

Spectrum Management through Economic and Other Incentives

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Spectrum Management in Canada



- The Minister of Industry has exclusive spectrum management responsibility
- Spectrum management is performed by Industry Canada – a federal government department reporting to the Minister of Industry
- Spectrum allocations largely harmonized with those of the U.S.
- A long and successful history of Canada – U.S. cooperation in managing spectrum along our mutual border

Fee Revenue and Program Costs

- Industry Canada total cost of the spectrum management program = \$61M/yr
- Industry Canada's licence fee revenue (non-broadcast) = \$209M/yr
- Industry Canada cost of managing broadcast spectrum = \$13M/yr
- CRTC (the broadcast regulator) licence fee revenue = \$101M/yr

Government External Charging Policy

- Relevant goals:
 - A greater awareness of the value of public assets
 - The sound stewardship of public resources
 - Permit the government to earn a fair return for Canadians for rights or privileges granted and access to or use of resources owned and controlled by the government on their behalf
 - To promote the efficient allocation of resources by subjecting them to a market test of supply and demand thereby reducing or eliminating the demand for products or services perceived as “free”

- Relevant policy:
 - Charges for rights, privileges, access or use should be based on the market value or a reasonable approximation thereof

Why Should Government Users Pay?

- To promote efficiency in the use of a scarce resource
- The costs of government programs reflect the cost of the inputs they consume
 - Better information for decision-makers
 - Greater accountability to citizens
- Avoid unaccounted for cross-subsidization across levels of government
- Avoid distortion of choices in the how the radiocommunication needs of government are provided (e.g. use of commercial services)

Anecdotal Experience – Government Users

- With the repeal of federal and provincial fee exemptions in 1987 certain government users:
 - Discovered that licences were held for radio systems long since discontinued
 - Implemented efficiency measures and rationalized spectrum usage
 - Corrected licensing records of what frequencies were in use at what locations

Fees Should Attach to Spectrum

- Fees prescribed prior to 1996 apply on a per station – per frequency or channel basis
 - Requires that an authorization be issued for every station in a radio system
 - May constitute a disincentive to efficient use to the extent that more stations result in less spectrum being required
- Fees prescribed since 1996 apply to the quantum of spectrum authorized in a defined geographic area
 - Typically population or households included as a variable

Anecdotal Experience – Commercial Users

- PCS authorizations issued in 1995 via comparative process had fees that applied on a per-station, per-MHz basis
- If no stations were constructed then no fees applied!
- In 2003 Industry Canada announced changes from station to spectrum licensing with fees that apply on a per-MHz, per-pop basis
- In 2004 and 2005 two licensees returned three 10 MHz licences
- In 2005 two 10 MHz licences were re-issued to a new entrant

Developing a new fee model



Five guiding principles were set for consultations on a new fee model:

1. The fee structure should be simple and equitable
2. The more of the spectrum resource used, the higher the licence fee should be
3. Where the spectrum resource is relatively scarce, the licence fee should be higher
4. The fee structure should be flexible and independent of the licensing process
5. Any significant change to the user fees should be announced promptly and should be implemented over a reasonable period of time

SEIP – A new approach



- ✚ Proposed model to assess licence fees is based on:
 - 🕒 consumption of the Radio Frequency Spectrum
 - 🕒 the relative scarcity of frequencies in a given area

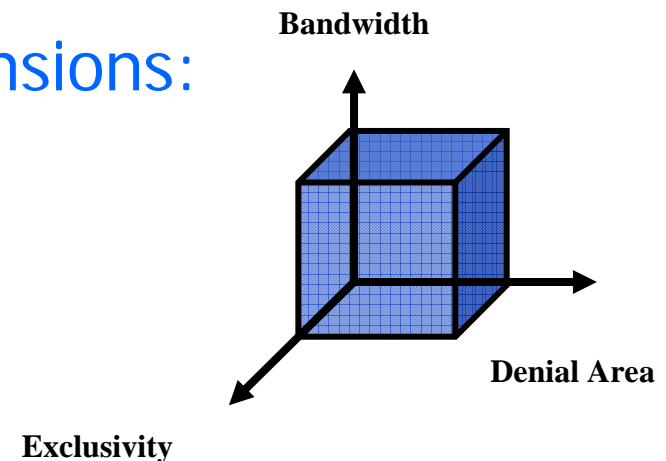


Spectrum Efficiency Incentive Pricing

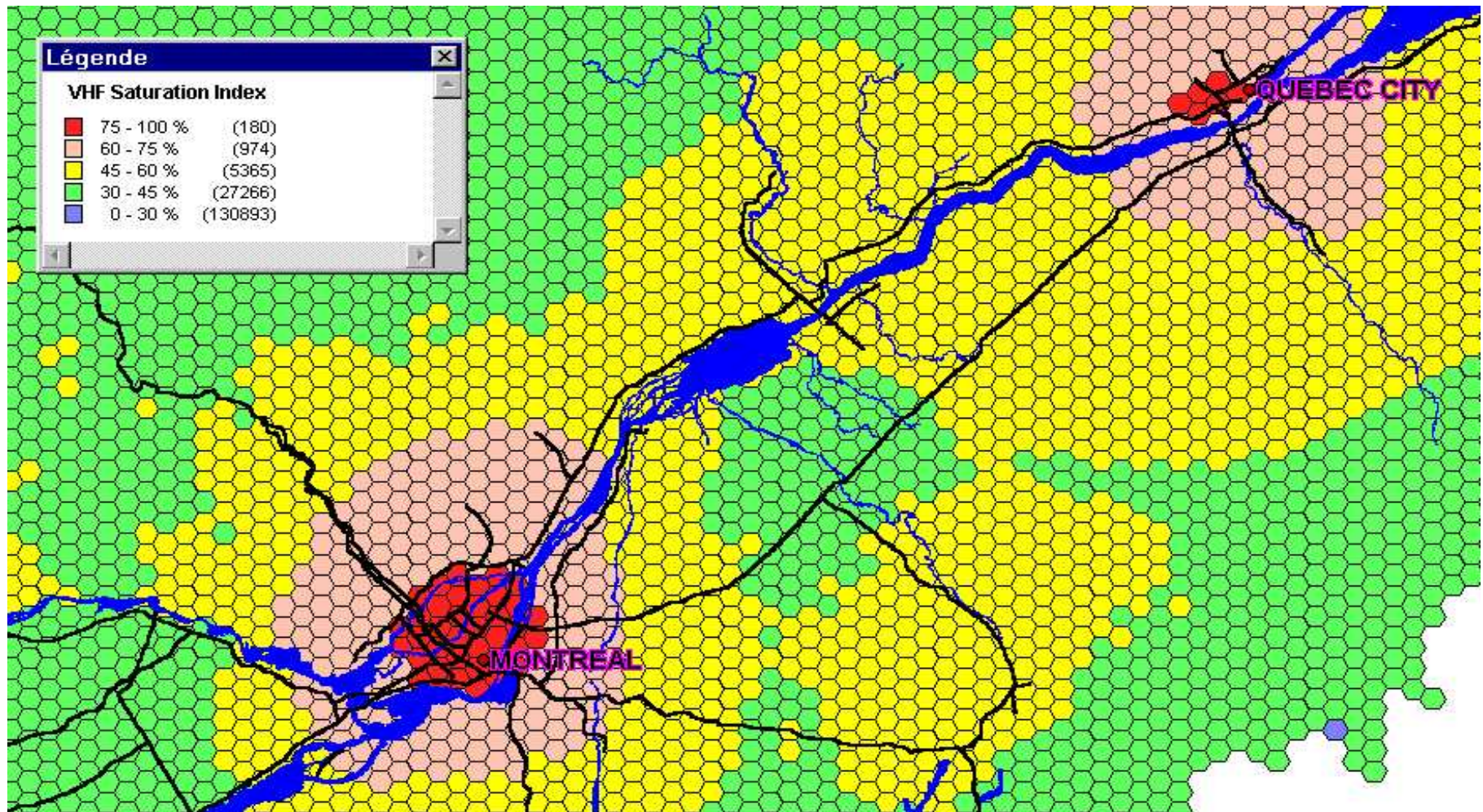
Spectrum Consumption



- † Spectrum Consumption is defined as the amount of radio spectrum a licensee consumes or denies to other users
- † It can be measured in 3 dimensions:
 - 🕒 bandwidth,
 - 🕒 exclusivity, and
 - 🕒 denial area



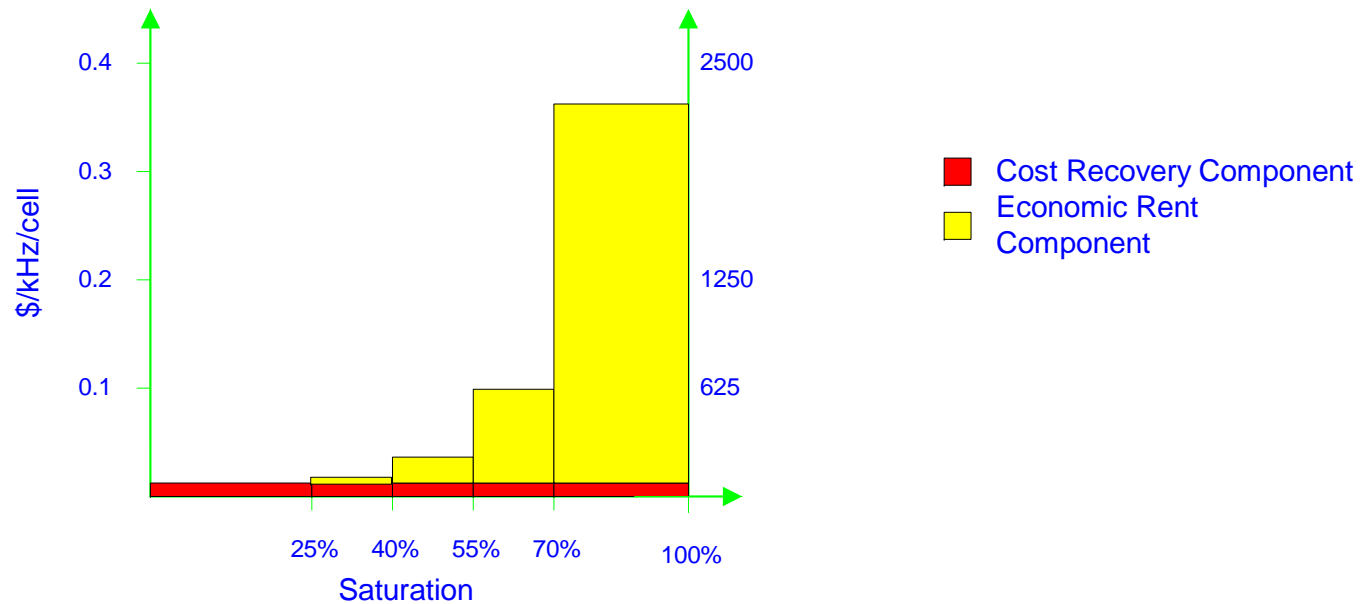
- « Saturation » Levels



Proposed Pricing for Spectrum Grid Cells



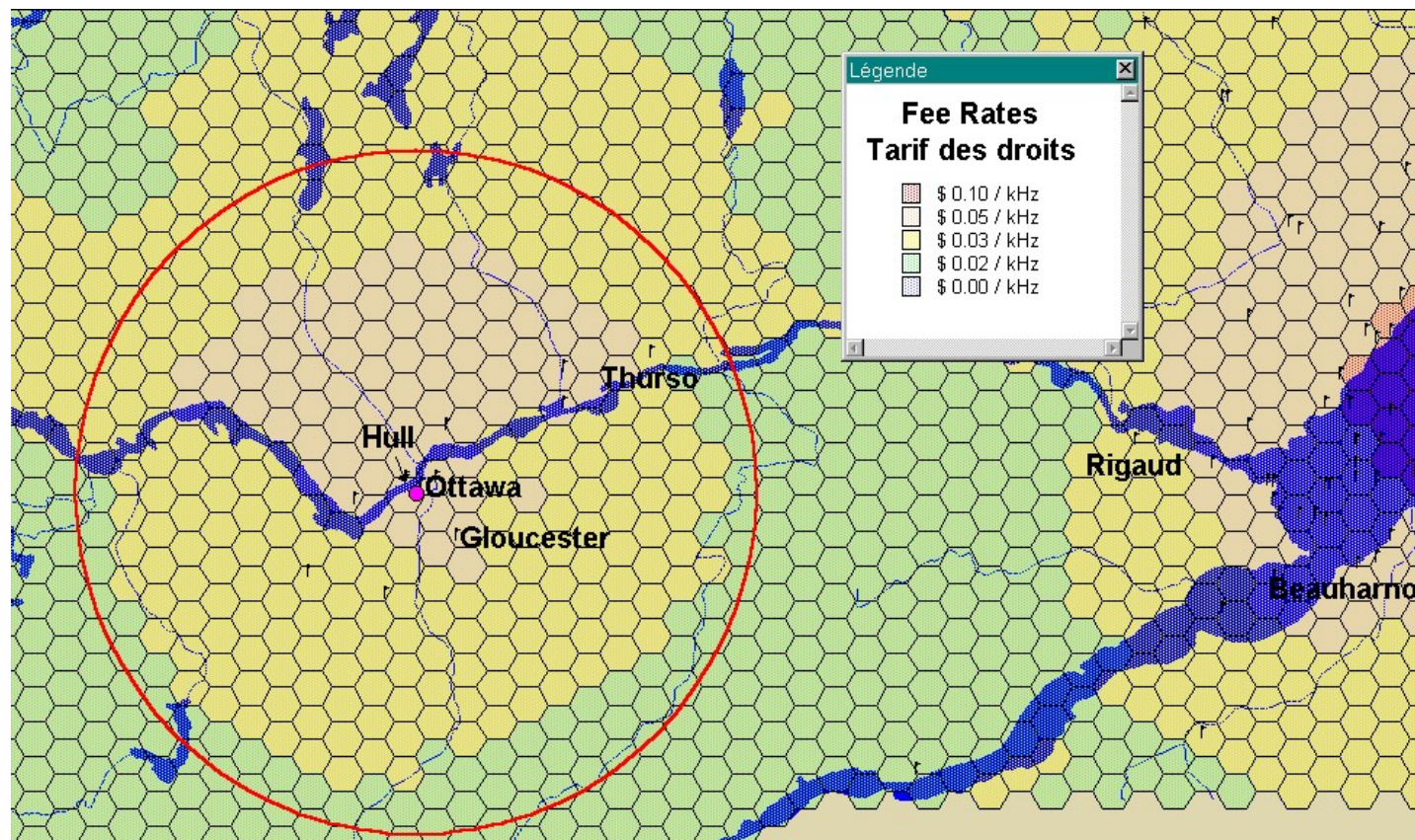
Basic Cell Rate



Example of Fee Calculation



Simple Denial Area laid over the Spectrum Grid








Example of Fee Calculation



Calculating the resulting fee

Example 1 (Exclusive assignment)

$$SCF = \text{Sum of cell rates} \times \text{Denied Bandwidth}$$

	\$ 0.10 / kHz x 30 kHz x 8 cells	\$24.00
	\$ 0.05 / kHz x 30 kHz x 73 cells.....	\$109.50
	\$ 0.03 / kHz x 30 kHz x 206 cells.....	\$185.40
	\$ 0.02 / kHz x 30 kHz x 54 cells.....	\$32.40
	\$ 0.00 / kHz x 30 kHz x 0 cell.....	\$0.00

Spectrum Consumption Fee **\$351.30**

Administrative Fee **\$25.00**

Total Fee (rounded to the nearest value) **\$376.00**

Displacement of Incumbents

- Industry Canada policy is that incumbents will not be compensated by the government nor will new entrants be required to compensate
- Typically Industry Canada:
 - Announces a moratorium on licensing for a service being phased out along with a sunset date after which incumbent systems become non-standard and no longer subject to interference protection thus permitting continued operation for a period of time generally sufficient to amortize sunk investment
 - Announces a date for the commencement of licensing a new service
 - Requires new entrants to request displacement of a specific incumbent installation due to an imminent incompatible requirement
 - Stipulates a minimum notification period for any displacement of an incumbent
 - Serves notice of displacement on incumbents based on the new entrant's demonstrated need
 - Permits new entrants to negotiate with incumbents displacements earlier than stipulated in the minimum displacement period

Spectrum Policy Framework Proposals

- Facilitate advanced technologies
- Flexible Use
- Avoid actions that create artificial scarcity
- Secondary market trading
- Timely release of licensed and licence-exempt spectrum
- High priority to public safety and interoperability

Innovating in a regulatory regime

- “A proposal to change an institutional arrangement, which has been in operation for a long time encounters basically three types of problems:
 - To show that the results to be obtained will be superior under the alternative approach to that of the existing system, and that the approach proposed is a viable system in that, once instituted, it will function properly;
 - To overcome the resistance to the change, the problem of acceptance; and
 - To cope with practical transitional problems that will be created by the change.”

Minasian, 1975