

## Welcome and Introduction

*David Chaffee, The FTTH Prism*

We like to think of each quarterly issue of *The FTTH Prism* as a smorgasbord prepared by some of the best chefs in the industry. I have long contended, and continue to believe wholeheartedly, that it is the insights of the talented people that populate the FTTH industry and take the time to provide us with their reflections that make Prism what it is.

This issue we have four centers from which you can get nourishment.

When it became clear at SCTE earlier this year that RFOG was going to be a major MSO answer to employing FTTH, I asked the erstwhile Jim Farmer if he knew anything about it. Not surprisingly, he chairs the major committee developing standards for RFOG. It was not surprising because Farmer seems to be in the middle of a lot of FTTH trends. It was he who got me started on RFOG punning, although I am to blame for my own bad puns. Rounding out the RFOG section are excellent entries from first time contributor Alloptic and Corning.

We are very pleased to have Hartwig Tauber, who directs the European FTTH Council, bring us up to date on FTTH and sustainability, an exciting new area which focuses on FTTH and its role as a sustainable technology. Joe Savage does his normal solid job previewing the show in Nashville, and whetting our appetites for the North American version of sustainability.

I was very pleased with the originality of the articles in our Networking section. Tellabs has gotten itself involved in the enormously exciting SARDANA project in Europe. Alcatel-Lucent's Leopold Diouf has filed an outstanding paper on the challenges and opportunities that GPON interoperability present. Guy Swindell begins quantifying what a future proof network actually is, and Bill DeMuth explains that there will be no slowdown on SureWest's FTTH mission as it takes over a midwestern property.

Finally, we get to the high crimes and low skullduggery of politics. Diane Kruse compares and contrasts the presidential hopefuls on a variety of relevant issues. Lastly, I give my accounting of the FCC's decision to protect an open Internet, and some of the politics that went on leading up to it.

Bon appetit!

# European Study Proves Positive Impact on Sustainable Development through FTTH Networks

*By Hartwig Tauber, Director General of the FTTH Council Europe*

While it isn't a very 'politically correct' observation to make, the fact is that historic concerns about the environmental ramifications of corporate investment were once largely the reserve of conservationists, anti-pollution radicals and the occasional hippy. Arguments about the plight of the planet – albeit backed with substantial scientific clout – were not treated anywhere near as credibly as they are today. In Europe, we've seen times change as climate change concerns seep further into public acceptance. These issues have risen enormously in prominence, provoking governments, legislators and large organizations to apply greater sensitivity over the carbon emissions and other impacts of their infrastructure-building exploits.

Earlier this year, the FTTH Council Europe commissioned a unique research exercise evaluating the sustainability and environmental impact of fiber networks. Conducted in collaboration with Price Waterhouse Coopers (PwC) and the Council's Sustainable Development and FTTH Committee (SUDEFIB), the research is the first of its kind.

The findings strengthen the case for ubiquitous FTTH by outlining the net positive carbon reduction from services uniquely facilitated by FTTH networks. The research compared the environmental impact of a typical FTTH network to its associated benefits and will provide the foundation for further research on the subject by the Council. The initial results gathered clearly demonstrate the overall service and environmental benefits of FTTH, and stand as testament that fiber is a sustainable and future-proof technology for the 21<sup>st</sup> century.

The research followed a number of principles and parameters including:

- Use of three FTTH network deployment scenarios (urban dense areas, urban wide areas and rural areas) in order to make the calculations used to determine the findings;
- Consideration toward four types of deployment techniques (existing ducts or urban sewers, traditional trenches, microtrenches, aerial hanging); and
- Accordance with the ISO 14040 standard.

Making some very conservative estimates about two applications driven by high-resolution 'telepresence' on FTTH networks – home working and telemedicine – we can prove that an FTTH network becomes carbon neutral 15 years after mass deployment, and from that point on contributes to a net reduction in carbon output. That makes FTTH the world's first 'self-cleaning' network technology: the more we use it, the smaller humanity's carbon footprint becomes.

We found evidence that by maximizing the opportunity for new services whilst minimizing the materials and maintenance required, FTTH contributes to reduced road travel, less transport infrastructure, and the introduction of innovative social and government services. Meanwhile, the total impact of network implementation in the study takes into account the full lifecycle of a typical fiber infrastructure from production of passive equipment, transport, civil works, implementation of all active equipment and power consumption to end of life.

(Continued on Page 29...)

Using the projection of FTTH users according to IDATE (20 million for 2015), the research found that for the first 15 years of network implementation, greenhouse gas emission savings per user were found to be 330 kg, the equivalent to a car traveling 2,000 kilometers. Moving forward, the sustainability of FTTH solutions will be increased significantly as user experience grows and other fields not assessed in this study such as supply-chain management and energy demand are considered.

Beyond this 15 year timescale - which in our view is actually quite conservative - the research shows that FTTH provides only positives for Europe. As explained above, the results are based on calculations from tele-working and tele-assistance applications only, although FTTH solutions offer extensive social and economical benefits over and above these, with the capability to change societies for the better because of the access to new services it brings.

Specifically, the calculations took into account all of the carbon costs of the civil engineering work needed for a mass fiber deployment, the manufacturing and deployment costs of the fiber and the active network components, and the power consumption of the network over its lifetime. The net carbon saving after 15 years was a result of reduced travel by tele-workers and medical staff. For the calculation it was assumed that just 10 percent of people teleworked for 3 days per week and that 20 percent of the population (over-75 rs old) could benefit from home assistance and telemedicine.

Over the full network lifecycle, the use of the network (power consumption) represents only 6 percent of the total environmental impact, whilst the production and deployment of the equipment totals over 80 percent. However, with continuing innovations taking place in the industry, these processes are becoming cheaper, quicker and less disruptive, henceforth reducing the environmental impact and further increasing the sustainability of fiber networks over time.

We are planning further research into the subject of sustainable development for the near future. If it proves as contentious and interesting as the first exercise then we will be very busy indeed! Having captured the imagination of many in the European telecommunications industry, the SUDEFIB Committee was placed under extraordinary demand, with numerous representatives hastily called to present our insights at many conferences and symposiums from London to Dubai.

Going forward, the FTTH Council Europe SUDEFIB Committee will revise the approach it uses within its 'ECOsystem' and expand its research to the areas of the home and appliances network, to arrive to the most comprehensive end-to-end perspective possible. Its revised results will be presented at the next annual conference of the Council on February 11th/12th 2009, in Copenhagen, Denmark.

In the meantime, we understand our colleagues within the FTTH Council 'family' are also exploring similar research projects based upon the model we've pioneered in Europe. According to its event programme, the FTTH Council North America has planned to disclose some of its own initial findings at its own forthcoming annual conference in Nashville. TN. We in Europe will watch with keen anticipation, as we will on any similar results from the Asia-Pacific regions. In FTTH circles, sometimes we forget we are a global industry, let alone one global community of people.

## **Entering The Mainstream, Sustainability are Themes of 2008 FTTH Conference**

*Joe Savage, President, The FTTH Council North America*

With fiber to the home networks now passing more than 10 percent of North American homes, and the number of subscribers nearing the four million mark, the FTTH industry is taking on a new look – one with growing emphasis on service delivery. Accordingly, the FTTH Council's annual Conference & Expo, being held at the Gaylord Opryland Resort & Convention Center in Nashville, is evolving in the way it presents the industry to its members and to the world at large.

That evolution is reflected in this year's conference theme, "Linking Communities at the Speed of Light," where the focus is on how FTTH deployment has affected communities across the globe as these new, higher bandwidth networks take hold, and bring growing numbers of consumers into the world of ultra-high broadband. As always, the conference offers its attendees plenty of case studies and lessons learned, not just in building FTTH networks, but also in running them and attracting and retaining subscribers.

An ongoing trend is the increasing number of telco service providers who have visited the conference looking for practical solutions for their daily business challenges. "Technology and How it works is no longer the central theme. Rather, Marketing and competition for the subscriber is the key theme. The planning committee has worked hard to put together a program that allows attendees to share their experiences and to learn from one another.

This year's conference program provides a forum for discussion of the trends that are emerging in the industry. ISP tracking data indicate that subscribers take 18 months, on-average to find and learn the applications that will fill the fattest pipe. As we're offering higher speeds, subscribers are learning how to maximize use of their bandwidth – and we think 18 months is a pretty short time to master this learning curve. This is particularly true in business where more tele-workers rely on FTTH for their Mission-critical, high-volume work-related applications.

Some observers have pointed out that this trend is likely to be furthered by the maturing of the "Net Generation," those who have lived the better part of their young lives in the online world. Foremost among these observers is Don Tapscott, author of *Wikinomics: How Mass Collaboration Changes Everything*, and opening keynote speaker for the Conference. Tapscott, who believes that need for greater bandwidth in the home will become even more intense in the coming years, will speak to how companies must create greater innovation and value in order to keep pace with the demands of this new generation. As a conference first, Tapscott will also lead an executive summit of industry CEOs on his longitudinal study of information aspects of 11,000 young people from ten countries and what the results mean for the telecommunications industry. The study provided the basis for his upcoming book, *Grown Up Digital*, which will be released in November.

### **Sustainability Report**

One factor likely to drive the demand for bandwidth in the near term is the growth of telecommuting, especially given the rise in energy prices and the growing desire of companies to operate in a more environmentally sustainable way. With FTTH connections, some telecommuters have reported having better connections to their company networks from their homes than from their office computers. With these and other examples of FTTH's green attributes in mind,

PricewaterhouseCoopers is partnering on a study to better understand and quantify the impact of FTTH deployments on the environment. PWC will generate an energy audit – similar to the financial audits - comparing how much energy is consumed in the deployment and operation of networks to the energy savings that result from consumer and business use of FTTH. Energy payback and “breakeven” will be modeled and presented at the Conference & Expo

PWC will explain the proven life cycle analysis methodology used in the study and how it was applied to the North American FTTH market. Initial results will be revealed in a track session held on September 22<sup>nd</sup>.

## **Global Rankings to be discussed Country by Country**

The three sister Councils (Asia Pacific, Europe and North America), continue to collaborate on a semi-annual global ranking survey. This survey tracks household penetration of FTTH by country. As announced in July 2008, market penetration shows that South Korea, Hong Kong, Japan and Taiwan are leading the percent of household connected, despite the fact that North American FTTH deployment has continued to double annually. The Councils will release country-by-country details at a media opportunity during the conference.

Despite what some may consider to be a lag compared to other parts of the world, we are actually seeing an overall transition to FTTH here in the U.S. A trend that follows the same transitions is seen in Japan, where FTTH is widely deployed. While DSL and Cable Modem subscriber growth are slowing, FTTH subscriber growth, which almost doubles each year, continues to be the highest in the world.

As in years past, the FTTH Council will use the Conference as a backdrop for Michael Render, CEO and President of RVA LLC, to issue his semiannual report on FTTH deployment statistics for North America. His report is expected to show continued robust growth in the number of subscribers connected and in homes passed by FTTH. Mike will indicate that FTTH has “crossed the chasm” and is now a mainstream technology.

## **Panels and Hot Topics**

Seven panels will offer differing points of view on a variety of hot industry topics. The ever-popular panel of global incumbent carriers will offer their perspective on what they see happening in their own countries. The government and regulatory panel will share the latest updates on how the telecommunications industry might be affected by the outcome of the November election. [Ed. Note: See Diane Kruse's column for further information.] A finance panel will feature the newest and novel methods of financing deployments and an Independent Telco panel will advise on ways smaller operators can achieve success through FTTH networks.

## Conference Highlights

Approximately 2,000 industry leaders and professionals from more than 30 countries are expected to attend the seventh annual FTTH Council conference. The program offers conferees a choice of 30 track sessions, panels and a comprehensive expo floor that includes the Fiber-Powered Pavilion and the Home Networking Zone. AT&T will supply the fiber optic network in the Pavilion via an OC-3 port to the Internet. The FPP will generate Gigabit PON bandwidth for the Home Networking Zone. Both properties feature applications and devices operating over fiber as a demonstration of what consumers can expect to be using now and in the future.

The conference closes on Thursday, September 25<sup>th</sup>. Post-Conference workshops on Thursday will include a workshop on MDU hot applications and Fiber 102 on fiber to the user. Visitors may register on site starting September 21<sup>st</sup>. Program, expo and accommodation information may be found at [www.ftthconference.com](http://www.ftthconference.com).

The Council recently announced that its 2009 conference, *Building the Business of FTTH*, will be held September 27 – October 1, 2009 in Houston, TX. Details will be announced later this fall.

## SARDANA: Toward Scalable Next Generation Access Networks

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*By Muneer Zuhdi, Senior Manager, Lightwave Technology, Tellabs, and Thomas Ruvarac, Director, Access Product Management and Marketing, Tellabs*

### Introduction

The demand for ever-higher bandwidth delivered to the home continues to pressure operators to upgrade their access, switching and core networks. There are several choices in upgrading the access network, but for many service providers, a high-bandwidth access network means placing new subscribers on a fiber-based network. And for some service providers, it means replacing existing copper facilities with fiber. For these service providers, Passive Optical Network (PON) technology has been the architecture of choice. PON technology lowers the operating expenses of running and maintaining the network because there are no active components in the access network, and fiber is more reliable than copper. Figure 1 shows examples of PON deployments. An exciting new project in Europe we are involved with, SARDANA, is specifically focused on WDM-PON.