

SUSTAINABILITY ACTION PLAN

Submitted to:

American Institute of Architects
AIA 2030 Commitment

July 2011

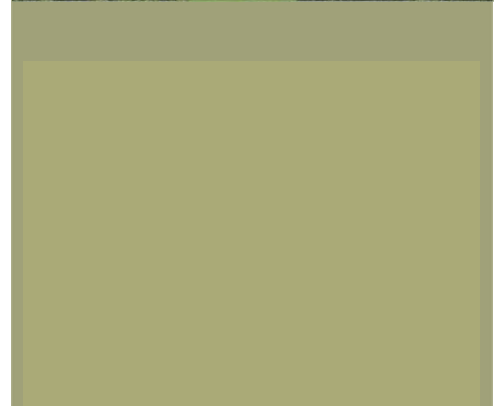
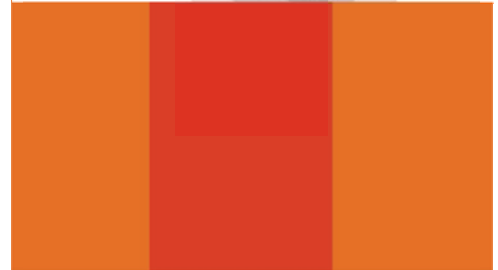
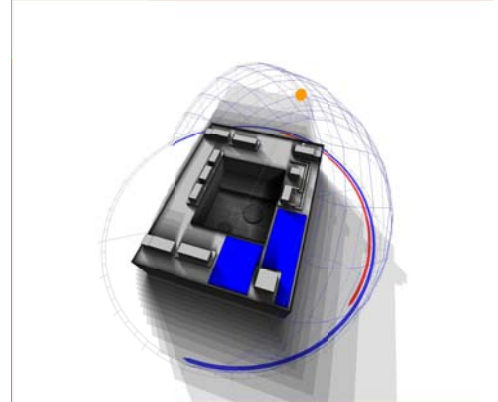


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1.0 INTRODUCTION

With the built environment as the single biggest contributor of greenhouse gas emissions, any successful strategy to reduce carbon emissions and combat global climate change must include building efficiency gains as a key component.

We therefore believe it is imperative for our industry (architecture, engineering, construction) to work toward a fundamental transformation in how buildings are designed, constructed and operated – toward incremental carbon footprint reductions with the ultimate goal of carbon neutrality.

1.1 Who We Are

Thornton Tomasetti is a global leader in engineering design, investigation and analysis serving clients worldwide on projects of all sizes and complexity. With practices in building structure, building skin, building performance, construction support services and property loss consulting, Thornton Tomasetti addresses the full life cycle of buildings.

Founded in 1956, today Thornton Tomasetti is a 500+ person organization of engineers, architects and support personnel collaborating from 23 offices across the United States and in Asia-Pacific, Europe and the Middle East.

1.2 Our Commitment

In July 2010 Thornton Tomasetti became the first predominantly structural design firm to join the AIA 2030 Commitment, which promotes the goal of carbon-neutral building by 2030.

We are committed to maximize efficiency and sustainability of all our projects in close collaboration with all members of the design and construction team. Therefore, we will evaluate all our projects for sustainability opportunities as our 'business as usual' approach - irrespective of whether a project has a defined sustainability agenda.

To meet this commitment, we are preparing a mechanism to quantify, track and ultimately reduce the embodied energy and carbon values of the structures we design.

At Thornton Tomasetti we are certain that the building model of the future will be dramatically "greener" than that of the past – any other scenario is simply, well, unsustainable. We are firmly committed to contribute our part on our collective way to a more sustainable built environment.

2.0 OUR WORK

Thornton Tomasetti is a multidisciplinary engineering/architecture firm with a multitude of service lines in the areas of design, construction and investigation. Given the complex interdependencies between building components and systems and the increasing emphasis on high-performance characteristics, we realize that sustainability considerations need to inform most, if not all, of what we do.

Thus, beyond 'traditional' design criteria, such as strength, constructability, serviceability, cost, etc., we now have an obligation to also consider sustainability criteria, such as operational efficiency, thermal efficiency, and carbon footprint as we devise our building designs.

We realize that we can succeed in reducing the built environment's energy consumption and associated greenhouse gas emissions only if we look beyond new construction projects and also focus on increasing the efficiency of existing buildings. We have a long history of working on new and existing buildings and know that with our diversified set of services and multidisciplinary team approach we can be instrumental in realizing smart, high-performance building solutions.

2.1 Our Practice Areas & Sustainability Opportunities

The following is a brief summary of Thornton Tomasetti's five practice areas and the sustainability opportunities for each.

Building Structure

Our engineers design structural systems for buildings of all types and sizes at locales throughout the world. We apply both traditional and cutting-edge building materials and structural systems, and consider both indigenous and newly introduced construction methods.

We realize that our structures typically account for majority of a building's mass, and as such a majority of the total embodied energy/embodied carbon (EE/EC) as well. Therefore, we have set out to implement a firm-wide mechanism to quantify and track the EE/EC values of our structural design projects, whenever possible within, or aided by, a building information model – with the aim of over time learning from the results and developing design strategies to effectively reduce these impacts.

Beyond the area of EE/EC, there are other ways that structural design decisions can positively affect a project's sustainability – either via optimizing our structural designs, or as part of synergistic measures devised in collaboration with other disciplines. (Refer also to chapter 3.2 below.)

Building Skin

Our skin specialists assist in engineering of innovative, constructible, cost-effective, thermally efficient building skin solutions, ranging from traditional curtain walls to the use of structural glass and through all phases of design and construction.

Knowing that the thermal properties of the building envelope are critical for

overall energy performance, we strive to conceptualize building skin systems that minimize thermal bridging, maximize thermal resistance and incorporate effective shading strategies that combined support the building's energy and daylighting concepts.

To achieve these desired high-performance outcomes, we utilize a variety of advanced computer simulation tools to model and optimize the structural, geometric, thermal, and light transmission properties of our building skins.

Building Performance

Our team of multidisciplinary building performance professionals offers expertise throughout a building's life cycle and relative to all building components and systems. We recommend maintenance regimes and guide owners through expansions, adaptive reuses, rehabilitations and upgrades.

In recent years energy efficiency has emerged as a key building performance indicator. Thus, the modus operandi of many buildings in the past of merely maintaining code required life safety and performance levels gradually gave way to improving building performance and to reduce energy and water consumption and the associated operational cost.

With Thornton Tomasetti's comprehensive knowledge of architectural, structural, and MEP building components and systems and their interrelatedness, we are positioned to devise holistic performance solutions that combined amount to more than the sum of their parts.

Construction Support Services

Our construction support services address a wide range of needs to efficiently move a project from concept to delivery, serving developers, construction managers, fabricators, erectors, and general and specialty contractors. Through our BIM services we develop and deliver steel, concrete and precast models, provide connection design, and deliver shop drawings – both in integrated project delivery (IPD) as well as in traditional settings.

Utilizing BIM platforms that support integrated processes increases sustainability of the construction process by facilitating paper reduction and, more importantly, construction waste reduction due to high levels of accuracy in the model. Thornton Tomasetti is at the forefront of employing not only common BIM tools, but also developing custom software routines that further streamline project delivery.

Property Loss Consulting

Our multidisciplinary PLC staff specializes in investigative engineering and architectural and construction material evaluation to assist attorneys and insurance companies with claims evaluations. Our scientific investigation provides our clients with a thorough assessment of damage or defects, as well as analysis of causation that can be used for retrofit, repair, claims adjustment or litigation.

We anticipate that the green building features of buildings will increasingly become subject to damage or performance disputes. With our knowledge of

sustainability strategies and technologies and the suite of LEED rating systems, we can evaluate any underlying technical issues and advise our clients throughout claims adjustment, litigation, remediation or recertification.

2.2 Structural Sustainability Best Practices

Structural design accounts for a majority of Thornton Tomasetti's work. At the same time, the structural engineering community is not generally thought of as being at the forefront of sustainability. Hence, we can make a significant contribution to building sustainability if we identify and implement ways in which our structural designs can improve building efficiency and reduce environmental impacts in terms of carbon emissions, general resource consumption (energy, water, raw materials).

To aid Thornton Tomasetti's project teams around the globe with the implementation of structural engineering strategies designed to increase project sustainability, we are developing an internal "Structural Sustainability Best Practices" document that will be made available to all structural design staff.

The purpose of this document is not to advocate that sustainability should trump all other performance criteria, but rather to educate all staff on the range of viable sustainable design strategies, providing them with the proper tools and resources, and to encourage consideration of sustainability objectives throughout the design process.

A summary of Thornton Tomasetti's "Structural Sustainability Best Practices" document is attached as Appendix A.

2.3 Embodied Energy/Carbon Reduction

A building's life-cycle energy and carbon footprint generally comprises two distinct areas:

- Operational energy used for ventilation, heating, cooling, lighting, and equipment.
- Embodied energy used for material extraction, refinement, manufacturing of building materials and components, transportation, and construction activities.

The embodied energy share as a percentage of the total is by no means insignificant, and with increasing levels of operational energy efficiency this percentage will increase.

In our role as structural and building skin designers, our ability to affect building operational energy efficiency is focused on assisting with the realization of thermally efficient building envelopes, which in turn reduce heating and cooling loads.

However, looking beyond operational energy use, we know that a majority of a building's total embodied energy/carbon footprint is often represented in our design scopes. Thus, in the spirit of the AIA 2030 Commitment with its main

objective of carbon emissions reduction, we realized that we need to focus on the EE/EC side of the energy equation.

Therefore, to quantify the “carbon efficiency” of our structural designs and measure our carbon reduction progress over time, we are developing a custom carbon tracking tool to aggregate the EE/EC impacts of our projects across our entire design portfolio.

This will allow us over time to expand our knowledge about the relative carbon efficiency of various design strategies and parameters, and to further refine our structural best practices accordingly.

We envision that the results of our EE/EC aggregation efforts will constitute Thornton Tomasetti’s annual AIA 2030 Commitment reporting (as opposed to Energy Unit Intensity and Lighting Power Density values that are reported by architectural firms.) Since there is no established structural EE/EC baseline, the results of our first reporting period (to be reported in early 2012 for the calendar year 2011), will become the baseline against which we will measure our hoped-for improvement.

2.4 Design Process and Tools

For some time, Thornton Tomasetti has been a champion of integrated project delivery (IPD) processes and building information modeling (BIM) tools. We have developed many custom tools for geometry optimization and interoperability that increase our design productivity and result in increased accuracy of our work product.

As an industry, we are in a transitional phase where new delivery models and associated BIM tools are constantly developed. Yet, the rate of adoption among the involved stakeholders (architects, engineers, contractors) varies and is far from universal. Furthermore, the level of interoperability between the multitude of BIM platforms is often limited or not possible at all.

Process

In the green building community it is an article of faith that an integrated design process is key to sustainable building outcomes. Yet in reality, for a variety of reasons, integrated design and delivery processes are not always implemented.

Nevertheless, we recognize that integrated, collaborative design processes are a prerequisite for realizing the best possible sustainability outcomes, and we will continue to support and participate in them whenever we can.

Tools

At this point, the tools to model sustainability performance (energy modeling, daylighting simulation, thermal heat flow analysis, computational fluid dynamics, life cycle assessment) need to be, and will likely become, more closely tied to the BIM platforms used by architects and structural engineers.

Thornton Tomasetti

Thornton Tomasetti's intends to not only maintain our structural BIM leadership position but to also integrate sustainability/energy performance modeling tools into our existing software infrastructure, and, to the extent necessary, to develop custom tools that facilitate interoperability and data aggregation.

3.0 OUR OPERATIONS

Thornton Tomasetti endeavors to conduct our business operations and practices in a way that is consistent with our values and beliefs. As such, our commitment to sustainability is not only reflected in our work product we deliver to our clients and the resulting built structures, but also in the way we operate our offices, the opportunities we offer to our staff and the role we play in our industry.

3.1 Sustainable Operations Policy

In our office spaces we aim to reduce our environmental footprint by limiting our consumption of energy, water and office supplies, reducing waste generation, and providing a healthy indoor environment.

Thornton Tomasetti's Sustainable Operations Policy stipulates minimum requirements, subject to local constraints, in the areas of energy use, water use, purchasing, waste management, office renovations/built-outs, and transportation.

We plan to review this policy on regularly and to "raise the bar" over time to keep up with evolving standards sustainable office operations technology.

Furthermore, we will develop and implement a protocol to benchmark our firm's energy consumption across all offices annually.

Refer to Appendix B "Sustainable Operations Policy"

3.1 Education

We recognize that technical knowledge about sustainability technology and strategies is key to our ability to participate in integrated design processes and to contribute to sustainable project solutions. Therefore we encourage and actively support all employees in obtaining and maintaining their LEED accreditation.

Thornton Tomasetti has currently more than 170 LEED APs representing about one third of the entire firm, and we constantly strive to increase this percentage,

To support all current LEED APs with the task of satisfying continuing education requirements, we have implemented a firm-wide lunchtime seminar/webinar program that will allow participants to accrue the requisite number of education units.

4.0 OUR BUSINESS STRATEGY

Over the past decade we have witnessed the growing importance of sustainability in our industry – not only in the US, but throughout the world. While the global economic crisis has certainly slowed the growth of green design and construction, there is no doubt that with economic recovery, sustainable design and construction will be more in demand than ever before – reflecting the transformation of the market toward a more sustainable and carbon-efficient model. Thornton Tomasetti is committed to participate in this ongoing transformation through the application of our technical expertise and delivery of our professional services.

We are continually refining and adding to the set of services we provide to our clients. As such, we realize that in an era of increasingly integrated designs and focus on sustainable high-performance building, we need to possess a high level of multidisciplinary technical expertise to make high-performance outcomes possible – and we need to make a concerted effort to stay on the forefront of the constantly evolving set of sustainability technologies.

Therefore, we have been expanding our service offerings beyond our ‘traditional’ areas of work, to include a variety of sustainability services, from LEED consulting to energy and daylight modeling. And we continue to evaluate the marketplace, available and emerging technologies and services, so that we can add and refine services that our clients will need to realize their visions of green buildings.

As structural design engineers we strive to support our design partners (architects MEP engineers, etc.) in the design of sustainable building. We know that we have significant contributions to make, and - with the help of our Best Practices guidance document – we plan to gain a level of sustainability knowledge and awareness among our structural engineers that will set us apart and that allows us to team up with like-minded project partners.

APPENDICES

Appendix A – Sustainability Best Practices for Structural Engineers - Summary

Appendix B – Sustainable Operations Policy v1.0



Appendix A

Sustainability Best Practices for Structural Engineers - Summary

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1.0 INTRODUCTION

Sustainability is best achieved in structures when the big picture is considered and thoughtful approaches are taken during design. A commitment may be required of the design team to elevate the priority of sustainability. Structural engineers are stakeholders in the design process (whether it is integrated or not) who can suggest innovations and systems that may not always be strictly structural in nature but facilitate the overall sustainability of the project.

The design and construction of sustainable structures requires structural engineers to take a thoughtful approach in both their typical scope of work and beyond. Structural engineers can play a leadership role in project management throughout the design, construction and service life of a building. A thorough understanding of sustainable design concepts and how they apply to building components and systems is required. Thornton Tomasetti utilizes its knowledge of building materials to make appropriate design choices.

The following sections provide an outline of Thornton Tomasetti's best practices to increase the sustainability of the structures we design. The bulleted items are drawn from a more detailed internal technical guidance document named "Sustainability Best Practices for Structural Engineers".

2.0 PROJECT MANAGEMENT

It is critical for structural engineers to participate in sustainability decisions throughout the design, construction and service life of a building. A truly integrated design process includes the expertise in building concepts and components that structural engineers can contribute.

During the schematic development of a project, Thornton Tomasetti helps educate our clients about green design incentives and requirements that may be available/applicable to the project. As the project takes shape, we help define suitable design criteria that achieve the project's sustainability goals. If possible, we seek synergies through the integration of building systems with the structure. Throughout the construction process and throughout occupancy, Thornton Tomasetti offers services that uphold the sustainable performance of the building.

The following list summarizes the contributions that structural engineers can make throughout all project phases to promote sustainability.

SCHEMATIC DESIGN

- Ensure that the desire for a sustainable structure has been reflected in contracts.
- Consider whether the project will benefit from regional incentives for sustainable design and practices.

- Suggest that the project schedule allow for sustainability to be properly designed, developed, bid, and constructed.
- Advocate for integration of building systems with structure.

DESIGN DEVELOPMENT

- Select appropriate design criteria while allowing for future flexibility where desirable.
- Apply sustainable design concepts and select appropriate materials for building components.
- Design the structure for a long service life.
- Perform a quality assurance review to ensure that sustainability criteria and green certification requirements (e.g. LEED) have been incorporated into the construction documents.

CONSTRUCTION & SERVICE LIFE

- Communicate desired sustainability outcomes to contractors.
- Engage Thornton Tomasetti's full range of practice areas, including Building Performance, Building Skin, and Construction Support Services, to provide expertise in sustainable design and construction beyond the typical scope of the engineer of record.
- Offer Thornton Tomasetti's expertise in repair and building maintenance to perform renovations that maintains the sustainable performance and occupancy of the structure.

3.0 DESIGN CONCEPTS

A thorough understanding of sustainable design concepts and how they apply to building components is required. Thornton Tomasetti evaluates design concepts and strategies for each project to determine where sustainable opportunities exist. The following list summarizes structural design concepts at our disposal to increase a project's sustainability.

- Building Reuse – Preliminary design can capitalize on reusing portions of an outdated existing building in lieu of complete demolition.
- Material Reuse – Specifying salvaged structural components and materials, whether used as an original product or down-cycled.
- Thermal Bridging – Detailing consideration of thermal breaches in the building envelope due to steel components and other thermally conductive materials.
- Thermal Mass – Intentional use of massive structural components for insulation and temperature regulation within the building.

- Exposed Structure – Reducing architectural finishing components through thoughtful planning and detailing of structural components.
- Evaluate and minimize the embodied energy and embodied carbon footprint of the structural system.

Additional strategies can be coordinated with the owner based on their long-term goals for the building and desired level of future flexibility.

- Design for Future Use – Consideration of future expansion needs or changes in use can provide the owner with added value, and save the building from becoming obsolete prematurely.
- Enhanced Durability – Going beyond code required minimum standards to ensure the structure and building envelope remain maintainable and in good condition for the intended service life of the building.
- Design for Deconstruction – Detailing and designing structural components for disassembly (in lieu of demolition) without producing waste creates added value in terms of sellable materials, reduces landfill, and reduces carbon emissions.

4.0 BUILDING COMPONENTS

Structural engineers can have a large impact on the design process by contributing to major design decisions on the size and configuration of various building components.

Sustainable designs strive to employ the most efficient load path in order to reduce the amount of total material used. Structural details should accommodate maintenance, durability, and accessibility for future repairs. Overall, the sustainable aspects of a building will benefit when individual structural components are designed with the entire structural system in mind.

Building components include all major systems requiring structural design, including the building foundations, superstructure, facades and roof.

FOUNDATIONS

- Consider techniques to reduce environmental impact of earthwork and foundation construction (i.e. balance cut and fill, re-purpose demolition rubble for sub-base, reduce spoil removal, avoid affecting the groundwater table).
- Reuse existing foundations where practical.
- Reduce the number of columns that must be supported on independent foundations.
- Suggest integrating geothermal systems into the foundations.

SUPERSTRUCTURE

- Design structures with efficient load path by considering: piece counts,

optimal bay sizes, utilization of composite construction, optimization of members, etc.

- Integrate structure with mechanical systems such as providing for raised floor system, coordinate plumbing shafts with structural columns, insulated walls, etc.
- Locate lateral resisting elements for maximum efficiency, and seek to design for minimum serviceability criteria as through the use of wind tunnel testing.

FACADE

- Limit thermal bridging to reduce the amount of direct heat transfer through the building enclosure.
- Encourage the use of solar shading devices to reduce solar heat gain.
- Employ double-skinned façade systems to allow airflow between the inner and outer membranes for enhanced year-round thermal performance.
- Consider façade attachment to structure with regard to accessibility for maintenance and durability.
- Engage Thornton Tomasetti Building Performance group to assist the owner with long-term maintenance.

ROOF

- Design for adequate capacity for green elements, including vegetated roofs, photovoltaic panels, wind turbines, and solar thermal collectors.
- Consider waterproofing and other serviceability issues (i.e. vibration due to turbine vibrations)

5.0 STRUCTURAL MATERIALS

Structural engineering can have a positive impact on the sustainability of all projects through responsible specification and innovative use of materials. By early communication of project goals with regard to recycled, regional, reused and rapidly renewable materials, outcomes can be realized that benefit the project team and end user as well as the environment.

For each building type, efficiency in design should be sought using material-specific strategies and reducing waste by allowing for prefabrication of building components. Innovative use of nontraditional materials may be employed to advance the profession toward designing highly efficient and environmentally responsible structures.

- Whenever possible, specify that materials are to be locally sourced.
- Whenever possible, propose the use of recycled or reused materials, including post-industrial cementitious replacements.

- Design for efficiency using steel systems – consider increasing deck spans and reducing connections (and thereby reducing embodied energy).
- Limit reinforcing for concrete to code required minimum.
- Specify use of precast concrete to minimize site waste.
- Evaluate the merits of using cementitious substitutions for increased durability and/or carbon footprint reduction.
- Specify timber from sustainably managed forests, ideally from a local source.
- Consider whether salvaged wood timbers be obtained from a local supplier.
- If project contains load-bearing BRICK MASONRY, suggest that reclaimed materials be used and sourced locally.
- Consider using not-traditional structural materials provided safety and performance is not compromised.
- Discuss whether contractors and fabricator may be chosen based on their environmental practices.



Appendix B

Sustainable Operations Policy

v1.0 - July 2011

M: Mandatory

E&I: Evaluate and implement if viable (technically, economically, legally)

gray: To be further developed or implemented per "Scheduled" column

	Existing spaces	New office build-outs	Scheduled	Reference Standards, Resources, Comments
1 Office Energy Use				
1.1 Lighting				
Occupancy sensors: Install occupancy sensors in private offices, conference rooms and, whenever appropriate, in common areas (hallways, kitchen, bathrooms). Lights in any occupancy sensor controlled space are to be turned off after 10 minutes of inactivity.	E&I	M		
Schedule settings: Office lighting in common and open office areas is to be controlled by timers that turn the light off between 8pm to 7am (except for emergency lights).	E&I	M		
Fixture types: Replace any existing incandescent fixtures with, and/or install only new CFL, LED or other high-efficiency lighting fixtures.	E&I	M		
Employee engagement: All employees are required to: - turn off individual task lights whenever they are not at their desk - when working late or on weekends, to turn off all lights upon leaving the office	M	M		
1.2 HVAC				
General: Calibrate control settings to ensure not to overheat or overcool spaces. If necessary work with the landlord and/or TT's MEP group to achieve these objectives.	M	M		
Schedule settings: Air conditioning is not to be provided between 8pm and 7am on weeknights, and if feasible should be limited on weekends to those periods and areas where employees work. (Server rooms and other spaces where air conditioning is critical are exempt.)	E&I	M		
1.3 IT infrastructure and equipment				
Monitors: Replace any existing CRT monitors with and/or purchase only new LCD monitors.	M	M		
Computer settings: The IT department is to automatically "wake up" all machines at 6am and force shut downs of machines that have been idle for more than 30 minutes after 8pm. From 6am to 8pm, machines that are idle for more than 15 minutes will be put into "Sleep" mode.	M	M		
Other equipment settings: To the extent technically feasible, copiers, printers, plotters, and other office equipments to be powered down overnight and over weekends.	M	M		
Employee engagement: All employees are required to shut down their computers and monitors when leaving work at the end of the day or being out of the office for business travel/vacation, unless overnight calculations, simulations, renderings, etc. are performed.	M	M		
<i>Refer to the attached TT IT Equipment Operations Policy for more details.</i>	M	M	Dec-11	
1.4 Measurement and tracking				
If not already in place: Install submeter or other suitable measurement device to measure and record office energy use.	E&I	M	Jun-12	
Company-wide emissions reporting	M	M	2013	

	Existing spaces	New office build-outs	Scheduled	Reference Standards, Resources, Comments
2 Office Water Use				
2.1 Fixture efficiency				
Install (new build-outs), or - to the extent necessary - replace or upgrade (existing offices) fixtures to have, at a maximum, the following flow/flush rates: - Toilets: 1.6 gpf (all new toilet fixtures shall have dual-flush feature) - Urinals: 1.0 gpf, or waterless if permissible by Code - Lavatories and sinks: 1.5 gpm (aerators can typically be added to existing faucets) - Shower heads: 1.5 gpm	E&I	M*		http://www.epa.gov/watersense/index.html * if under TT control
2.2 Measurement and tracking				
If not already in place: Install submeter or other suitable measurement device to measure and record office water use.	E&I	M	Jun-12	
3 Consumables and Waste Management				
3.1 Paper use				
Copiers and high-volume printers: Set default settings as follows: - Copy mode: 2-sided to 2-sided - Print mode: 2-sided	M	M		
Personal printers: Upgrade existing printers not capable of duplexing, with duplex upgrade kit; and purchase only duplex-capable new printers.	E&I	M		
Paperless procedures: Encourage the use of electronic documents and forms to reduce paper consumption. Consider strategies such as electronic shopdrawing processing, bluebeam markups, project websites for document exchange.	M	M		
Marketing materials, such as brochures, bifolds, annual report, christmas cards, shall be printed on paper from FSC-certified sources.	M	M		
Scrap paper collection/reuse/recycling	M	M	Jun-12	
Tracking of total paper use per office/per head.	M	M	Jun-12	
Employee engagement: All employees are encouraged to be mindful when printing or copying documents and to consider the following questions: - Do I really need a hardcopy of this document? - Do I really need all pages of this document as hardcopy? - Can I print multiple pages per sheet without losing important information? (Bob DeScenza can be consulted for tips on how to keep an office free of paper.)	M	M		
<i>Refer to the attached TT Printing Policy for more details.</i>	M	M	Dec-11	

	Existing spaces	New office build-outs	Scheduled	Reference Standards, Resources, Comments
3.2 Sustainable purchasing policy				
Paper for printers and copiers: General office use letter, legal and abloid sized paper to be 100% post-consumer recycled.	M	M		
<i>Other paper products: requirement to be defined</i>	M	M	Dec-11	
Ongoing consumables are materials with a low cost per unit that are regularly used and replaced, such as (besides paper) toner cartridges, binders, paper clips, pens, tape, batteries, and other office supplies. Purchase only items that meet one or more of the sustainability criteria listed under credit MRC1 of the LEED EBOM (2009) rating system.	M	M		LEED EBOM 2009, MRC1: Sustainable Purchasing: Ongoing Consumables
Kitchen supplies: Implement the following measures: - Generally, preference shall be given to non-disposable kitchen supplies. - Do not purchase any disposable cups. - Any disposable flatware, stirrers, cutlery shall be biodegradable.	M	M		
Equipment and appliances: For eligible equipment types, including computers, monitors, copiers, printers, scanners, refrigerators, dishwashers: Purchase only Energy Star rated equipment and appliances; or (outside of the US) purchase equipment that complies with an equivalent national standard. New personal printers are to be capable of duplexing.	M	M		http://www.energystar.gov/index.cfm?c=products.pr_find_es_products
Office furniture: Purchase furniture that meets one or more of the sustainability criteria listed under credit MRC2.2 of the LEED EBOM (2009) rating system.	M	M		LEED EBOM 2009, MRC2.2: Sustainable Purchasing: Furniture
Catered food: Give preference to food vendors that minimize the use of disposable tableware, etc.	M	M		
Bottled water: In all locations where good quality potable water is available from the municipal water supply: No bottled water for vending machines or meetings shall be purchased. Instead, provide filtered tap water via water fountains to employees and for meetings.	M	M		
Cleaning supplies: Criteria to be developed.	M	M	Dec-11	
<i>Refer to the attached TT Sustainable Purchasing Policy for more details.</i>	M	M	Dec-11	
3.3 Waste management and recycling				
Recycling: All offices are to participate in recycling programs and and adhere to recycling policies put into place by the host building or the local municipality. If no such recycling program is instituted, explore other locally available recycling options, and, if economically viable, engage a third party to transfer office waste into the recycling stream.	E&I	E&I		
Batteries and cellphones: All offices are to institute a used batteries and cellphones collection procedure to divert them from the solid waste stream. Dispose of batteries and cellphones at a local drop-off location. In the US call2recycle maintains drop-off points in proximity to all domestic TT offices.	M	M		http://www.call2recycle.org/
Employee engagement: All employees are encouraged to participate in local recycling programs and battery/cellphone collection procedures, and are asked to be generally mindful about strategies to reduce waste.	M	M		
<i>Refer to the attached TT Waste Management Policy for more details.</i>	M	M	Dec-11	

M: Mandatory

E&I: Evaluate and implement if viable (technically, economically, legally)

gray: To be further developed or implemented per "Scheduled" column

	Existing spaces	New office build-outs	Scheduled	Reference Standards, Resources, Comments
4 Office Renovations and New Build-Outs				
4.1 Process				
Any office planning to move to a new location, undertake a substantial renovation/upgrade, or being established in a new location shall prior to the search for a suitable space (or prior to the start of the design process in case of substantial upgrades/renovations) form a TT-internal project team, including TT's Director of Sustainability. Subsequently an Integrated Design Process shall be implemented to take maximum advantage of sustainability opportunities and develop sustainability goals and strategy. When searching for a lease space, the suitability of prospective office spaces for implementing efficiency/sustainability measures and pursuing LEED CI certification shall be an important selection criterion.	n/a	M		
4.2 LEED CI certification				
Search: Give preference to lease spaces that are suitable for LEED CI certification. Upon initial contact with prospective landlords, TT will express the desire for LEED CI certification, discuss the feasibility of a LEED certification effort, and inquire about the landlord's willingness to support such an effort.	n/a	M*		* if LEED certification is pursued
Lease: TT will endeavor to incorporate provisions in new leases that promote sustainability and support LEED credits: - Pay for actual energy/water use (as opposed to prorated amounts) via submetering - Access to building amenities such as bicycle storage room - Long-term lease	n/a	M*		* if LEED certification is pursued
Design process: Form a TT LEED taskforce led by a member of the Sustainability group and including volunteers from the affected office. The LEED taskforce shall facilitate an Integrated Design Process and develop a sustainability/LEED strategy for the project by working closely with TT's regional/office manager in charge, TT's Office Services department, the design team, the landlord and the contractor. It is imperative that the taskforce be convened and a substantial dialogue happens among all stakeholders before fundamental, irreversible design decisions are made.	n/a	M*		* if LEED certification is pursued
Certification: The LEED taskforce shall manage the LEED certification process from registration to certification, including LEED-online administration, keeping tabs on all LEED credits to be pursued, and tracking LEED related responsibilities of all members of the design/construction team.	n/a	M*		LEED for Commercial Interiors v3 * if LEED certification is pursued

	Existing spaces	New office build-outs	Scheduled	Reference Standards, Resources, Comments
4.3 Minimum sustainability standards (if LEED CI certification is not feasible)				
<p>Process: Form a TT Sustainability taskforce led by a member of the Sustainability group and including volunteers from the affected office. The Sustainability taskforce shall facilitate an Integrated Design Process and develop a sustainability strategy for the project by working closely with TT's regional/office manager in charge, TT's Office Services department, the design team, the landlord and the contractor. It is imperative that the taskforce be convened and a substantial dialogue happens among all stakeholders before fundamental, irreversible design decisions are made.</p> <p>The Sustainability taskforce shall keep tabs on all sustainability measures included in the sustainability strategy and track responsibilities and status throughout the process.</p>	n/a	M		
<p>Guidance: The LEED for Commercial Interiors rating system shall be used as a guide throughout the design and construction phases to maximize the project's sustainability characteristics.</p>	n/a	M		LEED for Commercial Interiors v3
<p>Minimum requirements: All build-outs shall comply with the requirements of the Prerequisite Credits of the LEED for Commercial Interiors rating system:</p> <ul style="list-style-type: none"> - WEp1: Water Use reduction - EAp1: Fundamental Commissioning of Building Energy Systems - EAp2: Minimum Energy Performance - EAp3: Fundamental Refrigerant Management - MRp1: Storage and Collection of Recyclables - IEQp1: Minimum Indoor Air Quality Performance - IEQp2: Environmental Tobacco Smoke Control 	n/a	M		LEED for Commercial Interiors v3
<p>Construction materials for office renovations, additions and new office build-outs shall, to the maximum extent feasible, meet one or more of the sustainability criteria listed under credit MRc3 of the LEED EBOM (2009) rating system.</p>	n/a	M		LEED EBOM 2009, MRc3: Sustainable Purchasing - Facility Alterations and Additions
<p>Low-emitting adhesives, sealants, paints, coatings, flooring, composite wood products, agrifiber products, furniture, seating shall be used to the maximum extent feasible. Refer to credit IEQc4 of the LEED for Commercial Interiors (2009) rating system.</p>	n/a	M		LEED CI 2009, IEQc4: Low-Emitting Materials
<p>HVAC: Install energy efficient HVAC systems/equipment that allows TT to exert a high level of control over temperature settings and schedules and incorporates individual thermostats for all enclosed offices and conference rooms.</p>	n/a	M		

	Existing spaces	New office build-outs	Scheduled	Reference Standards, Resources, Comments
5 Indoor environmental quality				
5.1 Air quality				
Monitoring	E&I	M	2013	
5.2 Daylight and views				
Daylighting Optimization	E&I	M	Jun-12	
5.3 Thermal comfort				
Criteria to be developed.	E&I	M	Jun-12	
5.4 Cleaning procedures				
Working with the landlord and cleaning contractors develop and implement green cleaning purchasing and procedural guidelines. Refer to credits IEQp3 and IEQc3.3 of the LEED EBOM (2009) rating system for guidance.	M	M	Jun-12	LEED EBOM 2009, IEQp3: Green Cleaning Policy; IEQc3.3: Green Cleaning - Purchase of Sustainable Cleaning products and Materials
<i>Refer to the attached TT Green Cleaning Policy for more details.</i>	M	M	Dec-11	
6 Transportation				
6.1 Commuting				
Pre-tax transit benefits: Wherever possible, the firm provides pre-tax public transit benefits to its employees (e.g. Transit Check in the US)	M	M		
Accommodate bicycle commuters by providing secure bike storage and shower/changing facilities.	E&I	E&I		
6.2 Business travel				
Encourage out-of-town meeting participants to coordinate travel plans and share rides from the airport	M	M		
All other parameters being reasonably equal, preference should be given to train travel over air travel.	M	M		
<i>Refer to the attached TT Sustainable Travel Policy for more details.</i>	M	M	Dec-11	
7 Business procedures				
7.1 Meetings				
Encourage virtual meetings (e.g. video-conferences) whenever possible.	M	M		