REGULATING WIRELESS COMMUNICATIONS TOWERS: TAIWAN'S EXPERIENCE IN COMPARATIVE PERSPECTIVE

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I. INTRODUCTION

As the number of people who own and use mobile telephones grows, more base stations are needed to carry the "traffic." New features, enabled by the Third Generation Mobile Telecommunication System ("3G") and Worldwide Interoperability for Microwave Access ("WiMAX"), such as internet access and multimedia services, require more and more information, or data, to be transmitted. The transmission of these large quantities of data increases the requirement for base stations.[1] By mid-2007, there were over 50,000 wireless communication towers in Taiwan. Of these, about 26,000 were designed for the Second Generation Mobile Telecommunication System ("2G"), 6,000 for the 3G, and about 16,000 for the Personal Handy-phone System ("PHS").[2]

Typically a wireless communication tower consists of an equipment cabinet, an antenna that sends and receives radio waves to and from mobile telephones, and a structure that supports the antenna.[3] Each base station provides coverage for a given area. Base stations can be a few hundred meters apart in major cities or several kilometers apart in rural areas.[4] The transmitting power of any particular base station is variable and depends on several factors, including the number of calls and the distance between the base station and the mobile telephone making the call. From a legal perspective, those "base stations," "antenna" and "radio waves" are subject to substantive and procedural rules.[5] This paper focuses on the conflict between operators and the community, common approaches used to regulate base stations and their associated problems, as well as the procedural issues of granting permission for cellular tower construction. After examining the regulatory framework for dealing with the construction of cellular towers, I propose some solutions. In particular, I analyze the issues from a procedural perspective, advocating a way forward that will help eliminate some of

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[1] In this article I use the terms "base station," "cellular tower," "wireless tower," and "wireless communications tower" interchangeably.

[2] *The Public Statement of the Former Deputy Chief Commissioner of NCC*, EPOCH TIMES, *available at* http://tw.epochtimes.com/bt/6/4/27/n1300414.htm (last visited Oct. 20, 2008).

[3] Office of Communications, Audit of Mobile Phone Base Stations - Information Sheet, http://www.ofcom.org.uk/sitefinder/audit_info (last visited Oct. 14, 2008).

[4] *Id.*

[5] *See generally* Jeffrey A. Berger, *Efficient Wireless Tower Siting: An Alternative to Section 332(C)(7) of The Telecommunications Act of 1996*, 23 TEMP. ENVTL. L. & TECH. J. 83 (2004). *See also* Robyn Durie, *Challenges Faced in Providing Mobile Broadband Services*, 11 COMPUTER AND TELECOMMUNICATION LAW REVIEW 66-72 (2005).

the problems caused by the conflict between the regulator, the telecommunications industry, and the local community.

II. THE PHENOMENON IN TAIWAN – COMMUNICATIONS POLICY TUG-OF-WAR

A. Stop Licensing! – The Local Resistance to the Siting of Wireless Towers

The widespread use of mobile phones is a global phenomenon. Cell phone usage has increased dramatically over the past decade, and with it the number of cellular towers. In contemporary Taiwan, virtually everyone owns (at least) one cell phone. The mobile voice volume in 2007 was 31.23 billion minutes, compared to 9.55 billion minutes in 1999.[6] As shown in Figure 1 below, mobile voice volume surpassed that of fixed voice communications for the first time in 2007, indicating that mobile telephones have indeed become integral to daily life.

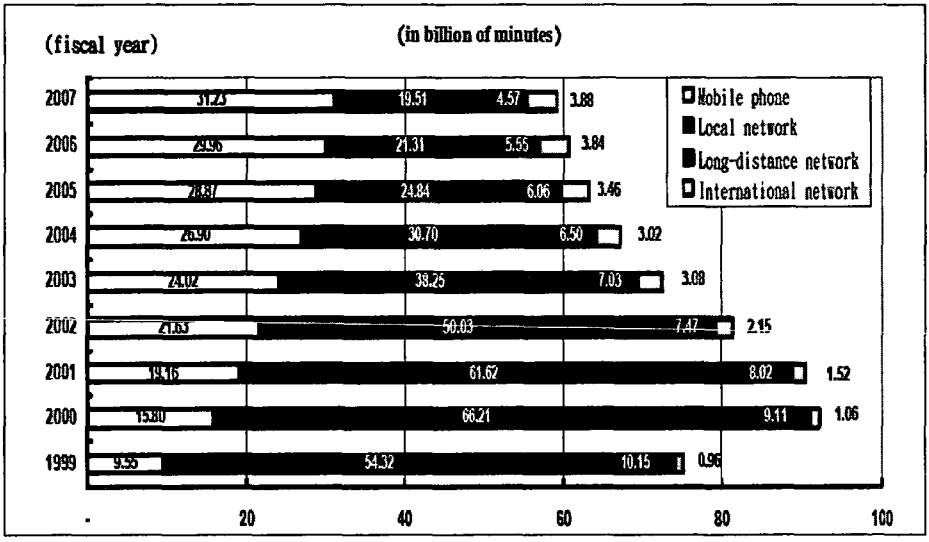

Figure 1 (Source: NCC)[7]

[6] REPORT ON MARKET SHARE OF MOBILE TELECOMMUNICATIONS, NATIONAL COMMUNICATIONS COMM'N OF TAIWAN (NCC), ANNUAL STATISTICAL REPORT (2007), *available at* http://www.ncc.gov.tw/chinese/news_detail.aspx?site_content_sn=955&is_history=0&pages=0&sn_f=5504 (last visited May 12, 2009).

[7] *Id.*

However, this rapid growth has been accompanied by the belief that exposure to radio waves – from mobile telephones and to base stations – may pose a health risk. As widespread as cell phone use is, nevertheless, resistance to building a cellular tower in close proximity to a residential neighborhood or public building is fierce. Dozens of petitions against the construction of cellular towers have been submitted to the National Communications Commission ("NCC") in recent years,[8] and at the municipal level a large number of requests for cellular tower construction are being contested.[9]

The conflict between telecommunications operators and those residents opposed to cellular towers in their neighborhood most often begins when a telecommunications company determines that it needs to build a tower in a new location. Specific petition issues have varied, but a common theme involves residents and town officials asserting that the towers cause health problems, raise environmental concerns, and decrease property values. These issues have become increasingly severe in the 2G and 3G age, and will likely continue to increase through the WiMAX age. WiMAX cells may be able to provide faster data connections to users than current 3G networks. The use of mobile phones and related technologies, therefore, will likely continue to increase for the foreseeable future. The advent of WiMAX will extend the use of most forms of communications technologies, including facsimile, e-mail, and internet access.[10] The planned WiMAX system requires a whole new network of base stations and so may pose even more health risks for nearby residents.

WiMAX technology creates a demand for a new type of mast, thereby increasing the already high tension level regarding possible health issues.[11] One cause of higher tensions is the environmental advocacy activities of groups opposed to WiMAX licensing. Dozens of environmental protection groups have petitioned the Executive Yuan in

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[8] Interview with Professor Kung-Chung Liu, the former Commissioner of NCC, on April 18, 2008, Taipei, Taiwan (conducted in Chinese). *See also* NCC, Petition Reports of 2008, *available at* http://www.ncc.gov.tw/chinese/petition.aspx?site_content_sn=375&is_history=0&pages=2 (last visited May 12, 2009).

[9] *Id.*

[10] WIMAX FORUM, FIXED, NOMADIC, PORTABLE AND MOBILE APPLICATIONS FOR 802.16-2004 AND 802.16E WIMAX NETWORK (2005), *available at* http://www.wimaxforum.org/node/931.

[11] As indicated earlier, as the number of people using mobile telephones grows, more base stations are needed to carry the traffic. New features, enabled by new technologies, such as internet access and multimedia services, require more and more information, or data, to be transmitted. The transmission of these large quantities of data increases the need for base stations.

recent months, requesting that the Taiwanese Government impose stricter regulations on electromagnetic waves ("EMW").[12] Chen Jiau-hua, chairperson of the Taiwan Environmental Protection Union ("Union"),[13] stated: "As there are an increasing number of cellphone towers, the electromagnetic waves are getting stronger in the environment. It is quite ridiculous that the government is now planning to establish more than 10,000 WiMAX towers before we have laws for EMW related issues."[14] The Union provided a list of people who they claim have died of cancers related to EMW pollution. The Union said that these people lived close to Chianan Church in Chiayi City, which has a large cellular telephone tower on its roof. The statistics provided by the Union showed that 12 residents died of cancer between 2004 and May 2008. Chen commented that, "there is insufficient evidence to prove that these residents died from the effects of electromagnetism, but no one can guarantee that their cancer had nothing to do with it either," and told reporters that she was protesting the NCC's issuance of WiMAX licenses because "WiMAX towers emit electromagnetic waves of 4,000 to 5,000 microwatts per square meter, which is dangerous to human health."[15]

In its petition, the Union made five requests[16]:

A. That the NCC not issue operating licenses for any WiMAX towers before the government can guarantee that their EMWs are harmless.
B. That existing cellular telephone towers decrease their strength to six volts per meter.
C. That the competent authority impose regulation such that persons aged 16 years or less may not use cellular telephones.
D. That the Taiwanese Government postpone the establishment of campus wireless Internet networks before the technology is proved to be harmless.
E. That the Taiwanese Government regulate wireless communications towers, including the relocation of cellular

[12] *Environmental Protection Groups Petitioned*, EPOCH TIMES, June 2, 2007 available at http://news.epochtimes.com.tw/7/6/2/56972.htm (last visited May 12, 2009). *See also* Angelica Oung, *Activists Say Tower Causes Blood Cancer*, TAIPEI TIMES, June 22, 2007, at 4, *available at* http://www.taipeitimes.com/News/taiwan/archives/2007/06/22/2003366306/ (last visited May 12, 2009).

[13] The Union is the leading advocacy organization regarding environmental protection in Taiwan.

[14] *Activists Ask for Tighter Controls on Phone Towers*, TAIPEI TIMES, June 2, 2007.

[15] *Id.*

[16] *Id.*

telephone towers, power stations and high-voltage power line towers away from campuses, residential areas and hospitals.

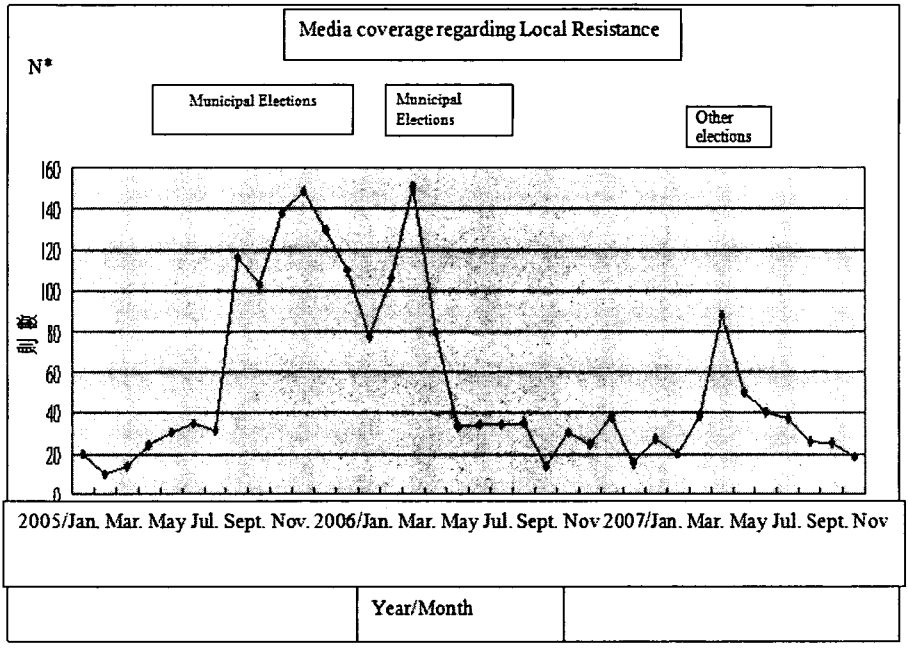
In addition to the requests for these major precautionary activities, strong concern about base stations is evidence among the broader society. Despite the lack of conclusive proof establishing a link between radio frequency (RF) emissions and adverse health effects, [17] negative information surrounding the health effects of RF emissions persists. As shown in Figure 2, media coverage of local resistance has been high, especially during municipal elections, and it is interesting to note the linkage between citizen resistance and local politics. The level of resistance peaked during November 2005 and May 2006. In most cases, the resistance group was led by candidates running for office. [18] As illustrated by Figure 2, local media reported most concerns about possible human health effects from exposure to RF from wireless towers during election periods. [19] It is therefore reasonable to argue that the debate regarding RF exposure may have been influenced by local politics. The ever present fear of cancer due to things unknown or not understood generates controversy and alarm.

[17] WIRELESS COMMUNICATIONS BUREAU, FEDERAL COMMUNICATIONS COMM'N, TOWER SITING FACT SHEET # 2 16-17, http://wireless.fcc.gov/siting/fact2.pdf.

[18] *See, e.g.*, Campaign position of Legislator Lu Chien-Chang, "Removing the Illegal Base Stations for You," *available at*, http://www.youcute.com.tw/ly10896a/index.aspx?page=12 (last visited May 12, 2009).

[19] Elections in November 2005, March 2006, and April 2007.

Figure 2



(Source: Author's revision based on analysis conducted by Taiwan Telecom Alliance)[20]

(*"N" refers to the volume of news reports regarding local resistance.)

B. Rights or Obligations? – The Need for "essential" Telecommunications Infrastructure

The fact that so many people own mobile phones attests to their importance to the general public, whether for convenience, emergency or commercial use. At the core of the issue is the choice between the need and demand for telecommunications services and public health concerns. In an information society, access to communications technology is the primary tool for enabling citizens to enhance their participation in economic, political, and social activities. Indeed, mechanisms promoting greater access to communications technology are being employed on an

[20] The author would like to thank the Taiwan Telecom Alliance for providing the analysis. Copy on file with the author.

international, regional, and national level.[21] It is self-evident that cell phones have many benefits. Critically, the benefit associated with using a cell phone during an emergency cannot be denied.[22]

From the perspective of a wireless telecommunications service operator, erecting a base station is not only a "right", but also an "obligation" under relevant laws. The case of 3G operators in Taiwan is illustrative here. An auction was held on March 3, 2002, in which several companies participated in bidding for five licenses to offer 3G services. In what was one of the most competitive 3G auctions in the world, the bidding sky-rocketed to 45 per cent over the floor price, and finally reached a high of about NT$49 billion.[23] The government raised a total of about US$1.4 billion and issued 5 licenses. On average, each license sold for nearly NT$10 billion.[24]

It is useful to consider the operator's perspective. The Taiwanese Government stipulates that every telecommunications company must obtain a license before it can provide cellular telecommunications services. In order to provide cellular services, telecommunications companies must install infrastructure throughout the service area. Approval from local authorities is required before base stations and similar infrastructure can be installed. Local authorities consider the views of local residents, including any advocacy groups, when determining whether to approve the installation of telecommunications infrastructure. As a consequence, some local authorities significantly restrict the companies' opportunities to install base stations.

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[21] Camille Rorer, Can You See Me Now? *The Struggle between Cellular Towers and NIMBY,* 19 J. NAT. RESOURCES & ENVTL. L. 213, 214 (2004).

[22] Cellular telephones have contributed to saving lives and will most likely continue to do so in the future. *See* Steven J. Eagle, *Wireless Telecommunications, Infrastructure Security, and the NIMBY Problem,* 54 CATH. U. L. REV. 445 (2005); Janet Askew, *Mobile Phone Masts: The Role of Planners in Resolving Conflict, Journal of Planning & Environment Law,* J.P.L. 2006, JUL, 929-938 (2006). However, events in recent years have also highlighted the shortcomings of mobile telephone networks in emergency situations involving mass casualties. *See, e.g.*, the Report of the 7 July Review Committee of the London Assembly (June 2006) at 128-129 especially, *available at* http://www.london.gov.uk/assembly/reports/7july/report.pdf (last visited May 12, 2009).

[23] William C. Pao, *3G Auction Finally Gets Results after Lengthy Bid,* THE CHINA POST, Feb. 7, 2002, *available at* http://www.chinapost.com.tw/business/asia/2002/02/07/22848/3G-auction.htm (last visited May 12, 2009).

[24] NATIONAL COMMUNICATIONS COMM'N OF TAIWAN (NCC), THE 3G AUCTION RESULT (2002), *available at* http://www.ncc.gov.tw/chinese/news_detail.aspx?site_content_sn=1596&is_history=0&pages=0&sn_f=9504 (last visited May 12, 2009).

At the same time, however, the wireless telecommunications industry is dependent upon its infrastructure to fulfill its service contracts with customers, which usually include a guarantee of service quality. As the popularity of wireless services grows and the range of services offered expands, more tower sites are needed to meet increased demand. Cellular service providers are in an invidious position: consumers demand services that require more towers, yet the installation of new towers is increasingly being opposed at the local level. One result has been litigation. Telecommunications companies are suing for the right to build cellular towers and at the same time being sued for having constructed unpopular towers, or for breaching contractual service obligations due to a lack of towers.

Taiwanese law requires cellular service providers to install certain infrastructure. For example, Table 1 shows that existing regulations impose strict timeframes regarding the number of towers that must be built to ensure that a certain percentage of the population within the area of operation receive cellular service coverage. From the perspective of the wireless telecommunications industry participants, local resistance against the siting of wireless towers not only imposes a cost on their businesses, but also impedes the fulfillment of their legal obligations.

Table 1: The "Obligation" of Telecommunications Operators to Construct a Base Station

Regulations Governing The Third Generation (3G) Mobile Telecommunications Service[25]	
Article 42	After having erected more than 250 Base Stations, and having completed the installation of the switching facilities and the connection of the telecommunication facilities, the winning bidder or the Operator shall apply to the DGT for a technical examination of the system. If the system passes the technical examination, a qualification certificate will be issued.
Article 74	The Operator shall ensure that, within three years from the

[25] Regulations Governing the Third Generation (3G) Mobile Telecommunications Service, arts. 33, 42, & 74 (2005), Faigui Huibian (Taiwan), *translated in*, http://www.ncc.gov.tw/english/news_detail.aspx?site_content_sn=66&is_history=0&pages=1&sn_f=96 (last visited May 12, 2009).

	day that a system build-out permit is obtained, the radio coverage of its Base Stations reaches 50% of the population within the operation area.
Regulations on Wireless Broadband Access Services	
Article 33	The performance bond remitted by the winning bidders shall be refunded in three stages according to the following regulations: 1. After successfully achieve the wireless wave coverage of base stations in which the population accounts for 10% of the total population in the service area, and acquiring a charter issued by the Commission by passing the Commission's acceptance inspection on the completed telecommunication facilities and wiring equipment installation, 10% of the performance bond may be refunded or the guarantor bank may partially relieve the performance responsibility equivalent to 10% of the performance bond. 2. After successfully achieving wireless wave coverage of the base stations for 40% of the county and city in the service area and 70% of the population in every county and city in the service area, and passing the Commission's acceptance inspection, then 30% of the performance bond may be refunded or the guarantor bank may partially relieve the performance responsibility equivalent to 30% of the performance bond. 3. Within five years after an establishment approval is issued, upon successfully achieving the wireless wave coverage of the base stations for 70% of the total population in the service area and half of the county and city in the service area, and passing the Commission's acceptance inspection for the acquisition of the system installation, the remaining amount of the performance bond may be refunded or the guarantor bank may relieve the performance responsibility equivalent to the remainder of the performance bond.

III. WIRELESS TECHNOLOGY AND HEALTH CONCERNS – COMMON APPROACHES AND THEIR PROBLEMS

A. Limitations on the Exposure Extent – Gaps in the Scientific Knowledge

The extensive use of mobile telephones has been accompanied by public debates about possible adverse effects on human health. The concerns are related to the emissions of RF from the telephones and from the base stations that receive and transmit the signals.[26] The public has become increasingly aware of the presence of EMFs in the environment, and this growing awareness is accompanied by concern that exposure to EMFs may have possible adverse health effects. A point of particular public concern is whether exposure to low-level EMFs might cause other non-established health effects, such as headaches, sleep disturbance, depression, and stress, in addition to long term health effects such as cancer.[27]

Mobile telephones and base stations transmit and receive signals using electromagnetic waves.[28] EMFs are abundant, especially in urban environments. They occur naturally, such as those from the earth's magnetic field which cause the needle of a compass to point north. EMFs are also emitted by a wide range of human-derived sources and are present wherever there is electricity.[29] Sources of anthropogenic EMFs include domestic wiring and appliances, visual display units, mobile telephones, electric trains, security systems, electric power lines, broadcasting transmitters, and telecommunications base stations.

It is obviously important that the public be protected if an adverse health effect exists. However, despite public concern about the safety of base stations, scant research has been published in the scientific literature that is specifically relevant to these emissions. There is, however, some literature available on human and animal studies relating to potential health effects caused by exposure to RF radiation from mobile telephone technology. The balance of the evidence to-date seems to suggest that exposure to RF radiation below NRPB (UK National Radiological Protection Board) guidelines does not cause adverse health effects to the

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[26] WORLD HEALTH ORGANIZATION, BASE STATIONS AND WIRELESS NETWORKS - FACT SHEET (May 2006), *available at* http://www.who.int/mediacentre/factsheets/fs304/en/index.html (last visited May 12, 2009).

[27] GOVERNMENT OF THE UNITED KINGDOM, DEPARTMENT OF COMMUNITIES AND LOCAL GOVERNMENT, PLANNING POLICY GUIDANCE8 TELECOMMUNICATIONS, at ¶ 87, *available at* http://www.communities.gov.uk/documents/planningandbuilding/pdf/ppg8.pdf (last visited May 12, 2009).

general population.[30] Scientific evidence now exists, however, which suggests that there may be biological effects occurring at exposures below these guideline levels.[31] Some official reports from other countries conclude that it is not possible at present to say that exposure to RF radiation, even at levels below national guidelines, are totally without potential adverse health effects.[32]

Given this uncertainty, governments all over the world have been implementing regulations to address these issues.[33] In Taiwan, the electromagnetic wave power density of the maximum exposure extent (MPE) is currently governed by various domestic regulations. As shown in Table 2, for the 2G mobile telephone system, the maximum power density of electromagnetic waves of 900MHz is 0.45 mW/cm2. The base station of a 3G system must have MPE of 0.4 mW/cm2 for the 800 MHz frequency range, or 0.1 mW/cm2 for the 2000 MHz frequency.

Table 2 : The electromagnetic wave power density of the MPE

Communications System		MPE	Regulations
WBA(WimAX) 2.5-2.69GHz		1.0 mW/cm^2	Regulations on Wireless Broadband Access Services (Promulgated on March 30, 2007, amended on January 12, 2009)[34]
3G	800MHz	0.40 mW/cm^2	Regulations Governing the Third Generation (3G)

[28] For the general population, the levels of exposure arising from telephones held near the head or other parts of the body are substantially greater than whole-body exposures arising from base stations.

[29] WORLD HEALTH ORGANIZATION, *supra* note 24.

[30] *Id.*

[31] *Id.*

[32] *Id.*

[33] *See generally* Peter A. Valberg et al., *Workgroup Report: Base Stations and Wireless Networks—Radiofrequency (RF) Exposures and Health Consequences*, 115 ENVTL. HEALTH PERSPECTIVES 416, 420 (2007).

[34] Regulations on Wireless Broadband Access Services, art. 5.2.2 (2008), Faigui Huibian (Taiwan), *translated in* http://www.ncc.gov.tw/english/news_detail.aspx?site_content_sn=66&is_history=0&pages=0&sn_f=423 (last visited May 12, 2009).

	2000MHz	1.0 mW/cm^2	Mobile Telecommunications Service (Promulgated on October 15, 2001, amended on August 13, 2008)[35]
2G	900MHz	0.45 mW/cm^2	Regulations Governing Mobile Communication Business (Promulgated on April 29, 1996, amended on July 20, 2007)[36]
	1800MHz	0.90 mW/cm^2	
PHS 1900MHz		0.95 mW/cm^2	Administrative Regulations governing 1900MHz Digital Low-Tier Cordless Telephony Business (Promulgated on July 7, 1999, amended on July 18, 2008)[37]

Although the official reports of the World Health Organization ("WHO") consistently emphasize that the overall conclusion is that exposure from transmitters is unlikely to be a health risk, the public fears remain.[38] Protest groups, I believe, will continue to cite global research suggesting adverse impacts from electro-magnetic field radiation, and governments will reiterate the view that the balance of evidence to date does not offer any concrete proof that there are adverse health effects. The pattern will go on.

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[35] Regulations Governing the Third Generation (3G) Mobile Telecommunications Service, art. 54 (2005), Faigui Huibian (Taiwan), *translated in* http://www.ncc.gov.tw/english/news_detail.aspx?site_content_sn=66&is_history=0&pages=1&sn_f=96 (last visited May 12, 2009).

[36] Regulations Governing Mobile Communication Business, art. 56 (2005), Faigui Huibian (Taiwan), *translated in* http://www.ncc.gov.tw/english/news_detail.aspx?site_content_sn=66&is_history=0&pages=0&sn_f=146 (last visited May 12, 2009).

[37] Administrative Regulations governing 1900MHz Digital Low-Tier Cordless Telephony Business, art. 5.2 (2005), Faigui Huibian (Taiwan), *translated in* http://www.ncc.gov.tw/english/news_detail.aspx?site_content_sn=66&is_history=0&pages=1&sn_f=111 (last visited May 12, 2009).

[38] WORLD HEALTH ORGANIZATION, *supra* note 24.

B. *Limitations on the Total Number — Controversies of Site-Sharing*

One strategy to limit EMFs is to minimize the number of base stations. The number of new base stations is minimized when multiple operators share existing sites.

The sharing of structures by several wireless service providers is typically referred to as "colocation." The U.S. Federal Communications Commission ("FCC"), for example, encourages colocation of antenna structures to the extent that it is technologically feasible, and recommends that local zoning authorities assist the parties in cooperative efforts to chart the potential overlap of desirable locations, in order to minimize the number of antenna structures to be sited.[39] As another example, the NCC in Taiwan imposes obligations of colocation. Article 63 of the Regulations Governing the Third Generation (3G) Mobile Telecommunications Service stipulates that:

> [T]he operator shall ensure that, within one year from the day a concession license is obtained, its base stations which are co-built or co-located with the base stations of other operators constitute at least 10 percent of the total number of base station already built, among which, at least 5% shall be the co-built base stations; and that within two years from the day when the concession license is obtained, the co-built and co-located Base Stations constitute at least 20% of the total number of base stations already built, among which, at least 10% shall be co-built base stations.

From a technological perspective, the fewest number of towers equals the least cost for the operators. Because of the high cost of constructing a site, wireless operators have a financial interest in building as few towers as possible. However, colocation should not be viewed as a complete solution to all concerns associated with the siting of wireless towers. First, different tower structures have different structural tolerances. According to my interview with one WiMAX operator,[40] it remains uncertain as to whether it is technologically possible for WiMAX

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[39] WIRELESS COMMUNICATIONS BUREAU, FEDERAL COMMUNICATIONS COMM'N, TOWER, *Towers and Facilities: Pre-Construction Review,* http://wireless.fcc.gov/siting/preconstruction.html (last visited May 12, 2009).

[40] Interview with Mr. Wu Chin-Wan, Chairman of the Public Telecommunications Co., on June 13, 2008, Taipei (interview conducted in Chinese).

operators to co-construct stations or share base stations with 2G/3G operators. In general, there are other technical issues that the service provider must consider, including the impact of interference and compliance with the RF emissions criteria. In addition, because colocation groups need to attach many pieces of equipment onto a single structure, colocation may result in even larger and much more unsightly structures than multiple, discrete installations of smaller individual antennas and transmitters. As a result, colocation could possibly increase the public's fears of radiation and expand aesthetic concerns.

IV. REGULATING THE BASE STATIONS — PROCEDURAL ASPECTS

A. Pre-establishment Stage — Public Participation

At the core of the issue is whether or not public concern is a material consideration to be taken into account by decision-makers. As shown in Figure 3 below, the lack of proper mechanisms for neighbors and communities in Taiwan to participate in the pre-established procedure for constructing a tower is surprising. In a normal application case for the construction of a base station in Taiwan, the first step for a wireless operator is to seek a building roof on which the base station can be located. Once an operator has secured a location for erecting its tower, the operator needs to apply for a preliminary permit from the NCC and then must submit the relevant documents to the local authority for a construction permit. The approval for operation from the NCC is the final stage for a base station to start running. Through the whole process, the regulatory framework does not safeguard the right of the next-door neighbors of the leased building to know what is happening, and neither does the law grant the neighbors any chance to express their concerns.

The U.S. procedural rules on this issue provide a valuable comparison.[41] At the federal level, public consultation must be conducted before the FCC grants approval. Similarly, hearings for local residents must be carried out by the county authority during its review process so as to ensure that the opinions of the community are heard.[42]

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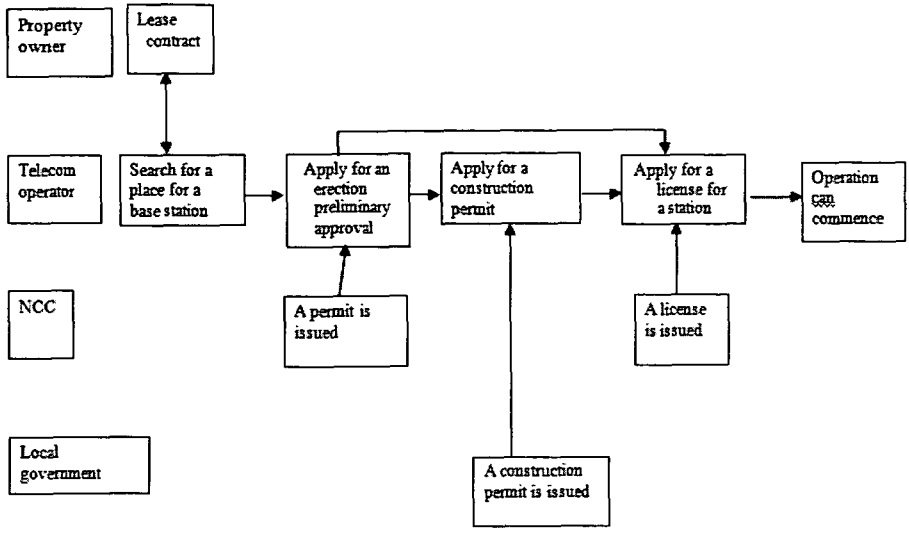
[41] AT&T Wireless PCS, Inc. v. City Council of Virginia Beach, 155 F.3d 423 (4th Cir. 1998). Illinois RSA No. 3, Inc. v. County of Peoria, 963 F.Supp. 732 (C.D. Ill. 1997). Sprint Spectrum L.P. v. Bd. of Zoning Appeals of Town of Brookhaven, 244 F.Supp.2d 108 (E.D.N.Y. 2003).

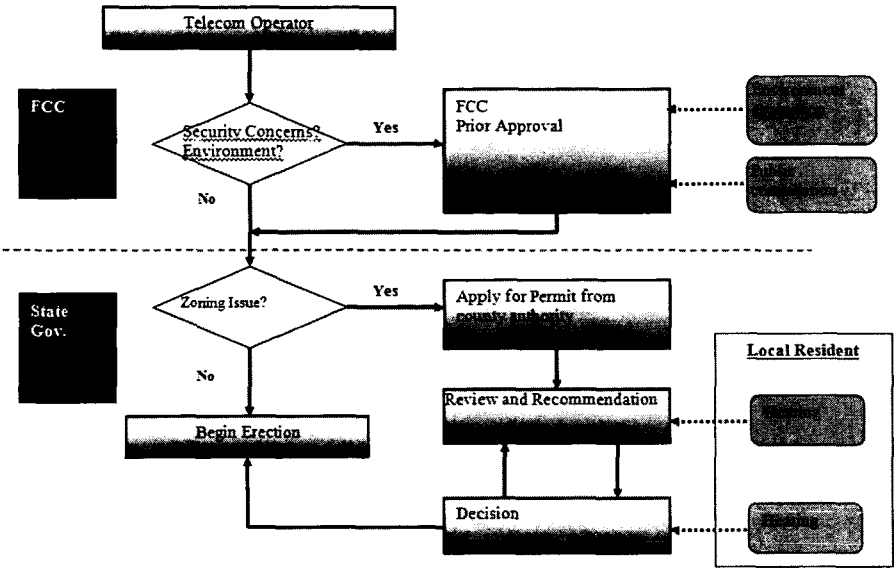
[42] *Id.* Section 332(c)(7) of the Communications Act preserves state and local authority over zoning and land use decisions for personal wireless service facilities.

Figure 3: Procedures for Erecting Base Stations in Taiwan (Source: Author's analysis and composition)[43]



[43] The analysis and composition are based on Articles 14, 32, & 33 of the Telecommunications Act, 1958, §§ 14, 32 & 33, *available at* http://www.ncc.gov.tw/english/news_detail.aspx?site_content_sn=17&is_history=0&pages=0&sn_f=364 (last visited May 12, 2009). Faigui Huibian arts. 32-33, *translated in* Telecommunications Act, http://www.ncc.gov.tw/english/news_detail.aspx?site_content_sn=17&is_history=0&pages=0&sn_f=364 (last visited May 12, 2009).

Figure 4: Procedures for Erecting Base Stations in the U.S.



(Source: Author's analysis and composition)[44]

The principal question here is to what degree should community activists be allowed to participate in the decision-making process? In particular, how can local residents inject their concerns about health issues? What should be required of a health impact assessment? Should the authority hold public hearings in the community, forcing the decision-makers to visit these locations and hear the citizens' concerns? As shown in Figure 4 above, under the U.S. legal framework, community members and local (county) groups generally have the opportunity to participate in written and sometimes oral hearings during the process of granting base station construction permits.[45] More consideration should be given to the question of how Taiwanese government decision-makers can benefit from the information the community provides, and how the public can be given the opportunity to influence decisions relevant to their communities.

[44] *See generally* Wireless Communications Bureau, *supra* note 35.
[45] *Id.*

B. Transparency — Information on the Base Station

Given the gap between the public and the scientific community with respect to scientific knowledge on the subject of possible health impacts of base stations, further study is required before any new regulatory approach is imposed. In my view, countries around the world are coming to recognize that there is a need for greater transparency in the licensing procedures. In this regard, the United Kingdom's ("UK") Sitefinder experience is of practical significance and can serve as a good reference.

The Sitefinder mechanism in the UK was developed in co-operation with mobile network operators who provided information on a voluntary basis.[46] It consists of a database that provides the technical details of all cellular telephone base stations in UK. It is enquiry driven and allows the user to see details about these base stations on a local area map.[47]

The data within Sitefinder is owned by the mobile network operators, who supplied it on a voluntary basis. One interesting case is the battle between the UK Information Commission and the Office of Communications ("Ofcom"). On January 11, 2005, Mr. Henton, the Information Manager for Health Protection Scotland, requested data about each cellular telephone base station held within the Sitefinder database together with the national grid references for each site. Ofcom initially refused the request, citing regulation 6(1)(b) of the Environmental Information Regulations, 2004 which refers to information already publicly available.[48] At the internal review stage, Ofcom decided that in fact the complete database that had been requested was not available in the public domain. So, it refused to provide the complete database based on the U.K. National Security and Public Safety exception[49] and the Intellectual Property Rights exception.[50] On January

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[46] Office of Communications, Frequently Asked Questions, Is Sitefinder compulsory? http://www.ofcom.org.uk/sitefinder/faq/ (last visited Oct. 15, 2008).

[47] Office of Communications, Sitefinder: Mobile Phone Base Station Database. http://www.sitefinder.ofcom.org.uk/ (last visited Oct.15, 2008).

[48] Ofcom stated that it considered that the request was for information falling within the meaning of "environmental information" and that it therefore had to be considered under the Environmental Information Regulations 2004 (EIR). It relied on reg. 6(1)(b) of EIR (information already publicly available). Ofcom asserted that as all the information could easily be accessed from the Sitefinder website there was no requirement to provide it in another form or format.

[49] Environmental Information Regulations, 2004, 12(5)(a) (U.K.).

[50] Environmental Information Regulations, 2004, 12(5)(c) (U.K.).

27, 2005, Ofcom replied to Mr. Henton with a refusal to provide the requested information.[51]

In September 2006, the U.K. Information Commissioner served Ofcom with a Decision Notice under the Environmental Information Regulations, ordering Ofcom to provide all data on mobile telephone base stations held within its Sitefinder database. The Information Commissioner found that Ofcom had not presented sufficient evidence to suggest that there was a particular risk to the security of base stations, particularly in light of the information that is already available in the public domain.[52] The Commissioner also determined that, although database rights and copyright exist, these should not prevent Ofcom from disclosing the requested information. The Commissioner did not consider that disclosure would adversely affect national security, public safety or intellectual property rights. The Commissioner found that the Environmental Information Regulations did not justify Ofcom's refusal to provide the information.

On October 10, 2006, Ofcom appealed to the Information Tribunal.[53] The Tribunal decided that the Information Commissioner was correct in ordering the release of the Sitefinder database to Mr. Henton although it reached that decision on grounds somewhat different to those set out in the Decision Notice. The Tribunal stressed that the overall network architecture of each telecom operator's system has already entered the public domain and has thereby lost the necessary quality of confidence.

The Sitefinder database improves the community's right-to-know procedures, thereby creating greater public understanding and awareness, as well as transparency of agency processes and accountability. This case suggests that better coordination among government, industry, and the public can be effective in preventing future disputes. As stressed earlier, the Sitefinder database can serve as a good reference for other countries to introduce a right-to-know mechanism so as to ensure greater transparency and public participation in the governance of base stations. The primary effect of increased public access is wider awareness of public issues. Overall, transparency enhances democracy by increasing citizens' access to information, thus enabling greater participation. It also raises the accountability of and confidence in public authority, which arguably will reduce the likelihood of disputes with public authorities.

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[51] Decision Notice, the Office of Communications (11 Sept 2006).

[52] *Id.*

[53] Office of Communications v. Information Commissioner [2007] UKIT EA_2006_0078.

C. *Dispute Resolution — The "Standing" Issue*

Another difficult issue is the standing of a party seeking a remedy. If the action of the authority (i.e., the NCC in Taiwan) is inconsistent with relevant laws, then a party "adversely affected" by the action will be entitled to appeal the decision.

On this particular matter, the NCC has cited the "Interpretation of Council of Grand Justices No 469,"[54] in which the Council of Grand Justices[55] expressed its opinion on the standing issue[56]:

> where harm is caused to the liberty or rights of an identifiable person as a result of an intentional or negligent failure to discharge official duties or a refusal to discharge duties where so obligated, then the victim can claim compensatory damages from the state. The determination of the purpose of protection under the aforesaid legal provision depends on each individual case. If the law clearly stipulates that the identified person shall enjoy certain rights or if it grants the identifiable person who satisfies the legal requirements the right of request of certain action vis-à-vis the administrative body or government authorities, undoubtedly the purpose of the regulation whereof lies in protecting the interests of the individual. However, although the laws are enacted for the public welfare or the benefits to the general public [sic], and judging from the overall structure of the law, the applicable party, the intended regulatory effects and factors of social developments, the laws also intend to

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[54] National Communications Comm'n, Petition Decision # 09600040964, Petition Decision # 09600298740, Petition Decision # 09600014400, Petition Decision # 09600045330, *available at* http://www.ncc.gov.tw/chinese/petition_detail.aspx?site_content_sn=375&is_history=0&pages=1&sn_f=5218 (last visited May 12, 2009).

[55] The power of the Justices in Taiwan consists of providing rulings on the following four categories of cases: (1) Interpretation of the Constitution; (2) Uniform Interpretation of Statutes and Regulations; and (3) Impeachment of President and Vice President of the Republic of China, and (4) Declaring the dissolution of political parties in violation of the Constitution.

[56] Interpretation No. 469, 1998 Shizi Reporter 25 (Constitutional Court, Nov. 20, 1998) (Taiwan), *available at* http://www.judicial.gov.tw/constitutionalcourt/en/p03_01.asp?expno=469 (last visited May 12, 2009).

> protect the identified persons, then the person who claims that his/her interests have been harmed as a result of the public servant's failure to discharge his/her duties shall have a recourse in law.

Article 62 of the Regulations Governing the Third Generation (3G) Mobile Telecommunications Service stipulates that:

> if a Base Station is to be erected on the roof of a building, it shall be assured that with respect to the height and bearings of the antenna, there is no legal building higher than the antenna within a range of 15m measured horizontally and directly in front the antenna.

Similarly, Article 24 of the Regulations Governing Mobile Communication Business also provides that, for the antenna of a Base Station that is constructed separate from any building, the height and the direction of the antenna must be such that there is no legal building higher than the antenna within a range of 15m measured horizontally and directly in front the antenna.[57] Based on the Interpretation of Council of Grand Justices No. 469, the NCC stated that only residents who live in a building within 15m in the horizontal plane and directly in from the antenna can claim these rights.[58]

This extremely limited standing constitutes a procedural barrier for local activists (e.g., the head of a village) or any other civic minded person to pursue the interests of the community. The NCC must balance the various considerations when determining the scope of the standing that best serves the interests of the public and the operators. Policy

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[57] Article 24 of the Regulations Governing Mobile Communication Business (2006): "For antenna of Base Station that is established the outdoors of building, the height and direction of antenna to establish shall ensure that there don't exist legal buildings higher than antenna within a horizontal direction of right in front of 15m. For the RF power of antenna input for base station that is greater than two watts, antenna that establishes to cover radio wave outdoors shall not be established in buildings."

[58] Cf., 47 U.S.C. §332(c)(7)(B)(v) (2006):

> Any person adversely affected by any final action or failure to act by a State or local government or any instrumentality thereof that is inconsistent with this subparagraph may, within 30 days after such action or failure to act, commence an action in any court of competent jurisdiction. The court shall hear and decide such action on an expedited basis. Any person adversely affected by an act or failure to act by a State or local government or any instrumentality thereof that is inconsistent with clause (iv) may petition the Commission for relief.

debates should be encouraged to allow for a more expansive scope of standing to bringing a claim on (erecting or removing) base stations.

V. CONCLUDING REMARKS

This article focuses on the telecommunications industry's struggle to meet consumer demand by siting its towers where needed, while simultaneously addressing the issues voiced by local communities. The wireless telecommunications operators are dependent upon their infrastructure to offer competitive services to their customers. As the popularity of mobile services grows, more antenna sites are needed to meet the increased demand. However, not all communities welcome the presence of more wireless towers. The gaps in the scientific literature suggest a need for further study to be conducted. There is interest in this topic in the UK, the US, Taiwan and around the world. Although official reports consistently emphasize that the overall conclusion is that exposure from transmitters is unlikely to be a health risk, public fears remain.[59] Protest groups will continue to cite global research which suggests an adverse impact from electro-magnetic field radiation, and governments will continue to reiterate the view that the balance of evidence to date does not establish that there are adverse health effects. This pattern will continue until there is definitive proof on the issue, one way or another.

In this existing context of incomplete scientific information, this paper stressed concerns regarding the lack of a proper mechanism for affected neighbors and communities to participate in the procedure for the approval of cellular telephone towers. At the core of this issue is whether or not public concern is a material consideration that must be taken into account by the decision-makers. And if the answer is yes, then the next question is to what degree should the concerned citizens be allowed to participate in the decision-making process? There are many subsidiary questions: How can local residents inject health issues into the process? What is required of a health impact assessment? Should activists demand that authorities hold public hearings in the affected community and force the decision-makers to visit these locations and hear local residents' concerns? In some jurisdictions, community members and local (county) groups generally have the opportunity to participate in written and sometimes oral hearings during the process of granting a base station permit. More considerations must be given to the questions of how government decision-makers can benefit from the information provided

[59] WORLD HEALTH ORGANIZATION, *supra* note 24.

by the community, and how the public can have an opportunity to influence the decision making process. More effort ought to be invested in changing the decision-making process so that it involves and promotes meaningful public participation.

Procedural rules are a good starting point. Given the gaps in scientific knowledge on the subject, further study of these issues is required before different approaches can be imposed for regulating base stations. However, there is recognition of the need for greater transparency. In this context, the UK experience of the Sitefinder database improved community-right-to-know procedures that create greater public understanding and awareness, as well as accountability and transparency of the agency process. In light of this, it should be noted that better coordination among government, industry and community can be effective for preventing future disputes.

At the same time, also significant is the question of how to empower citizens to file complaints in which they claim to be adversely affected by the actions of the NCC. The extremely limited standing available constitutes a procedural barrier facing local activists (e.g., the head of a village) or any other civic minded person to pursue the interests of the community. The NCC must balance these various considerations when determining the scope of standing that best serves the interests of the public and the operators. Policy debates should be encouraged to allow for a more expansive scope of standing to bring a claim on (erecting or removing) base stations.

Obviously, the controversy over the construction of cellular towers is a challenging task for governments across the globe. When tackling these issues, it should be remembered that technology should not only be used to make one's life easier, but also to make the world a better place to live. Having said that, promoting access to communications technology is a primary policy tool that enables citizens to participate in economic, political, and social activities. There are many benefits associated with having a cellular telephone and the wireless telecommunications industry is dependent upon its infrastructure to offer competitive services to its customers.

This article therefore explores the wireless industry's struggle to meet consumer demand by siting its towers where needed while simultaneously addressing the issues voiced by local residents. After reviewing relevant regulations, I conclude that the controversies and uncertainties of the siting of wireless towers are not only a high cost to the operators, but also inhibit them fulfilling their legal obligations. From an operator's perspective, erecting a base station is not only a right, but also an obligation under relevant laws. Operators of wireless

communications networks face a battle that will difficult to win alone. While more research needs to be done on how to balance the requirements of technology and the protection of public health, the Government of Taiwan should actively contribute to the development of the internal market by removing obstacles to the provision of wireless communications services.