



ISSP Insight

*Taking sustainability to the next level,
making it standard practice in all organizations.*

FEATURED ARTICLE

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Using Green to Re-energize Lean: Why focusing on sustainability can yield better results than Lean alone

By **Darcy Hitchcock**

International Society of Sustainability Professionals and President of AXIS Performance Advisors

Interview with Ian Young, *Insights to Excellence (i2e) Ltd.*, based in Melbourne, Australia

Ian Young gets to hang out with leaders of the best companies in Australia. While many of them have been using Lean concepts to improve their performance, they have found that focusing on sustainability has super-charged their efforts and inspired a new wave of innovation from their employees. Find out why.

What is Insights to Excellence?

Darcy: *Tell me a bit about your organization, Insights to Excellence.*

Ian: i2e is a not-for-profit, established for five to six years now, that is largely government funded. We organize and facilitate site visits to see excellent organizations in Victoria (the Australian state of which Melbourne is the capital). There are similar programs in some of the other states that we helped establish. Earlier this

year, we also received funding for a pilot sustainability insights program where we learn to see the triple bottom line from leading companies.

Darcy: *Site visits are so powerful. People can go and see companies first-hand and talk to people just like them. It makes it all seem doable. There's a lot of credibility that comes from that.*

Ian: I often say I have the best job in the world, where 50-60 times a year I get to spend time with the leadership teams of organizations doing truly great things. It's a privilege.

Darcy: *Yes, but it's also a lot of work. How many people do you generally take?*

Ian: Usually 20-30 people. It's often capped by the capacity of the host. It's always a challenge to find new host companies. There is a limit to how often we can call on our existing hosts for a visit. Of course, hosting tours is

not their main business, so we have to be careful not to wear out our welcome. They're willing to open their doors once or maybe twice a year, but we can't bring busloads every week!



Darcy: *That reminds me of the dynamic in this country when the Malcolm Baldrige National Quality Award was popular. Companies that won often had their performance drop afterward because they spent so much time hosting visitors tromping through their facility. So how do you define excellence in this context?*

IAN YOUNG - BIO



Ian is an author, educator, Churchill fellow, and engineer, actively involved in the development of tomorrow's manufacturing leaders.

He leads a nonprofit business, Insights to Excellence (**i2e**), established to foster and facilitate a sustainable community of Best Practices in Victoria. **i2e** facilitates the Victorian government-sponsored *Innovation Insights* program, and recently launched a *Sustainability Insights* program in partnership with Sustainability Victoria.

Lean to Green is a program initiative to assist leaders within manufacturing to develop an understanding of their Triple Bottom Line and the linking of green initiatives with existing Lean initiatives to develop a sustainable organization.

In 2008/09, Ian presented a selection of Australian case studies (including the 2008 Premier's Sustainability Award winner, Davey Water Products, and the 2009 Banksia award winning Kraft Vegemite project), at the AME's Toronto conference and the Society for Manufacturing Engineers (SME) Lean and Green conference in Portland, Oregon. His presentation was rated in the top 10 of the AME conference programs.

www.i2e.org.au

www.lean togreen.com.au

Ian: (Laughing) It's a good question. Actually, I'm writing a book about it: *Excellence Is ...*. In part, we link with other award programs. We have a Victorian Manufacturing Hall of Fame, for example. So excellence is being judged by other people, not just by us. One of the obligations of being inducted into the Hall of Fame is to host an Insights visits to share your knowledge. But I'm avoiding your question about what excellence is. The definition I like is, 'The organization that is able to change itself and continually adapt to a changing environment.'

Darcy: So you're starting up a new program related to sustainability. How are you going to distinguish between sustainability and excellence?

Ian: Well, sustainability is excellence, or at least a subset of it. We have several different 'learning to see' programs; it started with Innovation Insights and now includes Logistics Insights and Service Insights. We try to make each visit a genuine learning event, not just industrial tourism. And as sustainability has long been a passion of mine, it's a natural for us to extend our focus to include the triple bottom line of best practice organizations.

What is Lean?

Darcy: I wanted to spend most of our time talking about Lean and its relationship to sustainability. But we should probably start by explaining what Lean is. How would you define what Lean is and how it relates to Total Quality Management (TQM)?

Ian: Lean is one of those big fat words that means so many things to so many people. We like to focus on Lean thinking, rather than just the Lean toolbox. The classic definition of Lean is eliminating waste. But we expand that definition to 'maximizing flow in the value stream.' If you look at it as a triangle, the tip is eliminating waste, one of the bases is to minimize variation, and the other is to optimize key constraints.

We need to stabilize and standardize our processes as a key foundation, and then try to improve and optimize throughput. We've forgotten some of our key learning from TQM.

Darcy: Yes, you have to control a process first so that you can manage it and improve it.

Ian: In my earlier work, I was a process capability engineer, so I was doing Six Sigma (a total quality tool) before there was a term for it. So it's in my DNA. My preferred definition of Lean is a broad one. Lean thinking (and the toolbox) is also a subset of excellence. The lessons of Total Quality have been forgotten and need to be reintegrated into Lean again.

Darcy: You've mentioned the Lean toolbox. Tells us more about that.

Ian: Value stream mapping is one tool. It starts and ends with the customer. What is value to the customer? What are the steps in the value adding process? Lean isn't just limited to physical material transformation (manufacturing), but also involves a transactional environment (services and logistics). So value stream mapping is a process flow chart that helps to identify what's value adding time and what's not.

Darcy: On average in a process, what percentage of the time is typically non value added? I would guess it's a pretty big number.

Ian: Yes, we often talk about the value adding ratio, the value added time over the total throughput time. That's often measured in zeros of a percent.

Darcy: Oh gosh! So what's an example of something that's not value added time?

Ian: Overproduction and waiting. Waiting in inventory, waiting between steps in the process. The total sum of cycle times of a series of processes might add up to five minutes, but the internal start/end time, not even accounting for getting it to the customer, can be measured in days or months. So you can see right away that a number measured in seconds, minutes, or at most an hour, divided by weeks or months, is going to be a pretty small percentage.

Darcy: What about mass balance. Is that considered a Lean tool?

Ian: Mass balance isn't a classic lean tool; it's a tool that introduces sustainability into Lean. Lean is very time-centric. It's all about throughput time, change-over time, everything expressed as time. So mass balance is drawing that same process, but measuring the inputs and outputs of everything by mass. Say you start with a ton of input materials. How much of that ton ends up in first-quality product? How much goes to other sources: waste, recovery, etc.? Energy has a mass balance equivalent as well.

Darcy: So is there a typical mass balance ratio? I would think that could vary a lot from one process to another.

Ian: Yes, it does vary a lot. My background is in food processing, and that is particularly challenging. You might

FIVE S'S

1. **Sort**—Eliminate unnecessary items from the work area
2. **Set in order**—Put things in their proper place
3. **Shine**—Clean the work area
4. **Standardize**—Implement the best practices as standard practice
5. **Sustain**—Keep the practices in place

start out with a ton of ingredients and end up with a ton of product, but you may have added a significant amount of water along the way. So you have to account for that.

There's a natural advantage in Lean for businesses that measure performance in weights and mass because they are naturally trying to maximize yield. But more traditional manufacturing where they measure in part counts, not in mass, has a greater challenge.

Darcy: So I can imagine, having mapped out my process and identified how long everything takes. I've identified some steps I can eliminate or compress. So that's value stream mapping. Are there other tools associated with Lean that we should describe before we talk about Lean to Green?

Ian: Lean is also about the culture of the organization. Empowerment and participation. There are many tools that can be used in problem solving and to create a visual factory. Every organization needs to

try to make nonconformance and noncompliance more visible. Can I tell from 5 meters and in 5 seconds whether the process is in control? We often get a good understanding of how to do that during an Insight visit.

That's why it's so important to go and see these practices in action. I often say to everyone that If a picture is worth a thousand words, an Insight visit is worth a thousand pictures.

Darcy: So here's my question about Lean. I had a client who was doing Lean and wanted to integrate sustainability into it. I worry about what this does to the people in the organization. In a lean training simulation, it felt like it was turning me into a machine. Lean drives people to have to do the same thing the same way, and they lose the autonomy and control that humans like. You also set them up for repetition injuries. So I worry that Lean can lead an organization to set up what appears to be a very efficient process, but if the people are unhappy or injure themselves, it's not in the long run the best way to organize. What does it feel like for people to work in a Lean system?

Ian: (Long pause). This is a big topic. Standardized work really is the person being an extension of the machine. Some people do feel uncomfortable in that environment. But it is in essence the foundation of Lean – you can't have hundreds of people on a car assembly line, each doing their job the way they think is best, which is different to the next person.

One of the most interesting site visits we did earlier this year was to McDonalds. Whether you like the product or not, it's the same Big Mac in your corner of the world as ours. How do they do that, all over the world, with a workforce that's typically 16-17 years of age, and with a relatively high employee turnover? How do they have the discipline to



achieve that? Standardized work is a challenge. If you're at Toyota, you are required to do a task the same way, every day, everywhere. We could get into all sorts of philosophical discussions about the difference between that and Taylorism.

Darcy: I ask this question because to me, internal social sustainability is part of the equation. What is the workplace like? You can design a workplace for maximum efficiency, or straighten out all the pipes to save on energy, but the resulting workplace can be so miserable that turnover undermines the performance. So given my background in high-performance/self-directed work teams, I wonder how Lean addresses those human needs.

Ian: Certainly some humans don't feel comfortable in those tasks. But more people than you might think prefer to work in a highly structured and 'hassle-free' environment.

Here's a way to have both standardized work and people engaged in improvement. There's a business here in Melbourne that's part of the Toyota family of companies. They developed a workforce with a non-automotive background, and in the few years they've been in operation, they've had no defects, no missed deliveries, and they deliver four times a day to the Toyota car assembly plant.

They regularly host an Insight event to get external feedback on how they can improve. The way they also tap into the creativity and innovation of their people is to take them off the line for a

time to see how they can improve the workflow themselves. But until they find a better way, they agree to all keep doing it the same way.

During this economic



downturn, rather than displacing any employees, they took the best people, the most creative people, off the line and challenged them to show if they could save their salary. And of course, they're doing all the green things: making sure they're not wasting any materials or energy. They're monitoring their compressed air usage. These are all the things we've

been trying to get organizations to do all along. So they're coming out of this downturn so much stronger. And they've maintained their crew of people. That's a very different paradigm than organizations that

displaced 40 percent of their staff when the economy dropped.

Darcy: So it sounds like a couple things are going on. Where you have a repetitive process, you try to find the best way of doing it and have everyone do it that way. But then periodically you pull people off the

line to think about how to improve it. Are there regular team meetings?

Ian: The better organizations pull people off for a day or week or month and have them step back, and use the

Lean tools to better understand what's impeding the flow. Then they come up with a grand plan to address the root causes of problems, not just fixing spot fires.

Lean to Green

Darcy: So let's talk about the relationship between Lean and Green. How do you dovetail 'Green' into Lean, and do you just look at environmental issues, or also social? Is it called Lean and Green just because it rhymes, or is it about the environment?

Ian: This is really a huge question. I think it starts in the relationship between profit and the planet. People are what links those two things together. I call it Lean to Green, not Lean and Green, because Lean is the foundation; it's a way of thinking. If we can't do the practices within Lean, it's going to be very difficult to overlay the 'enviro' or green aspects.

This is a controversial statement with some of the Lean folks. But I like to say, "Being a Lean organization doesn't necessarily mean that you're a sustainable organization; but you can't be a sustainable organization without being Lean. So let's understand first what we need to do to be a sustainable organization, and then see what we need to do to deploy that down to a Lean operation. For example, you may have a Lean process very efficiently creating product, but the customer isn't buying it anymore. A sustainable organization is a more holistic one. You have to decide first what you should be doing, and then ensure that you are doing it in a Lean way.

Lean tools work best in a setting where demand is growing. Every day we're trying to do more with the same level of resources. But sustainability is about doing less. This is where it rubs up against Lean. We're in a world where we want to encourage customers to buy less, not more. For the organizations that really 'get' Lean and Green, their whole business model is changing. This is not well understood. Interface is a good example. I suppose they would have said they make carpet. But now they might say they provide flooring solutions. And they take the product back in a closed loop process at the end of their product's life.

One of the key benefits to a sustainable organization is that they have a much more engaged workforce. And people outside that business want to come work for them. Therein comes the social aspect. They can take a leadership role in their industry and their business community. They have influence over their suppliers and customers.

Darcy: I've read the Environmental Protection Agency manual on Lean to Green, and they showed how to look at the value stream map and identify environmental impacts. Is that how you see doing Lean to Green?

Ian: That's a starting point, but it is only a starting point. You need to understand what your key consumption ratios are. One company used to use five or ten percent recycled material. Now they have designed some products that use 100 percent recycled materials.

So they're out talking to their customers to get the product back instead of it being sent to a landfill. Sometimes their customers' customers. Suddenly there is an organization two or three steps up the value stream saying, "We want that material back when you are finished with it." The systems are being connected up outside the organization. Lean hasn't always done that; it hasn't typically thought about the end-of-life at all.

SEVEN LEAN WASTES

1. Overproduction and early production producing over customer orders, producing unordered materials / goods.
2. Waiting hanging around, idle time (time when no value is added to the product) .
3. Transportation handling more than once, delays in moving materials, unnecessary moving or handling .
4. Inventory - unnecessary raw materials in stores, work in process (WIP), & finished stocks .
5. Motion - movement of equipment or people that add no value to the product .
6. Over-processing - unnecessary processing or procedures (work carried out on the product which adds no value) .
7. Defective units producing or reworking scrap.

Others have included additional categories which include:

Untapped human potential

Inappropriate systems

Energy and water

Pollution

Source: Manufacturing Advisory Service, <http://www.swmas.co.uk/info/index.php/7-Wastes>

Are there clear benefits to integrating sustainability into Lean?

Darcy: I can see how that's good from the planetary perspective, but is it good for the financial bottom line? It takes effort to work with other organizations. Is it saving them money? Is it getting them new customers? Are they coming up with new products? Do you have any good success stories?

Ian: Yes, yes, yes, and yes! We're finding that when you overlay Lean with the 'planetary aspects,' to use your term, there is a very strong buy-in for the people. They're doing this stuff at home. Here we are in one of the driest cities in a major drought in the driest continent on the world. We're on severe water restrictions. We're capturing rainwater and recycling and using compact fluorescent bulbs. We're doing these things at home, but we're not doing it at work. Imagine the impact when our businesses turn around and give those same people an opportunity to unleash those same values at work.

Last year, one award winner had told their staff they wanted to put together teams to work on environmental issues. They had 35 out of 100 people volunteer!

They'd been doing Lean for eight years. Every year, every month, every work group did a Lean project – it was compulsory and displayed in the main work area. After eight years, they were running out of ideas. But then suddenly it threw open the gate into a new paddock. Let's look at energy, at recycling, at landfills. And they have done fantastic things in 18 months.

Darcy: That's so shocking, because – energy, waste, recycling – those are all the things they should have been managing in the first place!

Ian: Well, they were managing them to compliance, and they were measuring, but they never really challenged themselves to make a product that uses 30 percent of the energy of the old product. They've understood their consumption and reduced their carbon footprint much more than they ever could have by turning off the lights.

This is just the starting point of what we can achieve. So with our new site visit program, we're asking people, "Have you put in place rainwater harvesting; have you done an energy audit and changed your lights?" If you haven't, just go do those things. Come along to the Insight session when you've taken those steps and want to learn to see how to take it further.

Do Lean and sustainability conflict in some ways?

Darcy: Let's talk about where Lean and sustainability conflict. It seems there is a lot of compatibility between them, but it's not a conflict-free marriage. You already alluded to the issue of Lean working best with growing demand. Several years ago, I was consulting with an organization that was doing Lean and wanted to integrate sustainability. And I'd periodically get into interesting debates with the Lean consultant. One point of conflict was that Lean often focuses on just in-time delivery. But if you have trucks coming into your factory four times a day with partial loads, you're using more fuel.

Ian: I understand those tensions. There are seven classic Lean wastes. And Lean people want to add to that list, like wasted ideas, etc. Now some people want to add environmental wastes. I'm saying that the environmental wastes, the mass wastes, are different from the Lean wastes.

The environmental wastes include raw materials, energy, water, consumables, and packaging. If we focus on reducing the environmental wastes, we can't do that without also reducing the Lean wastes. But the reverse may not always be true. So we should focus on reducing the environmental wastes.

For example, if you overproduce, it creates surplus stock that is probably kept as inventory. But as well as triggering three or four other Lean wastes, we also need to have a warehouse, that needs heating and cooling, and fuel to move the stuff around, and maybe we also shrinkwrap and add extra packaging, as we don't have enough containers.

You have to learn to see the environmental and Lean wastes together and understand the relationship between the two.

Kraft Foods is a good example; they won a Banksia award earlier this year (an Australian environmental award). They've shown a significant reduction of resources used to make one of their products, a spread. They first piloted that with peanut butter. In food processing, there's always waste, especially at the start and end of runs. So instead of focusing on the Lean things, they focused on the 'green' things; they halved and then nearly halved again the waste in that process that was going to a landfill. But what happened to all the Lean metrics, and throughput? Well, they got better too! Everyone focused on doing the best possible change-overs once they understood that most of the wasted material was because of a 'not-so-good' process.

All the exemplar organizations are saying the same thing: if you target and achieve the green outcomes to reduce consumption, you can't help but pick up the Lean outcomes too.

The key is the people. Many are suspicious of Lean. But they love doing Green. There's nothing magic about what we're doing. People cringe when I say, 'If you're not doing Lean, or your improvements have flattened off, give it a rest – but focus on Green and sustainability instead. You can't become Green without being Lean.'