

The Triple Bottom Line: What Is It and How Does It Work?

<http://www.ibrc.indiana.edu/ibr/2011/spring/article2.html>

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Sustainability has been an often mentioned goal of businesses, nonprofits and governments in the past decade, yet measuring the degree to which an organization is being sustainable or pursuing sustainable growth can be difficult.

John Elkington strove to measure sustainability during the mid-1990s by encompassing a new framework to measure performance in corporate America.¹ This accounting framework, called the triple bottom line (TBL), went beyond the traditional measures of profits, return on investment, and shareholder value to include environmental and social dimensions. By focusing on comprehensive investment results—that is, with respect to performance along the interrelated dimensions of profits, people and the planet—triple bottom line reporting can be an important tool to support sustainability goals.

Interest in triple bottom line accounting has been growing across for-profit, nonprofit and government sectors. Many businesses and nonprofit organizations have adopted the TBL sustainability framework to evaluate their performance, and a similar approach has gained currency with governments at the federal, state and local levels.

This article reviews the TBL concept, explains how it can be useful for businesses, policy-makers and economic development practitioners and highlights some current examples of putting the TBL into practice.

The Triple Bottom Line Defined

The TBL is an accounting framework that incorporates three dimensions of

performance: social, environmental and financial. This differs from traditional reporting frameworks as it includes ecological (or environmental) and social measures that can be difficult to assign appropriate means of measurement. The TBL dimensions are also commonly called the three Ps: people, planet and profits. We will refer to these as the 3Ps.

Well before Elkington introduced the sustainability concept as “triple bottom line,” environmentalists wrestled with measures of, and frameworks for, sustainability. Academic disciplines organized around sustainability have multiplied over the last 30 years. People inside and outside academia who have studied and practiced sustainability would agree with the general definition of Andrew Savitz for TBL. The TBL “captures the essence of sustainability by measuring the impact of an organization’s activities on the world ... including both its profitability and shareholder values and its social, human and environmental capital.”²

The trick isn’t defining TBL. The trick is measuring it.

Calculating the TBL

The 3Ps do not have a common unit of measure. Profits are measured in dollars. What is social capital measured in? What about environmental or ecological health? Finding a common unit of measurement is one challenge.

Some advocate monetizing all the dimensions of the TBL, including social welfare or environmental damage. While that would have the benefit of having a common unit—dollars—many object to

putting a dollar value on wetlands or endangered species on strictly philosophical grounds. Others question the method of finding the right price for lost wetlands or endangered species.

Another solution would be to calculate the TBL in terms of an index. In this way, one eliminates the incompatible units issue and, as long as there is a universally accepted accounting method, allows for comparisons between entities, e.g., comparing performance between companies, cities, development projects or some other benchmark.

An example of an index that compares a county versus the nation’s performance for a variety of components is the Indiana Business Research Center’s Innovation Index. There remains some subjectivity even when using an index however. For example, how are the index components weighted? Would each “P” get equal weighting? What about the sub-components within each “P”? Do they each get equal weighting? Is the people category more important than the planet? Who decides?

Another option would do away with measuring sustainability using dollars or using an index. If the users of the TBL had the stomach for it, each sustainability measure would stand alone. “Acres of wetlands” would be a measure, for example, and progress would be gauged based on wetland creation, destruction or status quo over time. The downside to this approach is the proliferation of metrics that may be pertinent to measuring sustainability. The TBL user may get metric fatigue.

Having discussed the difficulties with calculating the TBL, we turn our attention to potential metrics

for inclusion in a TBL calculation. Following that, we will discuss how businesses and other entities have applied the TBL framework.

What Measures Go into the Index?

There is no universal standard method for calculating the TBL. Neither is there a universally accepted standard for the measures that comprise each of the three TBL categories. This can be viewed as a strength because it allows a user to adapt the general framework to the needs of different entities (businesses or nonprofits), different projects or policies (infrastructure investment or educational programs), or different geographic boundaries (a city, region or country).

Both a business and local government agency may gauge environmental sustainability in the same terms, say reducing the amount of solid waste that goes into landfills, but a local mass transit might measure success in terms of passenger miles, while a for-profit bus company would measure success in terms of earnings per share. The TBL can accommodate these differences.

Additionally, the TBL is able to be case (or project) specific or allow a broad scope—measuring impacts across large geographic boundaries—or a narrow geographic scope like a small town. A case (or project) specific TBL would measure the effects of a particular project in a specific location, such as a community building a park. The TBL can also apply to infrastructure projects at the state level or energy policy at the national level.

The level of the entity, type of project and the geographic scope will drive many of the decisions about what measures to include. That said, the set of measures will ultimately be determined by stakeholders and

“The level of the entity, type of project and the geographic scope will drive many of the decisions about what measures to include.”

subject matter experts and the ability to collect the necessary data. While there is significant literature on the appropriate measures to use for sustainability at the state or national levels, in the end, data availability will drive the TBL calculations. Many of the traditional sustainability measures, measures vetted through academic discourse, are presented below.

Economic Measures

Economic variables ought to be variables that deal with the bottom line and the flow of money. It could look at income or expenditures, taxes, business climate factors, employment, and business diversity factors. Specific examples include:

- Personal income
- Cost of underemployment
- Establishment churn
- Establishment sizes
- Job growth
- Employment distribution by sector
- Percentage of firms in each sector
- Revenue by sector contributing to gross state product

Environmental Measures

Environmental variables should represent measurements of natural resources and reflect potential influences to its viability. It could incorporate air and water quality, energy consumption, natural resources, solid and toxic waste, and land use/land cover. Ideally, having long-range trends available for each of the environmental variables

would help organizations identify the impacts a project or policy would have on the area. Specific examples include:

- Sulfur dioxide concentration
- Concentration of nitrogen oxides
- Selected priority pollutants
- Excessive nutrients
- Electricity consumption
- Fossil fuel consumption
- Solid waste management
- Hazardous waste management
- Change in land use/land cover

Social Measures

Social variables refer to social dimensions of a community or region and could include measurements of education, equity and access to social resources, health and well-being, quality of life, and social capital. The examples listed below are a small snippet of potential variables:

- Unemployment rate
- Female labor force participation rate
- Median household income
- Relative poverty
- Percentage of population with a post-secondary degree or certificate
- Average commute time
- Violent crimes per capita
- Health-adjusted life expectancy

Data for many of these measures are collected at the state and national levels, but are also available at the local or community level. Many are appropriate for a community to use when constructing a TBL. However, as the geographic scope and the nature of the project narrow, the set

of appropriate measures can change. For local or community-based projects, the TBL measures of success are best determined locally.

There are several similar approaches to secure stakeholder participation and input in designing the TBL framework: developing a decision matrix to incorporate public preferences into project planning and decision-making,³ using a “narrative format” to solicit shareholder participation and comprehensive project evaluation,⁴ and having stakeholders rank and weigh components of a sustainability framework according to community priorities.⁵ For example, a community may consider an important measure of success for an entrepreneurial development program to be the number of woman-owned companies formed over a five-year time period. Ultimately, it will be the organization’s responsibility to produce a final set of measures applicable to the task at hand.

Variations of the Triple Bottom Line Measurement

The application of the TBL by businesses, nonprofits and governments are motivated by the principles of economic, environmental and social sustainability, but differ with regard to the way they measure the three categories of outcomes. Proponents who have developed and applied sustainability assessment frameworks like the TBL encountered many challenges, chief among them, how to make an index that is both comprehensive and meaningful and how to identify suitable data for the variables that compose the index.

The Genuine Progress Indicator (GPI), for example, consists of 25 variables that encompass economic, social and environmental factors. Those variables are converted into monetary units and summed into a single, dollar-denominated measure.⁶ Minnesota developed its own progress indicator comprised of 42 variables that focused on the goals of a healthy economy and gauged progress in achieving these goals.⁷

There is a large body of literature on integrated assessment⁸ and sustainability measures that grew out of the disciplines that measure environmental impact. These are not constrained by strict economic theory for measuring changes in social welfare.⁹ Researchers in environmental policy argue that the three categories—economic, social and environmental—need to be integrated in order to see the complete picture of the consequences that a regulation, policy or economic development project may have and to assess policy options and tradeoffs.

Who Uses the Triple Bottom Line?

Businesses, nonprofits and government entities alike can all use the TBL.

Businesses

The TBL and its core value of sustainability have become compelling in the business world due to accumulating anecdotal evidence of greater long-term profitability. For example, reducing waste from packaging can also reduce costs. Among the firms that have been exemplars of these approaches are General Electric, Unilever, Procter and Gamble, 3M and Cascade Engineering.¹⁰ Although these

companies do not have an index-based TBL, one can see how they measure sustainability using the TBL concept. Cascade Engineering, for example, a private firm that does not need to file the detailed financial paperwork of public companies, has identified the following variables for their TBL scorecard:

- **Economic**
 - Amount of taxes paid
- **Social**
 - Average hours of training/employee
 - From welfare to career retention
 - Charitable contributions
- **Environmental/Safety**
 - Safety incident rate
 - Lost/restricted workday rate
 - Sales dollars per kilowatt hours
 - Greenhouse gas emissions
 - Use of post-consumer and industrial recycled material
 - Water consumption
 - Amount of waste to landfill

Nonprofits

Many nonprofit organizations have adopted the TBL and some have partnered with private firms to address broad sustainability issues that affect mutual stakeholders. Companies recognize that aligning with nonprofit organizations makes good business sense, particularly those nonprofits with goals of economic prosperity, social well-being and environmental protection.¹¹

The Ford Foundation has funded studies that used variations of the TBL to measure the effects of programs to increase wealth in dozens of rural regions across the United States.¹² Another example

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is RSF Social Finance,¹³ a nonprofit organization that uniquely focuses on how their investments improve all three categories of the TBL. While RSF takes an original approach to the TBL concept, one can see how the TBL can be tailored to nearly any organization. Their approach includes the following:

- **Food and Agriculture** (economic): Explore new economic models that support sustainable food and agriculture while raising public awareness of the value of organic and biodynamic farming.
- **Ecological Stewardship** (environmental): Provide funding to organizations and projects devoted to sustaining, regenerating and preserving the earth's ecosystems, especially integrated, systems-based and culturally relevant approaches.
- **Education and the Arts** (social): Fund education and arts projects that are holistic and therapeutic.

Government

State, regional and local governments are increasingly adopting the TBL and analogous sustainability assessment frameworks as decision-making and performance-monitoring tools. Maryland, Minnesota, Vermont, Utah, the San Francisco Bay Area and Northeast Ohio area have conducted analyses using the TBL or a similar sustainability framework.

Policy-makers use these sustainability assessment frameworks to decide which actions they should or should not take to make society more sustainable. Policy-makers want to know the cause and effect relationship between actions—projects or policies—and whether the results move society toward or away from sustainability. The State of Maryland, for example, uses a blended GPI-TBL framework to compare initiatives—for example, investing in clean energy—against

“The concept of the triple bottom line can be used regionally by communities to encourage economic development growth in a sustainable manner.”

the baseline of “doing nothing” or against other policy options.¹⁴

Internationally, the European Union uses integrated assessment to identify the “likely positive and negative impacts of proposed policy actions, enabling informed political judgments to be made about the proposal and identify trade-offs in achieving competing objectives.”¹⁵ The EU guidelines have themselves been the subject of critique and have undergone several rounds of improvement.¹⁶ The process of refining the guidelines shows both the transparency of the process and the EU commitment to integrated assessment.

Regional Economic Development Initiatives

The concept of the triple bottom line can be used regionally by communities to encourage economic development growth in a sustainable manner. This requires an increased level of cooperation among businesses, nonprofit organizations, governments and citizens of the region. The following examples throughout the United States show various ways the TBL concept can be used to grow a region's economic base in a sustainable manner.

Cleveland, Ohio

In 2009, the mayor of Cleveland convened the Sustainable Cleveland 2019 (SC2019) Summit to bring together hundreds of people interested in applying the principles of sustainability to the design of the local economy.¹⁷ The SC2019 is a 10-year initiative to create a

sustainable economy in Cleveland by focusing on a TBL-like concept. The city uses four key areas for measuring sustainability: the personal and social environment, the natural environment, the built environment (e.g., infrastructure and urban growth patterns) and the business environment. Each key area has six goals. At this point, specific measurement indicators have not been fully developed; however, the city is looking to create a dashboard that could be combined to create an index for overall project success. This dashboard would allow for quick year-to-year assessment in the SC2019 progress.

Grand Rapids, Michigan, and the Surrounding Region

In 2005, the Grand Rapids region created the nation's first “Community Sustainability Partnership” to develop a roadmap to lead Grand Rapids to sustainability. The region employs 14 major indicators related to the region's quality of life and environmental factors to determine progress made towards sustainability. Rather than create an index, target goals were established for each indicator. More detailed information of the metrics used for each indicator can be found in their TBL report.¹⁸ Below are brief explanations of the variables used to measure their TBL.

- **Environmental Quality**
 - o Waste: trends in recycling, refuse and yard waste
 - o Energy: energy consumption, natural gas

consumption and alternative fuel usage

- o Water: water consumption
- o Air Quality: toxic release inventory and number of air pollution ozone action days
- o Built Environment: number of LEED registered and certified projects
- o Land Use and Natural Habitat: inventory of land use and forest canopy
- o Transportation: public transportation ridership

- **Economic Prosperity**

- o Personal Income: personal income per capita
- o Unemployment: unemployment rate
- o Redevelopment, Reinvestment and Jobs: results from brownfield redevelopment investment and job creation
- o Knowledge Competitiveness: third-party report ranking U.S. regions

- **Social Capital and Equity**

- o Safety and Security: crime statistics
- o Educational Attainment: degree attainment levels
- o Health and Wellness: infant mortality rate and blood lead levels trends
- o Quality of Life: home ownership, poverty, and reduced price and free lunches trends
- o Community Capital: 211 calls for assistance, voter participation and population and ethnicity

Summary

The Triple Bottom Line concept developed by John Elkington has changed the way businesses, nonprofits and governments measure sustainability and the performance of projects or policies. Beyond the foundation of measuring sustainability on three fronts—people, planet and profits—

the flexibility of the TBL allows organizations to apply the concept in a manner suitable to their specific needs.

There are challenges to putting the TBL into practice. These challenges include measuring each of the three categories, finding applicable data and calculating a project or policy's contribution to sustainability. These challenges aside, the TBL framework allows organizations to evaluate the ramifications of their decisions from a truly long-run perspective. ■

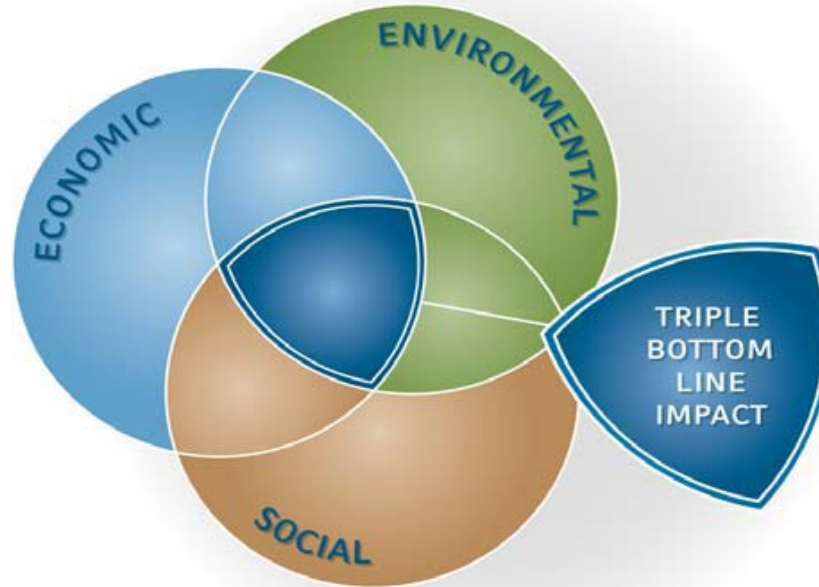
Notes

1. John Elkington, "Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development," *California Management Review* 36, no. 2 (1994): 90–100.
2. Andrew Savitz, *The Triple Bottom Line* (San Francisco: Jossey-Bass, 2006).
3. Peter Soderbaum, "Positional Analysis and Public Decision Making," *Journal of Economic Issues* 16, no. 2 (June 1982): 391–400, www.jstor.org/stable/pdfplus/4225177.pdf.
4. Terre Satterfield, Paul Slovic and Robin Gregory, "Narrative Valuation in a Policy Judgment Context," *Ecological Economics* 34 (2000): 315–331.
5. Stephen R. J. Sheppard and Michael Meitner, "Using Multi-Criteria Analysis and Visualization for Sustainable Forest Management Planning with Stakeholder Groups," *Forest Ecology and Management* 207 (2005): 171–187. Another example can be found in Katrina Brown et al., "Trade-Off Analysis for Marine Protected Area Management," *Ecological Economics* 37, no. 3 (June 2001): 417–434.
6. See Herman E. Daly, John B. Cobb and Clifford W. Cobb, *For the Common Good: Redirecting the Economy towards Community, the Environment, and a Sustainable Future* (Boston: Beacon Press, 1989) and John Talberth, Clifford Cobb and Noah Slattery, "The Genuine Progress Indicator 2006: A Tool for Sustainable Development," www.environmental-expert.com/Files/24200/articles/12128/GPI202006.pdf.
7. Minnesota Planning Environmental Quality Board, "Smart Signals: An Assessment of Progress Indicators," March 2000, www.green.maryland.gov/mdgpi/pdfs/GPI-Minnesota.pdf.
8. Integrated assessment is used as a general rubric for all sustainability assessment frameworks, including TBL. The proliferation of frameworks and their acronyms often complicates the issues associated with implementing a TBL framework for evaluating economic development initiatives. Except for a couple of sustainability frameworks, the accessibility components and measures

can be easily organized into the three TBL categories (economic, social and environmental).

9. Theo Hacking and Peter Guthrie, "A Framework for Clarifying the Meaning of Triple Bottom-Line, Integrated, and Sustainability Assessment," *Environmental Impact Assessment Review* 28 (2008): 73–89 and Wouter de Ridder et al., "A Framework for Tool Selection and Use in Integrated Assessment for Sustainable Development," *Journal of Environmental Assessment Policy and Management* 9, no. 4 (December 2007): 423–441.
10. Cascade Engineering, "The Triple Bottom Line Report," 2009, www.cascadeng.com/pdf/TBL_2009.pdf.
11. Nancy Fell, "Triple Bottom Line Approach Growing in Nonprofit Sector," *Causeplanet*, January 21, 2007, and Peter Senge, et al., *The Necessary Revolution* (New York: Doubleday, 2008).
12. For example, see Nancy Stark and Deborah Markley, "Rural Entrepreneurship Development II: Measuring Impact on the Triple Bottom Line, Wealth Creation in Rural America," July 2008, www.yellowwood.org/wealthcreation.aspx.
13. "Focus Areas," RSF Social Finance, <http://rsfsocialfinance.org/values/focus/>.
14. "Maryland's Genuine Progress Indicator: An Index for Sustainable Prosperity," Maryland: Smart, Green and Growing, www.green.maryland.gov/mdgpi/.
15. Commission of the European Communities, "Communication from the Commission on Impact Assessment," May 6, 2002, http://trade.ec.europa.eu/doclib/docs/2005/february/tradoc_121479.pdf.
16. EU Secretariat General, "Memo: The Main Changes in the 2009 Impact Assessment Guidelines Compared to 2005 Guidelines," http://ec.europa.eu/governance/impact/index_en.htm.
17. Sustainable Cleveland 2019, "Action and Resources Guide: Building an Economic Engine to Empower a Green City on a Blue Lake," October 2010, www.gcb.org/system/files/SC2019+Executive+Summary+%28SEP10%29.pdf.
18. City of Grand Rapids, Michigan, "Community Triple Bottom Line Indicator Report," September 2008, www.grpartners.org/pdfs/resources/TBLFinal1.pdf.

TRIPLE BOTTOM LINE ANALYSIS



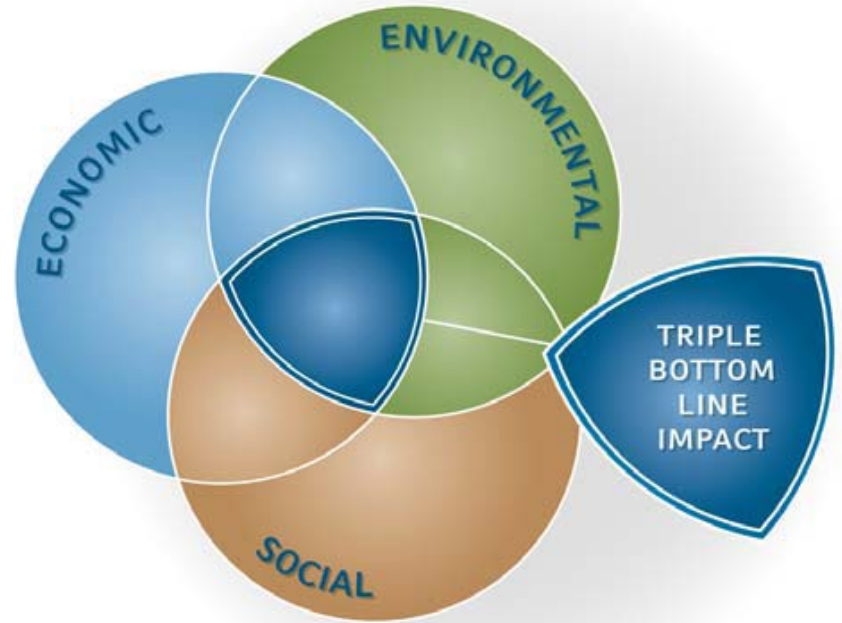
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Triple Bottom Line (TBL)

- Balanced approach to business decisions
- **Environmental** – what impacts will it have on the environment?
- **Social** – how will it impact society?
 - Consider both Workforce & the Community
- **Economic** – how much will it cost over the life of the project or product?



Factors to Consider When Applying TBL

- **Environmental** – life cycle assessment of: energy consumption, GHG emissions, waste generation, depletion of natural resources, impacts on biodiversity, etc.
- **Social** – human health impacts, use of local businesses, impact to employees, etc.
- **Economic** – life cycle cost assessment, use reduction, product performance & quality, impact on staff time & labor, etc.



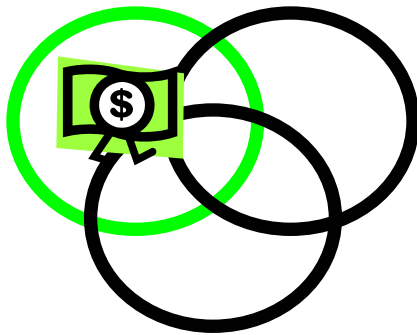
Triple Bottom Line Analysis: Not So Different From Common Sense

- Increased life cycle vs. low cost
 - Examples?
- Reduced maintenance expenses vs. low cost
 - Examples?
- Reduced operations expenses vs. low cost
 - Examples?

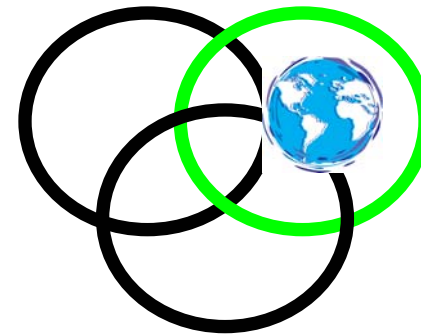


EXAMPLE (3 slides)

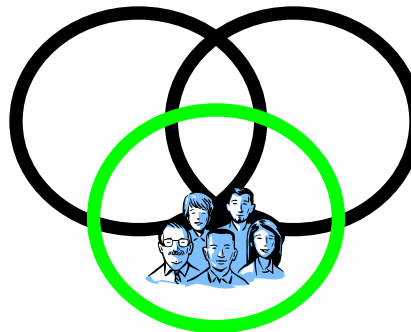
Economic



Environmental





Social



Example:

Use of Compact Fluorescent Lamps (CFLs)

Typical Light Output (Lumens)	Standard Bulb (Watts)	Exposed CFL Bulb (Watts) 	Enclosed CFL Bulb (Watts) 
250	25	5 to 7	9 to 10
450	40	9 to 11	14 to 15
900	60	13 to 18	18 to 20
1,200	75	18 to 23	25
1,750	100	25 to 30	—

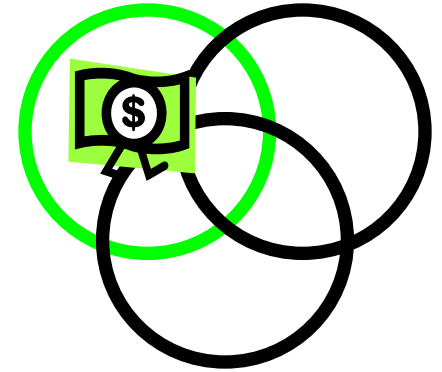
- Last up to 10 times longer than standard light bulbs.
- Use 2/3 to 3/4 less energy than standard light bulbs.
- CFLs are offered locally from \$1.75 to \$8, allowing for positive return on investment ROI.
- Smaller than standard light bulbs; retrofitting incandescent bulbs is easy.
- Operate at lower temperatures, generating less waste heat than incandescent.



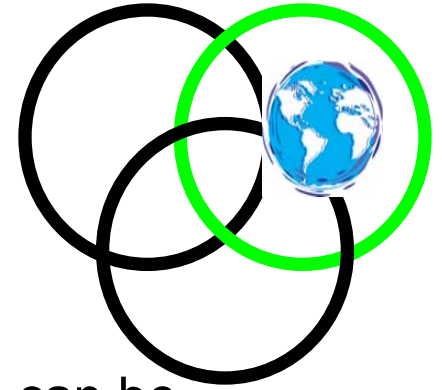
Use of Compact Fluorescent Lamps (CFLs)

Economic Benefits (1 of 3):

- Pros:
 - Reduced energy needs & longer life of CFLs vs. incandescent makes for a positive Return on Investment (ROI).
 - Longer life span allows reduced maintenance & replacement costs.
- Cons:
 - Higher capital investment (initial cost).
 - Higher costs of disposal (labor & transportation costs) if no local recycling program exists.
 - Not suitable in every type of lighting fixture (size, lighting duration).



Use of Compact Fluorescent Lamps (CFLs)



Environmental Benefits (2 of 3):

– Pros:

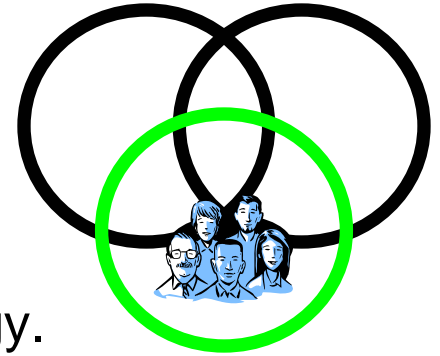
- Reduces landfill waste.
- Reduces energy consumption, & therefore can be part of GHG reduction strategy.
- Airborne mercury entering environment avoided as part of energy savings (less coal combustion)

– Cons:

- Requires proper handling & disposal for mercury.
- If communication & implementation of mercury handling & disposal isn't adequate, public health & ecosystem problems could be created (contamination of water & land).



Use of Compact Fluorescent Lamps (CFLs)



Social Benefits (3 of 3):

- **Workforce & Community Pros:**

- Provides adequate light for work & saves energy.
- Less time needed for maintenance & replacement over life of lamp.
- Reduced energy costs frees up funding to support workforce & other local businesses.

- **Workforce & Community Cons:**

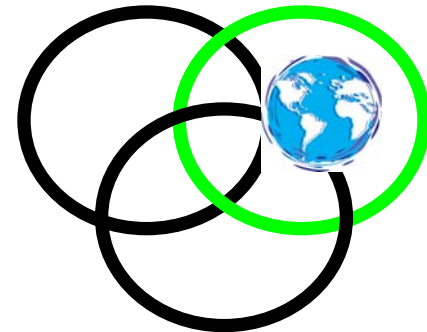
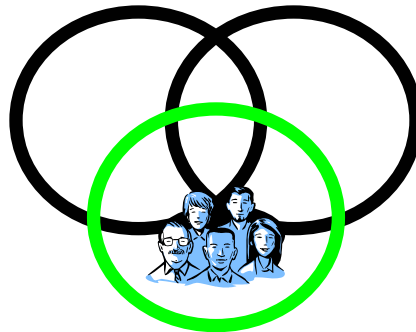
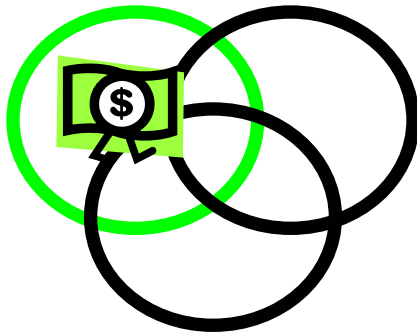
- Disposal must be handled appropriately to avoid compromising public health.
- Public concerns about mercury handling & health risks.



Triple Bottom Line Memory Test - CFLs

What Do You Remember from the last three slides?

- Would you make your analysis or recommendation from the information on the previous 3 slides?



TBLAM!

Triple Bottom Line Analysis Map (TBLAM)

• When you have completed each section, please select the appropriate "Condition indicator" on the traffic light graphic that reflects the result of the analysis.

Project or Decision: Use of Compact Fluorescent Lamps





Evaluated by: Ft. Collins Utilities

Positive Outcome - Proceed!

Acceptable Risks - Caution

Re-evaluate Before Proceeding



Social		Environmental	Economic
WorkForce  <p>STRENGTHS:</p> <ul style="list-style-type: none"> - Able to provide adequate light for work needs while saving energy. - Less time needed for maintenance & replacement over life of lamp. <p>LIMITATIONS:</p> <ul style="list-style-type: none"> - Lighting change may be noticeable and may potentially cause eyestrain for some unless designed appropriately. <p>OPPORTUNITIES:</p> <ul style="list-style-type: none"> - If employees are educated or consulted prior to change, employee engagement in a company savings effort, can help develop energy efficiency culture. <p>THREATS:</p> <ul style="list-style-type: none"> - If employees are not engaged, some may actively attempt to deter energy savings. 	Community  <p>STRENGTHS:</p> <ul style="list-style-type: none"> - Reduced energy costs frees up funding to support other local businesses, - Reduced energy needs may improve regional air quality from coal-fired power plants - health benefit. <p>LIMITATIONS:</p> <ul style="list-style-type: none"> - If quantities of CFLs are large, disposal must be handled appropriately so as not to compromise public health. <p>OPPORTUNITIES:</p> <ul style="list-style-type: none"> - Possible reduction of greenhouse gases and improved regional air quality through reduced electrical demand. <p>THREATS:</p> <ul style="list-style-type: none"> - Public concerns about mercury handling & health risks pose a problem. 	 <p>STRENGTHS:</p> <ul style="list-style-type: none"> - Reduces landfill waste. - Reduces energy consumption, and therefore can be part of GHG reduction strategy. - Mercury entering environment avoided as part of energy savings (less coal combustion). <p>LIMITATIONS:</p> <ul style="list-style-type: none"> - Requires proper handling and disposal for mercury. <p>OPPORTUNITIES:</p> <ul style="list-style-type: none"> - Possible reduction of greenhouse gases and improved regional air quality through reduced electrical demand. <p>THREATS:</p> <ul style="list-style-type: none"> - If communication of mercury handling and disposal is not adequate, public health and ecosystem problems could be created (contamination of water and land). 	 <p>STRENGTHS:</p> <ul style="list-style-type: none"> - Reduced energy needs & longer life of CFLs versus incandescent makes for a positive Return on Investment (ROI). - Longer life span allows reduced maintenance & replacement costs. <p>LIMITATIONS:</p> <ul style="list-style-type: none"> - Higher capital investment (initial cost) - Higher costs of disposal (labor and transportation costs) if no local recycling program exists. - Not suitable in every type of lighting fixture (size, lighting duration). <p>OPPORTUNITIES:</p> <ul style="list-style-type: none"> - Reduced energy costs will contribute to ROI. Less work time spent on replacement of lamps <p>THREATS:</p> <ul style="list-style-type: none"> - Large scale adoption may lead to temporary supply issues.

NOTES: The condition indicators should be selected based on your personal values as they relate to this analysis. You are not "trying to get to green," but using this form as an analysis method to guide a qualitative and quantitative assessment.

Consider using a more detailed analysis method like this one to develop a memorandum with your recommendation.