Service Provider Energy Strategy: The Why and the How.
An Introductory Discussion

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Today service providers (SP) are racing to add capacity and assure availability as traffic continues to grow exponentially. The question to those responsible for building and managing the network is <u>not</u> whether they care about energy consumption; it's whether they even see their energy bill? The answer is likely no. Thus, if they don't see it, how can they care about it? Their management is telling them to "scale" and meet customer expectations (e.g., availability).   If this is the case, why should SP CxO's care about energy consumption in their IP and mobile networks?   Put another way, who within the service provider feels the pain and has the budget to alleviate the pain?

The better question to ask is when will they feel the energy pain? Figure 1 (based on work by Green Touch[1]) illustrates the current situation. As shown, traffic is growing exponentially, and energy efficiency is growing linearly. One need not be a mathematical wizard to see that it is inevitable that at some point the gap will grow large enough for provider to feel real pain.   The only question is when?

Figure 1
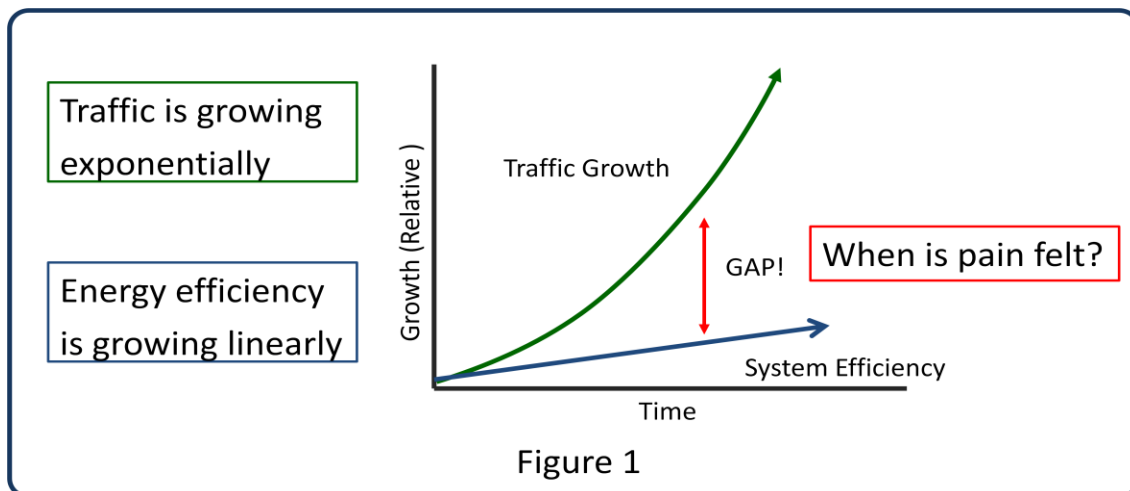
WHY NOW?

GreenTouch, is focusing their efforts on the year 2020. Why should service providers, system manufacturers or semiconductor manufactures invest limited resources now?   The answer is clear, new technologies and architectures take time to develop and to perfect in order to deploy in production networks.   SPs typically take 2 years to rollout a new technology, equipment manufacturers typically take 2 years to fully develop a new device and semiconductor manufacturers typically take 2 years to get a new device into production.   Therefore, the time to begin these initiatives is now!

WHY CARE?

First, there are real numbers that highlight the issue. Here are a few to illustrate the point. The Internet as a whole is estimated to use 2% of the global energy supply. This number is expected to grow to 4% in the next 5 years. According to Nokia Seimens Networks, electricity alone accounts for 15% of large service provider's OPEX. According to CEET[2], at the University of Melbourne, the wire cloud will consume 43 TWh in 2015 a 460% increase from 2012. Lastly, Park Research reports that the telecom service industry will invest more than 61% of its capital budget into sustainable infrastructure by 2016, representing US$194 billion.

> "Our energy calculations show that by 2015, wireless cloud will consume up to 43 TWh, compared to only 9.2 TWh in 2012, an increase of 460%. This is an increase in carbon footprint from 6 megatonnes of CO2 in 2012 to up to 30 megatonnes of CO2 in 2015, the equivalent of adding 4.9 million cars to the roads. Up to 90% of this consumption is attributable to wireless access network technologies, data centres account for only 9%"
>
> *CEET, U. Melbourne*

These numbers are presented to illustrate the magnitude of the energy issue. Now let's look at more qualitative benefits an energy strategy will provide to the service provider.

SERVICE PROVIDER BENEFITS

As will any technology, one must focus on the business benefits realized by their customers. This section will highlight four of these. They are the ability to grow traffic faster than OPEX, better asset utilization, improve brand and regulatory preparedness.

Traffic Growth Faster Than OPEX

Cost, both CAPEX and OPEX, are a major drive for all aspects of operating a network. If SPs continue to add equipment in current "quantum units", such as a router, switch or line card, their cost and energy usages will continue to rise at current rates. This will only accelerate the occurrence of the "pain gap". Therefore, by adopting prudent energy strategies, SPs will be able to meet the exponential growth in traffic without the associated growth in the cost of energy.

Asset Utilization

Large SPs across the globe are subject to degrees of public scrutiny. Government regulators and shareholders alike have an internal view of the SPs operations unlike most global industries. One of the metrics often looked at is asset utilization. A prudent energy strategy, by default, will ensure all assets are used more efficiently. This includes buildings, equipment and outside assets such as plant and antennas[3] for a discussion on SP real estate usage. Additionally, investors now view sustainability programs and energy strategies as an indication of the sophistication of the management team.

Brand

Brand? You mean the Marketing Department can benefit from the energy management efforts? Absolutely!   We've seen this movie before in broadband internet access where the over-the-top players are dominating the up-sell revenue landscape. The same is occurring in mobile broadband. In both cases marketing to the consumer is about cost and brand. In many markets you have a competitive duopoly or tri-opoly competing to acquire and to retain customers (i.e., reduce churn) in a truly zero sum market.

> ➤ Traffic growth faster than OPEX
> ➤ Better asset utilization
> ➤ Enhanced Brand
> ➤ Regulatory Preparedness

An example of this fierce competition can be found in the U.S. Market.   There AT&T and Verizon each spend over $1 billion per year on <u>advertising</u>. It's the battle of the brands; like Coke vs. Pepsi.   Many consumers are eco-aware, meaning they care to varying degrees about the eco-friendliness of the products and services they buy.   Service providers are no exception. Having a real and verifiable lower carbon foot print will certainly attract and retain a large segment of the consumer market.

Regulatory Preparedness

Without going into a deep regulatory discussion that is beyond the scope of this article, let's postulate the following.   Global regulators will only add new regulations to the existing ones and they will be stricter on environmental impact.   Assuming this is true, service providers who start now developing an energy strategy will be ahead of the regulators and in many cases can work with them to craft new regulations that are realistic based on their actual experience.

HOW?   ENERGY STRATEGY OPTIONS

An energy strategy for service providers need not be a daunting endeavor.   As noted above the pain threshold has not occurred…Yet! Any strategy must have a plausible long term vision coupled with a realistic tactical roadmap[4.] For sake of brevity here, let's assume the "vision" is to be an energy efficient service provider for the benefits highlighted previously.

Given this, a logical roadmap would consist of three main "stepping stones" to attain the vision. They are "Sustainability 101", new system and device architectures and new network architectures. As illustrated in Figure 2 these three programs can continue independently of each other. The timing of them is based on market realities and available technologies.

Sustainability 101

The first logical step is what I refer to as "Sustainability 101". This refers to the well document array of technologies and procedures in the market <u>today</u> that are being adopted across the globe.   It can be as basic as installing better light bulbs and tuning up the HVAC system in all facilities, including retail stores. Or it could be installing a renewable energy source (e.g., solar or wind) to augment existing power to the

facilities. If the building sustainability professionals can create a solid ROI for other industries why not adopt it for SPs?

Please note, that this step of the roadmap includes nothing that is SP specific. The team of people implementing this step could easily work for a bank or manufacturer. Keep this in mind as we progress through the roadmap.

New systems and device architectures

Energy savings with new equipment benefits by Moore's law by default. Moore's law states that the performance of semiconductor devices doubles every 18-24 months. Thus, SPs can deploy more energy efficiency devices and equipment with zero impact on current network architectures and operations. Whether a "Cap & Grow" or "Rip & Replace" deployment scenario newer equipment will reduce energy usage on a watt/bit basis.

As network demands change, equipment manufacturers will continually develop new equipment architectures. New technologies under study within Greentouch include: zero-buffer routers and single chip line cards. These are just of few examples of current research that comprise the logical second step in the roadmap.

Figure 2

New Network Architectures and Protocols

The third major step in the roadmap to achieve the energy vision is the deployment of new network architectures. The deployment of new network architectures within an existing network is not without challenges. However, new architectures in the mobile RAN, optical network and data center are currently in development.
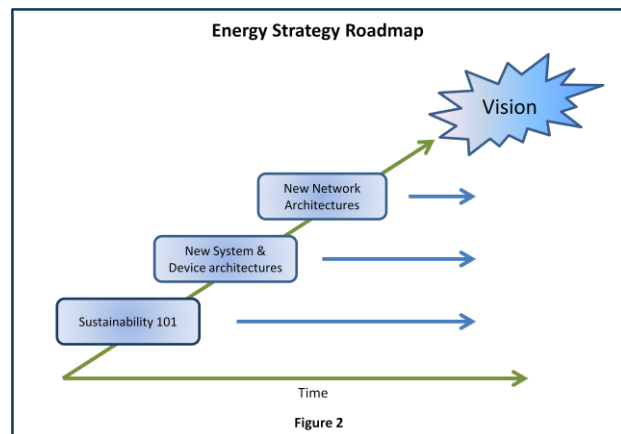
 Unlike the other two steps in the roadmap this one will by definition impact network operations. The goal of this should be "zero" impact in services.   CxO's of service providers will not adopt a technology that has any impact on the customer experience. As noted above, these markets are a brutally competitive zero-sum game.   However, this step of the roadmap has the largest long term potential to address the energy requirements of the future.

SUMMARY

The paper discussed the current trends that will likely result to energy becoming a strategic issue of service providers. Namely, traffic is increasing exponentially and energy efficiency is increasing linearly. It's only a matter of time before the gap becomes a pain point for large SPs. Next, the value of an energy strategy was discussed and included growing traffic faster than energy related OPEX, better asset

utilization, enhanced brand and regulatory preparedness. Lastly, we briefly discussed a logical three step roadmap to achieve the vision and goal of an energy optimized network. One could argue when the pain gap will reach the level of management attention. It is however, difficult to argue that this gap does not exist and will not become painful. Thus, service providers can start now to create an energy strategy that provides short term benefits and long term success.

NOTES:

1. www.greentouch.org
2. Center for Energy Efficient Telecommunications, University of Melbourne
3. For further discuss see: http://greywhalemanagement.blogspot.com/2013/05/untapped-service-provider-real-estate.html
4. For further discuss see: http://greywhalemanagement.blogspot.com/2013/02/vision-vs-roadmap-part-ii.html

ABOUT THE AUTHOR

Greg Whelan, Principal, Greywale Management has over 20 years of international high technology marketing experience. He has worked in technical marketing roles for large technology firms including Cisco Systems (San Jose, CA) where he lead award winning global marketing campaigns in telecommunications and internet markets and Analog Devices (Norwood, MA) where he created and lead their entrance into the broadband telecommunication market. He's also spearheaded marketing for a number of early stage venture-backed start-ups in the Boston area, three of which were acquired by larger tech companies.

He's a pioneer in the broadband telecommunications area and drove the first international DSL standards and was a co-founder, and Vice President of the International Broadband Forum. He has over two-dozen published papers and articles and has spoken at numerous conferences and forums in the US and in Europe. Today, he focuses on service provider energy strategy technologies, issues and trends. He advises both corporations and entrepreneurial start-ups in strategic marketing, messaging, value chain participation and marketing material development.

He has a BS Electrical Engineering from Cornell University and a High Technology MBA, with honors from Northeastern University. He has also studied Digital Video Networking at the MIT MediaLab.