GreenTouch Wireline Access WG Roadmap

Seattle, November 17, 2011

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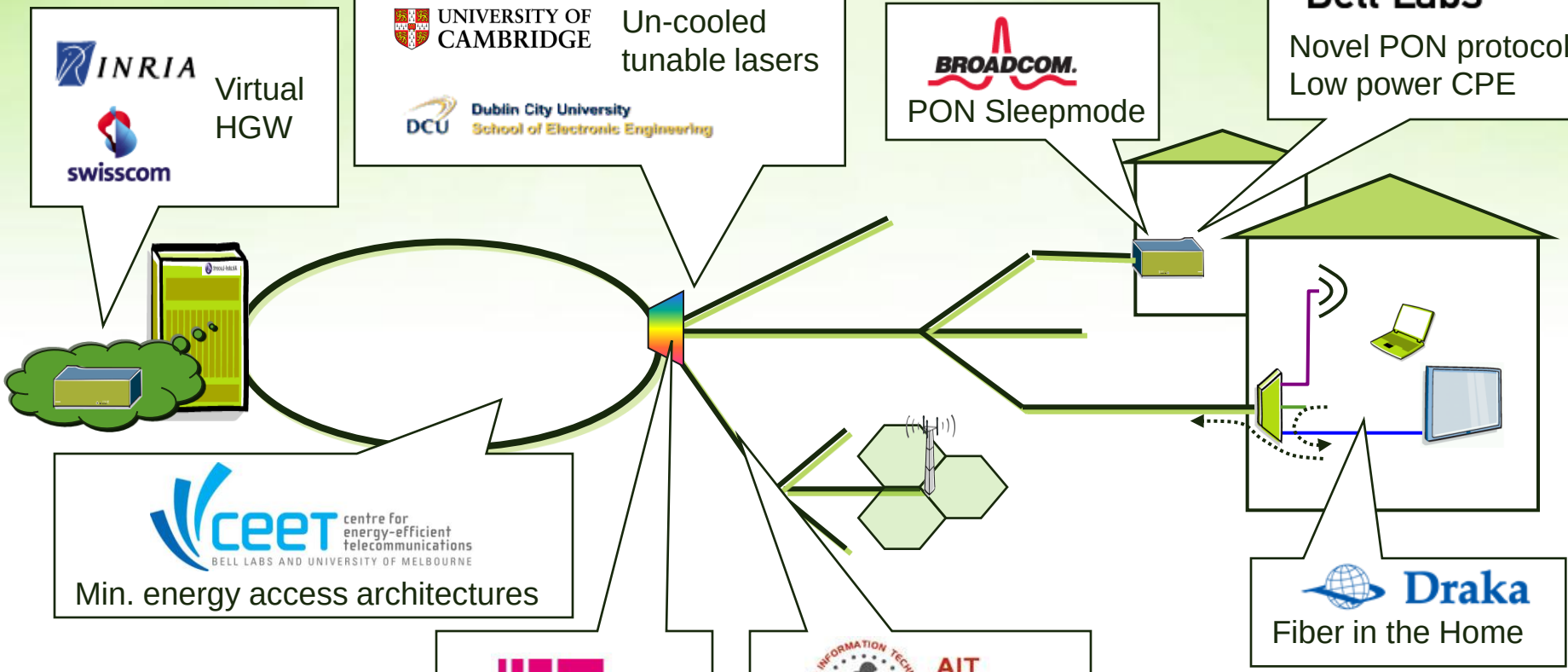
Wireline Access WG
Target: 10x per user – 100x efficiency gain



INRIA
swisscom
Virtual HGW

UNIVERSITY OF CAMBRIDGE
Un-cooled tunable lasers
DCU Dublin City University School of Electronic Engineering

BROADCOM.
PON Sleepmode

INTEC design
Bell Labs
Novel PON protocols; Low power CPE

ceet centre for energy-efficient telecommunications
BELL LABS AND UNIVERSITY OF MELBOURNE
Min. energy access architectures

IBBT
Hybrid PON

ATHENS INFORMATION TECHNOLOGY 2002
AIT CENTER OF EXCELLENCE FOR RESEARCH AND EDUCATION
Perceptum ex Optimus
Low power OFDM in optical access

Draka
Fiber in the Home

Also:
TNO
orange
NTTグループ
ZTE, KAIST

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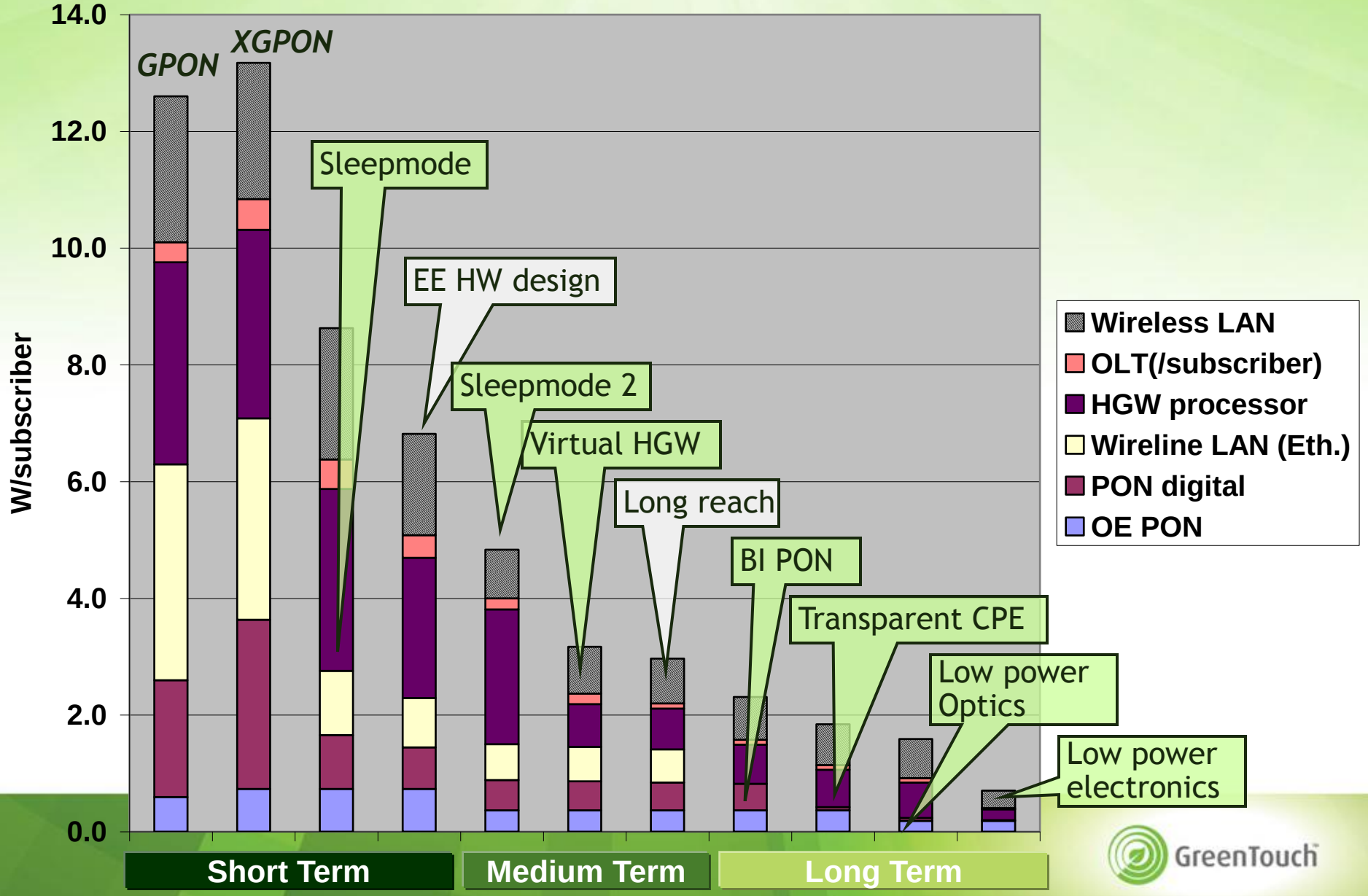
Wireline access PON improvements



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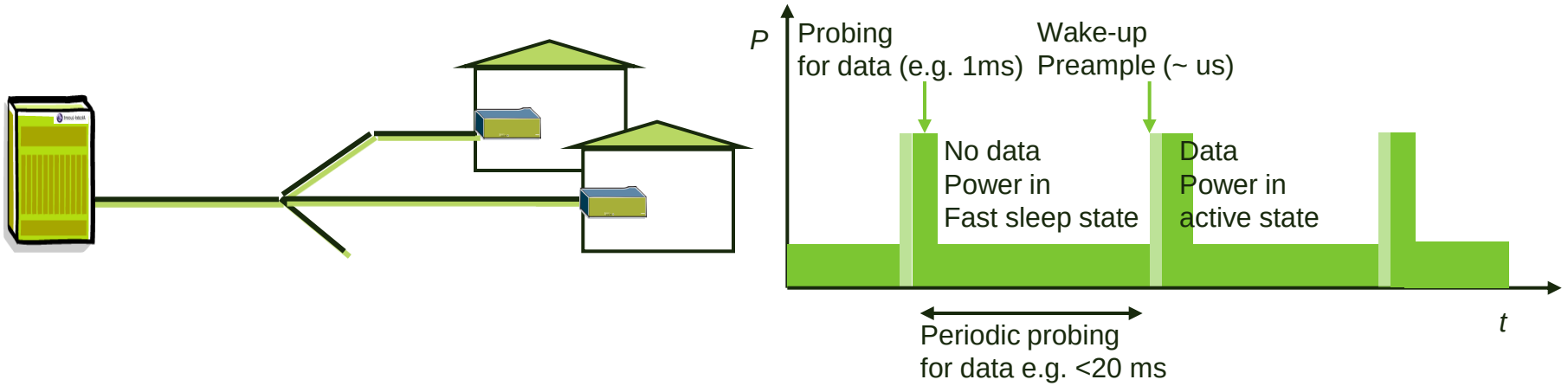
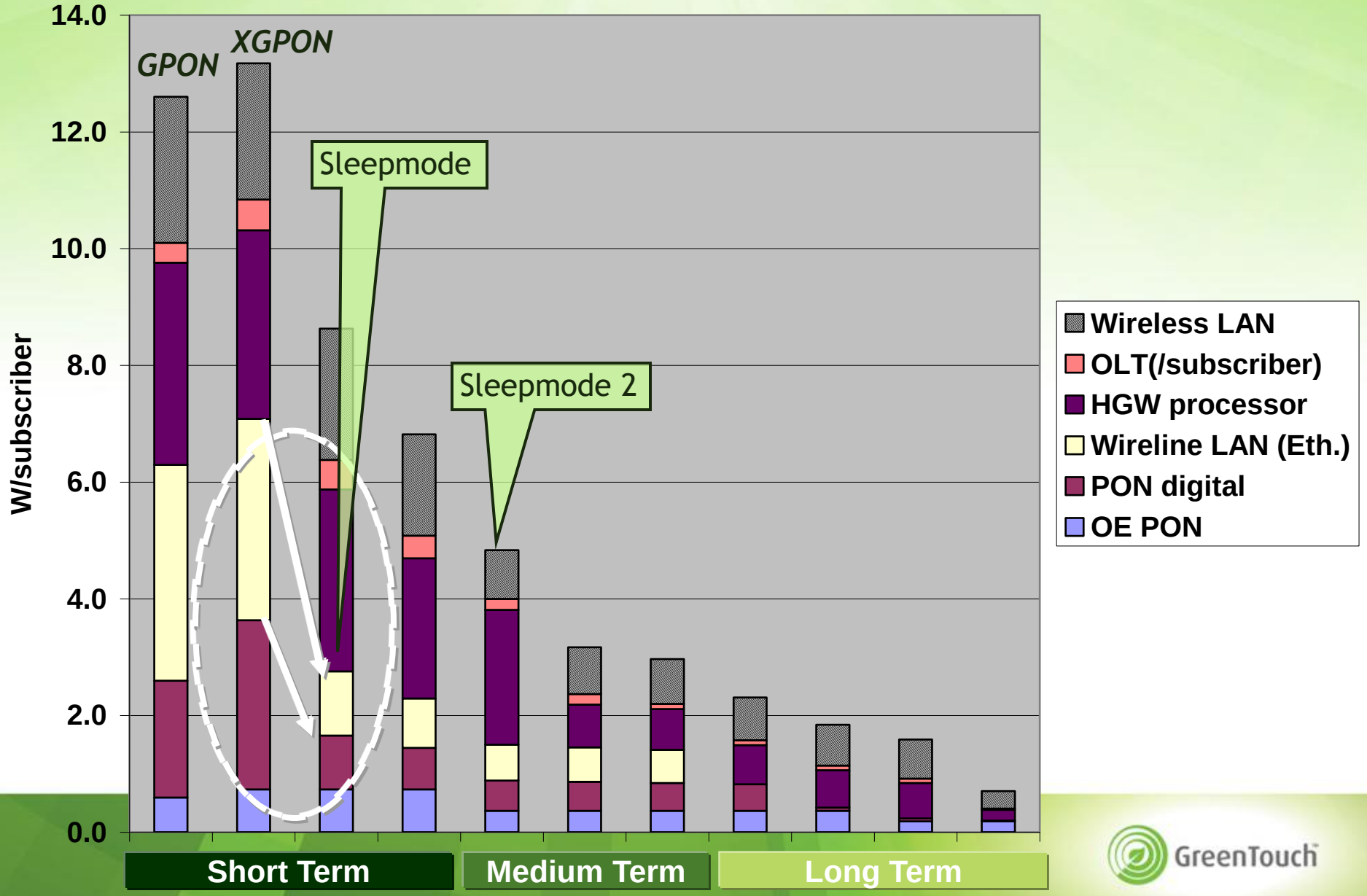
Fast Sleep Mode

- Aim for awake time ONU proportional to useful payload
- Challenges
  - Schedule probing cycles and awake time with minimum impact on QoE
  - Minimize power during sleep state
  - Minimize fast wake-up



Wireline access PON improvements



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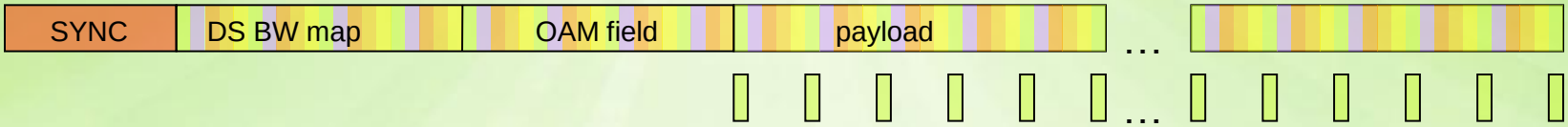
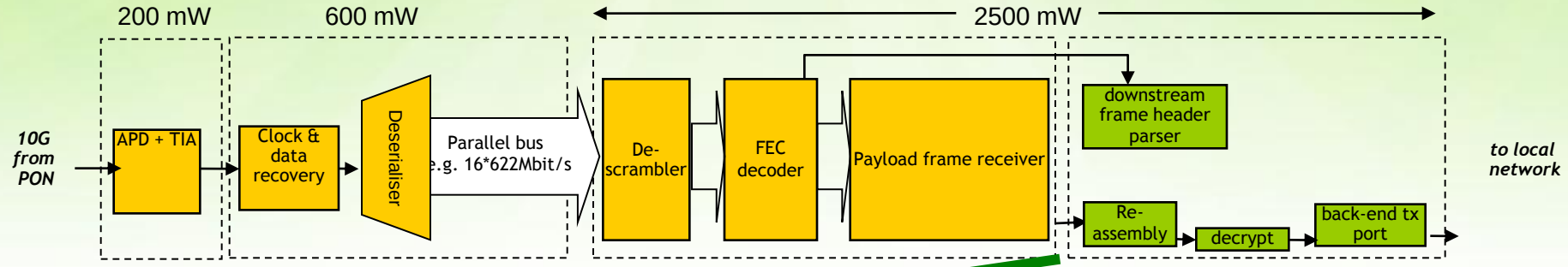
Bit-Interleaved PON



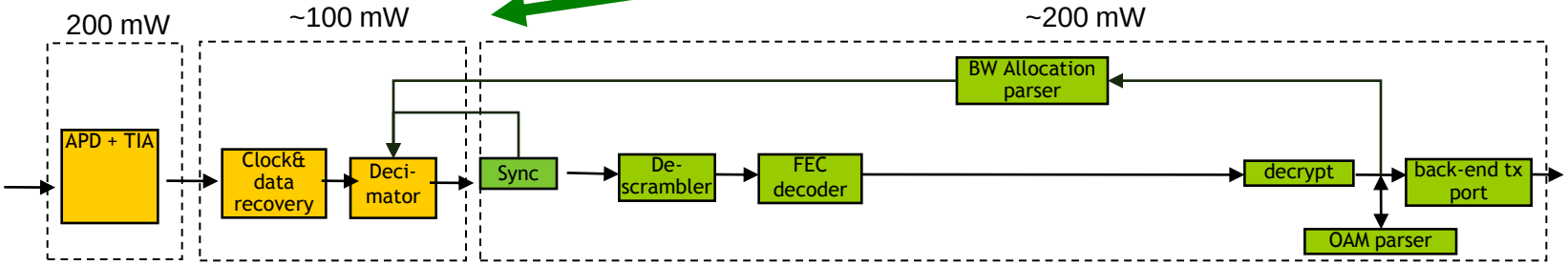
ONT today:



BI ONT:

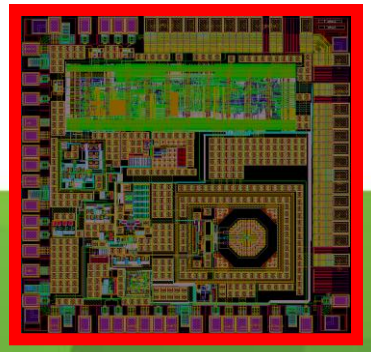
Function at high rate (10G) reduced

Function at user rate (~10-100s Mbit/s)



Fast clock, high V_{dd}

Slow clock, low V_{dd}



INTEC design

Bell Labs

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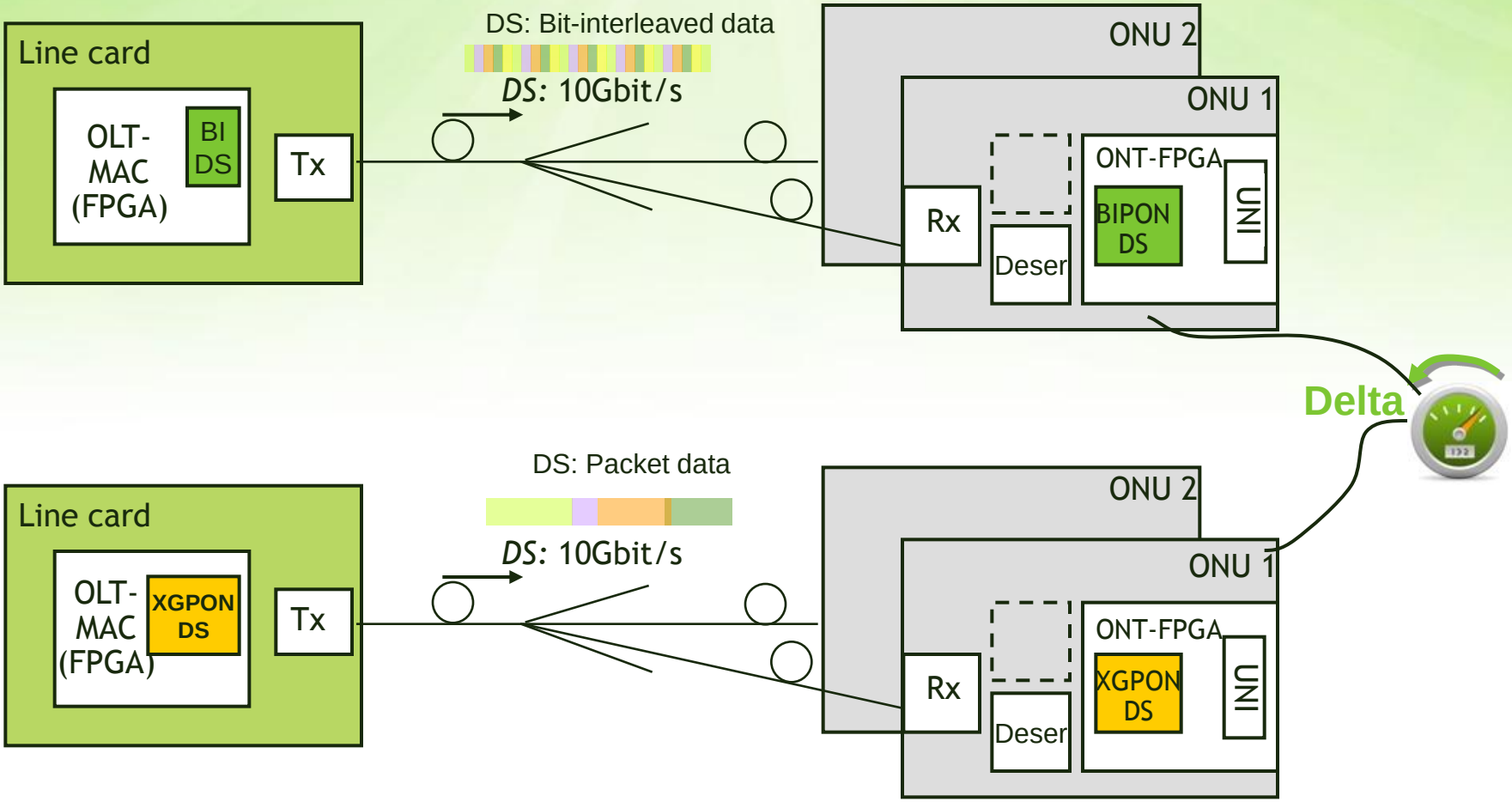
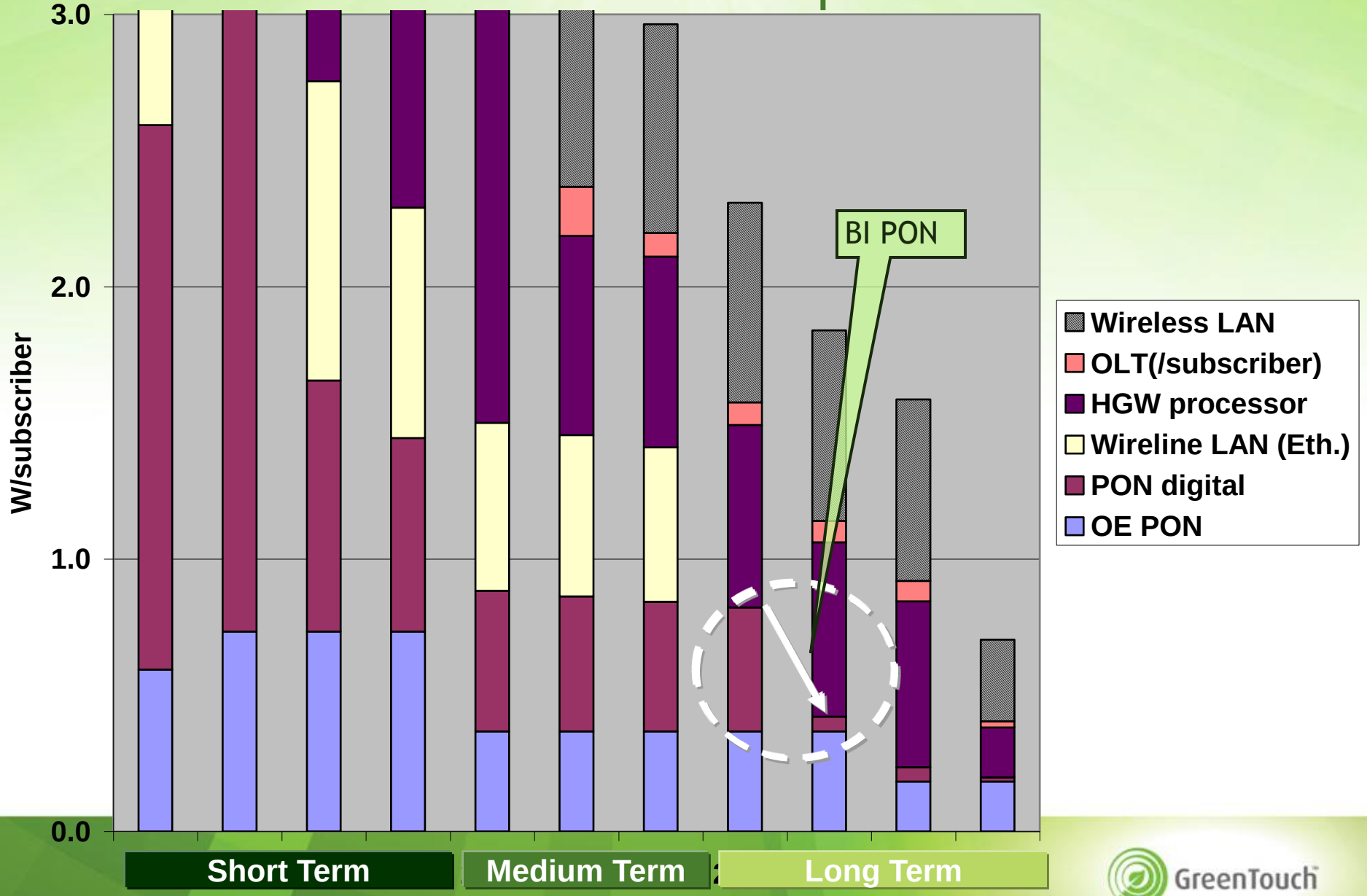
Demonstrator



Wireline access PON improvements



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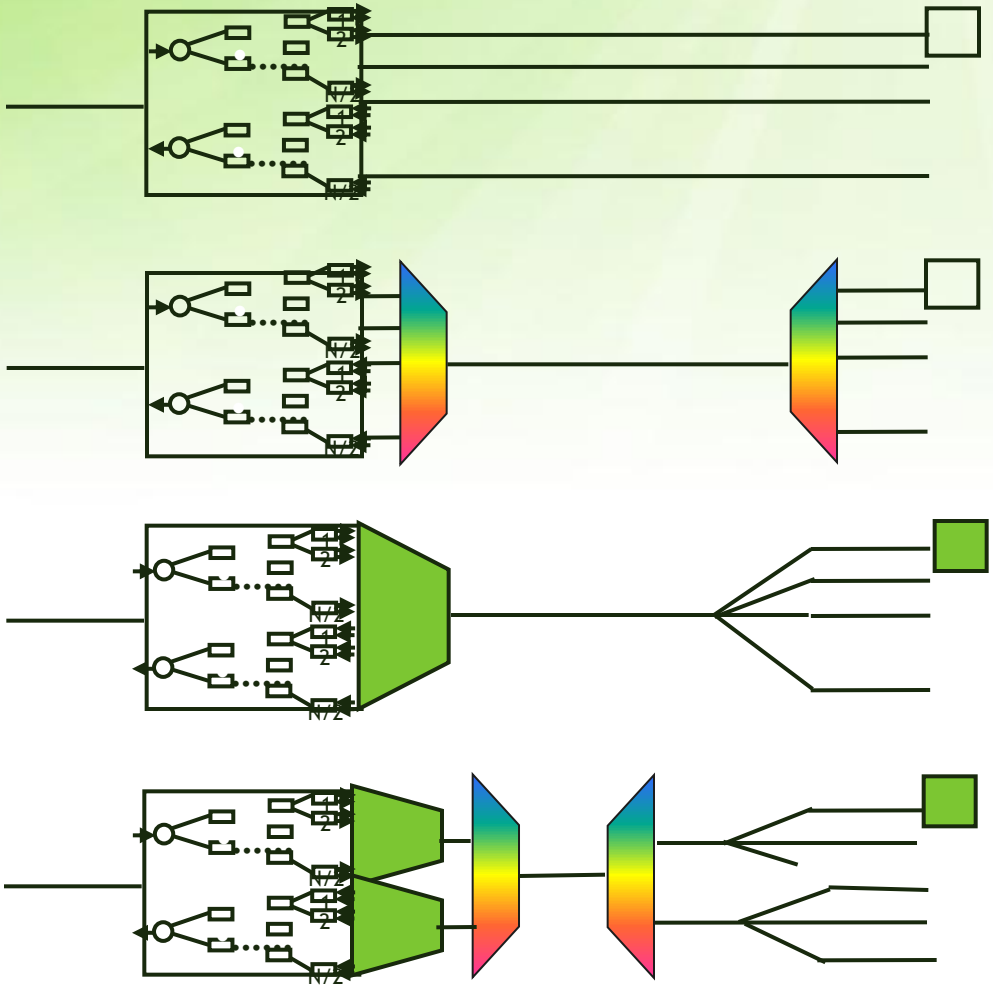
Low power access architectures comparison



PTP
- Single stage switch and lowest energy transmission medium
- Lowest limit

WDM PON
- Same as PTP, but single
- Cooler less tuneable Tx

TDM PON
- Single feeder
- New bit-interleaving protocol

WDM/TDM PON
- Larger number of channels over single feeder

Other:Low energy OFDM

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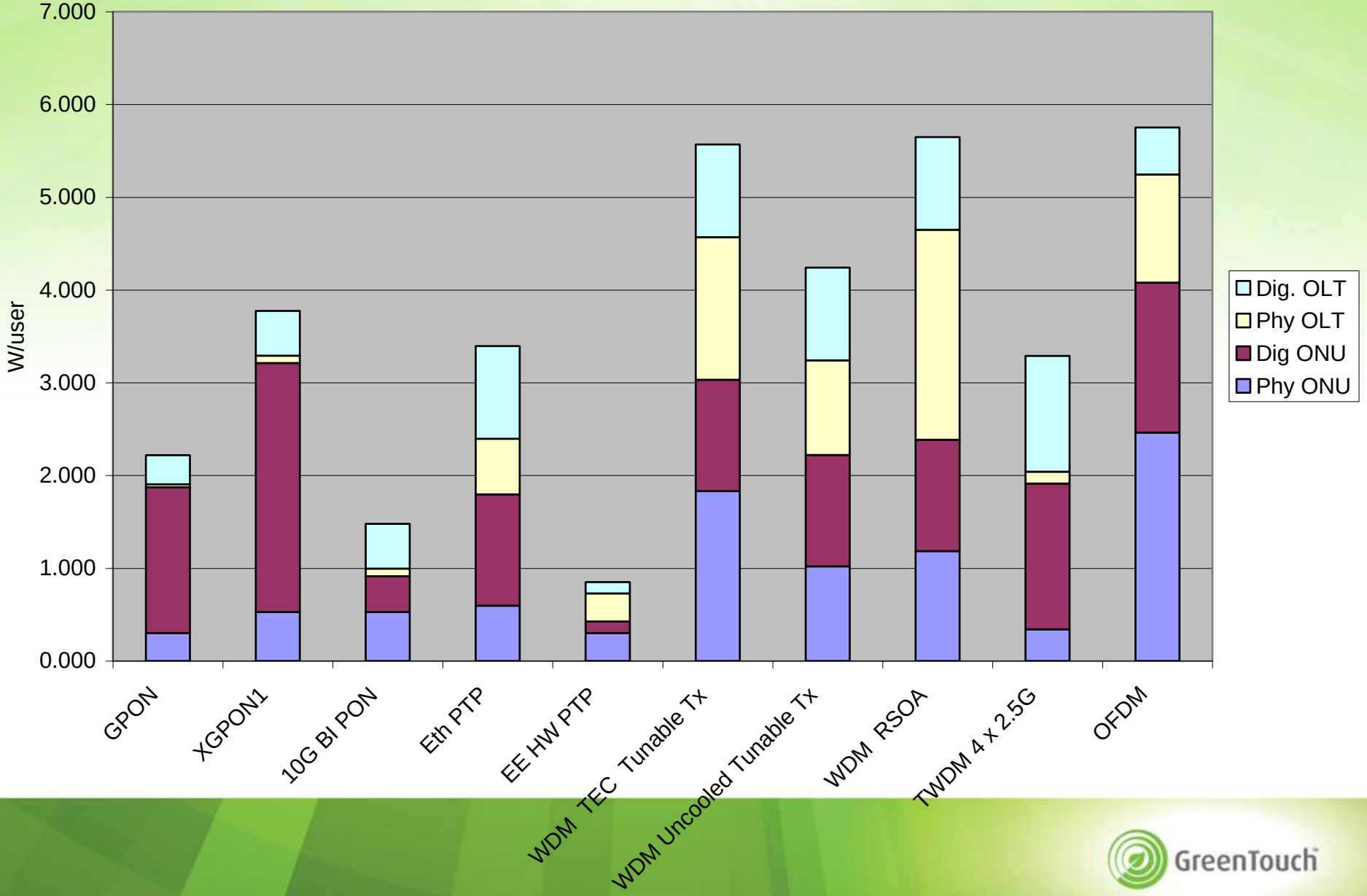
Comparison architectures



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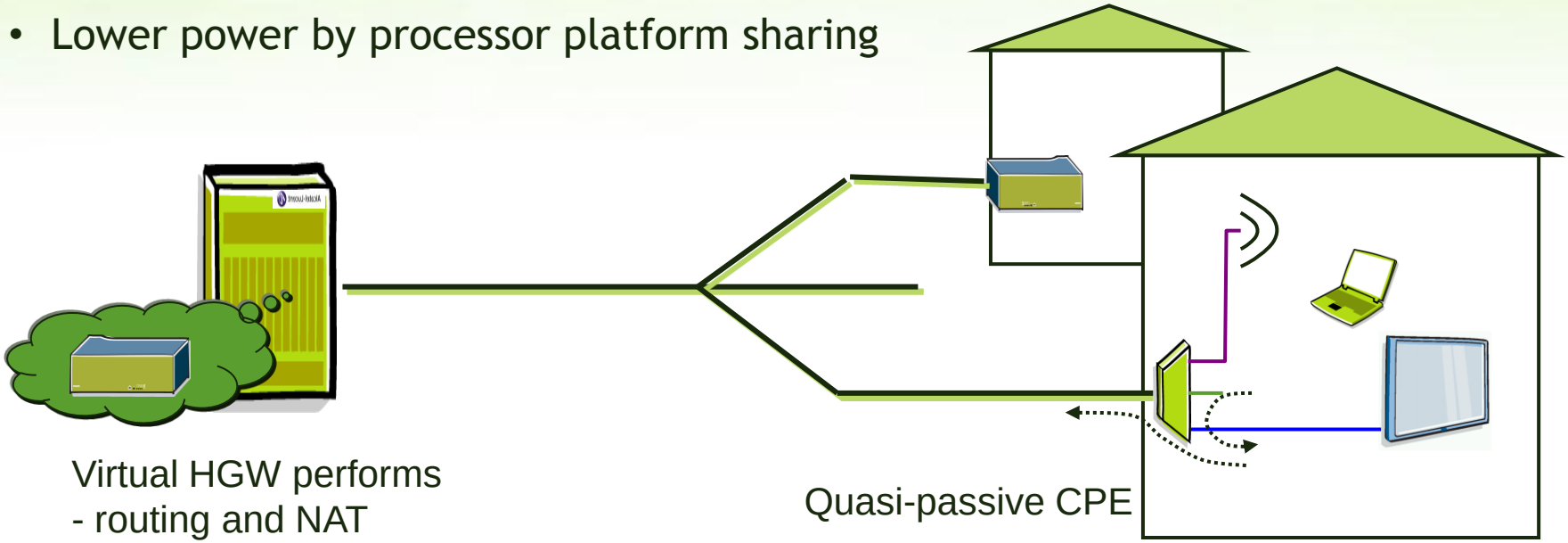
Virtual Home Gateway / Quasi-passive CPE

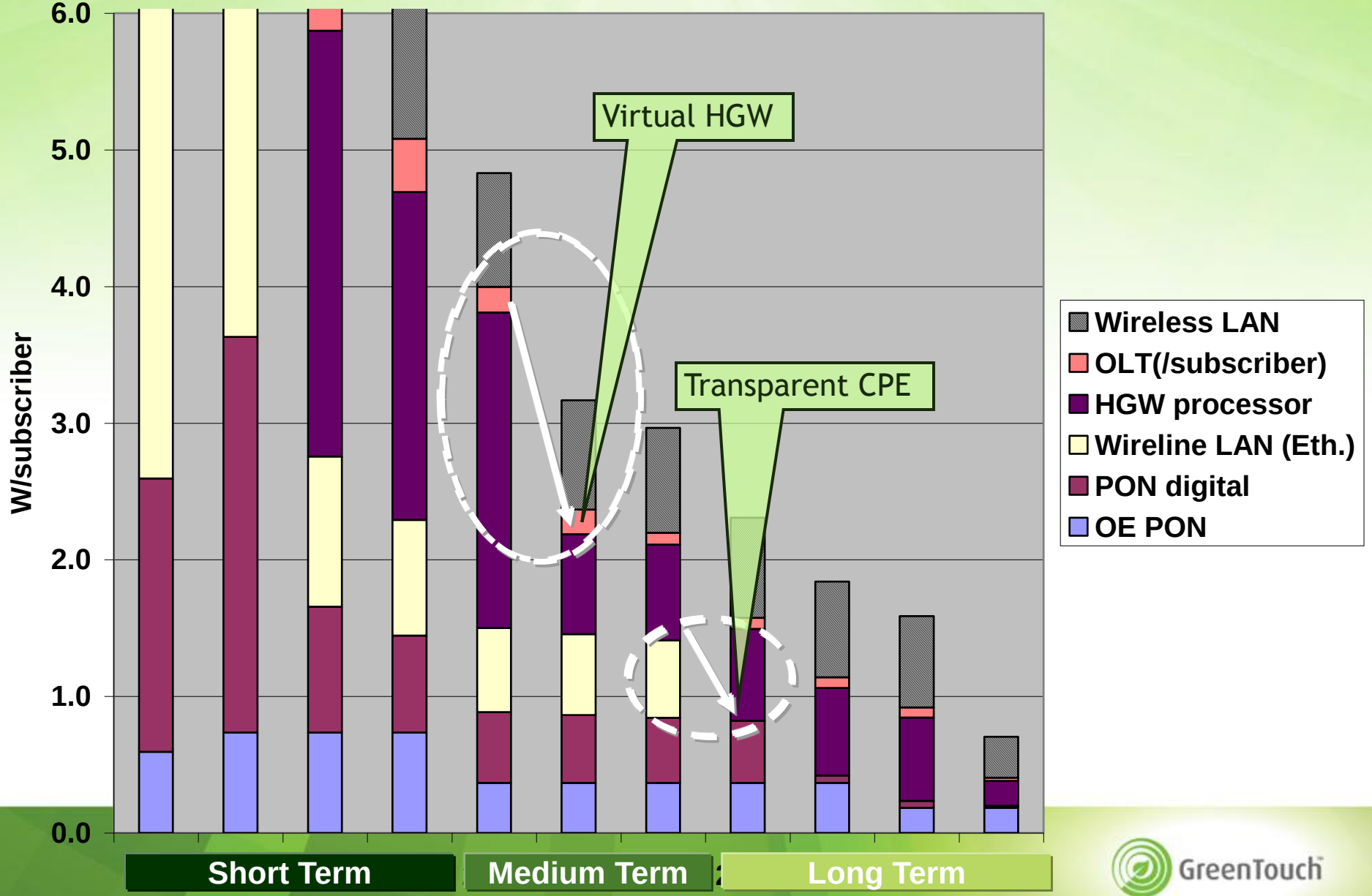
- Transparent CPE providing connectivity in-house and to network
  - Functions of current CPE moved to virtual HGW in network
  - Low power connectivity (“quasi-passive”) or transparant (“passive”) CPE
- Savings:
  - Cut-through of high bitrate services to terminal: LAN interfaces on CPE
  - Lower power by processor platform sharing



Virtual HGW performs
- routing and NAT
- firewalling
- OAM management

Quasi-passive CPE

Wireline access PON improvements



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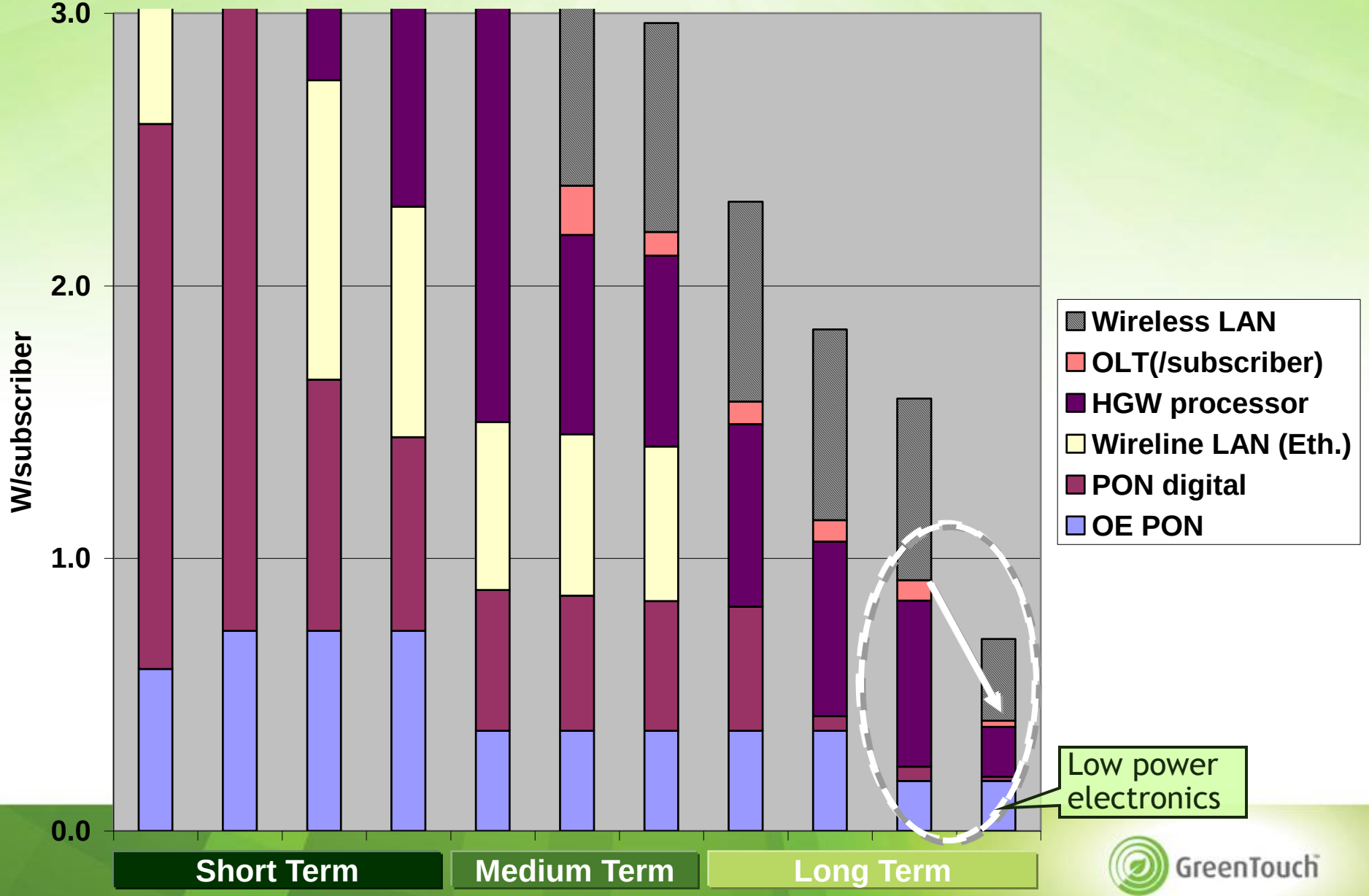
Wireline access PON improvements



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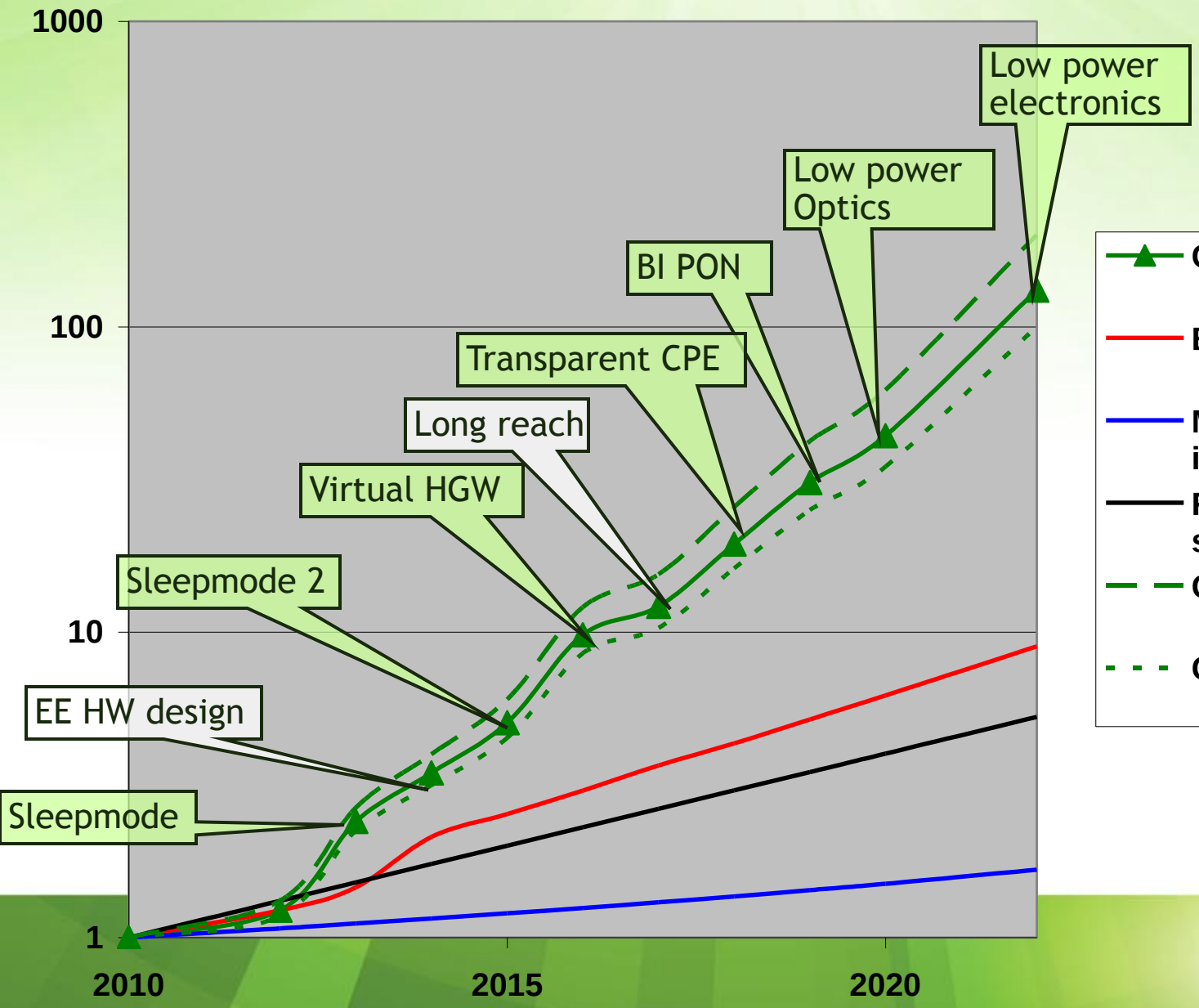
Wireline Access Energy efficiency



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