# SMF Link Costs over Time

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- Contemporary cost modeling assumes new fiber is used/consumed every time a module is installed.
- In reality fiber is used for much longer than modules.
  - SMF commonly deployed for 10-20 years
  - Modules may be replaced/upgraded every 3-5 years
- A better way to model link costs:
  - Calculate the cost of _servicing_ the fiber
    - By looking at the full life cycle of the fiber, and the multitude of modules which will service it
- Hypothesis: It is better to put your value in your longest lived assets, while reducing the costs of your shortest lived assets.

SMF Link Costs over Time

- Looks at 150m link lengths
  - Cost centroid for 500m application space
- Assumes the same module cost for each successive replacement
  - Ie, Cost/Gbps reduces commensurate with rate increases
- Assumes all solutions are at high volume production
  - May not always be the case, since volume can be a strong function of cost
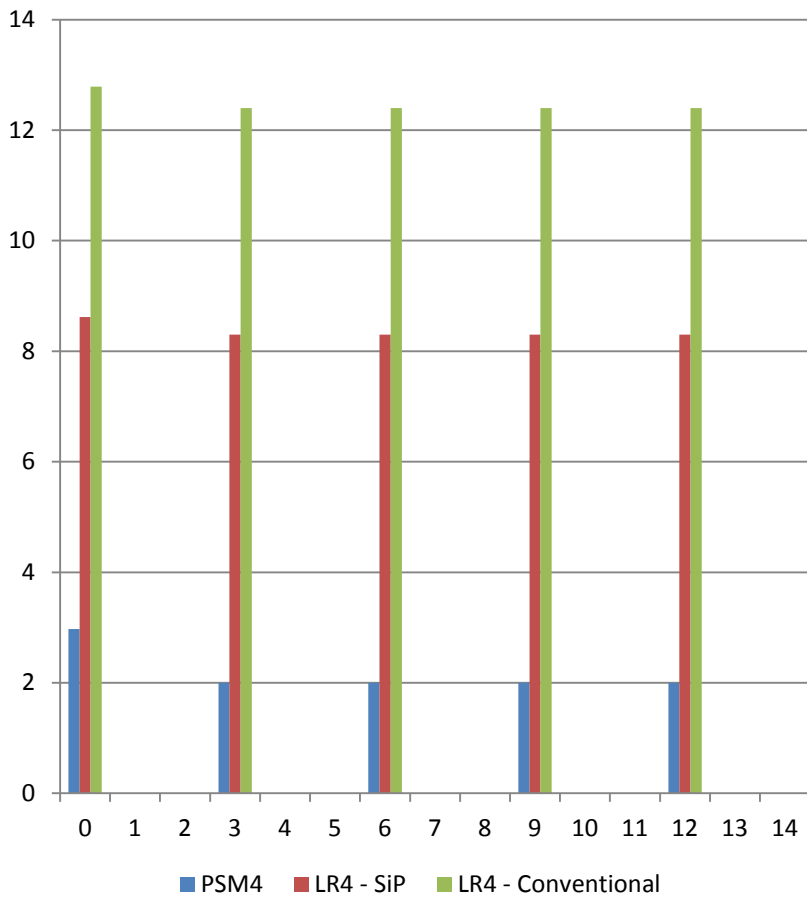
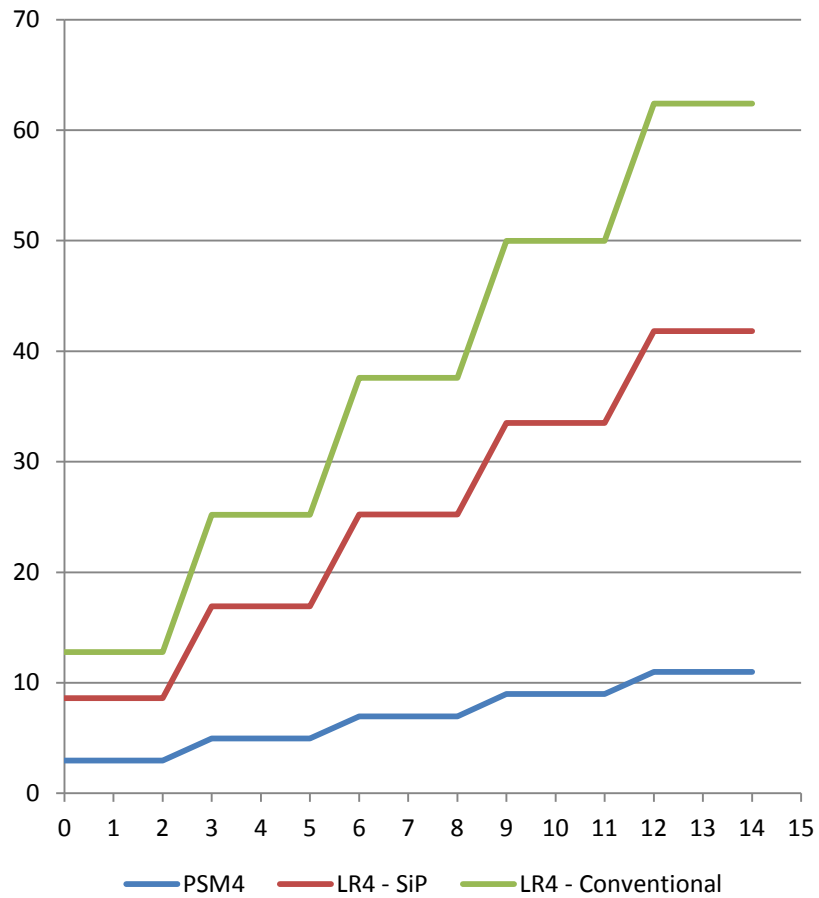# Five Year Module Turnover

Costs Per Year — Cumulative Costs charts comparing PSM4, LR4 - SiP, and LR4 - Conventional.
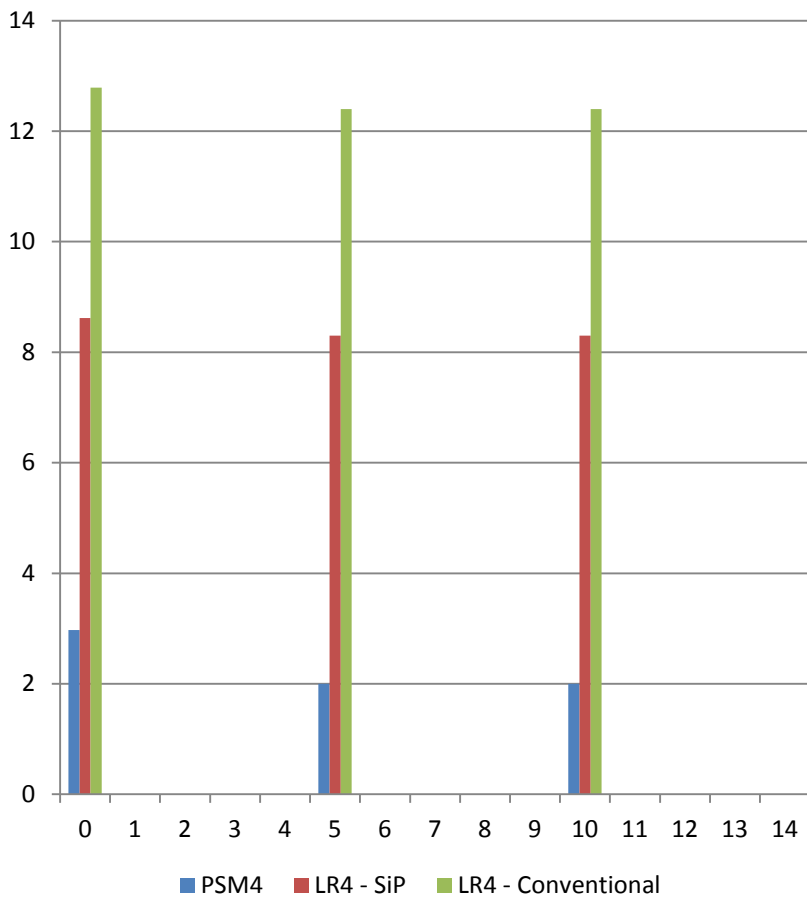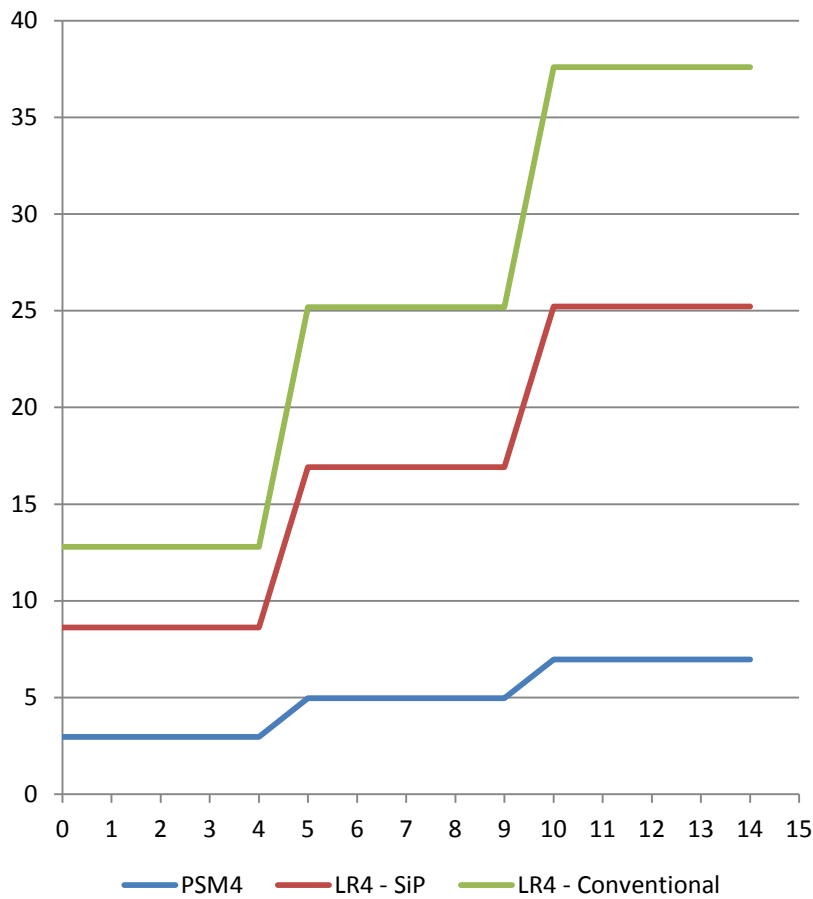
Three Year Module Turnover

Costs Per Year

Cumulative Costs

Net Present *Cost*

- Assuming a five year module refresh over 15 years, LR4 links cost 3.6x and 5.4x more than PSM4 links

- Assuming a three year module refresh over 15 years, LR4 links cost 3.8x and 5.6x more than PSM4 links

- To compare them in contemporary cost terms, an NPV analysis is done (using a 10% discount rate)

	5 Year Refresh	Ratio vs. PSM4	3 Year Refresh	Ratio vs. PSM4
PSM4	4.5		6.5	
LR4-SiP	15.4	**3.4**	23	**3.6**
LR4-Conventional	23	**5.1**	35	**5.4**

Comparison and Conclusions

	Contemporary Cost Model[†]	NPV with 5 year refresh rate	NPV with 3 year refresh rate
LR4-SiP/PSM4	2.9	3.4	3.6
LR4-Conventional/PSM4	4.3	5.1	5.4

- Looking at the total cost to service SMF fiber, the real costs (as measured as a ratio to PSM4) of LR4 are approximately 25% higher.

- PSM4 solutions put the most value in the datacenter infrastructure, while reducing the costs of the consumables.

† from welch_01_0513_optx.pdf

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