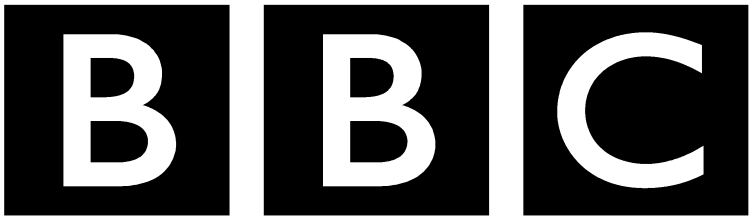
ANNEX C



Further evidence for
The Radio Spectrum Management Review:

Incentives for Broadcast Spectrum Efficiency

20 November 2001

INCENTIVES FOR BROADCAST SPECTRUM EFFICIENCY

It has been suggested that broadcasters may have insufficient incentive to maximise spectrum efficiency, and that spectrum pricing might helpfully provide that incentive. This note attempts, as a contribution to this debate, to answer the following questions:

- What is meant by "maximising spectrum efficiency" – what different categories of behaviour are encompassed by this phrase?
- What incentives currently exist to achieve it?
- Would spectrum pricing be effective as an additional incentive?
- What other incentives or measures might alternatively be helpful?

Categories of spectrum efficiency

A variety of different outcomes, in terms of spectrum planning and use, could be characterised as being more efficient than other outcomes. It is important in assessing what drives these outcomes to look at them individually.

Broadly speaking, an increase in spectrum efficiency will result in either:

- unrequired spectrum being released by existing users,
- existing users extracting greater value from their spectrum, or
- more intensive use of broadcasting spectrum overall.

These outcomes could be delivered by at least **eight different categories of approach**:

1. Changing broadcasting policy to release blocks of terrestrial spectrum
2. Replanning spectrum use to maximise efficiency
3. Providing small-scale services in the gaps in broadcasting spectrum
4. Adding more functionality to current services
5. Fitting current digital services into less capacity overall
6. Reducing the spectrum allocation to individual services
7. Eliminating overlap and duplication
8. Sharing broadcasting capacity with non-broadcasting users

Incentives

The attached analyses explore the impact of various incentives in each case. The following key conclusions can be extracted:

- by far the greatest "saving" in broadcasting spectrum would be achieved by a fundamental change in the Government policy framework for broadcasting – notably, the ending of analogue terrestrial transmission.
  - All the key players – Government, broadcasters, industry and regulators – have clear economic and business incentives to aim for analogue switch-off.
  - Charging terrestrial broadcasters for analogue spectrum would not act as an effective further incentive to achieve analogue switch-off, since the decision is in the hands of the Government, not the broadcasters.

  - On the contrary, charging the broadcasters for spectrum would result in them having less money to invest in the new services and expanded coverage (ie. more transmitters) which will drive digital take-up, which is the key to analogue switch-off. Spectrum pricing is therefore more likely to slow down progress to analogue switch-off than to speed it up.

- The industry has incentives to deliver marginal efficiency savings which do not involve a change in Government policy – the supply of spectrum currently allocated to broadcasting falls short of what would be needed for universal delivery of all services which would aim for it; taken together with the competition for access between the BBC and the commercial sector, this helps ensure a stringent approach to spectrum planning.
- Categories of spectrum efficiency which do not involve broadcasters releasing "spare" spectrum (such as 2, 3 and 4 above) could by definition not be incentivised by the application of spectrum pricing.
- Strong incentives already exist on the industry to develop technologies which are more spectrum efficient, allowing individual services to use less spectrum without a perceptible loss of quality or coverage (as in category 5 above). Any additional incentive from spectrum pricing is likely to be marginal.
- Public service broadcasters do not have a free hand to trade off spectrum charges against the coverage and quality of their services (as in category 6), and spectrum pricing could therefore conflict with other Government policy objectives.
- There is very little remaining overlap and duplication in terrestrial delivery (as in category 7) and spectrum pricing is therefore unlikely to have any real role to play in increasing efficiency in this area.
- Broadcasters could be incentivised to identify spare capacity in their broadcast signals to carry third party commercial data services (category 8), but this would not require the imposition of a full spectrum pricing regime, which would be an inefficient response to this at best marginal opportunity.

Additional **new incentives** for achieving efficiency improvements of the kind identified may include:

- A clear Government strategy for achieving analogue switch-off, to which the whole industry can work
- Detailed reviews of existing spectrum plans, considering whether replanning might deliver efficiencies and at what cost
- Additional public investment in transmission infrastructure where necessary to implement any replanning which might be identified
- Public funding for not-for-profit (eg. community radio) use of small amounts of spare spectrum
- Identification of clear coverage requirements for broadcasters, together with minimum reception quality and resilience obligations, against which spectrum needs can be assessed.
- A flexible regulatory framework in which all broadcast users of spectrum, including public service broadcasters, are free to exploit commercially, or sell to third parties, a limited amount of capacity on frequencies allocated to them, for the carriage of data services alongside the broadcast stream.

1. Changing broadcasting policy to release blocks of spectrum

How is it achieved?

Requires a fundamental change in Government policy, with less terrestrial spectrum set aside for broadcasting.

Examples

- Switching wholly from analogue to digital ("analogue switch-off")
- Reducing the scope of the digital terrestrial transmission platform
- Changing the "all platforms policy" for public service broadcasters – eg. allowing them to provide some services via satellite only

Impact

Would generate the largest potential savings of terrestrial spectrum, but only by changing the nature of the broadcasting marketplace fundamentally. If such a change were introduced ahead of consumer behaviour, consumers could be deprived of existing services, or be forced to migrate. For many consumers who currently rely upon portable TV sets, but who live outside the existing coverage of digital terrestrial television, providing satellite as the only means of receiving digital TV would deprive them of television reception following analogue switch-off.

Decision stakeholders

Only the Government could make such a politically contentious decision – no government would ever leave it to broadcasters or even regulators. The Government would need to be satisfied that the residual impact on consumers (the electorate) was manageable.

Regulators, broadcasters, platform operators, audiences and equipment manufacturers can help create the conditions for analogue switch-off. For broadcasters, this largely means investing in compelling digital services. None, however, has sufficient influence to persuade Government to implement such a change before it was satisfied that the political preconditions have been satisfied.

The position of existing terrestrial broadcasters is particularly constrained. The Government has clear policies that the BBC, C4, ITV, C5, S4C and Teletext must continue to simulcast in analogue until analogue switchover is achieved, and that they should maintain a platform neutral stance between terrestrial, satellite and cable delivery. Without a change in those policies, these broadcasters have no flexibility to determine their own approach.

What incentives/disincentives currently exist?

The key driver is the potential for windfall revenues for the Exchequer. The Government therefore has a strong incentive to achieve analogue switch-off.

Broadcasters also have a direct interest in the drive to digital. Digital can accommodate more services generally and provide new opportunities for specialist subscription and on-demand audio-visual services; it can support new value added services such as interactive programming and specialised data services, as well as new funding models including interactive advertising.

The existing terrestrial broadcasters, obliged to simulcast, are facing higher distribution costs than would be the case after analogue switch-off, or if they were not required to be platform neutral. In the face of firm Government policies, however, they must simply absorb all of these additional costs.

What action has resulted?

The Government has made clear its ambition to achieve digital switchover and has published a draft digital action plan aimed at delivering this within a manageable period. Government, the regulators, broadcasters, platform operators and equipment manufacturers are working together in a number of fora to encourage the development of the necessary preconditions.

For their part, the broadcasters are investing heavily in new digital services. On current plans the BBC in the coming year will be broadcasting up to 6 channels on digital TV which are not available to analogue terrestrial viewers, in addition to full widescreen digital versions of BBC ONE and TWO (together with their regional variations), and 5 new national digital radio stations alongside the five existing national radio networks and the World Service, and providing digital enhancements to the existing services, including interactive support for landmark programmes. In total, the BBC will be investing about £250m a year in digital services, associated programme enhancements, infrastructure and distribution.

What would be the impact of spectrum pricing?

Charging the existing analogue terrestrial broadcasters for access to the spectrum which the Government requires them to use would in no way increase the likelihood of achieving early analogue switch-off:

- As the broadcasters cannot determine their own date for switch-off, nor their own approach to different platforms, they would not be able to respond directly to any additional “incentive” created by spectrum pricing.
- While they might place pressure on the Government to change the policy framework to allow them some control over their distribution costs, such pressure could not realistically affect the overriding political equation behind the Government’s policy on analogue switch-off.
- In the meantime, therefore, broadcasters would have no choice but to absorb the additional charges, with a direct impact on service budgets. Charges of possibly “tens of millions of pounds a year” could represent around 20% of the BBC’s digital spend. Facing such an unavoidable new tax, the BBC would have to revisit current levels of investment in digital. So, far from hastening the date of analogue switch-off, charging broadcasters for spectrum could reduce the attractiveness of digital for audiences and reduce investment in transmitter roll-out, thereby slowing down digital take-up which is the prerequisite for analogue switch-off.

What alternative mechanisms or incentives could be introduced?

The *valuation* of broadcasting spectrum (identifying the opportunity cost of using it for terrestrial broadcasting rather than auctioning it off to other users) could help ensure that the Government makes a proper cost-benefit analysis of policy initiatives to deliver analogue switch-off. For example, the promise of future revenues from the auction of surplus spectrum could justify up-front investment by Government in digital transmission infrastructure, the funding of new digital services, or in the promotion of digital take-up by consumers.

Government needs to adopt a clear strategy which takes into account the necessary trade-offs between issues such as the speed of DTT roll-out, the scope for power increases from digital transmitters, the possible conversion of existing analogue frequencies to digital use, and the amount of spectrum which can eventually be released.

2. Replan spectrum use to maximise efficiency

How is it achieved?

Spectrum which has been allocated piecemeal over a long period might be replanned in an entire block, to maximise efficient use.

Examples

FM radio has developed over 30 years, with new spectrum identified and allocated for new services at various times. Starting the planning process afresh, taking account of technologicial developments in transmission techniques and in the quality of receivers might therefore provide some opportunity for efficiency savings without loss of services or coverage.

Impact

No existing services need be lost. However, there would be cost implications from the need for new transmitters. There could also be considerable disruption to services as they were moved around the tuning dial, with audiences facing initial confusion. Broadcasters might have to boost marketing spend to ensure they did not lose audience in the process.

Decision stakeholders

No single broadcaster can act unilaterally, since every frequency change has knock-on effects on other users. Such an exercise could only be taken in concert between all affected broadcasters and their regulator. If the plans were very disruptive, the Government might also seek to become involved.

What incentives/disincentives currently exist?

The principle incentive is the current shortage of broadcasting spectrum and competition for access to what is available. Both the BBC and the commercial regulators have an interest in considering all possible options. As demand for spectrum has grown, so has the incentive to consider more radical options.

It is generally accepted, however, that despite its sequential nature, spectrum planning has in general delivered a relatively efficient use of available spectrum and that any potential “savings” are marginal and almost certainly outweighed by the cost of installing new transmission infrastructure.

What action has resulted?

Replanning exercises have occurred on several occasions, for example at the launch of commercial radio.

What would be the impact of spectrum pricing?

Since any efficiency savings from spectrum replanning would result from “closing up the gaps” between users, rather than in reducing the amount of spectrum used by individual broadcasters, no “saving” is likely to be available to individual broadcasters. The application of spectrum pricing to broadcasters would not therefore represent an additional incentive.

What alternative mechanisms or incentives could be introduced?

A review could be carried out into current spectrum usage, to consider whether replanning could generate significant savings, and encompassing a formal cost-benefit analysis of the options.

3. Provide very small-scale broadcasting services in the gaps in broadcasting spectrum

How is it achieved?

While the scope for providing new national, regional or local broadcasting services is constrained by the lack of available frequencies, there is scope throughout the UK for the provision of very short range services, operating at low power on frequencies not otherwise in use in the immediate vicinity.

Examples

Suitable uses for such short-range broadcasts include very local not-for-profit services of public value – such as community, hospital or campus radio stations – as well as time-limited information services supporting local events – for example, a radio service targeted at people driving to the Wimbledon Tennis Championships, or providing a dedicated commentary service at other sporting events.

Impact

Spectrum is used more intensively, but in a way designed not to impact upon existing broadcast services.

Decision stakeholders

The Restricted Services Licence (RSL) regimes for both television and radio allow the regulators to licence such short range services. Potential licence holders approach the regulators to seek suitable frequencies.

What incentives/disincentives currently exist?

Potential users themselves provide the driver for using spectrum in this way. However, because of their limited coverage, RSLs will rarely be commercially viable for the provision of free standing services. More widescale use of RSLs might therefore be hampered by lack of available funding.

The Government has recently announced that it wishes to see the emergence of a significant new tier of radio – “access radio” – employing such short range transmissions.

What action has resulted?

The regulators routinely receive applications for RSLs and award licences in appropriate cases.

The Government’s policy objective of seeing the emergence of an access radio sector has led the Radio Authority to launch a pilot scheme for the award of a greater number of RSLs for not-for-profit services.

What would be the impact of spectrum pricing?

Given the general lack of a commercial model for services using RSLs, spectrum pricing would, if it resulted in an increase in operational cost for such services, act as a further disincentive to launch them.

What alternative mechanisms or incentives could be introduced?

Public funding mechanisms may be a prerequisite for the more widescale emergence of such services.

4. Add functionality to current broadcasting services

How is it achieved?

Develop technologies which enable new functionality to be incorporated into current services, using the broadcast signal more intensively and thereby extracting higher value from spectrum use.

Examples

The introduction of teletext services within the analogue television broadcast stream, allowing text based information services to be accessed via suitably enhanced television sets, was an early example of the development of technologies enhancing basic broadcast services and thus allowing greater value to be extracted from the spectrum used by broadcasters. Other such examples are widescreen TV and the interactive functionality which is being developed around digital television services.

Impact

Consumers benefit from access to services of higher value. Enhancements related to digital services act as USPs, helping drive digital switchover. The broadcasting industry benefits from new business opportunities. The receiver market is boosted (as it was significantly by the purchase of sets with NICAM digital stereo sound in the 1990s). However, since the point of such developments is to extract additional value from broadcasting services, they do not usually result in the release of spectrum.

Decision stakeholders

The decisions on the introduction of such new enhancements is largely in the hands of broadcasters and platform operators, subject to satisfying any concerns of the regulators and Government.

What incentives/disincentives currently exist?

Broadcasters have incentives to see such developments, as a route to launching value added services which are distinctive in the marketplace. Equipment manufacturers view such developments as a driver for the new equipment marketplace, particularly for digital kit, as consumers upgrade.

What action has resulted?

Examples of such developments have been given above.

What would be the impact of spectrum pricing?

Spectrum pricing would not provide any significant new incentive to develop new functionality which can be accommodated within current spectrum, since no spectrum would be released. It could, however, provide a *disincentive* for the development of functionality, since these enhancements are mostly not commercially viable on a stand-alone basis and any capacity used might otherwise be able to be released, resulting in a saving in spectrum charges. In the case of DTT, such a disincentive for service enhancements such as interactivity could weaken the attractiveness of the platform and act against the Government's policy of promoting competition in the provision of digital platforms.

What alternative mechanisms or incentives could be introduced?

The Government could set targets in its digital switchover plan for the early adoption by the industry of enhancements which could drive digital take-up.

5. Fit current digital services into less capacity

How is it achieved?

Develop technologies which allow current services to be carried in less digital capacity without impinging upon service quality, and without requiring changes in the overall policy framework or installed receiver base.

Examples

Digital broadcasting is intrinsically most efficient than analogue. Since the introduction of digital, further improvements in compression techniques and the introduction of statistical multiplexing have allowed more services to be provided within the allocated spectrum than had initially been expected. These developments have allowed the number of full channels carried on the BBC's DTT multiplex to increase recently from four to five – an efficiency gain of 25%.

Impact

Since capacity can be freed up for new services, consumers can benefit from access to a greater number and wider range of services. The broadcasting industry benefits from new business opportunities.

Decision stakeholders

Decisions are largely in the hands of broadcasters and platform operators, subject to satisfying any concerns of the regulators and Government and complying with any industry-wide agreements on digital standards.

What incentives/disincentives currently exist?

There are powerful incentives on the key players to see such developments. Broadcasters see the potential to launch new services. Capacity freed up can be sold by platform operators. Where digital terrestrial television is concerned, competition with more bandwidth-rich platforms intensifies the drive to generate the greatest value from limited spectrum.

What action has resulted?

The industry works together, through bodies such as The Digital Network (TDN), to identify and develop new techniques, and to agree their adoption on an industry-wide basis, as in the case of the examples given above.

What would be the impact of spectrum pricing?

Spectrum pricing could increase incentives to develop more spectrum efficient technologies. However:

- current incentives have already produced relatively large gains, and the scope for further efficiency gains is unlikely to be as great.
- current DTT capacity available to the BBC is insufficient to carry all the public services approved by the Government – so BBC Parliament is currently carried in audio only. Any efficiency improvements in the future are likely to be absorbed by enhancements necessary to meet the BBC's legal obligations, rather than provide the opportunity to release spectrum.

What alternative mechanisms or incentives could be introduced?

Additional measures are unlikely to add significantly to the current, very strong, business incentives.

6. Reduce spectrum allocation to individual services

How is it achieved?

Service providers would trade off the robustness or coverage of their broadcast signal against the amount of spectrum used.

Examples

- The number of transmitters and frequencies used to deliver individual services could be reduced, or the power of transmitters turned down
- A relaxation in planning standards might tolerate more interference between services
- The amount of capacity for each service on a multiplex could be reduced

Impact

Capacity could be freed up for new services. However, in each case customers would be deprived of existing services at the margin, or receive services of an unacceptable quality level.

Decision stakeholders

The decision rests ultimately with the regulators, who must decide what coverage and quality obligations to place on broadcasters. Commercial broadcasters can trade off the size of their audience against potential advertising revenues, in bidding for licences. The BBC has an obligation to aim for universal delivery and general high technical standards, and the Government has an interest in any loss of coverage of BBC public services.

What incentives/disincentives currently exist?

Since demand for broadcast spectrum exceeds supply, the commercial regulators and the BBC have a clear incentive to ensure that each party uses spectrum efficiently.

What action has resulted?

Particular cases have been the subject of specific studies, including the Review of FM use which recently looked for practical opportunities to fit in new services in the most crowded marketplaces. It concluded that new commercially viable services could only be accommodated with some loss of existing service coverage.

What would be the impact of spectrum pricing?

Charging broadcasters for spectrum would invite them explicitly to strike a balance between coverage and use of spectrum. While for commercial broadcasters spectrum charges could be offset against audience reach and advertising revenues, for the BBC, spectrum pricing could only act as a disincentive to meet its general obligations of universal coverage and high technical quality, resulting in a conflict in government policy objectives.

What alternative mechanisms or incentives could be introduced?

If the Government wants significant numbers of new broadcasting services and is prepared to see coverage of existing services reduced to accommodate them, then the regulators and the BBC should be invited to develop specific proposals with a full impact assessment.

7. Eliminate overlap and duplication

How is it achieved?

Where audiences can access services from a choice of terrestrial sources, focus delivery from a single source.

Examples

The only obvious example is analogue local radio services, some of which are delivered by both FM and AM transmission. In theory, AM might be given up.

Impact

Spectrum might be released for new services. So long as the installed receiver base was predominantly able to receive either signal (as for FM/AM radio), then the medium term impact on audiences, in technical terms, would be minimal. However, it has been demonstrated in the past that certain audiences can become so strongly attached to particular ways of receiving services that they are prepared to take political action to preserve them – as with the “Save Radio 4 Long Wave” campaign.

FM and AM coverage are not co-terminous. To avoid overall loss of coverage, FM coverage might have to be increased, increasing demands on FM spectrum and involving costs for new transmission infrastructure.

Decision stakeholders

Broadcasters and regulators, acting together.

What incentives/disincentives currently exist?

Duplicating delivery has a direct cost impact upon broadcasters. Against this, broadcasters must balance the cost of rolling out new transmission infrastructure to complete coverage by a single means.

What action has resulted?

Over the last twenty years, as most listeners have migrated to FM-equipped receivers, the BBC has progressively given up its AM frequencies, releasing them to the Radio Authority for new commercial services. Simulcasting only continues where AM coverage adds considerably to that provided by FM, and where the completion of FM coverage is impractical.

In any case, demand for AM radio frequencies has fallen off: about 10 local BBC AM frequencies have been on offer to the Radio Authority for some years, but the Authority has not seen sufficient commercial demand to warrant taking them up.

What would be the impact of spectrum pricing?

Spectrum pricing could provide further incentive to eliminate duplication of delivery, which broadcasters would have to balance against the cost involved in completing coverage on a single distribution system. However, since the amounts of spectrum involved are tiny, pricing is unlikely to affect the overall cost benefit analysis or compensate for adverse consumer reaction.

What alternative mechanisms or incentives could be introduced?

The remaining opportunities for eliminating duplication in delivery being so few, the amounts of spectrum involved so small, and the cost of filling gaps in transmission networks likely to be disproportionate, the Government, if it wished to promote the complete elimination of duplication, might have to provide direct financial investment in the necessary infrastructure.

8. Share broadcasting capacity with non-broadcast users

How is it achieved?

Small amounts of spare capacity in broadcast signals could be made available for the delivery of non-broadcast services, without impinging on the broadcast service.

Examples

Business and financial data or traffic information and maps could be transmitted to dedicated receivers in the office or car.

Impact

More efficient use of available spectrum and the provision of new services of economic value and public utility.

Decision stakeholders

Under the analogue regulatory regime, the regulators can advertise “additional service licences” in spare capacity within broadcasting frequency bands. The digital television and radio regulatory regimes allow multiplex licence holders to apply up to 10% and 20% of capacity respectively to the provision of data services.

What incentives/disincentives currently exist?

Such services, especially if highly targeted at premium markets such as business services, can provide a lucrative revenue stream and digital platform operators therefore have plenty of incentive to use capacity to the full. The key driver for the launch of services in analogue spectrum is the level of demand from potential service providers.

What action has resulted?

A number of such services are already provided in analogue and digital capacity. The BBC also provides public service data services within its broadcast signals.

What would be the impact of spectrum pricing?

Pricing capacity could provide an additional incentive to maximise the commercial exploitation of spare data capacity, if broadcasters were allowed to keep the revenues.

In the BBC’s case, the existing requirement to raise commercial revenues to supplement the recent licence fee settlement is sufficient incentive to pursue all available opportunities, even without the extra pressure of charges for spectrum at the margin.

What alternative mechanisms or incentives could be introduced?

In the case of the BBC, the regulatory regime might have to be changed to explicitly permit the commercial exploitation of “public service spectrum”, either by the BBC’s own commercial subsidiaries or by the sale of bit-rate to third parties.