

A Roadmap to Environmental Product Declarations in the United States

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Executive Summary

Environmental Product Declarations (EPDs) are an ecolabels based on life cycle science. Their use is sweeping the globe and there are indications that many governments will be requiring them, as is already the case in France. Were all the countries with national EPD systems to follow France's lead, exporters to those countries would need to provide ecolabels: nearly 5 million U.S. export jobs would be at risk.

The current US LCA infrastructure is inadequate to support the needed effort for a national program, but there are many national resources that can be called upon to support the effort. New legislation requiring EPDs would be very useful, but existing legislation and executive orders can provide a springboard to developing a U.S. based, world-class EPD system. All economic sectors (government, non-governmental organizations, academia and business) must work together to strengthen and build programs. If they do, tens of thousands of green jobs will be developed, and the U.S. will benefit from a cleaner and healthier environment.

We recommend the following actions be taken by the federal government, many times playing the leadership role but also actively participating in efforts led by other sectors of the economy.

1. Develop legislation requiring EPDs in the United States. The legislation should direct **U.S.EPA** to lead the planning on how to accomplish that goal, which should include the efforts of green purchasing programs at the federal agency level.
2. Develop a strong life cycle inventory program that makes best use of existing monitoring programs within the U.S. government, providing this data for free. We recommend that the **U.S. Environmental Protection Agency** take the lead on this effort.
3. Support the National Product Category Rule Repository to facilitate the economy-wide program. This effort is led by the **American Center for Life Cycle Assessment**. Federal grants should support its startup, and federal environmentally preferable purchasing programs should reference the Repository.
4. Develop sector-specific guidance and PCR programs: This effort must be led by the **business sector**. But government and the

Non-Governmental Organization (NGO) sector needs to participate, too.

5. In joint with the National PCR Repository, collaborate with international EPD programs. This effort should be led by the **International Trade Agency** and coordinated with the National Export Initiative.
6. Bring together the existing environmental science community with the LCA community to provide clear guidance on how best to perform life cycle impact assessment, developing simple to use and free tools. The **National Science Foundation** should lead this effort, partnering with the academic and NGO sectors.
7. Educate the full range of the population from K-12 through graduate programs and existing workers and professionals to increase LCA capacity throughout the nation. **The Department of Education, the Department of Labor, academia and NGOs** should work together for this end.

Several concrete actions can be undertaken now, but developing a federal EPD system is a long term commitment. Private investment in the national EPD program is likely to be much larger than public sector investment: these costs will be offset by the cost savings that are typically discovered through LCA studies.

The EPD program will provide tens of thousands of green jobs, strengthen U.S. exports, and use the power of markets to drive increased health and environmental benefits in the U.S.

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Background

Environmental Product Declarations (EPDs) are ecolabels that disclose the environmental performance of products based on an environmental life cycle assessment (LCA). Unlike most environmental labels that signify “green” performance, EPDs merely disclose environmental performance in much the same way a nutrition level discloses nutritional performance. For example, product carbon footprints are a kind of EPD.

Life cycle assessment is the science of measuring the environmental outcomes of products from cradle to grave, from the time resources are removed from the earth to the time they are returned at the end of the product life. LCA is the basis of environmental policy in the EU, Japan and elsewhere in the world. Its impartial analysis allows governments to determine which policy outcomes support the outcomes specified in legislation. Because of its holistic approach, LCA breaks down the regulatory and value chain chimneys and permits a whole-system optimization. In essence LCA assures that efforts to improve one environmental issue do not result in environmental degradation elsewhere.

The life cycle approach provides a high-level look at all direct and indirect environmental issues at once, and is especially powerful when evaluating alternatives. It is possible to use LCA to evaluate very disparate ways to accomplish the same social benefits. For example, LCA can evaluate the different ways to get workers to their place of business. This permits comparing public versus private transit, but also it permits the evaluation of telecommuting and even urban planning to provide walkable communities. In the context of EPDs, LCAs provide the consumer with a way to evaluate their everyday choices.

From the point of view of business, LCA is a useful tool that links the goods and services they sell directly to the environmental impacts of those services. It permits them to engage in greening the supply chain as well as greening their own processes. It permits a science-based discussion of the environmental impacts and benefits of their products.

LCA is a very flexible tool, and although that is a strength, it can also be a weakness, because it is possible to design a study to favor one product over another. This is not an acceptable state of affairs in ecolabels, where one wants a clear and unbiased approach that applies to all equivalent products. In order to address this issue, the international standards on EPDs (ISO 14025 and others) require a program of Product Category Rules (PCRs). These are the detailed instructions on how to perform the LCA for EPDs. They assure that the LCAs performed are done in the same way, so that an analysis of the same product will yield the same results no matter who does the analysis.

EPD programs exist around the world as voluntary programs in many countries. Nearly all countries in Western Europe already have national level EPD programs, and are beginning the effort of harmonization. EPD programs also exist in the Asia-Pacific region, including in China, Japan, Malaysia, New Zealand, Thailand and South Korea. What is new is that EPDs are becoming mandatory, either because of customer demands (e.g. Wal-Mart’s initiatives) or through

legislation, starting in France. The French government passed the *Grenelle Environment*¹ in 2007 and in May 2010 completed its legislative action with *Grenelle 2*. This program is phasing the requirement for EPDs for all consumer goods, starting in 2011. Were all countries with an existing EPD program to make the labels mandatory, potentially nearly a trillion dollars of annual U.S. exports would be affected. According to Department of Commerce figures, this represents five million U.S. jobs.

The logical step for the U.S. is to develop its own EPD program as quickly as possible, and use that program as the basis of international negotiations, assuring that the U.S. voice is heard in those efforts. The U.S. has many elements needed for a successful EPD program, but there is substantial work needed to get from the current situation to a fully operational world-class system.

This document lays out the needed infrastructure, and recommends steps towards achieving that infrastructure, providing cost estimates for both government and private support. Developing a national EPD system supports the National Export Initiative and the exporting community. It also supports the execution of Executive Order 13514², which requires that Federal Agencies develop a plan for carbon footprinting of all the goods they purchase.

The cost of developing an EPD program is substantial, but considering the potential for lost exports (and the jobs they imply) the cost of not doing so is much larger.

Elements of a Strong EPD Program

The key to any EPD program is conformance to the international standards on EPDs and LCAs, ISO 14025, 14040 and 14044³. These standards lay out the requirements of an EPD program, including the management system for developing EPDs, and the validation requirements for them. But it leaves many issues open, thus providing both economic flexibility and the opportunity for greenwashing.

Ideally, an EPD program should be cost-effective, transparent, and integrate the best available science. It should have ongoing commitment from government at all levels and from businesses of all sizes, as well as the support of non-governmental organizations and the general public. Finally, it should include strong collaboration internationally. To accomplish these goals, we need:

1. Government Programs
 - a. Enabling legislation
 - b. Life cycle inventories
 - c. International negotiation and collaboration
 - d. Research and education funding
2. NGO and Higher Education Programs
 - a. National standardization

¹ <http://www.legrenelle-environnement.fr/>

² Executive Order 13514 FEDERAL LEADERSHIP IN ENVIRONMENTAL, ENERGY, AND ECONOMIC PERFORMANCE October 5, 2009

³ ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework; ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines; ISO 14025:2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedures

- b. National Product Category Rules Repository
- c. Research & Education
- 3. Business Programs
 - a. Sector-specific PCR programs
 - b. Internal LCA capacity
 - c. Collaboration on international efforts.

1 Government Programs

Enabling Legislation

In the U.S. the only current legislation enabling EPDs is the requirement in the Energy Independence and Security Act of 2007, which requires that federal agencies prefer biofuels when it can be shown that the biofuel has a lower carbon footprint. Guidance on how to do this measurement for jet fuels is under development with funds from the Federal Aviation Administration and the Department of the Air Force, with the first draft available in June 2010, and final guidance expected in 2011.

There is significant interest in the topic of LCA and carbon footprints as demonstrated by activity in Congress.

- The House Energy Bill passed in 2009 requires investigation of carbon footprinting
- Senate Bill S. 3396, the Supply Star Act of 2010 focuses on the energy consumption of the supply chain.
- Since 2008, there have been hearings referencing life cycle assessment, ecolabels or carbon footprints in house committees on science, financial affairs, agriculture, veterans' affairs, small business, and sub-committees on energy commerce and trade.
- Likewise, in the Senate, similar hearings were held in the energy committee, the environment and public works committee, and the appropriations committee.

There have been some efforts in Congress to develop a national ecolabel program, but none of these efforts has passed the level of discussions into committee submission. Recently, Executive order 13514 required that all federal government agencies develop carbon footprints for their own emissions and develop a plan for carbon footprints for all purchases (so-called scope 3 carbon footprints, a form of EPD).

Recommendations

Legislation supporting EPDs in the US should be put forward as soon as possible.

The legislation should:

- Require that all products sold in the United States have environmental product declarations.

- Instruct EPA to develop a plan, phasing in the EPDs requirements over a ten-year period, on an industry sector by sector basis, and have these EPDs integrated in to the green purchasing programs of the federal government.
- Instruct other appropriate agencies to aid in development of EPDs and PCRs, as noted below in this document.
- Provide tax incentives for early adopters of EPDs.
- Provide penalties for failure to provide EPDs. At least, these should result in disbarment from bidding on government contracts, thus supporting EO 13514.

Life Cycle Inventories

The most costly and time consuming part of doing any LCA is data gathering. Normally, practitioners rely on purchased data or published data in databases and other publications for the part of the life cycle outside of their direct control. Where current national data is not available from a recognized authority, the results of the analysis are different based on different assumptions of the practitioners. The challenge is to provide data that is free to the user, statistically valid, high quality and constantly updated.

A few federal agencies are aware of LCA and support its use, either in research or in application. The national laboratories have supported several attempts at developing life cycle inventories and other applications, including:

- the National Renewable Energy Laboratory (owner of the U.S. Life Cycle Inventory Database)
- The Pacific Northwest National Laboratory (Source of a now-defunct LCI database)
- Argonne National Laboratory (source of GREET, a fuel cycle program)
- EPA's National Risk Management Laboratory (Source of TRACI and FRED, life cycle impact methods)
- National Institutes of Standards and Technology (Source of BEES, a life cycle application tool used for building and agriculture programs)

None of these agencies can be described as the preeminent lead on LCA in the country, largely because the mission of the national laboratories is research, not implementation or policy.

There are many agencies of the US government that regularly provide monitoring data that is useful to LCA practitioners, who typically take published government figures to calculate background inventory data. These agencies include: the Energy Information Agency (EIA), the U.S. Department of Agriculture (USDA), the Bureau of Census, the Environmental Protection Agency (EPA), the Department of Transportation (DOT) and others. With relatively little effort, the data already collected at great expense to the taxpayer can be converted to life cycle inventory data that supports the development of EPDs as well as other policy objectives.

Recommendations

- 1) Place EPA in charge of **coordinating** the federal data collection and reporting effort: the drivers should not be research (as in the many national laboratory efforts) but application and policy. EPA collects some of the data, but much of it is and should be collected elsewhere in the federal government.

- 2) Do trials of different data mining approaches. These should be within agencies, between them and independent outsourced efforts. They should be funded by grants and operating funds.
- 3) Using an inter-agency effort led by EPA, evaluate and combine best ideas from the data mining efforts, and institute permanent infrastructure to update the information as it is acquired. The frequency of update should be that appropriate to the sourcing agency. For example, EPA data is generally provided annually, while the EIA has monthly data. Each agency should post its own data, in a form that permits easy use by public stakeholders as well as by the LCA community.
- 4) Provide a portal for the data on the EPA website, and also on the NREL website.
- 5) Consider regulations and other policy mechanisms to permit better data collection from the private sector.

Once the life cycle inventory infrastructure is in place, we can anticipate ongoing costs. Japan is a world leader in LCI data collection and development, and spends about \$0.08 per capita annually on this task. The Swiss government is also a leader, and although the figures for Switzerland are harder to obtain, we estimate the between \$0.10 and \$0.30 per capita annual expenditure support this effort.

International Negotiations

With the exceptions of global climate change and stratospheric ozone depletion (the ozone hole) different countries have different environmental conditions and therefore will need to have their own life cycle measures integrated into their EPD systems. Different nations address impact assessment in their local contexts, and local situations must be respected. But the global nature of value chains means that countries will have to work together for data exchange and EPD collaboration.

Within the federal government, the responsibility for international trade is diffuse: that means that the International Trade Agency, the White House Trade Representative, the Agricultural Trade Agency and the EPA should all mobilize to work together developing a consistent approach to negotiations with other countries to harmonize EPD efforts. The National Export Initiative can be a platform to organize these efforts. Partnering with the NGO and business sectors will provide public-private strength and flexibility in these negotiations.

Recommendations

1. The International Trade Agency should lead in developing national and international relationships, bringing in resources from other agencies as appropriate.
2. The relevant agents throughout the world representing US trade interests should be educated as to the topic and issues related to EPDs, so they can help coordinate and provide the US response.
3. The various federal trade agencies and the National PCR Repository should coordinate their efforts and partner to maximize public/private advantages.
4. U.S.-based multi-nationals, NGOs and industry associations should be consulted and involved in assuring that information and coordinated policy can flow through these private channels, thus minimizing overall cost.

Funding of Research and Education Programs

At the moment, life cycle research and development in the U.S. is poorly funded. This is in sharp contrast to the situation of the EU and Japan, where hundreds of university and national laboratory researchers are funded exclusively to do LCA research, and where basic information about LCA is part of the secondary school curriculum.

Research

The ideal LCA should marry excellent industrial modeling with excellent environmental modeling. With some notable exceptions, to date LCA research efforts have not incorporated advances in the environmental sciences, either in the U.S. or elsewhere. Because the U.S. has very good environmental monitoring and satellite measurement systems, it has the potential to lead the world in integrating environmental science into LCA practice. A strong and focused research effort could support the development of US policy to achieve the best overall outcomes.

Recommendations

Like the effort for the life cycle inventory, the key to success in life cycle impact assessment is to link existing resources together, making a strong overall program. The work that needs to be done includes:

- 1) Bringing together LCA practitioners with environmental scientists, through a group of workshops. These may be organized according to impact category or by some other method, but they must make recommendations on how to integrate the science with the LCA to provide tools useable to everyone.
- 2) Funding research based on the recommendations of the workshops. The National Science Foundation, NASA and USGS are all important participants in the research.
- 3) Provide characterization factors to the public for free through the internet.
- 4) Continue to fund research to update characterization factors as needed.
- 5) Develop a long term LCA research agenda, provided through the National Science Foundation. This research agenda should converge environmental science, computer science, remote sensing and industrial engineering to develop strong, easy to use life cycle impact tools freely available to the public, and build capacity in LCA research by supporting graduate students.

Education

The goal of a national EPD program that covers the entire economy is a daunting one. It will not come about if it is left to the intelligentsia. Rather, it represents a sea change, calling all Americans to be responsible in their purchasing decisions. This means that education must be provided at all levels.

Recommendations

Support development of LCA curriculum and curriculum development. This can be supported by NSF, DOE and DOD as well as the Department of Education and the Department of Labor. The goals should be:

1. Develop capacity for life cycle thinking in the adult population. Of particular interest here are blue collar/green collar workers and defense workers, such as the National Guard. This education can lead to green job development.
2. Develop LCA accounting capability through local colleges and universities. The work of EPD generation will be distributed throughout the economy, and will enroll tens of

thousands of individuals, who should understand the mechanics and theory of LCA, but who are not high-level researchers. Properly developed, this workforce can contribute to the ongoing production of national life cycle inventory data.

3. Develop capacity for K-12 education, so that life cycle thinking can be used to educate a new generation of citizens aware of their responsibility in sustainable consumption and production.

2 NGO and Higher Education Programs

The non-governmental organizations (NGO) community is essential to EPD development and credibility world-wide. With the exceptions of Thailand and China, all national EPD programs are operated by NGOs. They are supported by national standardization bodies.

Standardization

The US has good infrastructure vis-à-vis standardization for EPDs. ASTM (American Standards and Testing Materials) has been developing sustainability standards since the 1970's through its E60 committee. ASTM is a recognized standards developer by ANSI, the mirror body to the International Organization for Standardization (ISO). Currently, ASTM is nearing completion for a standard on PCR instructions for building components. A similar standard needs to be developed for each major economic sector.

Recommendations

1. Industry sectors and NGOs should be organized and encouraged to participate in the development of ASTM standards for PCRs in their sectors.
2. Federal agencies, especially EPA and DOC (NIST) should assist in this effort.
3. NGOs should be supported to participate, through an organization similar to ECOS (European Environmental Citizens Organization for Standardization)

Product Category Rule Repository

Product category Rules are the Pivot on which EPDs turn. They are the detailed rules on how to do the LCAs behind every EPD, permitting comparisons between products. An estimated 40,000 are needed to cover the economy. As an outcome of a PCR workshop jointly sponsored by EPA Region 10 and the Institute for Environmental Research and Education (IERE), the American Center for Life Cycle Assessment has recently announced that it will develop a National Product Category Rule Repository.

The National Repository will:

- Deliver education and outreach to industry, government and NGOs about EPDs and PCRs
- Develop infrastructure, including contracting support for EPDs and PCRs
- Develop example PCRs in key industry sectors
- Develop guidance (to be turned into an ASTM standard) on how to develop and implement a PCR program
- Provide conformity assessment to that guidance and post PCRs online

- Work with representatives of the US Government to cooperate and negotiate with EPD programs internationally
- Work with green purchasing programs to link them to the Repository

ACLCA is the professional society for LCA in the US. It holds annual conferences, certifies LCA professionals and works to educate and support the use of LCA in the US.

Recommendations

- 1) The federal government should financially support the startup of the National Product Rule Repository.
- 2) Government at all levels should participate in the development of product category rules as needed.
- 3) Government should use the Repository to fulfill its requirements under EO 13514, and to support its green purchasing programs, eventually selecting the products with the best life cycle environmental performance.
- 4) NGOs should develop their capacity to effectively participate in standardization efforts, including the development of PCRs.

ACLCA is seeking funds from foundations and governmental sources, but it expects the Repository to be self-supporting in five to seven years.

Education

Relatively few people in the U.S. have ever heard of an EPD, although the concept of carbon footprints is becoming more familiar. There are substantial resources to teach LCA at the post-graduate level. Some of the universities offering such programs are:

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| • University of Washington | • University of Tennessee |
| • Carnegie-Mellon University | • Harvard University |
| • University of California (Berkeley, Davis, Santa Barbara) | • Yale University |
| • University of Ohio | • Massachusetts Institute of Technology |
| • University of Chicago | • New Jersey Institute of Technology |
| • Arizona State University | • University of Oklahoma |
| • Virginia Technical University | • University of Arkansas |
| • University of Maine | • University of Minnesota |

It is clear that there is great capacity for developing LCA experts in the U.S.

Recommendations

- 1) Programs for basic LCA training should be developed at all institutions of higher learning, these should be degree and non-degree programs to cover the broad need for LCA education.
- 2) Technical colleges should focus on Life cycle thinking programs for blue-collar workers. IERE has developed LCA training for blue collar workers, with very good outcomes. The individuals taking the training immediately begin making better environmental decisions, and the training is credited in the Seattle Parks district with decreasing fuel consumption by 10%. Comparable education across the country, if properly done, will provide similar results with concomitant savings.

3 Business Programs

Business has both the most to gain and the most to lose from a national EPD program. Properly developed, the EPD program will secure U.S. exports, increase efficiency of U.S. businesses, decrease their environmental impact, and provide market access and strength to US companies.

Sector-Specific PCR Programs

Industry organizations have the necessary technical know-how to develop strong PCR programs. In fact, such programs cannot be developed without their support. To be effective they must be transparent and open to NGOs.

Recommendations

1. Industry organizations should develop the PCR programs for their sector.
2. They should include strong support from government and NGOs in their development process.
3. They should work with their sector organizations at the international level as much as possible.
4. They should post their PCRs in the National Repository.
5. Business should work to automate the process of EPD generation.

Every company will have to invest in developing the EPDs for their products and although there are real costs in doing so, there are also real benefits. Companies doing LCAs typically develop many strategies for cost savings, as the resource costs become clear to them. Several software providers are developing systems to perform LCA calculations within business management software, with the result that eventually the cost of calculating each of the EPDs will be insignificant.

Internal Capacity Development

In order to cost-effectively develop EPDs, companies will have to employ internal human resources. These do not need to be LCA experts, but they do need to be effective environmental accountants, able to collect organize and report the business and environmental data behind every LCA. They will be the equivalent of an internal bookkeeper to an outside accounting firm. We anticipate that between 12,000 and 120,000 individuals will be needed to perform this function.

Recommendations

1. Larger producers of consumer products should work with the local community and technical colleges to encourage the development of an LCA training curriculum.
2. As needed, support the re-education of existing employees to develop LCA capacity.

Job Opportunity

Depending on how many people get training, the number of educators needed will be between 120 and 2400 employees. Overall many thousands of green jobs will be developed to support the national EPD program. Estimates are provided below.

Consultancy and IT Development

As noted above, companies will have to develop internal capacity, but that will have to be balanced by external capacity. Currently, there are at most a hundred LCA consultants practicing in the United States. We anticipate that about 5000 consultants will be needed to meet the requirements of the EPD system, and this figure may be substantially larger. Several IT companies are already developing software to automate many of the tasks required for EPDs. Integrating PCRs into business software will further reduce variability and costs.

Recommendations

1. Existing LCA consultants should gear up to accommodate increased business.
2. Consultants should participate in the development of PCRs and encourage their clients to participate as well.
3. Until capacity is fully developed in business, consultants will likely be required to help their clients meet this new business challenge.

Summary

There is an urgent need for the U.S. to develop its EPD capacity to protect its export markets. The U.S. does not have a robust infrastructure in place to develop a national EPD system, but it has many of the necessary resources upon which the system can be built. There are real costs in developing the system, but there are internal drivers to develop the system and the risk of not developing it is large in terms of potential loss of export markets, which are currently at about \$1 Trillion per year.

There are many potential green jobs to be found in the EPD system: educators, environmental accounting professionals, and LCA experts all stand to increase in number, with the required capacity increases in the tens of thousands.

US EPD-Related Employment		
	Low	High
Educators	120	2400
Researchers	50	400
PCR Administrators	200	2,500
LCA experts in companies	2,400	24,000
LCA consultants	3,000	30,000
Computer programmers	200	2,000
Support staff	580	5,850
Total USA Employment	6,550	67,150

The biggest benefits of EPDs will come from their potential to decrease externalities through market forces. A cleaner environment means a healthier population, reduced risks of climate change, and natural resources for future generations. EPDs have the potential to accomplish these goals with little or no regulatory oversight. A national EPD program is a win for the U.S.