Greening ITIL: Expanding the ITIL Lifecycle for Green IT

Saurabh Dubey, William E. Hefley
University of Pittsburgh, Katz Graduate School of Business, Pittsburgh, PA 15260, USA

Abstract—An important strategic decision for CIOs is to contribute to the overall long term sustainability of the organization and building the capacity and capability to preempt the information technology (IT) roadmap of the industry and come up with an IT roadmap for the organization to keep it in front of the competition. With the current industry trends, IT organizations need to make environmental sustainability (or “Green”) a part of their strategy. This would mean that an extension of the industry frameworks to suggest the best green practices is also imperative. Our work in this paper is just one set of suggestions among many to come in the future. It addresses proposed extensions to the ITIL framework to address green IT in the full ITIL lifecycle.

I. OVERVIEW

Since showing up on the Gartner hype cycle in 2008 as rising to the Peak of Inflated Expectations [13], Green IT or Green computing has constantly been among the “hot” discussion topics for IS professionals. A definition from Murugesan says that Green IT or Green Computing refers to “the study and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems – such as monitors, printers, storage devices, and networking and communication systems – efficiently and effectively with minimal or no impact on the environment” [10].

Still, Green IT has been “nebulously defined and is a nascent market, at best,” says Rick Thompson, a VP at Greentech Media, and enterprises getting into green IT generally focus on one of three areas:

- Data center design best green practices;
- Getting more compute power per kilowatt;
- Being committed to “green,” but uncertain how to proceed [14].

The primary goal behind a solid, green IT strategy is to maintain or reduce the energy use and costs while managing the continuously increasing requirements for performance and capacity [14].

A. Why Green?

The issue with global warming and shortage of sources of energy is well known by now. A company’s energy profile is key to determining its carbon footprint. In 2006, the average carbon footprint for a US household was 19 metric ton of carbon dioxide (CO₂) [9]. In terms of a data center within an organization, this energy profile signifies the total amount of greenhouse gases, such as carbon dioxide, that are produced as a result of using fossil fuels [14]. A simple idea of the effect of the technology on the environment is below:

- Each server produces 8 tons of CO₂ per year
- Each PC and laptop produces 4 tons of CO₂ per year
- Each printers and photocopiers produces 10 tons of CO₂ per year
- Each router produces 20 tons of CO₂ per year
- Each Ethernet switch produces 5 tons of CO₂ per year

In a small experiment performed at the Joseph M. Katz Graduate School of Business, University of Pittsburgh, we estimated the approximate amount of energy spent by the business school in a year using a Green IT Carbon Footprint Calculator provided by IT Governance Ltd. [6]. At peak hours, the school produces approximately 198.70 tons CO₂ per year. The typical computing configuration within the school consists of a desktop computer with two LCD displays; many with a personal low-duty laser printer. By reducing the number of LCD monitors used from 2 to 1 per desktop and consolidating the number of printers in different offices to 3-4 per floor, the school’s greenhouse gas emissions could be brought down to 128.60 tons CO₂ per year. The experiment was to prove that it really doesn’t take a huge effort to control the environmental impact for any organization – big or small. And that makes it even more important to make the move towards ‘Green IT’ at this moment.

B. Efforts around Green IT

There are several efforts going on in the field of Green IT. A growing number of high-profile companies are paving the way by publicizing their green strategies. Digital Realty, Google, Hitachi, IBM, and Microsoft are among those that have detailed how they’ve reformed their IT operations, in some cases dramatically [6]. The greening strategies include minimizing server electrical consumption, reducing overall data center energy use, recycling water for data center cooling, reusing and recycling equipment, and supporting green grids to advance the adoption of green practices.

Core objective for a Green IT Strategy for most organizations include:

- Minimizing energy consumption for the overall IT establishment
- Purchasing green energy
- Making use of green suppliers
- Reducing paper consumption and other consumables used
- Minimizing equipment disposal requirements
- Reducing travel requirements for employees and customers

Many businesses look for real as well as soft dollar benefits from their green strategies. Some power companies
reward customers who reduce power consumption with rebates. There are some companies that also offer discounts to customers for purchasing equipment from specific vendors known for carbon friendly gear. Internationally, carbon credit or offset programs also help in adding financial incentives, where companies that reduce emissions by agreed-on levels receive credits. These can then be traded on exchange market set up for them, such as the Chicago Climate Exchange which boasts Alcoa, DuPont, GE and various energy companies as participants.

C. Need for Green ITSM

With all these efforts around the Green IT domain already taking place, it leads to the question – Why is there a need for Green ITSM? The obvious response to the question is that if we use the sustainability or green aspect as the premise of our Service Management practice, we will achieve much more than what we would by merely making minor technological changes.

Many organizations have been adopting the principles and practices of ITIL; ITIL® is reported to be “the most widely accepted approach to IT service management in the world.” [11]. As we take guidance from the ITIL when defining our ITSM practices, we always talk about how ITIL helps us take a systematic and structured approach towards the Service Management practices.

If one looks at a strategic perspective, we can provide a much broader perspective to our individual green efforts if they are structured through our processes and policies. The itSMF-USA recently acknowledged this fact and has formed a Special Interest Group called “Sustainable 360” SIG. Its aim is to “go beyond traditional data center energy efficiency initiatives, reaching out to identify opportunities where IT departments can help positively affect the bottom line of their organizations through new sustainability activities.”

Further, we also know that technology strategies play an enormous role in service management practices, and by planning our service management strategies in advance, we can achieve a higher level of energy savings through our efforts. But the biggest of all is the need to make progress sustainable – not just ‘green – sustainable’ but also ‘long-term sustainable’. And that has the highest priority for the business in the long term strategic objectives. Our concept of green ITSM practices introduces the thought of including the sustainability aspect (in both forms) right from the onset of the strategic planning process.

II. OBJECTIVE

A. Possible Approaches

There are several approaches that one can take towards this strategic effort. The most common approach taken by many companies is the efforts they put in their Corporate Social Responsibility (CSR) teams. As great as the concept is, most organizations do not take the time to actually work on a CSR strategy. Also, CSR is not only about ‘green’ and ‘sustainability’, it involves all the efforts that an business employs towards embracing responsibility for the impact of its activities on the environment, consumers, employees, communities, stakeholders and all other members of the public sphere; and environmental concerns are only one part of the organization’s overall social responsibility efforts.

The other extreme of this is the operational approach of using technology at the lowest level to display energy savings. This includes the use of EnergyStar compliant devices, using energy efficient servers, virtualization or lately the concept of cloud computing as a way to save energy. However, many of these activities take place at an operational level. And even though these operational projects can be very useful, they are but one aspect of the overall strategy, which makes them vulnerable to failures or omission.

B. Rationale for a Green ITSM Extension to ITIL

Once we have established the fact that strategic planning is required to earn the most benefits from our energy savings efforts and contribute to true sustainability, we look to the suggestion that is being made through this paper – an extension to the core books of ITIL which would extend the guidance that proven framework provides to the service management practice. The suggestions that are presented in this paper can also provide as a stepping stone to designing similar suggestions for other complimentary frameworks. The purpose of this extension is to ensure that our energy saving efforts start when you refer to ‘the library’ for strategic planning and execution across the IT lifecycle.

In the sections that follow, we present recommendations for the ITIL sections which can be added to the different service lifecycles to provide the sustainability perspective to the overall approach. The suggestions are possible approaches to conducting business and measuring it accordingly to take steps towards greener operations.

III. GREEN ITSM EXTENSION TO ITIL

Each of the following paragraphs addresses potential Green ITSM extensions, presented in the order of the five volumes and relevant sections of ITIL Version 3. ITIL is comprised of practices arranged in the following core publications:
- Service Strategy
- Service Design
- Service Transition
- Service Operation
- Continual Service Improvement [11]

A. Green Service Strategy

The service strategy lifecycle is where we start introducing the plan of action. However, nothing will take off unless there is a fundamental strategy and clear vision regarding the energy saving efforts. Service Strategy must address the sustainability and energy savings objectives of the organization.
1. Value Creation

We know that value creation is done using warranty and utility. But to get both of these, we need to perceive the customer's needs. In building this marketing mindset, we have heard of 7 questions. Three of these questions that we may need to pay particular attention to in establishing Green ITSM are:

- What does the customer value?
- How do they use our services?
- Why are they valuable to them?

Green IT being at the peak of its hype, there are many organizations that place high value on the 'sustainability factor'. Defining a ‘Green Vision’ is at the heart of the efforts. Once a vision is created and clearly planned out, the hype for ‘green’ can help any organization create the market for sustainable services offerings.

2. Define the Market

There is a growing market for sustainable services consisting of organizations that are promoting themselves as essentially ‘green’ organizations. These organizations can be identified by their marketing campaigns. These are the clients who are looking for green credits on the carbon exchanges, also organizations that have sustainability as a corporate goal. There are also several financial incentives that are offered around the world for achieving certain specific levels of energy savings. Even the organization making this plan can be a candidate for this incentive. Any organization that is in contention for such incentives is a great candidate for being a client.

3. Financial Management

There are several methods to measuring the financial benefits that come out the green efforts. The purpose of financial management is to provide the business and IT with the quantification of the value of IT services – and these metrics provide exactly that. In the financial management process, the following metrics can prove to be very effective:

- Incentives offered by EPA
- Carbon Credits
- Carbon offset Incentives
- Traded Credit
- Costs associated with specific energy saving efforts
- Basic Cost savings associated with energy saving efforts

4. Demand Management

In the demand management process, the value proposition and market definitions can be leveraged to provide the client with what they expect. We discussed earlier the methods of defining a market. We now target the market that we have identified with following instruments:

- Using demand management techniques to incentivize clients. There are many revenue sharing models that we know of, that can be applied here. The savings caused by energy efficiencies can be offered as payback to the client.
- We can also identify the Patterns of Business activities looking at the various social resources that we have. Using this information we can understand the specific areas in which our prospective clients are looking to save energy.
- Once you understand the demand, you can also look at creating a parallel “Green Service Catalog” – which can then be offered as a parallel service offering, or offering parallel green alternatives within the present service catalog.

5. Service Automation

When we think about Service Automation, there are two different aspects that we need to look at. The first is the one that we are aware of – Automation as a promoter for Warranty and Utility. Automation of optimal allocation of resources is a great value-add to any business.

However, the second aspect is about the question of whether this increased warranty and utility comes at the expense of higher energy expenditure. It is clear that the business decision is made by the fact that the cost savings provided by the automation are much higher than the marginal increase in the cost of the energy required to automate the additional CPU cycles. However, these few extra CPU cycles do cause a great impact on the nature because of the energy that they use. There is currently no clear suggestion that we can make about Service Automation, however, it will be interesting to see what the future has in store, and Green and its outcomes around energy use are factors that should be addressed in making service automation trade-offs.

6. Sourcing Strategy

Probably the most amounts of strategic efforts that a company can employ are in the field of sourcing. This begins with the fundamental choice which most organizations make of Build vs. Buy. Further, we can look at the vendor decision matrix to have a green factor in it. Increasingly, organizations are looking to incorporate CSR considerations, including environmental and energy factors, in their sourcing decisions [1, 2]. We can also look at effective selection methodologies for data center sites. The green data center is already a huge market already.

The following suggestions can be added to the sourcing strategy of the company to increase its green effects:

- The factors influencing the decision of Make vs. Buy should include energy savings as a metric. This can be quantified based on cost savings through energy savings, difference in the cost of development servers vs. servers used by a vendor, and other such factors.
- When deciding about vendors for products, select the energy efficient products, and select the vendors that can present a long term energy efficiency value proposition. This can be vendors that comply with green standards like EnergyStar and ISO 14000, or follow the guidance of
• Evaluate the services vendors on various green metrics. For instance, Datacenter outsourcing can be evaluated based on metrics such as power usage effectiveness (PUE) and data center infrastructure efficiency (DCIE) [6]. PUE is a measure of how efficiently a computer data center uses its power; while DCIE is a metric used to determine the energy efficiency of a data center. Some other metrics can be created based on the vendors’ ability to rate themselves on custom Green Scorecards (discussed later in the paper). These may consist of standardized compliances like Carbon ratings and also specific company required ratings like internal energy efficiency of the vendors or roadmap for the green initiative for the vendor. If created successfully, this can initiate a virtuous cycle of efficiency where vendors strive to achieve the maximum possible energy efficiency to be chosen by most clients, and hence expect a high rating of green efforts from their suppliers.

• Strive to achieve a Green Data Center. There are many possible ways of achieving this, including the data center site selection, design methodologies, automations. This will be discussed in more detail under the Green Service Design section. There are ratings available for the data center efficiency currently – PUE and DCIE, and more are being created and evaluated as we move ahead.

While selecting these advanced metrics for sourcing strategy, also look at the basic green efforts like reverse logistics considerations, e-waste and product recycling, end of service energy benefits, and other related concerns.

B. Green Service Design

The Service Design phase involves the actual design of the service. This is the phase where we would actually implement many of the strategic plans that we have made in the previous section.

1. Balanced Design

Jim McCarthy’s balanced design [12] can be appended to add environmental sustainability to the previously existing three aspects of functionality, resources and schedule. Each of the three aspects of the balanced design can be looked at from an environmental sustainability perspective. We modified the concept [12] to add this suggestion, as shown in Figure 1.

Incorporating Green ITSM considerations into Balanced Design, we would select resources (products, vendors, etc.) based in part on the various green factors. We can also look at schedule and functionality aspects with environmental sustainability in mind. This would give us a greener approach to design of service. Schedules can be adjusted to have more efficient and renewable sources of energy being used for longer periods of time or during peak performance hours. It is somewhat linked to choosing the right resources, but adds the aspect of adding the right schedule for the use of those resources. Finally, in the functionality aspect – we can align the usability of a particular service towards our green efforts – adding not only how to service provides the functionality required by the clients but also what more can it provide. For instance, keeping the temperature of the data centers at 45 degree instead of the more widely used 27 degrees, would save a lot of energy in the long run.

2. Design Architecture

As we discussed in the previous section, green data center is probably the hottest topic that the service management industry is currently speaking about. There are hundreds of suggestions coming out on a regular basis from many channels about increasing data center energy efficiency. However, the fundamental behind these efforts is to ensure that the Service Architecture is environmentally sound. The ITIL Service Design book (pg 36) recommends some responsibilities for the work of architectural design. The following points would complement the same and also bring in the environmental sustainability aspect in this:

• There is compliance with the organization’s “Green Vision”
• The right balance of cost and energy efficiency should be achieved, to ensure that for incremental cost savings, the brand value provided by the marginal green efforts is not overlooked

Most operational design recommendations for increased energy efficiency will support these suggestions.

3. Service Design Models

The service design models depend mainly on the model selected for delivery of IT service. This comes partly for the sourcing strategies that we discussed earlier and partly from the various aspects of the service. During the Service Design stage, we currently look at a review of the current capability and provisions with respect to all aspects of the delivery of IT services. The additional factors that this review needs to
address are:
- ‘Green Vision’ of the organization (as a part of the culture of the organizations involved)
- Potential for energy savings based on current capability and installation
- Energy Savings caused by the plan
- Incentives due to green efforts (possible impact through financial incentives offered)
- Effect of Green ratings on the brand value of the business

4. Service Catalog
There are two possible ways of looking at the interaction of our green effort and Service Catalog – internal and external.

Internal to the Service Catalog, we can add features to our current services which are offered with or without certain green benefits. For instance, let’s say our existing service catalog provides three services, Messaging, Network Management, and Security Management. These services are then offered at different service levels, Silver, Gold, and Platinum. We propose an additional attribute called ‘Green Level’, a rating from 1 to 5, which will be based on the features of the service. If the Messaging Service is supported by virtualized servers which are reducing the energy consumption from 20 servers to 5 servers, it is rated at a ‘Green Level’ of 2. If the Network Management service is provided using the traditional architecture, the ‘Green Level’ may be 0. Similarly, if the Security Management service uses a green data center located in a naturally cold climatic conditions, and runs on equipment manufactured through efficient recycling methods, it may have a ‘Green Level’ of 4.

External to the Service Catalog, we can look at creating separate Service Catalog for traditional services, and ‘Green Services’. These ‘Green Services’ are services offered using higher energy efficient technologies. These services can be associated with carbon credits with required approvals and can also offer paybacks incentives based of the energy savings. Further, these services can offer higher utilization per service for a lower price. For example, most organizations have servers running at 30-40% capability utilization. If these servers could run up to 80% utilization, and still provide the same service availability, they can be offered as a part of ‘Green Services’ and will provide cost savings, which can then be shared with the customers, eventually resulting in a win-win situation.

5. Retiring Services
In planning and designing the services, we also need to look at eventually retiring the services. When we look at our green efforts chart, the obvious thing to look at would be reusing the various components of the architecture that provided the service and recycling those components that cannot be reused. This may then be added as a lifecycle stage in the Lifecycle of Configuration Items (which are usually the components of the architecture) as – Reused and Recycled. Consequently, the new components, architectures, and therefore the services that are composed of these will have a higher ‘Green Level’ than others.

C. Green Service Transition
Service Transition is the execution phase and once the design considerations have been made with a ‘Green Vision’ in mind, we would have to focus on the measurement of the execution. There can be ‘Green Measures’ added at various checkpoints to ensure that the design as planned is being executed.

There is some amount of green effort that can be applied in the technology considerations for the Service Transition lifecycle. However, they would not be much different from those applied during the design of Service Transition capabilities. A few examples are provided below:
- Ensure that the equipment used to provide these tools are from vendors that have higher Green Rating.
- Ensure that the tools used for knowledge management (KM), collaboration and configuration management systems (CMS) are from vendors that have higher Green Rating.

D. Green Service Operations
Service Operations is where the service is provided. Most of our day to day operations in a service organization are conducted through this phase. There are several places where our green efforts can be directed in Service Operations lifecycle.

1. Operational Health
IT operations are measured by isolating a few important vital signs on devices and services that are of importance to the business. Similarly, this measure of health can also be applied to the green effort.

It is simpler to think of the measurement process for ‘green’, similar to that we use for measuring quality. Every company has their internal metrics that they use to maintain quality like Sigma levels, kaizen approaches, etc. These metrics are based out of the desire to maintain a certain level of quality and improve on it. Similarly, the recommended ‘Green Metrics’ can be used to measure and maintain the operational health of the ‘Green Effort’.

We can measure the vital signs of our green effort by developing some key metrics to measure the effort. This can be quantified using the following metrics:
- Energy savings in kWh (last day, last year, since the service introduction)
- Cost savings caused by Green effort (by business, by service, by customer)
- Current energy utilization levels (for data center, offices)
- Green Levels offered (as discussed in the Service Design section)
- Green Services offered
- Savings through green services
- Cost and energy saved through reuse and recycle
2. Event Management

Instead of looking at Service Operations as a purely customer facing activity (as we generally focus), we need to look at the service that we provide to ourselves as our ‘Green Vision’. During the Event management process, we can benchmark and identify thresholds that we would like our green efforts to perform at. This would then help us identify any deviations from this baseline that we have developed on our current green efforts. The metrics mentioned above can be used to develop a baseline of the services that we provide to our customers and to the internal business.

3. Other Service Operation Processes

Once a baseline of green operations is established, the other Service Operation processes act on this baseline information as they would for any other operational health issue. Incident Management process will activate when a deviation from our regular measurements is observed (an event is observed).

We might still be some distance away from handling outages to our green vision or strategy through incident management and problem management. However, it would still make sense to look at it through the same lens. The following example explains the proposed scenario:

Let’s say that we are measuring our green efforts based on the following 3 factors:

- Cost savings through energy savings
- Current energy utilization levels
- Cost saved through reuse and recycle

Through our operational health analysis, we form a baseline for the 3 factors:

- Cost savings of $50,000 per month through saved energy
- Current energy utilization level of 3000kWh per month
- Cost savings of $10,000 through reuse and recycle per quarter

We then monitor these continuously. We then get an event on the 20th day of the month that says that the ‘current energy utilization level’ is going to surpass 3000kWh this month. We consider this as an event that we need to take an action on, and activate the Incident Management process. Incident Management then tries to see what is causing the utilization to go above the threshold that is set, and works through the process for the same. There are two possible scenarios from here – the utilization is controlled by taking effective action, or the utilization goes beyond the threshold at the end of the month. Incident Management then passes this issue on to Problem Management, who then try to understand that root cause of this breach of threshold and work on finding a solution for it.

The above example explains a scenario in which our green efforts are being monitored as would any other service parameter.

4. Service Desk Models

We are aware of three models of Service Desk function:

- Local Service Desk
- Centralized Service Desk
- Virtual Service Desk

When deciding between these three, there are no considerations given to the impact that these might have on the environmental sustainability. Many organizations choose to adopt a centralized helpdesk, when a virtual help desk is also a possibility. The virtual helpdesk has certain advantages over a centralized helpdesk which can make it a greener choice. Similarly, sometimes local helpdesk may be a greener alternative to virtual helpdesk. Looking at these factors, the following is suggested to provide a greener service desk:

- The choice of service desk should also be based on a balance between cost effectiveness and energy efficiency offered by the models.

Of course, the assumption behind these suggestions is that there will be a strong drive to achieve a ‘high degree of greenness’ by organizations in future.

E. Green Continual Service Improvement

Continuing from the previous example, Continual Service Improvement (CSI) affects each and every step of the green efforts that we have created. In particular it has great implications on the operational health aspect of our green metrics. In long run, these green operational health parameters will be improved upon through the CSI cycle.

Another very important role of CSI will be in the transition of currently offered not-so-green services and approaches into those guided by the suggestions made in this paper. CSI plays a big role in helping us understand how to add more green efforts towards the existing service offerings.

IV. FUTURE WORK

A. Green Metrics

Time and again in this paper, we have mentioned the term Green Metrics. These are metrics that help us measure and assess the efforts that we are making towards our ‘Green Vision’.

1. Current Metrics

Out of the many metrics that exist, when it comes to documenting the energy efficiency of data centers, the Green Grid consortium has two primary metrics: Power Usage Effectiveness (PUE) and Data Center Infrastructure Efficiency (DCIE). Both compare power consumed by IT equipment such as servers, networking gear, and storage devices with total power consumed by the data center, including power for heating and cooling, keeping the lights on, and UPS. A PUE of 1.0 is ideal because that means that all of the power is going to keep IT gear running [8].
Carbon offsets are measured in metric tons of carbon dioxide-equivalent (CO2e) and may represent six primary categories of greenhouse gases. One carbon offset represents the reduction of one metric ton of carbon dioxide or its equivalent in other greenhouse gases [5].

Carbon footprint further provides financial incentives such as the carbon offset. A carbon offset is a financial instrument aimed at reduction in greenhouse gas emission. Carbon offsets are measured in metric tons of carbon dioxide-equivalent (CO2e) and may represent six primary categories of greenhouse gases. One carbon offset represents the reduction of one metric ton of carbon dioxide or its equivalent in other greenhouse gases [5].

There are two markets for carbon offsets. In the larger, compliance market, companies, governments, or other entities buy carbon offsets in order to comply with caps on the total amount of carbon dioxide they are allowed to emit. In the much smaller, voluntary market, individuals, companies, or governments purchase carbon offsets to mitigate their own greenhouse gas emissions from transportation, electricity use, and other sources. For example, an individual might purchase carbon offsets to compensate for the greenhouse gas emissions caused by personal air travel [3]. The global carbon offset market is valued currently at $135 billion [15]. The carbon offset is also used as a strong financial incentive in many countries like India and China where organizations become eligible for certain governmental grants by achieving a certain level of carbon offset. This is a much stronger metric for the business. However, it is still a strong ‘Green IT Metric’.

2. Green ITSM Measures

As opposed to the above mentioned ‘Green IT Metrics’, our purpose is to present the thought of metrics that measure the green efforts of ITSM – hence called the ‘Green ITSM Metrics’. However, currently there are not many metrics out there which can be called thus – and hence we recommend some metrics which can be used as a measure of the Green ITSM effort, which we have explained in this paper and link them back to the financial incentives and the most important aspect of the IT Service Management – customer value proposition. The next section talks in brief about a composite measure of these metrics which will enable us to do so.

B. Green ITSM Scorecard

The Green ITSM Scorecard is planned to be a composite balanced scorecard metric which will combine the financial, technical, and process measures which would then enable us to measure, evaluate and assess any organization and its service management capabilities on a Green Scale.

This scorecard will use the currently available technical metrics like PUE and DCIE and put them in an organizational perspective. For instance, one datacenter can be a shared infrastructure location, and can be interpreted by different customer organizations differently. Assume that datacenter X is used by organizations A (30%), B (45%) and C (25%). And let’s say that the PUE value for X is 3.0. This 3.0 can be caused by a mix of green efforts by the three organizations. Organization A might have a 1.17 PUE value and the other two may have 3.8 and 3.76 respectively. This would still impact the energy ratings that organization A can show to their shareholders.

Further, this scorecard will add the currently available financial metrics like carbon offset as a measurable improvement to assess the ‘Green Rating’ of vendors, suppliers and even customers. This would enable the business to make the decisions that we mentioned during out initial discussion of the Green Service Strategy and Green Service Design recommendations.

Finally, this scorecard will use the metrics that we have mentioned during the course of this paper and other metrics that will be developed in the future work of the authors of this paper as well as from the industry experts, and add them to the composite scorecard to measure the overall ‘greenness’ of any organization to be considered as vendors, suppliers, and customers.

The Green ITSM Scorecard is also expected to include the measurements of the process capabilities of various lifecycles of the evolved Green ITIL Lifecycles. Examples of this will be capability of Service Catalog management to incrementally improve the available services, environmental sustainability of the service architecture design process, and the capability of Continual Service Improvement cycle to transition more services and their components into ‘Green Service Offerings’.

C. Research into adoption of Green ITSM Principles

Since this is one of the early discussions in this domain, a discussion of the adoption of these recommendations is imperative. Given the current hype around the Green IT domain and the increasing consciousness about the impact of excessive energy utilization, a concept such as Green ITSM principles should be adopted by the industry within the coming years, if not sooner. However, most of it will depend upon the extent of cost savings that such recommendations can provide. The recent creation of the “Sustainable SIG” by the itSMF-USA, a long and fruitful existence of the Green Grid Consortium, a surge of online discussion forums about
Green IT, Green Computing, and Green Standards and an increasing trend on Google and Bing search about these keywords are all clear indicators that this is going to be an important part of the strategic decision making process for many organizations in future.

V. CONCLUSIONS

An important strategic decision for CIOs is to contribute to the overall long term sustainability of the organization and building the capacity and capability to preempt the IT roadmap of the industry and come up with an IT roadmap for the organization to keep it in front of the competition. With the current industry trends and societal concerns regarding sustainability and environmental and energy impacts of our actions, IT organizations need to make environmental sustainability (or ‘Green’) a key part of their strategy going forward. This would mean that an extension of the industry frameworks to suggest the best green practices is also imperative. Our work in this paper is just one set of suggestions among many to come in the future, and proposes an initial set of Green ITSM extensions to the ITIL V3 framework.

REFERENCES