers in everything they buy, from medical treatments to food and clothing. In fact, research at the American Enterprise Institute suggests that half of the total spending consumers do on energy is invisible to them: Its costs are embedded in the things they buy and the services they use. The more things cost, the less people consume, which means less production, less economic growth, and fewer jobs. They're regressive: Most analysis shows that energy taxes are highly regressive. After all, it's not the rich people who are driving around old cars with poor mileage, living in old houses with poor insulation and inefficient appliances, or having limited career mobility and lengthy commutes from poor communities into wealthier communities where there are jobs. They're anti-competitive: Energy taxes also make countries less competitive when it comes to exports, particularly when they're competing against countries that don't impose comparable taxes. Carbon tax proponents argue that such things can be handled with border taxes on imported goods from non-carbon-priced regimes, but does anyone really believe that such activities will not set off innumerable trade wars? They are bait-and-switch: If climate alarmists really thought that the goal was to get the price right, you'd hear them promising to remove all of the other regulations of carbon emissions if they got their carbon tax. They'd talk about repealing vehicle efficiency standards, appliance standards, technology standards, emission standards, unraveling regional trading systems, ending low-carbon energy subsidies, and more. But they don't. Climate change alarmists, like Al Gore, have never been shy in admitting that they will not be content with a carbon tax and will still want additional layers of carbon suppression through cap-and-trade as well as regulation. This will result in rampant over-pricing of carbon emissions and energy. As the country grapples with economic havoc, some are pointing to carbon taxes as a potential solution to the government's revenue shortage. Carbon taxes might be "better" than cap-and-trade or regulations, but then, in a train-wreck, losing a hand is better than losing a forearm, which is better than losing an entire arm. Most would rather skip the wreck. Even in flush economic times, carbon taxes would be bad policy. When economies are already laboring under too much spending and are at diminishing-return levels of taxation, implementing a carbon tax would be a mistake.

#### Now is not the time for a carbon tax - Ford Proves

Herald Sun 7-17 ("Ford job cuts, carbon tax ‘bad timing" http://www.heraldsun.com.au/news/breaking-news/ford-job-losses-due-to-carbon-tax-hunt/story-e6frf7kf-1226427920770) BSB

JOB cuts at car company Ford prove the carbon tax has arrived at the worst possible time and must go, federal opposition climate action spokesman Greg Hunt says. "This confirms that it is the worst possible time for a carbon tax," he told reporters in Melbourne on Tuesday, referring to a Herald Sun report that Ford will shed 440 jobs at two Victorian plants. "Our sympathy is with the workers and our determination is to do all we can to take away the added pressures which can be removed on production in Australia." Mr Hunt dismissed Prime Minister Julia Gillard's claims that a coalition government would not repeal the carbon tax despite its repeated promises to do so. "We will repeal the carbon tax clearly, absolutely and unequivocally," he said. "I am not surprised that the prime minister thinks that others won't honour their word simply because she doesn't honour her word."

#### Carbon tax would wreck the economy - Australia proves

Wright 12 (Shane, Economics Editor, The West Australian, "Carbon tax 'bad economic reform'" TheWest, http://au.news.yahoo.com/thewest/full-coverage/carbon-tax/a/-/article/13311206/carbon-tax-bad-economic-reform/) BSB

The outgoing head of the Future Fund has slammed the Gillard Government's carbon tax as the worst piece of economic reform he has seen. David Murray, who has publicly said there is no link between carbon emissions and climate change, said introducing the scheme would hurt the ability of Australian businesses to compete internationally. Mr Murray, who was appointed to head the Future Fund by then Liberal treasurer Peter Costello, has not previously commented on either the Government's carbon tax or the emissions trading scheme that was backed by the Howard government. But he told Radio National the carbon tax was not up to scratch. "It is the worst piece of economic reform I've ever seen in my life in this country," Mr Murray said. "The consequences of introducing that tax at that level in Australia today is very, very bad for this economy, particularly in terms of its international competitiveness." Mr Murray said the proposed level of the tax, at $23 a tonne, would simply not reduce the reliance of businesses and households on carbon-intensive energy sources. Treasurer Wayne Swan said Mr Murray's position flew in the face of advice about climate change and support in the international economic community for the Government's carbon tax.

#### Carbon tax kills competitiveness and leads to economic depression

Puhanic 7/3 (Andrew, contributor and writer for the Average Joe News, "Australians Desert the Carbon Tax" Average Joe News, http://theaveragejoenewsblogg.com/2012/07/03/australians-desert-the-carbon-tax/) BSB

It’s official, Australians are now being forced to pay a carbon tax on the emissions they produce. The Clean Energy Legislative Package, passed by the Australian Senate on 8 November 2011 become law on 1 July 2012, sets out how Australia will introduce a carbon price (carbon tax) to reduce Australia’s carbon pollution. The carbon tax will increase the cost of living for all Australians and, if effective, will only reduce Australia’s total contribution of global emissions by less than 0.05%. In fact, this will take more than 10 years for such savings to be realised. The price of food, electricity, water, gas, petrol and other essential goods and services will all increase. The increase in the cost of doing business as a result of the carbon tax in Australia will soon make Australia one of the most uncompetitive countries to trade with. While India, China and the United State of America continue to do business with all of their respective trading partners unhindered by a carbon tax, the Australian Government has done everything in its power to make it as difficult as possible for Australian small business owners to trade internationally and has firmly planted the seeds of economic depression for many years to come.

#### Carbon taxes increase costs for public transit – leads to tipping point

Kelton 12 (Greg, State Editor, “Bus fares to rise with carbon tax,” <http://www.adelaidenow.com.au/bus-fares-set-to-spike-with-carbon-tax/story-e6frea6u-1226390559719>) KA

They will be part of a raft of rising transport costs caused by the carbon tax. Internal memos from Transport Department executives show the department will face a $15 million annual hit in operating costs, particularly with street lighting and road construction. They warn the tax could add another $4.6 million to the cost of the Southern Expressway duplication. The department is so worried about price rises, it has already applied to Treasury for extra funding. Details of the increased costs, based on the Commonwealth Government's predictions that the carbon tax will increase costs by about 0.7 per cent, are in memos released to the Opposition under Freedom of Information. While no figures are given for possible fare increases, even if only the 0.7 per cent carbon tax impact was applied to fares along with the CPI next year, the cost of a single trip ticket would rise from $4.90 to $5.10 and a multitrip ticket would rise by $1.24 to $33.14. In this month's state Budget, single trip tickets rose by 4.3 per cent to $4.90 while multitrips rose 3.2 per cent to $31.90. The department warns street lighting costs could rise by $700,000 a year while road construction costs will increase by about $70,000 per lane kilometre. A memo from Piero Sparapani, manager of finance and procurement, Public Transport Services, dated April 30, says it is expected energy costs for rail services will be affected from July this year while fuel costs for bus services will be affected from July, 2014. The memo says the carbon tax will result in diesel costs for metropolitan bus services rising by $213,881 a year for Torrens Transit, $491,545 for Transfield, and $636,565 for ATE. Regional passenger transport services will face an additional $161,601 in diesel costs. The second memo, from Julienne TePohe, director, finance, Corporate Services division, says a 0.7 per cent increase with the carbon tax would add $7.2 million to the department's operating program and another $7.6 million added to its capital works program. Opposition transport spokeswoman Vickie Chapman said the Gillard carbon tax would put unnecessary pressure on state finances and services, which were already at breaking point.

#### Carbon taxes kill the economy

Climate Lab 9 (Climate Lab, “Carbon Tax,” <http://climatelab.org/Carbon_Tax>) KA

Possible negative impact on consumers and economy. There are concerns that the components of carbon tax added to the current tax structure will likely to have potential impact on consumers and economic growth. Especially, carbon tax is likely to have bigger impact on poor communities that already struggle to heat their homes or use their vehicles for work. As for the economy as a whole, a carbon tax can skew the development of different sectors. For example, in 1990s, Ontario's long-running Fair Tax Commission rejected posing carbon taxes, arguing they would distort too many key sectors of the economy, manufacturing and transportation in particular.9

### Carbon Tax Kills Charities

#### Carbon taxes destroys charitable efforts

AAP 4/11 (American Academy of Pediatrics, <http://www.news.com.au/national/carbon-tax/dumping-on-charities-salvation-army-says-carbon-tax-will-be-a-costly-load-of-rubbish/story-fn99kjia-1226323329705>) IGM

CHARITIES will be forced to cut back essential services for needy families as the carbon tax adds millions of dollars to operating costs. In the latest challenge to the Gillard government's carbon tax, the Salvation Army estimated it would add $3.5 million to the annual landfill costs for charitable organisations. The Salvation Army says it is bracing for an avalanche of useless household goods, dumped by people unwilling to pay higher rubbish tip fees as a result of the carbon tax. In a confidential briefing note, it labelled the carbon tax "unjust and unfair" and said it would lead to "more dumping from a price-sensitive public". Federal Finance Minister Penny Wong has assured charities that government assistance will be available to help them deal with the impact of a carbon tax which comes into effect from July 1. "We have put in place a fund for charities to help them with the transition to the carbon price," she toldABC Radio today. Opposition climate change spokesman Greg Hunt said it was absurd that programs such as support for victims of domestic violence and the homeless could be at risk. "This hit on charities shows the stupidity of this carbon tax and exposes it as a policy failure," he said in a statement.

### Carbon Tax Kills EV Market – Key to Solve

#### Carbon tax kills EV industry which is necessary to solve warming

Ramli 6/15 (David, Journalist for the Australian Financial Review, <http://afr.com/p/technology/carbon_tax_bad_for_electric_cars_3UDkms0NFaraPUJiHdahvK>) IGM

Still, Nissan’s electric model, which launched on Friday, will travel 170 kilometres on a $6 charge, which is far less than the cost of a petrol car. But at $51,000 plus $2,750 for a recharging station, the Leaf would seem to face bigger consumer hurdles than the carbon tax. Nissan admits it is targeting early adopters and expects to sell no more than a few hundred in the first year. Nissan’s global head of product strategy Francois Bancon predicted that around 10 per cent of the world’s cars would be electric by 2020. But he said the carbon tax and lack of taxpayer handouts – Nissan is lobbying for subsidies – mean slower take up rates than Europe, the US and other parts of the world. “Yes the [carbon tax] will probably slow down the progress in Australia,” he said. “It comes down to how people put pressure on their governments because this is a democracy. So taxes are something you can change in one month.” Mr Bancon said electric cars were a powerful tool in the fight against carbon change and that falling global oil levels would force commuters to change their way of travelling. But he added that people would only switch if the price of the car could be reduced with government assistance and electricity prices stayed low

### Carbon Tax Kills Clean Energy Market

#### Extra money paid through the carbon tax kills clean energy markets

Barnett 12 (Colin, Australian Premier, “Carbon tax may stop clean energy: Barnett,” <http://news.ninemsn.com.au/article.aspx?id=8493984>) KA

Pricing carbon may actually stop the transition to cleaner energy, says West Australian Premier Colin Barnett. The premier told ABC Radio in Perth on Wednesday that far from being an incentive, the carbon price may soak up surplus cash that could have been used by polluting industries to convert to cleaner alternatives. "In some ways it may actually stop a transition to cleaner energy," Mr Barnett said. "For example, you impose a carbon tax on a polluting industry; it pays that tax, it no longer, therefore, has cash reserves to make the sort of changes needed. "Right around Australia you're seeing coal power station owners - whether they're government or private - saying: 'This tax affects our industry, we've got two choices; either continue or close - we won't be reinvesting in the alternative'." Mr Barnett said it would have been cheaper and simpler to legislate the "increasing use of renewables - in particular natural gas in power generation". He admitted that WA consumers, even those who had opted to pay a premium of up to $480 a year for renewable energy, were being supplied mostly with coal-fired and gas-fired electricity without their knowledge. "The reality is, despite the increased use of renewable energy, most of the electricity that we use in our house - whether you opt for green energy or not - is in reality produced by coal and increasingly gas-fired power stations," Mr Barnett said. The premier's comment was in relation to the Australian Competition and Consumer Commission giving WA electricity retailer Synergy the go-ahead on Wednesday to levy a carbon-price surcharge on customers paying for renewable energy. Synergy gives its customers the option to pay $10-$80 in a two-month billing cycle to receive up to "141.34 per cent green energy", according to its website. Many customers, according to the ABC, had indicated they would pull out of the scheme because of the carbon tax ruling. "I still encourage people to support renewable energy by paying that little bit extra, but understandably a lot of people may pull out," Mr Barnett said.

### Carbon Tax --> Other Bad Policy

#### Carbon tax would be passed along with other bad measures

Davis 7/9 (Steve, Marketing Director at Baker Marketing, <http://bakermarketingservices.com/2012/07/using-your-carbon-tax-to-sneak-through-some-nasties/>) IGM

Every business and person uses a ‘Carbon Tax’ from time to time as the scapegoat for tough or bad decisions. Things like: new taxes delay by our supplier staff turnover new systems roadworks busyness head office the devil Sometimes these factors ARE to blame but when they are not it is BAD practice to blame something or somebody else when you need to pass on bad news.

### AT: Warming

#### Doesn’t solve warming—bad policy and economic incentives

Mintz 06 (Jack, U of Calgary, “Carbon tax: an idea whose time has not come,” Financial Post, 6/28/6) LA

The argument for a carbon tax yielding a green dividend is that consumers will avoid purchasing higher-taxed products with greater carbon content. However, the tax approach may achieve little in the way of environmental objectives. The demand for such products as gasoline and heating fuel is less sensitive to price, since the tax also falls on necessary, almost essential, services such as heating and transportation. The carbon tax is also a highly inflexible tool since it cannot be easily adjusted for changing emission levels. Further, governments become reliant on the revenue and are less willing to adjust the tax rates downward when emissions decline. For these reasons, some experts have argued that regulations that limit emissions, including tradable permit regimes, can be more effective and more flexible. The "blue" dividend from a carbon tax could include recycled revenues spent on environmental programs. Dedicated taxes are anathema to finance departments since they introduce a rigidity in which the revenue must be spent on a bureaucratic-devised program regardless of whether the money is needed. Instead, greater bang for the buck could be achieved if carbon tax revenues were to replace economically harmful levies with high marginal tax rates on earnings, investment and risk-taking. You can bet your bottom tax dollar, however, that recycled revenues would likely be spent on transfers and politically driven public programs instead. Thus, no assurance can be given that the blue dividend would even be positive. The carbon tax most likely results in a negative "red" dividend because it falls most heavily on the poor, whose consumption of gasoline, electricity and heating fuel tends to be a larger share of their resources compared with the rich. To get around this, some of the carbon tax revenues would be paid out as rebates to low-income Canadians to offset higher energy costs, thus negating the purpose of the policy. So carbon taxes have little appeal in the sense that the "green" and "blue" dividends are far from certain and the "red" dividend is undoubtedly negative. While current gas taxes are used to fund highways and roads or other infrastructure, proposals have often been made to raise the gas tax to curb greenhouse gas emissions and other pollutants. However, a broad-based environment tax on energy would be far better than a narrow-based environmental tax such as the gas tax. The case for turning the federal gas tax into a broad-based environmental tax on various forms of energy was made by the Technical Committee on Business Taxation eight years ago. By keeping environmental revenues constant, the gas tax would be lowered in favour of new taxes on forms of energy reflecting environmental damage. In the end, the carbon tax is an idea whose time has not come. If governments are to be serious about reducing greenhouse gases, they need to look for more effective policies surgically directed at emissions rather than using blunt instruments. Carbon taxes won't be much better than Project Green in achieving environmental or economic objectives.

#### Turn—

#### A. Carbon tax increases natural gas

Thomas et al 11 (Valerie, Todd Levin and Audrey Lee, PhD in theoretical physics from Cornell and Associate Professor, Harvard, “State-scale evaluation of renewable electricity policy: The role of renewable electricity credits and carbon taxes,” Energy Policy, 2/2011) LA

We have developed a state-scale version of the MARKAL energy optimization model, commonly used to model energy policy at the US national scale and internationally. We apply the model to address state-scale impacts of a renewable electricity standard (RES) and a carbon tax in one southeastern state, Georgia. Biomass is the lowest cost option for large-scale renewable generation in Georgia; we find that electricity can be generated from biomass co-firing at existing coal plants for a marginal cost above baseline of 0.2–2.2 cents/kWh and from dedicated biomass facilities for 3.0–5.5 cents/kWh above baseline. We evaluate the cost and amount of renewable electricity that would be produced in-state and the amount of out-of-state renewable electricity credits (RECs) that would be purchased as a function of the REC price. We find that in Georgia, a constant carbon tax to 2030primarily promotes a shift from coal to natural gas and does not result in substantial renewable electricity generation. We also find that the option to offset a RES with renewable electricity credits would push renewable investment out-of-state. The tradeoff for keeping renewable investment in-state by not offering RECs is an approximately 1% additional increase in the levelized cost of electricity.

#### B. Turns warming—scientific studies

US News 11 (US News and World Report, Content Provided by the National Science Foundation, “Natural Gas from Fracking Could Be 'Dirtier' Than Coal, 4/22/11) LA

Extracting natural gas could do more to aggravate global warming than mining coal,”

**Extracting natural gas from the Marcellus Shale** could do more to aggravate global warming than mining coal**, according to a Cornell study** published in the May issue of Climatic Change Letters (105:5). While natural gas has been touted as a clean-burning fuel that produces less carbon dioxide than coal, ecologist Robert Howarth warns that we should be more concerned about methane leaking into the atmosphere during hydraulic fracturing. Natural gas is mostly methane, which is a much more potent greenhouse gas, especially in the short term, with 105 times more warming impact, pound for pound, than carbon dioxide (CO2), Howarth said, adding that even small leaks make a big difference. He estimated that as much as 8 percent of the methane in shale gas leaks into the air during the lifetime of a hydraulic shale gas well—up to twice what escapes from conventional gas production. "The take-home message of our study is that if you do an integration of 20 years following the development of the gas, shale gas is worse than conventional gas and is, in fact,worse than coal and worse than oil," Howarth said. "We are not advocating for more coal or oil, but rather to move to a truly green, renewable future as quickly as possible. We need to look at the true environmental consequences of shale gas." Howarth, the David R. Atkinson Professor of Ecology and Environmental Biology, Tony Ingraffea, the Dwight C. Baum Professor of Engineering, and Renee Santoro, a research technician in ecology and evolutionary biology, analyzed data from published sources, industry reports and even Powerpoint presentations from the Environmental Protection Agency (EPA). They compared estimated emissions for shale gas, conventional gas, coal (surface-mined and deep-mined) and diesel oil, taking into account direct emissions of CO2 during combustion, indirect emissions of CO2 necessary to develop and use the energy source and methane emissions, which were converted to equivalent value of CO2 for global warming potential. The study is the first peer-reviewed paper on methane emissions from shale gas, and one of the few exploring the greenhouse gas footprints of conventional gas drilling. Most studies have used EPA emission estimates from 1996, which were updated in November 2010 when it was determined that greenhouse gas emissions of various fuels are higher than previously believed. "We are highlighting unconventional gas because it is a contemporary problem for us in upstate New York, and because there is a big difference between developing gas from an unconventional well and a conventional well, for the mere reason that unconventional wells are bigger," Ingraffea said. He noted that the hydraulic fracturing process lends itself to more leakage because it takes more time to drill the well, requires more venting and produces more flowback waste, he said. "A lot of the data we used are really low quality, but I'm confident they are the best available," Howarth said. "We want to go out into the Marcellus Shale and do micrometeorological fluxes of methane at the time of venting and get a real number on this, which has never been done. We're optimistic we can get funding and do that over the next year." **"**We've tried to be conservative all along; we're not trying to be hyperbolic in our statements," Ingraffea said. "We do not intend for you to accept what we've reported on today as the definitive scientific study in regards to this question. It's clearly not," he added. "What we're hoping to do with this study is to stimulate the science that should have been done before. In my opinion, corporate business plans superseded national energy strategy."

#### Natural gas shift causes methane emissions – causes even more warming

Colman 12 (Zack, reporter for The Hill, “Natural-gas boom could isolate US on climate change”, <http://thehill.com/blogs/e2-wire/e2-wire/237601-natural-gas-boom-could-hurt-us-climate-change-efforts>) KA

The domestic national-gas boom might thin the ranks of climate change advocates and put the United States at odds with the international community on the issue, an expert said Thursday. America's insistence that natural gas will play an important role in easing the effects of climate change runs counter to European views and will likely invite “friction,” Michael Levi, program director on energy security and climate change with the Council on Foreign Relations, said during a discussion hosted by the New America Foundation. He said Europeans view natural gas as a dirty energy source. That could isolate the United States in international climate talks, Levi said. “For the most part, people in the United States who care about climate change think that natural gas is good news,” Levi said. “That is not the view in Europe. In Europe, natural gas is generally seen as a bad thing for climate change and a bad direction for the climate. On the international level, that will put us in some problems.” Natural gas emits less carbon dioxide than oil or coal when burned as an energy source. But some environmentalists fear that emissions of methane -- a potent greenhouse gas -- at well sites could erode the climate benefits of the fuel. Climate change has garnered more attention in recent weeks as abnormal weather — including droughts, fires, windstorms and record temperatures — sweeps the country. Department of Homeland Security Janet Napolitano last week said there could be a link between the extreme weather and climate change. The expansion of natural gas might also cause environmentalists most concerned about resource scarcity to drop from a coalition of groups that push for climate change policies, he said. “If that piece of the coalition that wants climate policy in place vanishes because of this sense of abundance, then I think it becomes more difficult to put good climate policy in place,” Levi said.

#### Doesn’t solve reductions at any level

Bruvoll and Larsen 03 (Annegrete and Bodil, Senior Researchers at the Research Department, Statistics Norway, “Greenhouse gas emissions in Norway: do carbon taxes work?” Energy Policy, 3/04) LA

During the last decade, Norway has carried out an ambitious climate policy. The main policy tool is a relatively high carbon tax, which was implemented already in 1991. Data for the development in CO2 emissions since then provide a unique opportunity to evaluate carbon taxes as a policy tool. To reveal the driving forces behind the changes in the three most important climate gases, CO2, methane and N2O in the period 1990–1999, we decompose the actually observed emissions changes, and use an applied general equilibrium simulation to look into the specific effect of carbon taxes. Although total emissions have increased, we find a significant reduction in emissions per unit of GDP over the period due to reduced energy intensity, changes in the energy mix and reduced process emissions. Despite considerable taxes and price increases for some fuel-types, the carbon tax effect has been modest. While the partial effect from lower energy intensity and energy mix changes was a reduction in CO2 emissions of 14 percent, the carbon taxes contributed to only 2 percent reduction. This relatively small effect relates to extensive tax exemptions and relatively inelastic demand in the sectors in which the tax is actually implemented.

#### Carbon tax increases emissions and is economically infeasible

Tieleman 9 (Bill, writer for 24 Hr News, “Carbon-tax levy an expensive failure,” <http://vancouver.24hrs.ca/Columnists/NewsViewsAttitude/2012/07/02/19943441.html>) KA

Yet for all its environmental piety, Norway is also a prodigious polluter. Its greenhouse gas emissions have grown 15% since it adopted the carbon tax. - The Economist, January 2009 British Columbia’s unique carbon tax on gasoline and other fuels went up another 1.1 cents a litre Sunday, but it remains an expensive, ineffective and unpopular failure. While the BC Liberal government is attempting to make the proverbial silk purse from a sow’s ear, the reality is the carbon tax is not reducing vehicle fuel consumption. Nor is it helping improve the environment, since every cent of the $1.17 billion in tax revenue raised this year goes to corporate and personal tax cuts – not to fund a single environmentally friendly program, such as public transit, energy efficiency or conservation. Statistics Canada figures show what happened. In 2008 – the carbon tax’s inaugural year – B.C. motor gasoline sales were 4,529.8 in thousands of cubic metres. Last year they totaled 4,536.8 thousand cubic metres. Gas sales went up, not down, under the carbon tax, despite a tough economic recession that reduced consumption. Nonetheless, B.C. Environment Minister Terry Lake claims success, arguing greenhouse gas emissions have dropped 4.5% between 2007 and 2010. But even Lake doesn’t deny that two-thirds of the GHG drop was “likely attributable” to the economic downturn, not the carbon tax. Mark Jaccard, a Simon Fraser University environmental economics professor who strongly supports the carbon tax, forecasts it will take 20 years to determine if it works. “It would be shocking if a carbon tax had made a difference in a couple of years and it hasn't." It would also be shocking if the BC Liberals admitted their own hypocrisy and either fixed or scrapped the carbon tax. While paying lip service to environmental concerns, this government’s biggest single capital expenditure is building a new $3.3 billion, 10-lane Port Mann Bridge that will dramatically increase vehicle traffic. And while Victoria claims it wants to reduce GHG emissions, last month it declared fossil fuel natural gas it previously condemned as “dirty” as “clean” now – in order to power liquefied natural gas plants. So don’t count on this government making the carbon tax disappear or using the revenue for anything that would actually help reduce fuel consumption anytime soon.

#### Carbon taxes will fail in the US – too expensive

Salam 12 (Reihan, writer for National Review Online, “ The Case for (and Against) a Carbon Tax,” <http://www.nationalreview.com/agenda/309161/case-and-against-carbon-tax-reihan-salam>) KA

Jim Manzi has offered an insightful discussion of the real-world pitfalls facing a carbon tax. An approach that works in British Columbia or Denmark might not work in the United States: First, a carbon tax would be highly regressive, so you’d have to institute some kind of offset, probably an income tax credit. This is especially tricky, since you have to make sure that the marginal deadweight loss (excluding the potential AGW-related benefits) of the carbon tax is no more than the marginal deadweight loss of the offset tax, or you will create a real incremental social cost. Second, if you only taxed carbon, you’d create all kinds of perverse incentives to convert some existing production to processes that create non-CO2 greenhouse gases, so you’d actually have to make this a multi-substance GHG tax (I’ll continue to refer to it as a “carbon tax” since this is the common terminology). Third, unless you make the dubious assumption that the major developing economies enact and enforce a harmonized international tax regime, a carbon tax would lead firms to conduct some GHG-producing activities offshore, typically in countries with less efficient production facilities, thereby increasing total GHG production for the offshored activities. I attended a climate change policy conference a couple of weeks ago in which a senior EPA economist gave a rough estimate that about 20% of GHG production subject to a tax in the US would leak in this manner. None of this complexity is insurmountable, but consider that the idea of “let’s tax each person a given percentage of annual income” sounds pretty simple too, but annual income tax compliance costs on the US are currently estimated to be as high as $100 billion. Assuming we do not actually do away with some other major class of taxation, imposing a carbon tax means imposing significant incremental compliance costs. Jim goes on to observe, among other things, that we don’t have a very good sense of how to set an appropriate price for carbon, in part because we know very little about climate sensitivity.

### AT: Both

#### Doesn’t solve the environment and kills economy—empirics

Bruvoll and Larsen 3 (Annegrete and Bodil, Senior Researchers at the Research Department, Statistics Norway, “Greenhouse gas emissions in Norway: do carbon taxes work?” Energy Policy, 3/04) LA

In the wake of the Brundtland commission ([United Nations (1987)]), Norway has been one of the most devoted advocates for more ambitious climate policies. Carbon taxes were implemented in 1991 and received broad attention in the policy debate. The highest carbon tax rate was US$51 per tonne CO2 in 1999, and the average tax was US$21 per tonne CO2. This is among the highest carbon taxes in the world, and average tax is three to four times higher than the most common estimates for the quota price in the Kyoto Protocol. Our study shows that despite politically ambitious carbon taxes, this policy measure hashad only a modest influence on GHG emissions**.** The Norwegian emissions of CO2 increased by 19 percent from 1990 to 1999. This growth is significantly lower than the GDP growth of 35 percent. In other words, average emissions per unit GDP was reduced by 12 percent over the period. We find that the most important emission-reducing factors are more efficient use of energy and a substitution towards less carbon intensive energy. The energy intensity and energy mix components contributed to a reduction in CO2 emissions over the period by 14 percent. The effect of carbon taxes on these emission-reducing components has been small. The model simulations indicate that the carbon tax contributed to a reduction in emissions of 2.3 percent. Also, the effect of the carbon taxes in Norway is strongly dominated by the Norwegian oil and gas sector. For onshore sectors only, the carbon tax effect on emissions is 1.5 percent. In light of the belief that the carbon taxes have been both considerable and pioneering, these results might seem surprising**.** The small effects are partly related to the exemption from the carbon tax for a broad range of fossil fuel intensive industries, exemptions which have been principally motivated by concern about competitiveness. The industries, in which we expect the carbon tax to be most efficient in terms of downscaling of the production and reduced emissions, are the same industries that are exempted from the carbon tax. The zero-tax industries consist mainly of the process industry, which explains why there is a close to zero effect of the tax on process-related CO2 emissions. If the metal sector and industrial chemicals had not been exempted from the carbon tax, a large share of these sectors could be unprofitable ([Bye and Nyborg (1999)]; [Sutherland (1998)]). Likewise, the low possibilities to substitute from heating oil for fishing and sea transport indicate that a tax would have reduced the production level in these industries. Manufacture of pulp and paper faces a reduced tax rate, but can substitute to electricity and machinery. A higher tax would probably both have reduced the emissions through the energy mix and energy intensity. In contrast, gasoline is taxed at a considerable rate that constitutes 13 percent of the price. The households’ possibility to reduce the energy intensity through substituting new cars for gasoline is limited. According to our model study, we may conclude that the taxes as they are executed have limited effect, and the sectors where the tax would have been efficient, are exempted. When we consider the emissions of all greenhouse gases, policy measures aimed at reducing other emissions than CO2 seem to have been more efficient than the carbon taxes. For example, abatement of landfill gases, and regulations of the process industries have significantly slowed down or reduced climate gas emissions ([Ministry of Environment (2002)]). Not only have these direct regulations proven far more successful, but they have also been carried out at significantly lower costs per tonne CO2 ([Bruvoll and Bye (1998)]). In comparison, the low emission effect from the high carbon taxes implies high costs from the sources on which the tax is levied. This comparison also shows that the lack of coordination of the multiple climate gas reducing instruments entails a large spread in the marginal abatement costs. A coordination of both the different instruments and a less differentiated carbon tax would improve the cost efficiency in the climate gas policy.

### Links to Politics

#### Carbon tax is incredibly unpopular—Republicans hate it and Democrats won’t touch it

Sheridan 11 (Greg, quoting Jim Sensenbrenner a Congressional Representative, Foreign Editor of the Australian, “Carbon tax is economic disarmament: Republican,” The Australian, 6/27/11) LA

AUSTRALIA will be embracing “unilateral economic disarmament'' if it adopts a carbon tax, says the key US Republican congressman on climate change. In a devastating judgment for the Gillard government's carbon tax plans, Jim Sensenbrenner told The Australian the US had turned its back on a carbon tax. Mr Sensenbrenner said cap and trade -- the US term for an emissions-trading scheme -- was “dead in the US''. “Any kind of direct carbon tax is dead in the US,'' he said. He said the Republicans, who oppose an ETS, had won every coal seat in congress in last year's election -- seats the Democrats would need to win back if they were to regain a majority in the House of Representatives. Mr Sensenbrenner believes climate change stopped former US vice-president Al Gore from becoming president in 2000. “George W. Bush won the presidency by winning West Virginia, which had never voted Republican in a presidential race, unless it was for an incumbent Republican, since 1928,'' he said. “Gore's close association with the Kyoto process lost him West Virginia. If Gore had won West Virginia, he would have been president.'' Mr Sensenbrenner is a key figure in the US politics of climate change. He led the US congressional delegation to Kyoto, is a former chairman of the congressional science committee and judiciary committee, and was the senior Republican on the climate change committee until it was abolished when the Republicans won control of the house last year. Mr Sensenbrenner believes Barack Obama's climate change target, to reduce greenhouse gas emissions on 2005 levels by 17 per cent by 2020, will neither be achieved nor approached. “The target is unrealistic,'' he said. Mr Sensenbrenner's comments point to the possibility that generalised pledges on climate change action by other countries will not be realised, whereas the report by the government's adviser, Ross Garnaut, takes all such pledges at face value. It is Professor Garnaut's assessment that allows Canberra to claim other nations are taking action on climate change. A senior strategist for the Democratic Party in Washington has confirmed that neither Mr Obama nor congressional Democrats would campaign for a carbon price in next year's presidential and congressional elections.

### Carbon Taxes Unpopular

#### Carbon taxes are very unpopular - Australia proves.

Grubel 7/2 (James, Senior Correspondent, Canberra, "Australian PM campaigns to sell unpopular carbon tax" Reuters, http://www.reuters.com/article/2012/07/02/us-australia-carbon-idUSBRE85T0LH20120702) BSB

(Reuters) - Australian Prime Minister Julia Gillard began an election-style campaign on Monday to promote a tax on carbon emissions, with her political survival hanging on a program highly unpopular with both industry and voters. Gillard's poll rating remains near record lows and some 2,000 protesters denounced the tax when they marched through Sydney on Sunday, the day the tax came into force. The carbon price applies to nearly 300 companies and city councils. It is designed to fight global warming and help curb carbon emissions by five percent of 2000 levels by 2020. The carbon price forces the biggest polluters, from coal-fired power stations to smelters, to pay A$23 ($23) per metric ton (1.1023 tons) of carbon dioxide emitted, more than twice the cost of carbon in the European Union, currently trading around 8.15 euros ($10) a metric ton. Gillard embarked on a round of radio and television interviews and said voters would see a muted impact of the carbon price on the economy and they would realize opposition warnings of big job losses were wrong. "People will have the opportunity to judge for themselves," she told Australian television. "And what people are going to see is tax cuts." The tax is to be superseded in 2015 by a trading scheme with international links under which companies will be able to buy permits authorizing emissions or carbon "offsets" allowing for energy savings elsewhere. SWEETENERS AND PERMITS For now, businesses will have the economic pain dulled by billions of dollars in sweeteners and free permits. Industries will get exemptions, especially those with large export volumes. Voters have also been given tax cuts to compensate for the impact of the carbon tax on prices, such as higher electricity bills. The consumer price index is forecast to rise by an extra 0.7 percentage points in the coming year. But a Nielsen poll in Fairfax newspapers on Monday found 62 percent of voters opposed the carbon price, and that Gillard's minority government would be thrown out of office if an election were called now. The conservative opposition has vowed to scrap the tax if it wins power at the next election, which is due in late 2013 but could be called at any time. From 2015, polluters and investors will be able to buy carbon offsets overseas from projects that cut emissions, like wind farms. Ultimately, they may trade with schemes in Europe, New Zealand and possibly those planned in South Korea and China. Australia has amongst the world's highest per capita CO2 emissions due to its reliance on coal-fired power stations. The companies covered, making up about 60 percent of Australia's roughly 550 million metric tons of CO2 a year, will pay a fixed price for the first three years of CO2 emissions, reaching A$25.40 a metric ton in the final year. Business groups and many big polluters, such as miners, remain vehemently opposed to the plan and uncertainty over its future is crimping investment in the power sector.

#### Carbon Taxes unpopular everywhere - EU proves

Xinhua News 12 ("Why EU carbon tax is unpopular" http://news.xinhuanet.com/english/indepth/2012-02/08/c\_131399104.htm) BSB

The European Union's decision to levy a carbon emissions fee on all airlines flying to and from Europe's airports has aroused strong suspicions and opposition globally, and has proven to be a quite unpopular move. Aviation officials from nearly 50 nations, including the United States and China, have refused to participate in the plan. The International Air Transport Association (IATA) also warned Tuesday that the EU carbon tax plan may create "an intolerable situation." To press ahead with the controversial plan, the EU has many high-sounding excuses, but it also holds some motives that cannot be admitted. The plan aimed at cutting emission initiatives helps maintain EU's moral advantage on combating global warming. In the meantime, the EU continues through carbon tax measures to keep the leading role in the world green industry.

#### Carbon Taxes would result in retaliation and resource wars

Xinhua News 12 ("Why EU carbon tax is unpopular" http://news.xinhuanet.com/english/indepth/2012-02/08/c\_131399104.htm) BSB

But if the EU takes a go-alone action, all-sided retaliation is easily expected and the impact of a trade war surrounding the carbon tax would be internecine. The unpopularity of the EU carbon tax stems from its lack of spirit for international law. Many airlines challenge the EU on the following fronts. Firstly, the EU's carbon regulations breach the sovereignty of other countries. The EU intends to tax airlines for the entire distance of their flights even though it has no rights on airspace outside of Europe. Secondly, the taxe is illegal under international treaties on air travel between the EU and other countries. Thirdly, in dealing with global warming, the EU is right to strive for a global emission cutting mechanism. But it is wrong to discard the principle of common but different responsibility and press ahead with a framework only to meet collisions on emission cuts. Another major argument is that the EU carbon tax would cost the industry 23.8 billion U.S. dollars over eight years. For international airlines that is an actual burden, and that cost would inevitably be shifted to passengers. It is estimated that the EU scheme would cost Chinese airlines an additional 800 million yuan (123 million U.S. dollars) in the first year, and a total of 17.6 billion yuan (2.71 billion dollars) by 2020. To avoid further retaliatory steps and even trade war, an internationally recognized solution should be practically negotiated through political, diplomatic and trade channels. For this, the EU needs to adopt a differentiating policy to reduce unilateralism and mercantilism as well as to increase responsibility and flexibility.

#### Carbon taxes are hated by the public - Australia proves

The Guardian 6/11 (Sydney news agency, "Julia Gillard now leads 'most unpopular Australian government in past 40 years'" http://www.guardian.co.uk/world/2011/jun/18/julia-gillard-most-unpopular-leader-australia) BSB

One year after Australian prime minister Julia Gillard ousted Kevin Rudd to become the country's first female leader, she's in serious trouble herself. The enthusiasm that greeted Gillard on a crisp June day last year has all but evaporated, with barely one in four (27%) Australians now prepared to vote for her, according to a new poll – the worst for any major federal political party in almost four decades. With a majority of just one in the hung parliament and Gillard having to rely on the support of three independents and a Greens MP to govern, a single by-election could spell disaster for her. With her personal approval rating collapsing (nearly 60% of those polled disapprove of her), Kevin Rudd is now the preferred Labor leader by a margin of two to one. Gillard has urged her colleagues to hold their nerve, suggesting that, unlike Rudd a year ago, she has a strategy to get things back on track. "We've got a plan which we are working through to deliver, which we did not have at the start of my prime ministership," she told the Sydney Morning Herald newspaper. Gillard used a newspaper interview to publicly attack the leader she overthrew a year ago, Kevin Rudd, in a move some analysts say is proof she is feeling her job is under threat. Gillard told News Corp newspapers her centre-left party "lost a sense of purpose and plan for the future" under Rudd. "We didn't have a clear plan as to how we were going to deal with a set of difficult questions or a clear plan generally about where the government was driving toward," she said. "What I've done as prime minister is inject that sense of clarity of purpose." Nick Economou, a Monash University political scientist, said Gillard's comments were evidence that her colleagues are considering replacing her. "They're gone unless something absolutely spectacular happens," Economou said of the government's prospects at the 2013 elections. "Whether bringing back Rudd is that spectacular thing, I don't think it would be," he said. "But there's still two years to go until the next election and anything is possible and they have to do something because if they don't, they'll be absolutely wiped out." Gillard's woes began in February when she announced plans for a carbon tax, having expressly ruled one out just days before last year's election.

#### Public people hate carbon taxes

The National 7/12 ("Australia's prime minister hits the road to try to sell unpopular carbon tax" http://www.thenational.ae/news/world/asia-pacific/australias-prime-minister-hits-the-road-to-try-to-sell-unpopular-carbon-tax) BSB

CANBERRA // Prime minister Julia Gillard will visit every Australian state and regional capital in the next two weeks, and will run ads on popular television shows as part of a campaign to reverse public opposition to her carbon plan. The government plans to cut taxes for workers as Ms Gillard tries to woo a public deterred by rising costs associated with a climate-change plan opposed by 60 per cent of Australians. Presenting the plan in Canberra on Sunday, she said it would include pension increases and higher payments for families in the developed world's biggest per capita polluter. Having secured the support of Greens and independent politicians whom she relies on for a majority, Ms Gillard will need to counter a campaign against the plan by the hardest hit businesses. At stake is her political future, with polls showing she is the most unpopular Australian leader in 13 years, with elections due in 2013. "This has been a long and divisive debate," Ms Gillard said during a question and answer session on Australian Broadcasting Corp, where she faced a live audience as well as emailed questions. "It's been tough. We will get this through parliament." Forty-eight per cent of voters indicated they oppose the government's proposal to price carbon from 2012, according to an Essential Media poll of 1,899 people published Monday, with 35 per cent supporting it. The poll, taken July 6-10, had a margin of error of plus or minus three percentage points.

#### Carbon tax kills popularity - Australia proves

Puhanic 7/3 (Andrew, contributor and writer for the Average Joe News, "Australians Desert the Carbon Tax" Average Joe News, http://theaveragejoenewsblogg.com/2012/07/03/australians-desert-the-carbon-tax/) BSB

Opposition to the Australian carbon tax started out at 56% after the Australian Federal Government announced the Clean Energy Legislative Package. It has now increased to more than 62 per cent. In a recent Nielsen poll, support for the carbon tax plunged to a record low of 33 per cent as Australia’s Prime Minister Julia Gillard (Greens Party advocate and supporter of world government) faces the fight of her political life to try to reconcile the public to her deeply unpopular tax. With one in two Australians believing that they will be worse off because of the carbon tax and with the current global economic uncertainty surrounding the Australian economy, no wonder business confidence in Australia is on the decline. Will the Australian Carbon Tax Be Reversed? Speculation is beginning to mount at whether or not the Australian Labor Party can retain government at the next election. A recent news poll in The Australian has revealed that Labor’s primary vote has dwindled to a record low of just 30 per cent compared to the oppositions 46 per cent. Therefore, if Australia was to repeal this Globalist-backed carbon tax, then it appears that the only way for this to occur would be via a change in Government. The leader of the opposition in Australia, Tony Abbott, has pledged to repeal the carbon tax. Mr Abbott was recently quoted as saying, “When I say during the campaign there will be no carbon tax under a government I lead, Australians can be 100 per cent certain that I am telling the truth”.

#### Carbon taxes unpopular in US

Climate Lab 9 (Climate Lab, “Carbon Tax,” <http://climatelab.org/Carbon_Tax>) KA

Carbon tax is politically unpopular in the United States. There are some politicians who are concerned with resistance from their constituencies and are worried that it would upset voters. Policy makers are also concerned that higher gas taxes would raise revenue but do little to curb pollution. On the other hand, the public is also worried the abuse of the tax revenue.7 Carbon Tax could become a revenue grab by desperate governments, that they create artificial winners and losers in the economy and that, if they are not at least done in step with other countries, they will simply drive jobs and business offshore to cheaper locales.8

### Carbon Tax --> Capital Flight

#### Carbon tax ships business overseas because other countries will not adopt it

Hunt 11 (Greg, Shadow Minister at Heritage, <http://liberal.org.au/Latest-News/2011/10/24/Removing-the-carbon-tax-will-not-be-difficult.aspx>) IGM

Far from creating certainty, the tax is both ineffective and deeply uncertain. The carbon tax is ineffective because it raises $105 billion of costs on Australian industry while simply sending investment, and therefore emissions, overseas. Moreover, the tax is itself a source of massive uncertainty in three ways. First, it is based on a fundamental assumption that the world will have a full emissions trading scheme by 2016 including the United States. This is palpably a fiction. There will be no US Cap and Trade scheme by 2020. Indeed, it is doubtful the US will vote for a massive energy tax at any time prior to 2050. Canada has just rejected such a system. Japan has deferred indefinitely, Korea has deferred and the chances of China or India adopting a carbon tax are zero. The consequence of this fiction is that the Government modelling is utterly unsustainable, will collapse - and the tax will have to rise. This means electricity will have to rise by a far greater amount than has been modelled. Second, the rate of tax is subject to variation at any time by the Government's unelected Climate Commission. A change in the targets can lead to a dramatic increase in the rate of the tax with almost no notice. That in turn creates more uncertainty for electricity prices and investment. All the tax risk is on the upside of prices and costs. Third, the rate of assistance to firms can not only be varied downwards but abolished entirely. This makes investment in trade exposed businesses even more uncertain again.

# A2: STEM/Competitiveness CP

## STEM Unpopular

#### STEM is unpopular and theres no need for it

Miller 11 (Mary Helen, Correspondent for CS Monitor, “US losing its technological edge? No!”, <http://www.csmonitor.com/Business/2011/0607/US-losing-its-technological-edge-No>!) KA

Amid some $40 billion in budget cuts in April, Congress decided to preserve a favorite – education programs for science, technology, engineering, and math. "STEM" programs, as they're called, have rare bipartisan support in a Congress worried about the United States' economic competitiveness. Business groups are pushing for more funding. President Obama has called the crisis "our generation's Sputnik moment." But what if the crisis isn't real? Political rhetoric aside, there's no lack of workers to fill technical jobs. And the pipeline of US math and science students to fill future positions has not deteriorated in terms of international competitiveness in the past 15 years. "Every time we look at these shortage claims, we can't find them," says Hal Salzman, a public policy expert at Rutgers University in New Brunswick, N.J. Nobody argues that the US couldn't do better in improving science and math education and technological competitiveness. But if the justification for pumping up STEM education is an economic one, alarmist warnings could take money away from equally deserving programs. "They're asking the government to direct a huge number of resources to increase the supply for something that's not in great demand," says Mr. Salzman. "Does that come at the expense of dealing with real problems?" That the US might be losing its technological edge has been a recurring theme since at least the Soviet launch of Sputnik 1 in 1957, which galvanized US science education. Worries reemerged in the 1980s as Japan made inroads into traditional US industries, such as automobiles. It is again a lively topic now as China challenges US primacy.

## STEM Not Needed

#### Increasing enrollment and the economy solve for STEM

McAward 10 (Tim, Vice President and Product Leader of Kelly Engineering Resources, “The future of engineering is here,” <http://www.sae.org/mags/aem/8789>) KA

Throughout the past few decades, four occupational specialties have generally combined to represent nearly half of the United States engineering workforce. To date, each of these specialties still attract a majority of American engineers: civil, mechanical, industrial, and electrical. Yet, even though 49% of all American engineers are employed by organizations that specialize in one of these four disciplines, more engineering students have either enrolled in the following five programs, or have attained degrees in one of these niche disciplines, than in the “Big Four” occupational specialties, in the last five years: • Aerospace: 30% increase in the number of graduates • Biomedical: 50% increase in the number of graduates • Chemical: 50% increase in undergraduate enrollment • Environmental: 100% increase in undergraduate enrollment • Petroleum: 100% increase in undergraduate enrollment and in the number of students graduating. In the meantime, although the manufacturing sector continues to employ the largest percentage of American engineers, many service-based industries, including professional, scientific, and technical, have begun to hire an increasing number of engineers as well. According to the Bureau of Labor Statistics Occupational Outlook Handbook for 2010, about 30% of all engineering professionals currently work in one of these industries. If engineers are not employed within the manufacturing sector or in service-based industries, they generally work for federal, state, or local governments, within a variety of capacities, including the U.S. Department of Defense, U.S. Department of Transportation, or U.S. Department of Energy; the National Aeronautics and Space Administration (NASA); or highway and public works departments. U.S. engineers approach retirement as college enrollment rates increase Many U.S. engineers are approaching the traditional retirement age of 55 or older. As a result, some well-experienced engineers are no longer working full-time, thus creating a nationwide engineering talent shortage that will lead many organizations to generate more flexible work options for their employees to retain them for longer durations of time. During the coming years, the future U.S. engineering workforce will be increasingly comprised of multiple generations of workers, including Baby Boomers and Generation X and Y employees. As engineers continue to retire and organizations search for future top talent, recent engineering graduates and current students should certainly maintain positive attitudes as they will likely find high-paying, meaningful positions, even in the midst of the ongoing national economic recession. Meanwhile, according to the American Society for Engineering Education, undergraduate engineering program enrollment rates essentially increased by 7% between the years of 2000 and 2005. Such an increase had originally led some organizations to believe that an engineering “youth movement” had begun. However, although a large number of students had enrolled into programs, enrollment increases did not translate into a higher number of graduates from 2005 to 2009. Nevertheless, the recent economic recession has truly created a spike in undergraduate engineering enrollment. In fall 2009, more than 427,000 students enrolled for collegiate engineering classes, a 6% increase over a one year period and a 16% increase since 2005. As the recession forced many unemployed workers to upgrade their current skills and to pursue new career opportunities, it appears a high number of individuals will begin their new careers within the next couple years—a sign that the current engineering labor shortage may slowly start to decrease throughout the upcoming decade.

#### American industries can innovate and adapt – no need for STEM

CRA 9 (Charles River Associates, “Innovation in Aerospace and Defense,” p. 3-4, <http://www.crai.com/uploadedFiles/Publications/innovation-in-aerospace-and-defense.pdf>) KA

As depicted in the illustration that appears as an Appendix to this paper, the aerospace and defense industry has long been a source of great innovation and continues today to produce cutting edge technologies that push the envelope of human achievement. However, at present, the indicators of innovation in aerospace and defense are mixed. Some, such as high profile program failures and an aging workforce, would suggest a looming crisis of innovation in the industry. Still others, concerning how innovators secure the necessary financial and human resources and then organize those resources for optimum results, underscore that the rules of the innovation game in aerospace and defense are changing. Together, these indicators are upsetting conventional attitudes toward innovation, and the natural friction and travail associated with the process of adapting to change are stoking anxieties. But upon closer examination one finds that there are at least as many encouraging indicators of risk-taking, innovative achievement, and successful adaptation to cast doubt on the reflexive conclusion that aerospace and defense today is experiencing a crisis in its propensity to innovate. The state of innovation in aerospace and defense is not in crisis; it is being transformed. To explore the changing nature of innovation from the 20 th to 21 st centuries, from the ColdWar to a post-9/11 world, Charles River Associates undertook a comprehensive study to assess the state of innovation in the aerospace and defense industry today. The study analyzed the trends and identified changes that are fostering the innovations that will become the 21 st century icons of progress. This White Paper is the culmination of that study. It draws on expertise from both academia and industry and includes the findings from recent interviews conducted with top executives at more than a dozen top tier firms.

## STEM Now

#### STEM is being implemented now

White House 9 (The White House, “President Obama Launches "Educate to Innovate" Campaign for Excellence in Science, Technology, Engineering & Math (Stem) Education,” <http://www.whitehouse.gov/the-press-office/president-obama-launches-educate-innovate-campaign-excellence-science-technology-en>) KA

President Obama today launched the “Educate to Innovate” campaign, a nationwide effort to help reach the administration’s goal of moving American students from the middle to the top of the pack in science and math achievement over the next decade. Speaking to key leaders of the STEM (Science, Technology, Engineering & Math) community and local students, President Obama announced a series of high-powered partnerships involving leading companies, foundations, non-profits, and science and engineering societies dedicated to motivating and inspiring young people across America to excel in science and math. “Reaffirming and strengthening America’s role as the world’s engine of scientific discovery and technological innovation is essential to meeting the challenges of this century,” said President Obama. “That’s why I am committed to making the improvement of STEM education over the next decade a national priority.” The new partnerships, with accompanying major commitments from philanthropic organizations and individuals, mark a dramatic first wave of responses to the President’s call at the National Academy of Sciences this spring for a national campaign to raise American students “from the middle to the top of the pack in science and math over the next decade.” Each of the commitments—valued together at over $260 million in financial and in-kind support—will apply new and creative methods of generating and maintaining student interest and enthusiasm in science and math, reinvigorating the pipeline of ingenuity and innovation essential to America’s success that has long been at the core of American economic leadership. Among the initiatives announced by the President are: Five public-private partnerships that harness the power of media, interactive games, hands-on learning, and 100,000 volunteers to reach more than 10 million students over the next four years, inspiring them to be the next generation of makers, discoverers, and innovators. These partnerships represent a combined commitment of over $260 million in financial and in-kind support. A commitment by leaders such as Sally Ride (the first female astronaut), Craig Barrett (former chairman of Intel), Ursula Burns (CEO, Xerox), Glenn Britt (CEO, Time Warner Cable), and Antonio Perez (CEO, Eastman Kodak) to increase the scale, scope, and impact of private-sector and philanthropic support for STEM education. This coalition, with the support of the Bill and Melinda Gates Foundation and the Carnegie Corporation of New York, will recruit private sector leaders to serve as champions for STEM at the state level; mobilize resources to help scale successful STEM innovations; and raise awareness of the importance of STEM among parents and students. An annual science fair at the White House, showcasing the student winners of national competitions in areas such as science, technology, and robotics. President Obama has identified three overarching priorities for STEM education: increasing STEM literacy so all students can think critically in science, math, engineering and technology; improving the quality of math and science teaching so American students are no longer outperformed by those in other nations; and expanding STEM education and career opportunities for underrepresented groups, including women and minorities. The Obama Administration has already taken bold action in the STEM education arena by directing that the $4.35 billion “Race to the Top” school grant program assure a competitive preference to states that commit to improving STEM education. “The Department of Education takes the STEM competitive priority very seriously – and states should as well,” said Education Secretary Arne Duncan. But while federal leadership is necessary, a real change in STEM education requires the participation of many elements of society, including governors, philanthropists, scientists, engineers, educators, and the private sector. That is why the President’s speech at the National Academy of Sciences challenged all Americans to join the cause of elevating STEM education as a national priority. “America needs a world-class STEM workforce to address the grand challenges of the 21st century, such as developing clean sources of energy that reduce our dependence on foreign oil and discovering cures for cancer,” said John Holdren, President Obama’s science advisor and director of the White House Office of Science and Technology Policy. “It is extremely gratifying to see this first and very robust set of responses to the President’s call to action.”

#### STEM is being funded already - $1 billion

Koenig 7/19/12 (Brian, writer for New American, “Obama Admin. Unveils $1-Billion “Master Teacher Corps””, <http://www.thenewamerican.com/culture/education/item/12133-obama-admin-unveils-$1-billion-%E2%80%9Cmaster-teacher-corps%E2%80%9D>)KA

The Obama administration announced a new initiative Wednesday to recruit an elite group of master educators in a $1-billion effort to bolster U.S. educational attainment in the subjects of math, science, engineering, and technology. “If America is going to compete for the jobs and industries of tomorrow, we need to make sure our children are getting the best education possible,” President Obama said when introducing the effort. “Teachers matter, and great teachers deserve our support.” The Science, Technology, Engineering, and Math (STEM) Master Teacher Corps, comprised of “some of the nation’s finest educators in STEM subjects,” is slated to launch with 50 teachers grounded in 50 different sites, with a four-year goal to reach 10,000 Master Teachers. The elite group is charged with a multi-year commitment to the corps, and in return for their service and expertise, they will receive an annual $20,000-stipend on top of their current salary. Speaking at a campaign event in San Antonio, Texas, on Tuesday, Obama emphasized an urgency to boost education funding, while blasting Republican rival Mitt Romney for preferring tax cuts to the wealthy over quality education for America’s children. “I’m running to make sure that America has the best education system on earth, from pre-K all the way to post-graduate,” the president declared. “And that means hiring new teachers, especially in math and science.” The White House expounded on the program, explaining that the underlying goal is to generate a breeding effect in which highly skilled educators share their expertise with other teachers, generating a more expansive educational quality for students across the nation: Today, the Administration also announced that the President will immediately dedicate approximately $100 million of the existing Teacher Incentive Fund toward helping school districts implement high-quality plans to establish career ladders that identify, develop, and leverage highly effective STEM teachers. With an application deadline of July 27th, over 30 school districts across America have already signaled their interest in competing for funding to identify and compensate highly effective teachers who can model and mentor STEM instruction for their teaching peers, providing those teachers with additional compensation, recognition, and responsibilities in their schools. According to Roberto Rodriguez, an assistant to the president in education policy, STEM teachers will be chosen among local education leaders and will spend at least four years in the role. "They'll be an elite group of teachers leading their communities,” Rodriguez affirmed. “They'd lead professional development [courses], mentorship activities, and would be regularly contributing new lesson plans and strategies to transform and improve science and math teaching.” Over the long term, the administration plans to propel the initiative with $1 billion included in the president’s 2013 budget request. However, both chambers of Congress struck down Obama’s budget earlier this year, posing a serious obstacle for his ability to get congressional approval for the program's $1-billion price tag.

#### STEM is being funded now and future funding will come

Bienstock 12 (Jordan, writer for CNN, “Obama administration announces STEM teacher corps”, <http://schoolsofthought.blogs.cnn.com/2012/07/18/obama-administration-announces-stem-teacher-corps/>) KA

President Obama’s administration has announced plans for a national Science, Technology, Engineering and Math (STEM) Master Teacher Corps. The effort is part of the administration’s plan to recruit, recognize and reward leading educators in these fields. Plans are for the STEM Master Corps to begin with 2,500 members - 50 teachers from each of 50 different sites - and then expand to 10,000 master teachers within four years. The Department of Education said it will work with nonprofit organizations, along with business partners and school districts, to identify teachers for the Corps through a competitive selection process. Membership will require a multi-year commitment from educators, who will receive up to $20,000 in compensation above their base salary, as well as other rewards. In return, these teachers will be required to offer their expertise and leadership to promote and expand STEM education. Administration officials say STEM Master Corps members will develop new lesson plans and strategies to improve science and math teaching. They will also run mentor programs for fellow STEM teachers and lead professional development programs. Rep. John Kline (R-MN), chairman of the House Education and the Workforce Committee, said Republicans share President Obama’s goal of recruiting better teachers, but he raised concerns about funding an initiative that may duplicate current programs. “A 2011 Government Accountability Office (GAO) report identified 82 existing teacher quality programs,” said Alexandra Sollberger, Chairman Kline’s spokesperson. “Many of the programs overlap, and little effort has been made to determine whether the programs were actually effective.” Rep. Mike Honda (D-CA), a former science teacher, applauded the announcement of the STEM Master Teacher Corps. “I know how important investing in STEM education is to our nation’s future,” Rep. Honda told CNN. He said that through initiatives like this one, “we are building a firm foundation of technologically literate and skilled Americans ready to continue American innovation and excellence.” White House officials plan to launch the STEM Master Teacher Corps with $1 billion from President Obama’s 2013 budget request, which is currently before Congress.

#### Obama already funding STEM

Hewitt 7/18/12 (Elizabeth, reporter for the Slatest, “Obama Wants $1 Billion for "Master Teachers Corps"”, <http://slatest.slate.com/posts/2012/07/18/master_teachers_corps_new_obama_intiative_would_reward_nation_s_top_teachers_in_math_science_techonology_and_engineering_.html>) KA

The White House on Wednesday unveiled a proposal to create a national elite teachers corps that would celebrate the achievements of the nation’s top educators in science, technology, engineering, and math, Bloomberg reports. The 50 top teachers in each field selected for the Master Teacher Corps would receive a stipend of $20,000 added on to their salaries and must commit for multiple years. The Obama administration plans to expand the corps to 10,000 over the next four years, with the ultimate goal that the elite group of teachers will pass their knowledge and skills on to their colleagues to help bolster the quality of teaching nationwide. On the campaign trail, President Obama has pledged to protect and expand funding for education programs, particularly in science and math, and charges that Mitt Romney’s tax and spending plan would mean inevitable cuts in the field, the Associated Press notes. Already, the administration has earmarked $100,000 for the program out of an existing fund to incentivize quality teaching, and plans to include $1 billion for funding the initiative in the 2013 annual budget request to Congress.

## No Solvency

#### STEM cant solve – need other programs that help creativity

Rasmus 12 (Daniel W., Director of Business Insights at Microsoft Corporation, “How Innovation Is More Poetry Than Science,” <http://www.fastcompany.com/1843017/how-innovation-is-more-poetry-than-science?partner=rss>) KA

In a recent conversation with Phil McKinney, former HP Chief Innovation Officer and author of Beyond the Obvious: Killer Questions That Spark Game-Changing Innovation, we discussed innovation and theory. McKinney said that much of the literature about innovation comes from theorists, not practitioners. I responded that some of us assert practical innovation insights informed by very different experiences. Rather than learning about innovation through an Executive Innovation MBA program, or receiving an MBA in Innovation Management, I sat in hours of workshop classes learning to write poetry. The experience of reading, writing, reviewing and publishing poetry has informed all of the innovations that I have had the pleasure helping co-create, from the Surface Mount Assembly Reasoning Tool (SMART) at Western Digital to the Center for Information Work at Microsoft. American state and national legislators and leaders relentlessly harp on the need for STEM (an acronym for Science, Technology, Engineering and Math that suffers as a marketing tool due to its meaningless abstraction), but this mindset does not recognize the need for well-rounded, culturally connected, researchers and readers who extend themselves beyond simple categories of knowledge in order to create innovation. Poetry does not find valor under the auspices of STEM. Our future is as much threatened by the lack of imaginative connection making as it is from a dearth of engineers or mathematicians.

#### STEM teachers use lecturing which fails – students hate it

Fairweather 8+ (James, Michigan State University, “Linking Evidence and Promising Practices in Science, Technology, Engineering, and

Mathematics (STEM) Undergraduate Education ,” <http://www7.nationalacademies.org/bose/Fairweather_CommissionedPaper.pdf>) KA

Do we need more evidence about the relative effectiveness of particular types of active and collaborative instructional strategies? Perhaps. If the reform goal is to help STEM faculty members already committed to effective instruction to choose the better of two pedagogical options then evidence about their relative effectiveness may be useful. As I stated above, these faculty members by and large are not causing the problems in STEM education. In contrast, we do not need additional evidence that almost any active or collaborative approach will result in better learning outcomes than the dominant pedagogical approach in STEM, the lecture. Such evidence already exists. As Massy & Zemsky (1994), David Leslie (2002), and I (Fairweather, 2005) have shown, faculty members currently unwilling to engage in newer, more effective pedagogical practices are unlikely to change their instructional approach because of empirical evidence. Instead, these faculty members respond to the larger reward structure in which they work. The key levers to promote changes in attitudes and behavior toward teaching among this large group of STEM faculty is more likely to rest on work allocation and rewards than on evidence of instructional effectiveness. After all, existing evidence about the relative ineffectiveness of the dominant teaching method in STEM, lecturing, has not led to dramatic changes in the use of that technique.

## STEM Bad for Women

#### Women are underrepresented in STEM

Ceci, Williams and Barnett 9 (Stephen J., Wendy M., and Susan M., Cornell University, “Women’s Underrepresentation in Science: Sociocultural and Biological Considerations”, Psychological Bulletin, Vol. 135, No. 2, 218–261, <http://www.apa.org/pubs/journals/releases/bul1352218.pdf>) LL

Underrepresentation of women is even worse farther along the science career path. At the top 50 U.S. universities, the proportion of female full professorships in math-intensive fields ranges from 3% to 15% (Science and Engineering Indicators; National Science Foundation, 2005, 2006). Moreover, although women obtain nearly 30% of the doctorates in chemistry, “the further you go up the ladder of prestige and seniority, the less encouraging are the numbers” (Cavallaro, Hansen, & Wenner, 2007, p. 21). Numerous scholars have opined about the causes of the underrepresentation of women in science and particularly in mathintensive STEM (science, technology, engineering, and mathematics) fields. Hypotheses span biological factors (e.g., effects of brain organization, evolutionary pressures, and prenatal hormones; Eals & Silverman, 1994; Finegan, Niccols, & Sitarenios, 1992) to social factors (e.g., effects of cultural beliefs, discrimination, and stereotypes). In this article, we attempt to reconcile conflicting evidence about causes for women’s underrepresentation as professionals. Unlike other efforts to resolve the debate on this topic (Halpern et al., 2007; Rhoads, 2004; Shalala et al., 2007; Spelke, 2005), our approach consisted of developing a framework to organize qualitative and quantitative evidence from the disciplines of psychology, education, sociology, anthropology, neuroscience, endocrinology, and economics into a causal chain and then evaluating this evidence in terms of the importance of each factor and the strength of the evidence for its effect. Over 400 studies served as inputs, including approximately 2 0 meta-analyses (and several meta-analyses of meta-analyses).

# A2: Nanotech

## Nanotech Leads to War

#### Nanotech research leads to international development of nanotech

**Wilson 4** (Specialist in Technology and National Security Foreign Affairs, Defense, and Trade Division at the Congressional Research Service (6/2/2004, Clay, “Network Centric Warfare: Background and Oversight Issues for Congress”, <http://fpc.state.gov/documents/organization/33858.pdf>)

Does the Administration’s strategy for implementing NCW incorporate the right technologies and acquisition strategy? Future research into areas such as nanotechnology will likely lead to radically new innovations in material science, fabrication, and computer architecture. However, the basic research to develop new technologies requires high-risk investment, and increasingly involves international collaboration. To maintain a U.S. military advantage for NCW may require stronger policies that encourage education in science and high-technology, and that nurture long-term research that is bounded within the United States private sector, universities, and government laboratories.100 (1) Technologies: Is DOD making sufficient investments for R&D in nanotechnology? Nanoscience may fundamentally alter military equipment, weapons, and operations for U.S. forces, and possibly for future U.S. adversaries. Does the Administration’s plan pay sufficient attention to creating solutions to meet bandwidth requirements for implementing NCW? Latency, which is often caused by a bandwidth bottleneck, is an important complaint of fighters, “once the shooting starts.” How do messages that are either dropped, lost, or delayed during transmission alter the effectiveness of Network Centric Operations?

#### Nanoweapons lead to extinction

**Navrozov 8** (Lev, worker with the Center for the Survival of Western Democracies, Future Wars Will Be Waged With Nano-Weapons, 9/5/08, accessed 11/17/10, <http://www.newsmax.com/navrozov/drexler-nanotechnology/2008/09/05/id/325194>)

Now, the general title of Drexler’s book is “Engines of Creation,” and only one chapter (Chapter 11) was entitled “The Engines of Destruction.” I was interested in this particular chapter, since the very survival of the United States and the rest of the free world depends on superior “engines of destruction,” that is, nano-weaponry. When Drexler finished his presentation (about the "Engines of Creation"), I raised my hand to speak, and I heard the editor of a nano-magazine whispering, in a theatrical manner, say, “Now, run for cover!” I asked Drexler why in his speech he did not mention the “Engines of Destruction”; that is, nano-weapons for the defense of the United States and the free West in general. Drexler’s answer was that when the engines of creation had been realized universally, the problem of world peace would have also been solved, and so there would be no need for the nano-engines of destruction. On a more historical note, let us recall that England became in the 17th century a strong military power due to its Industrial Revolution (spinning and weaving machines, Watt’s steam engine, the railway locomotive, and the factory system with its assembly lines). Arms that used explosives were called “firearms.” That was what war was like for about four centuries, including the past century: steel contraptions blasted out — by means of explosives — bullets, shells, bombs, etc., to kill enemy soldiers and destroy enemy installations. Nano-weaponry makes it all as obsolete as firearms made bows obsolete in the 17th century. Originally, Drexler included “Engines of Destruction” in his book but then took it out, possibly for fear of being viewed as a militarist. However, on his Web site, KurzweilAI.net, Ray Kurzweil, an admirer of Drexler and a scientist of genius in his own right, publishes Chapter 11. In Chapter 11, Eric Drexler writes that nano-weapons “can be more potent than nuclear weapons: to devastate Earth with [nuclear] bombs would require masses of exotic hardware and rare isotopes, but to destroy all life with [nano] replicators would require only a single speck made of ordinary elements.” We also read, “A [nuclear] bomb can only blast things, but nanomachines . . . could be used to infiltrate, seize, change, and govern a territory or a world.” The epigraph to “Engines of Destruction,” taken from Sir William Perry and dated by 1640, says, "Nor do I doubt if the most formidable armies ever heere [sic] upon earth is a sort of soldiers who for their smallness are not visible." To compare the size of Drexler’s “nano-soldiers” with that of microbes? The unit of molecular nanotechnology is a molecule. Drexler proceeded from the fact that a molecule contains space, which can be filled, thus converting the molecule into a mobile computer and God knows what else. Yet compared with a molecule, a microbe is a giant: Even before Drexler’s studies, one nanocentimeter meant one billionth of a centimeter. All this may seem miraculous in 2008 just as firearms seemed miraculous in 1646. Yet the new epoch has come: The future world war will be a war of nano-weapons, not of firearms.

#### Nanotechnology causes Armageddon – the race to build up technology leads to continuous military confrontation and renders arms control and diplomacy useless

GUBRUD 97 (Center for Superconductivity Research) 1997 [Mark Avrum, “Nanotechnology and International Security”, foresight.org //wfi-tjc])

Interstate conflicts, confrontations and rivalries have a life of their own. Military confrontation can be dynamically stable or unstable simply with regard to possible military moves: rearmament, mobilization, readiness, forward deployment, preemptive seizure of territory, or full-scale attack. Military threats interact with political processes in cycles that can be escalatory or deescalatory. A country that is completely at the mercy of a stronger power may seek accomodation when threatened, yet the escalation of military threat generally leads to more hostile attitudes when the two sides are more or less equally matched, even when the cost of a war would be unacceptably high to both. The history of the Cold War provides ample evidence of both sides of this paradox. It also shows that, in spite of intense rivalry, hostility, and covert warfare, nuclear confronters will be deterred from open combat and will eventually seek detente when both are completely at the mercy of a stronger power — nuclear weapons. But finally, the many crises of the Cold War, particularly the 1962 crisis, and the long human history of disastrous wars blundered into by combinations of accident, misunderstanding, miscalculation and hubris, provides ample warning that holocaust is possible. On the assumption of stochasticity, given enough time and circumstances, global holocaust is a likely eventuality, as long as nations confront each other with arms and with threats. Even in the total absence of political conflict or ill-will, merely that fact that sovereign states maintain separate armed forces under separate command, within reach of each other and able to attack each other, contains the germ of a possible confrontation, arms race, and war. With the advent of molecular manufacturing, nations that possess the technology will be able to greatly increase the size and quality of their arsenals in a short period of time. Unless they are controlled from doing so under some system of international agreement, it is very likely that they will begin to build up more credible armed forces, perhaps slowly and cautiously at first — but others will note the development and respond with similar increases. Soon the nanotechnic powers can be doubling and redoubling the size of the threats they pose to non-nanotechnic neighbors while imposing very low costs on themselves. Given the very large potential for expansion of arsenals by the use of a self-replicating manufacturing base, nanotechnic powers which do not engage in a very dramatic buildup will be artificially restraining themselves. It seems very unlikely that a large (orders of magnitude) gap between potential (at low-cost) and actual military production will be sustained for long. No doubt the potential for disaster will be well foreseen, but so was the potential for nuclear disaster, and yet a combination of distrust, arrogance, and rapid technological progress made it impossible to slow the nuclear arms race before it reached the level of thousands of missiles minutes from their targets, the geopolitical equivalent of a high-noon standoff, a "balance of terror" which exacted a vast and unaccounted cost in collective neurosis, and which remains in effect to this day, in spite of the much ballyhooed Cold War "victory." The failure of the Security Council "allies" to effect radical nuclear disarmament at a time when no conflicts of interest serious enough to engender a war, hot or cold, exist, is not encouraging with respect to the prospects for avoiding a nanotechnic arms race. A race to develop early military applications of molecular manufacturing could yield sudden breakthroughs, leading to the abrupt emergence of new and unfamiliar threats, and provoking political and military reactions which further reinforce a cycle of competition and confrontation. A very rapid pace of technological change destabilizes the political-military balance. Revolutionary new types of weaponry, fear of what a competitor may be doing in secret, tense nerves and worst-case analyses, the complexity of technical issues, the unfamiliarity of new circumstances and resistance to the demands they make, may overwhelm the cumbersome processes of diplomacy and arms control, or even of intelligence gathering and assessment, formulation of measured responses and establishment of political consensus behind them. A runaway military technological revolution must at some point escape the grasp of even wise decisionmakers.

#### The dynamics of nanotechnology cause preemption and arms races

GUBRUD 97 (Center for Superconductivity Research) 1997 [Mark Avrum, “Nanotechnology and International Security”, foresight.org //wfi-tjc])

From a purely military perspective, in the absence of a "balance of terror" which inhibits action in spite of military logic that compels it, a confrontation between more or less equally advanced terrestrial nanotechnology powers could be unstable to preemption as a result of the special dynamics of production based on self-replicating systems, and the high levels of armament that it would be capable of producing. It might be impossible to maintain an armed peace at low levels of armament without a very strong arms control regime, including highly intrusive verification provisions; further, it might be impossible to constrain a runaway arms race from breaking out into a general war.

## No Grey Goo/Replication

#### No grey goo

Center for Responsible Nanotechnology 3 (12/14/03, “BRIEFING DOCUMENT: DECEMBER 14, 2003 Grey Goo is a Small Issue”, http://www.crnano.org/BD-Goo.htm)

Fear of runaway nanobots, or “grey goo”, is more of a public issue than a scientific problem. Grey goo as a result of out of control nanotechnology played a starring role in an article titled "The Grey Goo Problem" by Lawrence Osborne in today's New York Times Magazine. This article and other recent fictional portrayals of grey goo, as well as statements by scientists such as Richard Smalley, are signs of significant public concern. But although biosphere-eating goo is a gripping story, current molecular manufacturing proposals contain nothing even similar to grey goo. The idea that nanotechnology manufacturing systems could run amok is based on outdated information. The earliest proposals for molecular manufacturing technologies echoed biological systems. Huge numbers of tiny robots called “assemblers” would self-replicate, then work together to build large products, much like termites building a termite mound. Such systems appeared to run the risk of going out of control, perhaps even “eating” large portions of the biosphere. Eric Drexler warned in 1986, “We cannot afford certain kinds of accidents with replicating assemblers.” Since then, however, Drexler and others have developed models for making safer and more efficient machine-like systems that resemble an assembly line in a factory more than anything biological. These mechanical designs were described in detail in Drexler's 1992 seminal reference work, Nanosystems, which does not even mention free-floating autonomous assemblers. Replicating assemblers will not be used for manufacturing. Factory designs using integrated nanotechnology will be much more efficient at building products, and a personal nanofactory is nothing like a grey goo nanobot. A stationary tabletop factory using only preprocessed chemicals would be both safer and easier to build. Like a drill press or a lathe, such a system could not run wild. Systems like this are the basis for responsible molecular manufacturing proposals. To evaluate Eric Drexler's technical ideas on the basis of grey goo is to miss the far more important policy issues created by general-purpose nanoscale manufacturing. A grey goo robot would face a much harder task than merely replicating itself. It would also have to survive in the environment, move around, and convert what it finds into raw materials and power. This would require sophisticated chemistry. None of these functions would be part of a molecular manufacturing system. A grey goo robot would also require a relatively large computer to store and process the full blueprint of such a complex device. A nanobot or nanomachine missing any part of this functionality could not function as grey goo. Development and use of molecular manufacturing will create nothing like grey goo, so it poses no risk of producing grey goo by accident at any point. However, goo type systems do not appear to be ruled out by the laws of physics, and we can't ignore the possibility that someone could deliberately combine all the requirements listed above. Drexler's 1986 statement can therefore be updated: We cannot afford criminally irresponsible misuse of powerful technologies. Having lived with the threat of nuclear weapons for half a century, we already know that. Grey goo eventually may become a concern requiring special policy. However, goo would be extremely difficult to design and build, and its replication would be inefficient. Worse and more imminent dangers may come from non-replicating nano-weaponry. Since there are numerous greater risks from molecular manufacturing that may happen almost immediately after the technology is developed, grey goo should not be a primary concern. Focusing on grey goo allows more urgent technology and security issues to remain unexplored.

#### The grey goo theory is sheer fiction

Ball 3 (Philip Ball, a science writer and a consultant editor of Nature, 6/23/03, “Nanotechnology Science's Next Frontier or Just a Load of Bull?” New Statesman, http://www.newstatesman.com/200306230018)

Such concerns say more about human nature than about nanotechnology. These fears loom large not because we are terrified, but because we are fascinated by them. Any nanotech researcher will tell you that assessing the prospects of this field on the basis of grey goo is like basing predictions of the impact of space travel on Star Trek. No one has the faintest idea how to make a replicating nanobot. "The nearest we can get to a self-replicating machine such as a mosquito is a helicopter," says Kroto--that is, big, cumbersome and not self-replicatingat all. The assembly-line approach to nanotechnology on which Drexler's grey goo idea was based, in which nanoscale robotic arms pick up and manipulate molecular fragments like so many factory components, is sheer fiction. Even Drexler no longer rates grey goo as an important concern for nanotechnology.

#### No grey goo

Pheonix and Drexler 4 (Chris Phoenix1 and Eric Drexler2, 1 Center for Responsible Nanotechnology 2 Foresight Institute, 6/9/04, “OPINION : Safe exponential manufacturing”, http://www.crnano.org/IOP%20-%20Safe%20Exp%20Mfg.pdf)

5. Safe autoproductive nanotechnology The above considerations indicate that a molecular manufacturing system, even if autoproductive, would have little resemblance to a machine capable of runaway replication. The earliest MNT fabrication systems will be microscopic, but simplicity and efficiency will favour devices that use specialized feedstocks and are directed by a stream of instructions supplied by an external computer. These systems will not even be self-replicators, because they will lack self-descriptions. As manufacturing systems are scaled up, these same engineering considerations will favour immobile, macroscopic systems of fabricators that again use specialized feedstocks. An autoproductive manufacturing system would not have to gather or process random chemicals. A device capable of runaway replication would have to contain far more functionality in a very small package. Although the possibility of building such a device does not appear to contradict any physical law, a nanofactory simply would not have the functionality required. Thus, there appears to be no technological or economic motive for producing a self-contained manufacturing system with mobility, or a built-in self-description, or the chemical processing system that would be required to convert naturally occurring materials into feedstocks suitable for molecular manufacturing systems. In developing and using molecular manufacturing, avoiding runaway replication will not be a matter of avoiding accidents or mutations, but of avoiding the deliberate construction of something dangerous. Suggestions in fiction (Crichton 2002) and the popular science press (Smalley 2001) that autoproductive nanosystems would necessarily be microscopic, uncontrollable things are contradicted by this analysis. And a machine like a desktop printer is, to say the least, unlikely to go wild, replicate, selforganize into intelligent systems, and eat people. 6. Risks of exponential manufacturing The authors do not mean to imply that advanced mechanochemical manufacturing will create no risks. On the contrary, the technology introduces several problems more severe than runaway replicators. One of the most serious risks comes from non-replicating weapons. The general rule that a product without a self-replicative capability will be more efficient than a product with such a capability applies also to weapons. A non-replicating weapon could be more rapidly destructive and harder to find, and such a thing might well be created and released deliberately. Unfortunately, there are no simple technical solutions to this problem, which involves questions of military power and political control. More broadly, general-purpose exponential manufacturing has the potential to profoundly disrupt economies and international relations. A nation making full use of this capability could see its GDP grow by thousands of per cent per year or more, with reduced dependence on foreign trade. Policymakers will have to deal with rapid and radical shifts in the ability to produce wealth and resources. Increased production capabilities could have large effects on the environment. Although mechanochemical manufacturing is expected to be clean and efficient as a result of controlling every molecule, it could be used to produce vast quantities of products—some of which could be environmentally destructive. On the other hand, wise use of the technology could substantially reduce our ecological footprint. These issues will require careful attention and policy.

#### Grey goo isn’t a threat---they don’t have the food to stay alive

Park 3 (Robert L. Park, Professor of Physics and former chairman of the Department of Physics at the University of Maryland, 2003, “End of the World?” Issues in Science and Technology, Volume: 20. Issue: 1. Publication Date: Fall 2003. Page Number: 84, <http://www.issues.org/20.1/br_park.html)\>

What follows is a set of brilliant essays forming more or less independent chapters that could be read in any order. He does not ignore the continued threat of nuclear holocaust or collision between Earth and an asteroid, but we have lived with these threats for a long time. His primary focus is on 21st century hazards, such as bioengineered pathogens, out-of-control nanomachines, or superintelligent computers. These new threats are difficult to treat because they don't yet exist and may never do so. He acknowledges that the odds of self-replicating nanorobots or "assemblers" getting loose and turning the world into a "grey-goo" of more assemblers are remote. After all, we're not close to building a nanorobot, and perhaps it can't be done. But this, Rees points out, is "Pascal's wager." The evaluation of risk requires that we multiply the odds of it happening (very small) by the number of casualties if it does (maybe the entire population). Personally, I think the grey-goo threat is zero. We are already confronted with incredibly tiny machines that devour the stuff around them and turn it into replicas of themselves. There are countless millions of these machines in every human gut. We call them bacteria and they took over Earth billions of years before humans showed up. We treat them with respect or they kill us. So why isn't Earth turned into grey-goo by bacteria? The simple answer is that they run out of food. You can't make a bacterium out of just anything, and they don't have wings or legs to go somewhere else for dinner. Unless they can hitch a ride on a wind-blown leaf or a passing animal, they stop multiplying when the local food supply runs out. Assemblers will do the same thing. You should find something else to worry about. But that's just my vote. As Rees puts it, "These scenarios may be extremely unlikely, but they raise in extreme form the issue of who should decide, and how, to proceed with experiments that have a genuine scientific purpose (and could conceivably offer practical benefits), but that pose a very tiny risk of an utterly calamitous outcome." The question of who should decide, I would argue, is the most important issue raised by this issue-filled book. Rees recounts the opposition to the first test, at Brookhaven National Laboratory, of the Relativistic Heavy Ion Collider (RHIC). The accelerator is meant to replicate, in microcosm, conditions that prevailed in the first microsecond after the Big Bang, when all the matter in the universe was squeezed into a quark-gluon plasma. However, some physicists raised the possibility that the huge concentration of energy by RHIC could initiate the destruction of Earth or even the entire universe. Every scientist agreed that this was highly unlikely, but that wasn't very comforting to the nonscientists whose taxes paid for RHIC. The universe survived, but this sort of question will come up again and again. Indeed, if we try hard enough we can probably imagine some scenario, however unlikely, that could conceivably lead to disaster in almost any experiment. Rees urges us to adopt "a circumspect attitude towards technical innovations that pose even a small threat of catastrophic downside." But putting the brakes on science, which excessive caution would do, also has a downside. The greatest natural disasters in our planet's history were the great extinctions produced by asteroid impacts. If astronomers were to discover a major asteroid headed for a certain collision with Earth in the 22nd century, we could, for the first time in history, make a serious attempt to deflect it. Had HIV appeared just a decade earlier, we would have been unable to identify the infection until fullblown symptoms of AIDS appeared. The AIDS epidemic, as terrible as it has been, would have been far, far worse.

## Nanotech Infeasible

#### Even if nanofactories don’t use ‘fingers,’ limits to the precision of chemistry makes assemblers impossible

Smalley 3 [Richard, Nobel Prize Winner, Prof. Chemistry, “Nanotechnology: Drexler and Smalley make the case for and against ‘molecular assemblers”, Chemical and Engineering News, Dec 1, vol. 81, no. 48, p. online //wfi-tjc]

I hope you will further agree that the same argument I used to show the infeasibility of tiny fingers placing one atom at a time applies also to placing larger, more complex building blocks. Since each incoming "reactive molecule" building block has multiple atoms to control during the reaction, even more fingers will be needed to make sure they do not go astray. Computer-controlled fingers will be too fat and too sticky to permit the requisite control. Fingers just can't do chemistry with the necessary finesse. Do you agree? So if the assembler doesn't use fingers, what does it use? In your letter you write that the assembler will use something "like enzymes and ribosomes." Fine, then I agree that at least now it can do precise chemistry. But where does the enzyme or ribosome entity come from in your vision of a self-replicating nanobot? Is there a living cell somewhere inside the nanobot that churns these out? There then must be liquid water present somewhere inside, and all the nutrients necessary for life. And now that we're thinking about it, how is it that the nanobot picks just the enzyme molecule it needs out of this cell, and how does it know just how to hold it and make sure it joins with the local region where the assembly is being done, in just the right fashion? How does the nanobot know when the enzyme is damaged and needs to be replaced? How does the nanobot do error detection and error correction? And what kind of chemistry can it do? Enzymes and ribosomes can only work in water, and therefore cannot build anything that is chemically unstable in water. Biology is wonderous in the vast diversity of what it can build, but it can't make a crystal of silicon, or steel, or copper, or aluminum, or titanium, or virtually any of the key materials on which modern technology is built. Without such materials, how is this self-replicating nanobot ever going to make a radio, or a laser, or an ultrafast memory, or virtually any other key component of modern technological society that isn't made of rock, wood, flesh, and bone? I can only guess that you imagine it is possible to make a molecular entity that has the superb, selective chemical-construction ability of an enzyme without the necessity of liquid water. If so, it would be helpful to all of us who take the nanobot assembler idea of "Engines of Creation" seriously if you would tell us more about this nonaqueous enzymelike chemistry. What liquid medium will you use? How are you going to replace the loss of the hydrophobic/hydrophilic, ion-solvating, hydrogen-bonding genius of water in orchestrating precise three-dimensional structures and membranes? Or do you really think it is possible to do enzymelike chemistry of arbitrary complexity with only dry surfaces and a vacuum? The central problem I see with the nanobot self-assembler then is primarily chemistry. If the nanobot is restricted to be a water-based life-form, since this is the only way its molecular assembly tools will work, then there is a long list of vulnerabilities and limitations to what it can do. If it is a non-water-based life-form, then there is a vast area of chemistry that has eluded us for centuries.

#### Practical engineering problems make construction of assembler impossible

Smalley 3 [Richard, Nobel Prize Winner, Prof. Chemistry, “Nanotechnology: Drexler and Smalley make the case for and against ‘molecular assemblers”, Chemical and Engineering News, Dec 1, vol. 81, no. 48, p. online //wfi-tjc]

You still do not appear to understand the impact of my short piece in Scientific American. Much like you can't make a boy and a girl fall in love with each other simply by pushing them together, you cannot make precise chemistry occur as desired between two molecular objects with simple mechanical motion along a few degrees of freedom in the assembler-fixed frame of reference. Chemistry, like love, is more subtle than that. You need to guide the reactants down a particular reaction coordinate, and this coordinate treads through a many-dimensional hyperspace. I agree you will get a reaction when a robot arm pushes the molecules together, but most of the time it won't be the reaction you want. You argue that "if particular conditions will yield the wrong product, one must either choose different conditions (different positions, reactants, adjacent groups) or choose another synthetic target." But in all of your writings, I have never seen a convincing argument that this list of conditions and synthetic targets that will actually work reliably with mechanosynthesis can be anything but a very, very short list. Chemistry of the complexity, richness, and precision needed to come anywhere close to making a molecular assembler--let alone a self-replicating assembler--cannot be done simply by mushing two molecular objects together. You need more control. There are too many atoms involved to handle in such a clumsy way. To control these atoms you need some sort of molecular chaperone that can also serve as a catalyst. You need a fairly large group of other atoms arranged in a complex, articulated, three-dimensional way to activate the substrate and bring in the reactant, and massage the two until they react in just the desired way. You need something very much like an enzyme. In your open letter to me you wrote, "Like enzymes and ribosomes, proposed assemblers neither have nor need these 'Smalley fingers.'" I thought for a while that you really did get it, and you realized that on the end of your robotic assembler arm you need an enzymelike tool. That is why I led you in my reply into a room to talk about real chemistry with real enzymes, trying to get you to realize the limitations of this approach. Any such system will need a liquid medium. For the enzymes we know about, that liquid will have to be water, and the types of things that can be synthesized with water around cannot be much broader than the meat and bone of biology. But, no, you don't get it. You are still in a pretend world where atoms go where you want because your computer program directs them to go there. You assume there is a way a robotic manipulator arm can do that in a vacuum, and somehow we will work out a way to have this whole thing actually be able to make another copy of itself. I have given you reasons why such an assembler cannot be built, and will not operate, using the principles you suggest. I consider that your failure to provide a working strategy indicates that you implicitly concur--even as you explicitly deny--that the idea cannot work.

#### Assemblers are impossible – laws of chemistry make precise assembly a pipedream

**Whitesides** **1** [George, Prof Chemistry @ Harvard, “the Once and Future Nanomachine”, Scientific American, Sept, p. asp//wfi-tjc]

And other problems cast long shadows. Where is the power to come from for an autonomous nanomachine? There are no electric sockets at the nanoscale. The cell uses chemical reactions of specific compounds to enable it to go about its business; a corresponding strategy for nanoscale machines remains to be developed. How would a self-replicating nanomachine store and use information? Biology has demonstrated a strategy based on DNA, so it can be done, but if one wanted a different strategy, it is not clear where to start. The assembler, with its pick-and-place pincers, eliminates the many difficulties of fabricating nanomachines and of self-replication by ignoring them: positing a machine that can make any composition and any structure by simply placing atoms one at a time dismisses the most vexing aspects of fabrication. The assembler seems, however, from the vantage of a chemist, to be unworkable. Consider just two of the constraints. First is the pincers, or jaws, of the assembler. If they are to pick up atoms with any dexterity, they should be smaller than the atoms. But the jaws must be built of atoms and are thus larger than the atom they must pick and place. (Imagine trying to build a fine watch with your fingers, unaided by tools.) Second is the nature of atoms. Atoms, especially carbon atoms, bond strongly to their neighbors. Substantial energy would be needed to pull an atom from its place (a problem for the energy supply) and substantial energy released when it is put in place (a problem of cooling). More important, a carbon atom forms bonds with almost everything. It is difficult to imagine how the jaws of the assembler would be built so that, in pulling the atoms away from their starting material, they would not stick. (Imagine trying to build your watch with parts salvaged from another watch in which all the parts were coated with a particularly sticky glue: if you could separate the pieces at all, they would stick to your fingers.) Problems with the assembler are also discussed by Richard E. Smalley in his essay on page 76.

## Nanotech Not Inevitable

#### Nano assemblers are not inevitable – bots wont be built because of fear and impossibility

Economist 4 [staff, “Nanotechnology’s Unhappy Father”, 3/13, asp//wfi-tjc]

There are all sorts of reasons why, even if Drexleresque machine-phase nanotechnology did come to pass, grey goo is not a plausible consequence. In any case, self-replicating assemblers will not come to pass soon, if ever. But that has not stopped fear of grey goo, with a little help from certain neo-Luddites, sticking in the public imagination. Even the heir to the British throne has expressed concern about nanotechnology, as a consequence of reading about grey goo. It is not likely that the grey-goo meme will stop progress, but it might. Opposition to agricultural biotechnology grew strong with almost as little scientific foundation. The other reason for concern is that the mutation of the nanotechnology meme has drawn attention--and, Dr Drexler argues, funding--away from the possibility that he might, actually, be on to something. His voice, it has to be said, is a lonely one now. A second book, "Nanosystems", published in 1992, made a good case that nanomachines would work if they could be built, but was hazy on how to get to the point where they might be. That, many mainstream chemists believe, is because making them using molecular assemblers is impossible. Their objection was outlined by Richard Smalley, of Rice University in Texas, in a recent exchange of letters with Dr Drexler in Chemical and Engineering News. Dr Smalley, whose projects include work on nanotube power-transmitters, says that considerations of geometry, the sizes of atoms, and the space available to work in mean that assemblers could never do the sorts of jobs that Dr Drexler assigns to them. Dr Drexler denies this vehemently, and claims that Dr Smalley and his supporters have misinterpreted the arguments. For the moment, though, Dr Drexler seems to have suffered the fate of prophets throughout the ages--to be not without honour except in his own country, the republic of science. At present he works from an organisation called the Foresight Institute, which he founded to explore the nanotech future. Whether he has truly seen that future remains, as it were, to be seen.

#### Opposition and investor skittishness can derail nanotechnology

BusinessWeek 4 [staff, “Nanotech: Beyond the Hype and Fear”, 5/6, asp//wfi-tjc]

Nanotechnology is surrounded by hyperbole, for good reason. It arguably shows as much promise in both science and business as any other major technology of the past century, including nuclear energy in the 1950s or genetics in the 1990s. Yet before business rushes headlong into a nano-tomorrow, an assessment of the risks nanotechnology poses to public health and the environment needs to be done. Just as nuclear waste and the flap over genetically modified foods tainted the promise of what were supposed to be transforming technologies, many people are concerned that nanomaterials could create problems if introduced without thorough testing. LESSONS LEARNED. Kristen Kulinowski is uniquely positioned to help separate nanotech hype from reality. As a chemistry faculty member and executive director for Education & Public Policy of the federally funded Center for Biological & Environmental Nanotechnology (CBEN) at Rice University, she believes that scientists are applying the lessons learned from past disappointments. Well in advance of major commercial production, testing of nanomaterials on living organisms is under way in university labs. And already, federal agencies such as the Food & Drug Administration and the Environmental Protection Agency are exploring regulation that will help ensure that commercialized nanotech is more a dream than a nightmare. Kulinowski does have concerns that in the near term -- before the basic science is even ironed out -- nanotech research could be derailed by outside factors. Already, nascent signs of dot-com style hucksterism are appearing, with companies making nanotech claims of dubious scientific merit. Conversely, Kulinowski adds, others are fearful of the perils of nanomaterials without understanding the underlying science.

#### Nano not inevitable – fears and backlash could derail it

Economist 4 [staff, “Much Ado About Almost Nothing”, asp//wfi-tjc]

On top of this, some people will worry about which companies control a revolutionary technology, and who has access to it. Concerns over patents on genes have a direct analogy in nanotechnology. In the latter case, people are expressing alarm over claims about basic nanoparticles such as "buckyballs" and carbon nanotubes. Groups such as Greenpeace and the more radical ETC (also known as the Action Group on Erosion, Technology and Concentration) are already warning about a gap developing in the future between nanotechnology "haves" and "have nots". Donald Reed is a senior consultant with Ecos, a business-advisory firm based in Sydney, Australia, that acts as an intermediary between corporations and activists. He is already working with DuPont, a large chemical firm that has interests in both agricultural biotechnology and nanotechnology. DuPont has hired Ecos to help it tackle emerging nano concerns. Mr Reed goes as far as to recommend that companies think about the early products they choose to pursue--in particular, whether they can demonstrate the "societal value" of these products. For example, it might be worth emphasising that one of the early products of nanotechnology could be cheap and efficient photovoltaic materials, which are used to generate electricity from sunlight. Mr Reed says that although only a few groups have expressed concerns about nanotechnology so far, this was also the case in the early days of biotech. If a bandwagon of fear and mistrust starts rolling, many people may jump on. Sensitive to this possibility, the British government has commissioned a study into the issues raised by nanotechnology. Scientists and engineers involved have already pointed out that public perceptions are a potential barrier to progress. In Europe and America, there is the growing sense that one of the most important lessons of the fierce opposition with which biotechnology has met is that, if science is seen to be progressing too fast, and too far beyond current knowledge, there will be pressure for legislation. If public concern seems trivial at the moment, it is worth remembering the power of the media to inspire alarm. "Jurassic Park", a movie based on a book by Michael Crichton, did a great deal to generate interest and concern over biotechnology. Ironically, the author's latest tome is about nanotech. There is no release date, yet, but the film is in pre-production.

**Despite research, backlash can still prevent nanotechnology – nano scientists agree**

Zachary 3 [G. Pascal, “Ethics for a Very Small World”, Foreign Policy, July/August, asp//wfi-tjc]

Nanotechnology is a field devoted to the design and manufacture of tiny machines, which could be as small as a few molecules and are created out of both organic and inorganic matter. The promise of these nanomachines is staggering: Injected into the human body, they could repair organs and fight disease. Sent into outer space, under water, or into other environments, they could mine valuable resources or clean up pollution. Applied to information technology, they might empower mobile phones or wrist watches to tackle problems once the preserve of supercomputers. Already, products from sunblock to computer displays contain nanoscale materials. In 2004, technology giant Hewlett-Packard will have prototypes of a computer memory device that uses nanoelectronic parts to store thousands of times more data than can the conventional electronic memory now used in computers. And the U.S. House of Representatives recently approved more than $2.3 billion for further nanotech research and development. The trouble, of course, is that these machines might go awry. Like Frankenstein's monster, they might display a "mind of their own," to draw on a frequent motif of science fiction and Hollywood. Nanomachines might wreak havoc on our bodies and environment. Terrorists might even harness this technology to nefarious ends. Thus, the argument against these invisible gremlins, like the one some activists make against genetically modified foods, is simple: Why mess with them? It is precisely because the neo-Luddite argument seems so sensible that scientists in the nanotech community have taken the offensive, presenting probing analyses of the risk-reward ratio of innovation in small machines. One example is "Mind the Gap: Science and Ethics in Nanotechnology," an article published in a recent issue of Nanotechnology, a leading and well-respected monthly journal in the field. The authors, Anisa Mnyusiwalla, Abdallah S. Daar, and Peter A. Singer, are a trio of medical professors and specialists in bioethics at the University of Toronto. They cite a Nobel laureate in chemistry, who believes that nanotechnology will have "at least" as great an impact as the computer on humanity, to bolster their claim that a growing backlash against the technology is a cause for worry. The authors fear that a terrified public might back a halt to nanotech research, thus robbing future generations of great benefits.

## Nanotech Long-term

#### Assemblers are too far off to be a consideration now

Whitesides 1 [George, Prof Chemistry @ Harvard, “the Once and Future Nanomachine”, Scientific American, Sept, p. asp//wfi-tjc]

Can we ever approach the elegant efficiency of cellular nanomachines by creating tiny cousins of the larger machines we have invented? Microfabrication has developed as an extraordinarily successful technology for manufacturing small, electronically functional devices--transistors and the other components of chips. Application of these techniques to simple types of machines with moving parts--mechanical oscillators and movable mirrors--has been technically successful. The development of these so-called microelectromechanical systems (MEMS) is proceeding rapidly, but the functions of the machines are still elementary, and they are micro, not nano, machines. The first true nanoscale MEMS (NEMS, or nanoelectromechanical systems) have been built only in the past few years and only experimentally [see "Plenty of Room, Indeed," on page 48].

#### Nanotech takes too long to develop

Equator Communications 7 (Equator Communications, “Very long time to market for nanotechnology applications,” <http://www.nanowerk.com/news/newsid=3594.php>) KA

The applications of Nanotechnology extends from sensors, displays, transistors, data storage, storage of hydrogen for fuel cells, photovoltaic cells for harnessing solar energy, water purification to steel and rocket propellants. Nanotechnology companies across the world are realizing 7-10 years are not enough to take a potential research finding to the market as a product. This view was expressed by a congregation of Investors, Scientists, Heads of Research & Development Organizations, senior executives from the Industry, etc on the 2nd day of Bangalore Nano 2007. Speaking on the topic, Venture Capital in Materials Science and Nanotechnology, Prof. Anthony K. Cheetham, Dept. of Materials Science and Metallurgy, University of Cambridge said, “It is easy to spot the commercial potential of a research finding in Nanotechnology, but the time to market is very long. It is illustrated by lack of commercial success of many start ups in the nanotechnology area.” Illustrating on various applications of Nanotechnology, Prof. Cheetham said, “Nanomaterials can be made into nanoparticles, nanotubes, nanowires, nanorods and nanosheets. Nanotubes can substitute steel as they are 10 times stronger than steel and 6 times lighter. Nanocrystals of aluminum could be used for rocket propellants.” He also said, “Earlier emphasis of Venture Capitals was on investments in the nanomaterials and nanotechnology area. In last 2-3 years emphasis shifted towards cleantech area, with applications in solar energy, water treatment, energy storage, fuel cells, emission controls, etc. There are also some unanswered questions concerning toxicology issues as well as societal concerns.” In the conference there evolved a consensus that the economic results of nanotechnology looks more certain compared to Information Technology and thus there is no dearth of funding by private and government. The US federal funding for Nanotechnology is $800 million per annum. Japanese government also funds the same amount. Europe has a funding of $1.2 billion per annum. In China funds of $150 million are available from both private and government per annum while India has an outlay of $ 100 million per annum.