The Economic Benefits of LSA in 2.3 GHz in Europe

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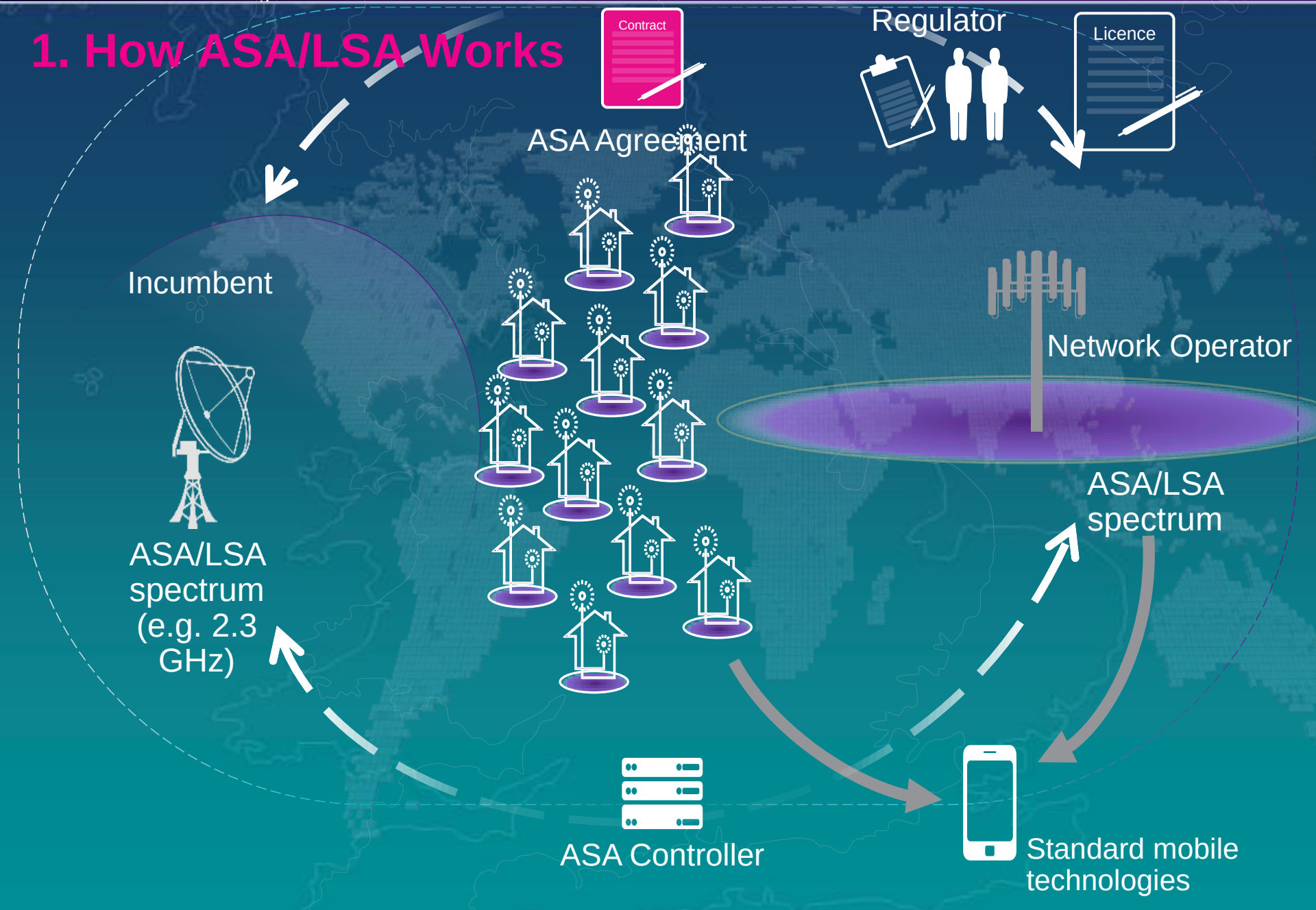
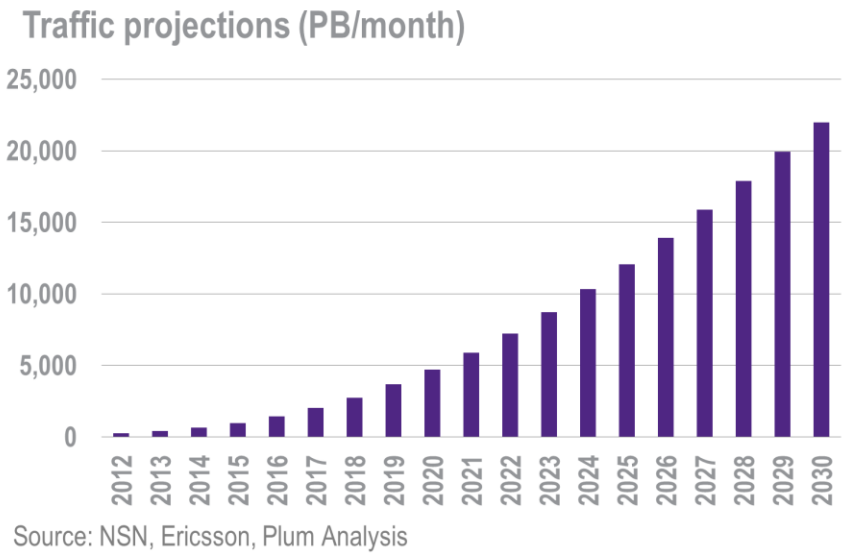
Note: Economic values and demand forecasts presented are a result of a PLUM consulting study for Europe commissioned by Qualcomm, NSN and Ericsson.

1. How ASA/LSA Works



2. The Case for LSA at 2.3 GHz in Europe

- **There is demand for additional harmonised spectrum for mobile broadband, such as the 2.3 GHz band**
- **The PLUM study estimates that mobile data traffic in the CEPT region will rise 100-fold between 2012 and 2030. (This is the central scenario.)**
- **However, total mobile broadband spectrum will only increase ~5-fold in the same timeframe, with over 50% of the additional spectrum becoming usable by 2015:**
  - 2012 – 140 MHz;
  - 2015 – 430 MHz;
  - 2030 – 670 MHz

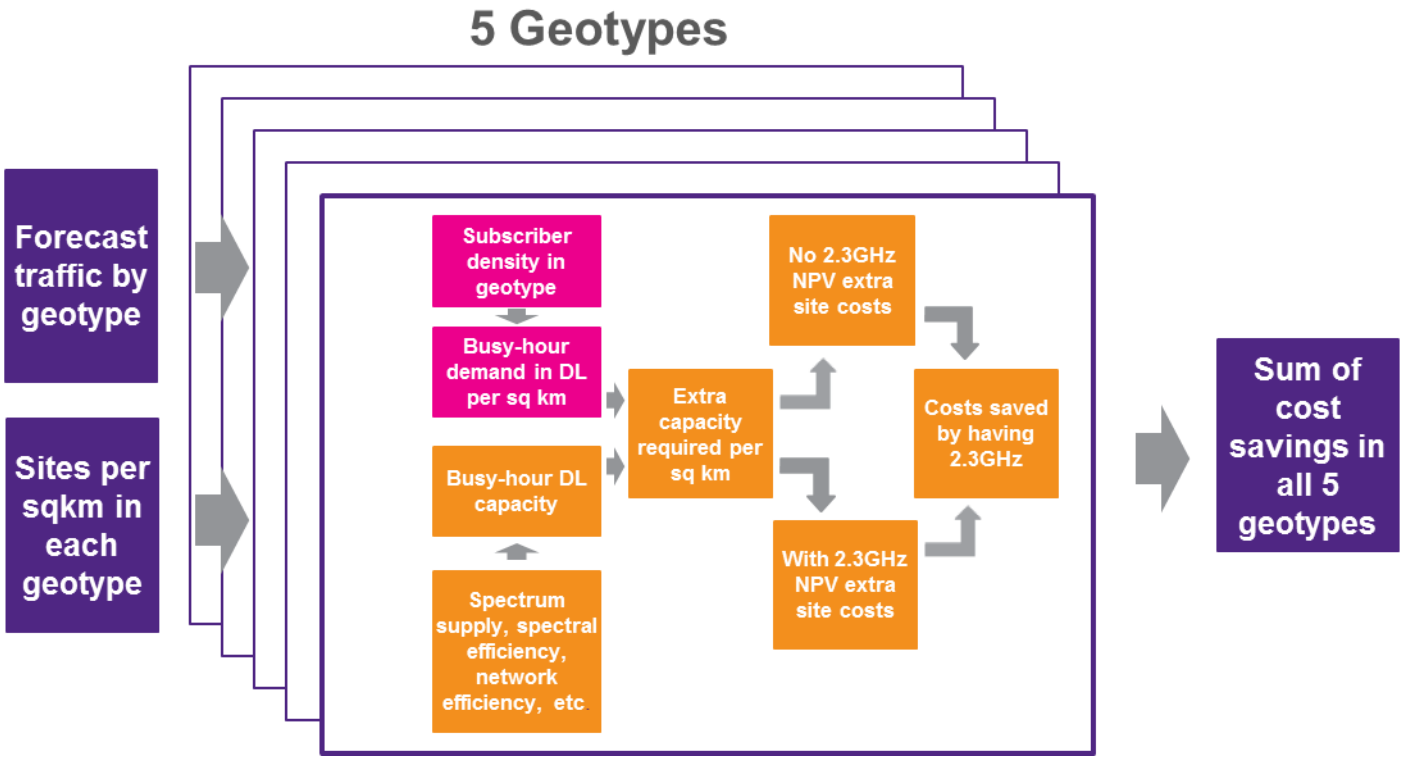


2. The Case for LSA at 2.3 GHz

- **Incumbents at 2.3 GHz can provide access to the band on terms and conditions that would be attractive to mobile broadband operators, and operators can use the band to generate benefits in one of the following ways:**
  - Using the additional spectrum to reduce infrastructure costs to support mobile data traffic
  - Providing a new mobile broadband-type service that either fills gaps in the existing market or creates a new market. Examples are cheap bolt-on data bundles and LTE-grade WiFi extension solutions.
- **Benefits from cost reductions and from consumer surplus generated through new service offering were estimated**

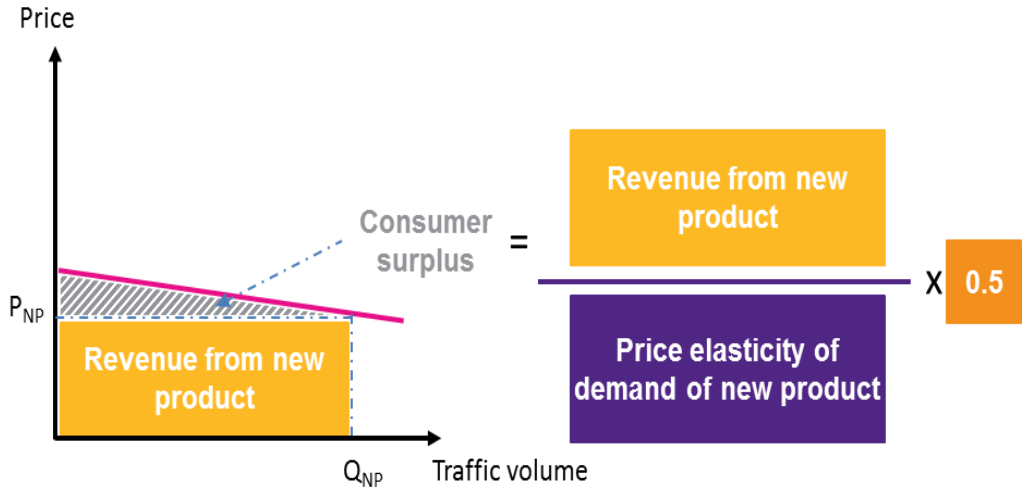
3. Benefit Calculation Methodology

Methodology for cost-reduction benefits of the 2.3 GHz band



3. Benefit Calculation Methodology

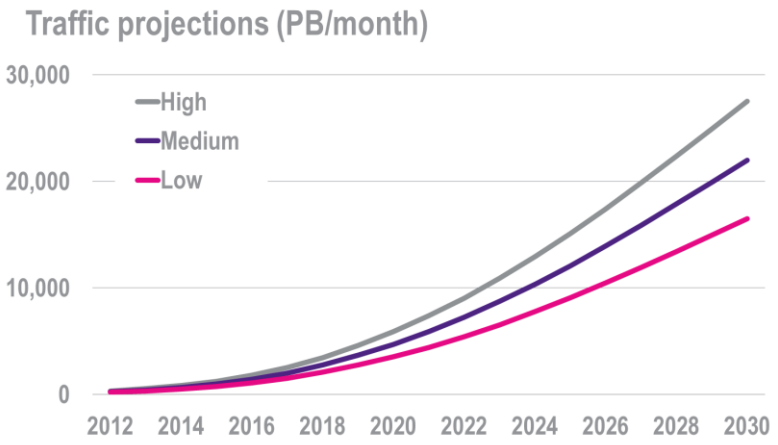
Methodology for consumer-surplus benefits of the 2.3 GHz band if the spectrum is instead used to provide capacity for a new service



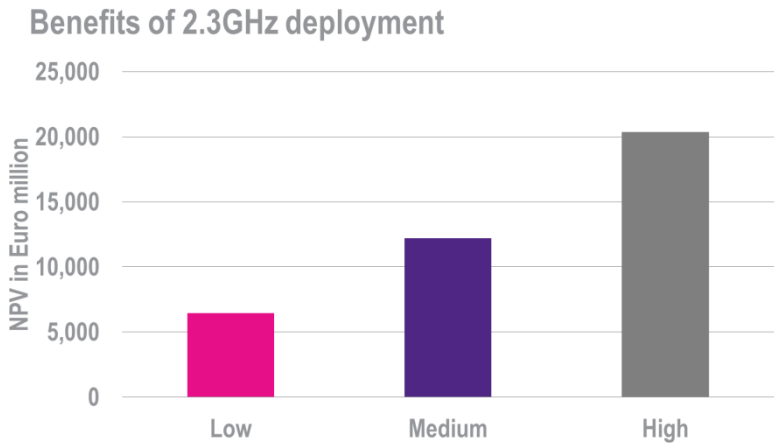
It is assumed that revenue is equal to the incremental cost (CAPEX and OPEX) of using the 2.3 GHz to provide additional capacity that would support the new service on existing sites.

4. Values of Economic Benefits

In addition to the central-case traffic scenario for the CEPT region, the cost reduction analysis with a higher-traffic and a lower-traffic demand was performed. Benefits are in the range EUR 6.5 bn – EUR 20 bn (USD 8.9 bn – USD 27.3 bn).



Source: NSN, Ericsson, Plum Analysis

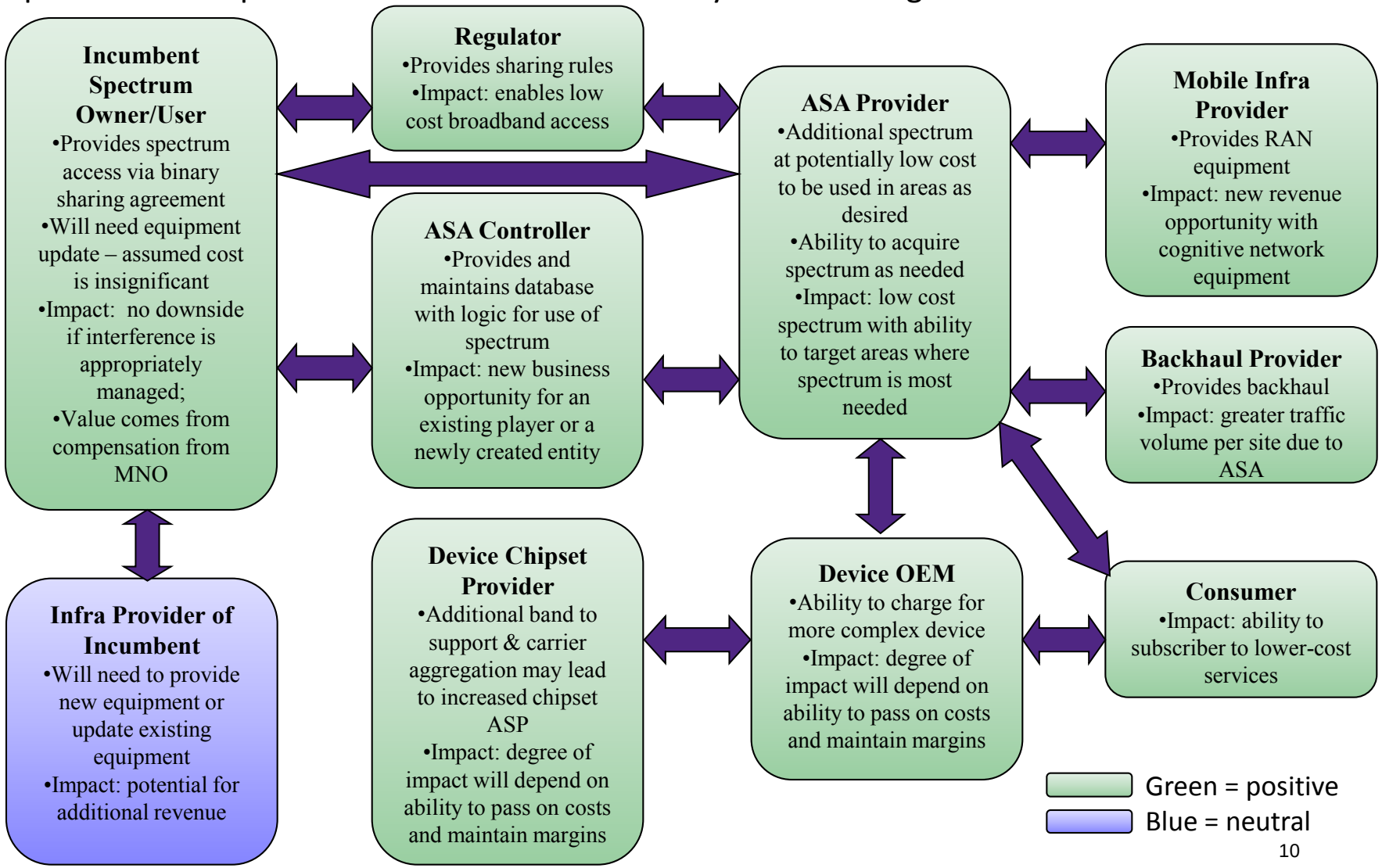


Source: Plum Consulting

5. ASAs Positive Implications for Various Industry Players

Use Case 1 – Existing MNO Leveraging ASA to Gain More Spectrum for Macro and/or Small-Cell Deployment and Achieve Lower Cost/MB

Compensation for Spectrum Use Based on a Mutually-Beneficial Agreement



Use Case 2 – Enabling a Low-cost Service for MNO's Price-sensitive Customers

ASA Used Only for a Low Priced Service Offering with Geographical or Temporal Limitations