

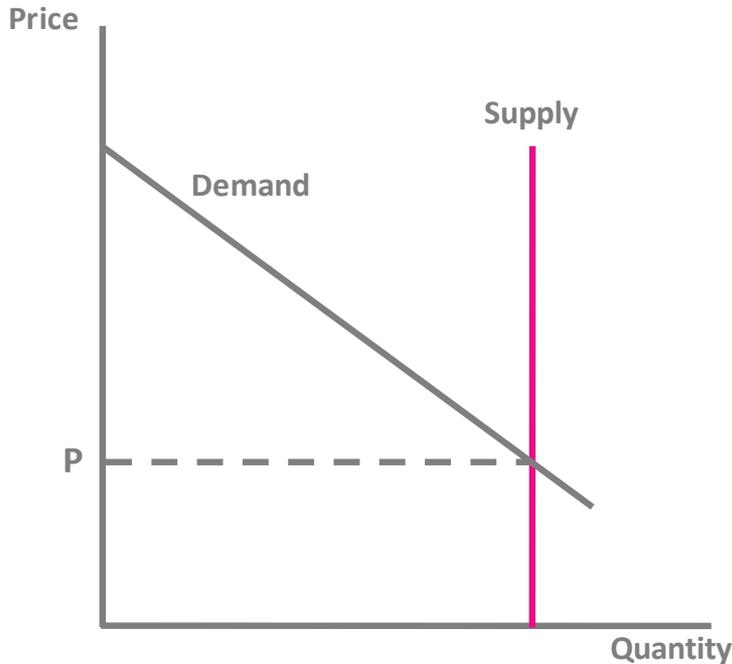


# Incentive pricing – theory and practice

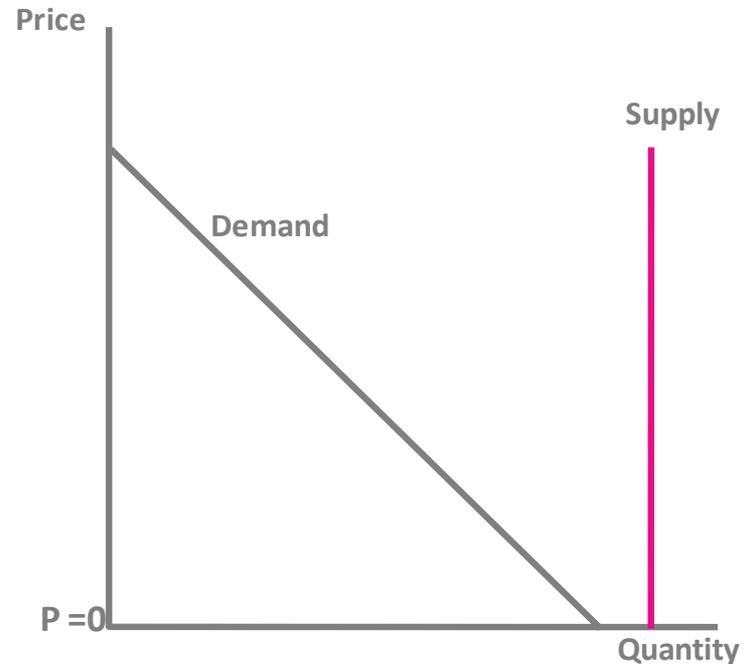
**Phillipa Marks**

**Spectrum Roundtable, 22 April 2010**

# Incentive pricing - what is it?



**Band with excess demand**



**Band with excess supply**

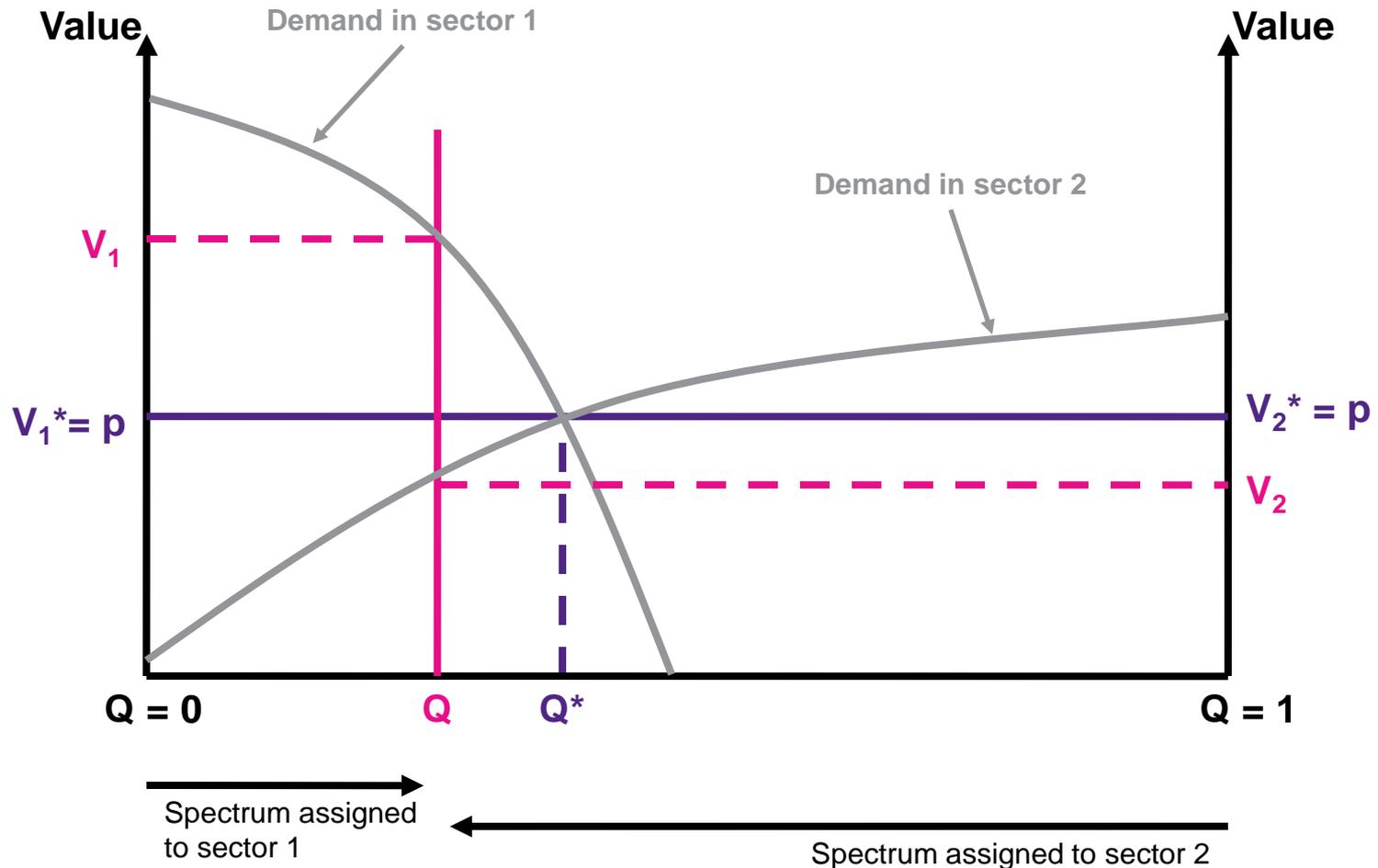
Setting a price equal to spectrum opportunity cost  
Approximating market price, so should be forward looking  
Payment for spectrum management costs is additional to this price

# Incentive pricing - why do it?

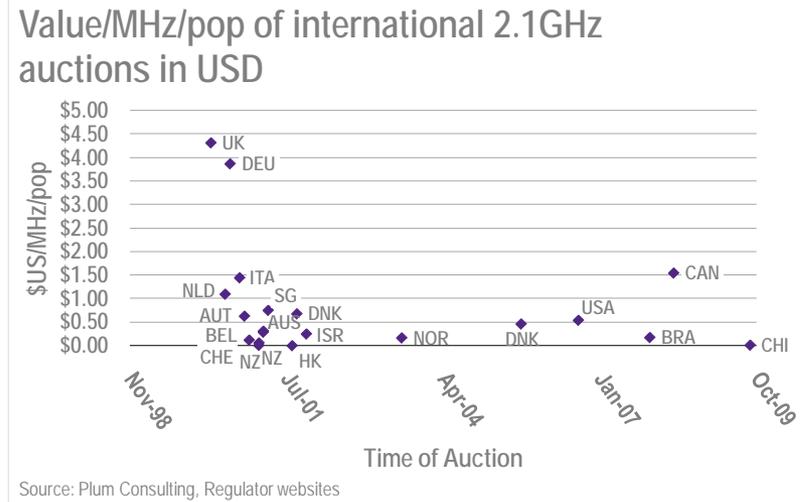
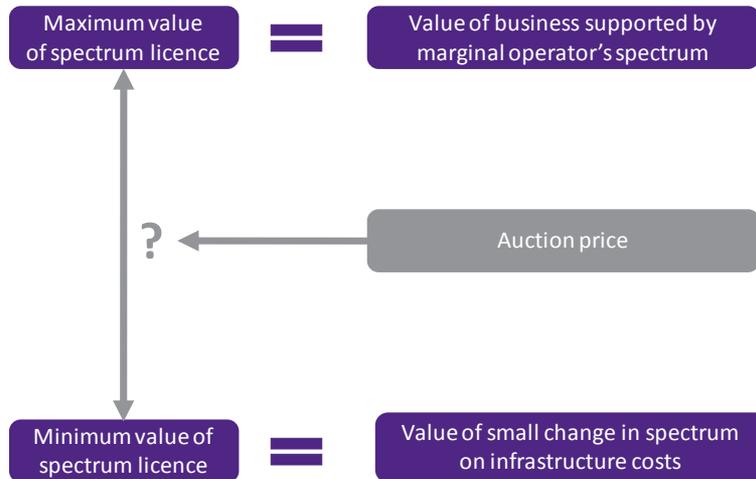


- **To provide incentives for economically efficient use .....**
  - Get spectrum vs investment and technology trade-offs right
  - Assign spectrum to those who value it most
- **When markets are absent or do not work well**
  - Spectrum is not tradable
  - Trading does not work well e.g. because of high transaction costs or users unlikely to respond to opportunity cost (e.g. government users)
- **We know if valuable resources are free**
  - They are hoarded and so do not move to highest value use
  - They will be “over” consumed
- **Pricing may also be applied to provide a fair return to the state for use of the resource**

# Incentive prices - how to set them?



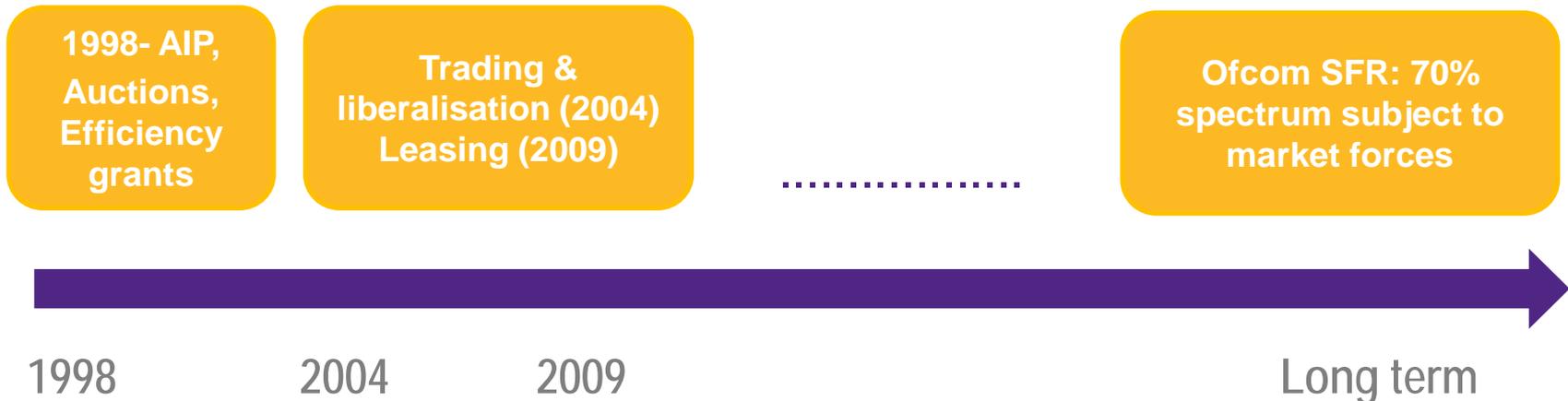
# Estimate value or use market data?



Market values – best in theory but limited in number and can be highly variable across countries and over time

Estimate value as might be done by an operator and cross check with market outcomes

# UK spectrum policy development



AIP is an annual price set for spectrum that is not auctioned  
AIP may be applied after the initial term of auctioned licences  
In principle AIP applies to all “licensed” users – government and non-government - in bands where there is excess demand

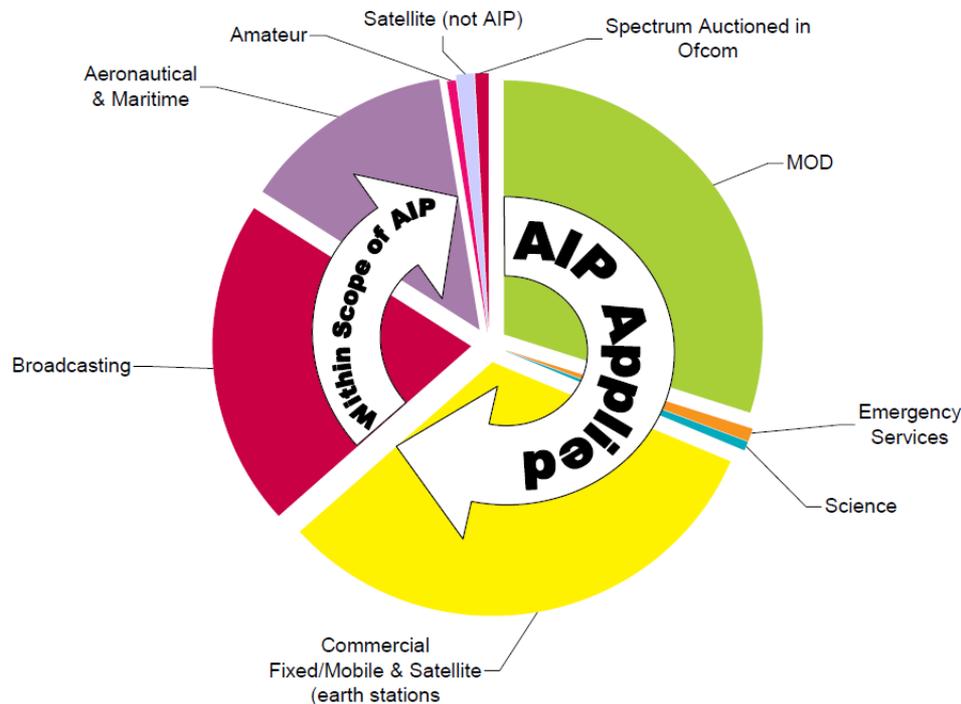
# AIP has been set as follows



- **Value at the margin calculated. For example**
  - Public mobile: reduction in network costs if assigned additional spectrum
  - Private mobile: additional costs of moving to a shared system
  - Fixed services: additional costs of moving to higher uncongested band
- **AIP set at about 50% of estimated value for bands/locations judged to have excess demand - most bands 60 MHz-15 GHz**
  - Erred on the low side to avoid risk of spectrum left idle
  - 3-4 year phase-in to avoid disruption to users
- **Prices based on spectrum use denied to others**
  - Bandwidth and area sterilised - discounts where channels shared
  - Band and location factors to reflect strength of demand
- **Prices intended to be reviewed every 5 or so years**
  - Adjust to reflect changing market circumstances

# AIP is applied up to 15 GHz

## Services applied to up to 3.3 GHz



## Current national values

Band	Price/MHz (£)
880-960 MHz	356.4k
1.8 GHz	277.2k
Land mobile	396k
MoD 960-1452 MHz	296.7k
MoD 2.2-3.1 GHz	236.9k
Fixed links - below 15 GHz	2.2k (100 links)
Fixed links – above 15 GHz	0.9k (100 links)

TV bands postponed to 2014; aeronautical VHF band under consultation

# AIP impacts – it is early days!



- **Major change in MoD position on spectrum release/sharing**
  - Released 110 MHz in 2004
  - Spectrum audit conducted and now looking at releasing/sharing bands at 400 MHz, 2.3 GHz, 3.5 GHz, 4.4-5 GHz and 5.3-5.85 GHz in the near term
- **Commercial release of up to 500 MHz (in bands at 400 MHz, 4GHz, 10 GHz)**
- **Radio astronomy – released 80 MHz and removed constraints on 300+ MHz**
- **Police – released 1 MHz at 400 MHz**
- **More generally AIP changes the nature of the discussion about access to additional spectrum**

## Ofcom AIP review – reaffirms principles and ....

- Will pay more attention to detailed demand situation (now and in future) including potential alternative uses of each band
- Proposes to take account of the effectiveness of trading when setting AIP
- Confirms that policy objectives other than optimal spectrum use should be addressed through other interventions
- Indicates a role for the use of market information in setting AIP ...  
But notes risks of distorting markets

Frequency band	Annualised auction price	AIP
400 MHz	£49k/MHz (2008)	£396k/MHz
28 GHz	£76/MHz	£48-256/MHz Depending on reuse

# Conclusions



- **Setting prices involves dealing with uncertainties – usually suggests err on the low side**
- **If you are certain that there are higher value uses of a band then refarm – AIP may help encourage incumbents to move**
- **AIP is one of several instruments for promoting efficient spectrum use. Trading/leasing may become more important but AIP likely to have long term role for government spectrum use**
- **Incentive pricing works!**

# References



- Administrative Incentive Pricing of Radiofrequency Spectrum, Plum and Aegis for ACMA, October 2008 [http://www.acma.gov.au/webwr/assets/main/lib310867/ifc12-09\\_app\\_a\\_1\\_plum\\_report\\_to\\_acma.pdf](http://www.acma.gov.au/webwr/assets/main/lib310867/ifc12-09_app_a_1_plum_report_to_acma.pdf)
- Is spectrum pricing compatible with spectrum markets?, Plum Consulting, 2009 <http://www.plumconsulting.co.uk/pdfs/Is%20spectrum%20pricing%20compatible%20with%20spectrum%20markets.pdf>
- An Economic Study to Review Spectrum Pricing, Indepen, Aegis Systems and Warwick Business School, Ofcom, February 2004. [http://www.ofcom.org.uk/research/radiocomms/reports/independent\\_review/](http://www.ofcom.org.uk/research/radiocomms/reports/independent_review/)
- Policy Evaluation Report: AIP, Ofcom July 2009, [http://www.ofcom.org.uk/research/radiocomms/reports/policy\\_report/evaluation\\_report\\_AIP.pdf](http://www.ofcom.org.uk/research/radiocomms/reports/policy_report/evaluation_report_AIP.pdf)
- SRSP: The revised Framework for Spectrum Pricing, Ofcom March 2010, <http://www.ofcom.org.uk/consult/condocs/srsp/>
- UK Defence Spectrum Management 2008-2012, <http://www.mod.uk/DefenceInternet/AboutDefence/CorporatePublications/ConsultationsandCommunications/PublicConsultations/UkDefenceSpectrumManagement200812.htm>