

# **High Speed Rail Transit: Developing the Case for Alternative Transportation Schemes in the Context of Innovative and Sustainable Global Transportation Law and Policy**

KAMAAL R. ZAIDI\*

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#### I. INTRODUCTION

Due to a rapidly growing world population and the pressure being placed upon the transportation sector in both urban and rural communities, there are several nations adopting alternative public transportation policies to better serve their citizens. Transportation planners around the world are considering serious public policy changes related to existing mass transportation. Whether for short or long distance travel, existing transportation sectors are in desperate need of upgrades, producing more traffic congestion, and contributing to increased pollution. Therefore, the pursuit of alternative transportation has come in the form of high-speed rail transit. This form of transport is not new to the transportation sector, but it has been met with opposition, primarily because of concerns over cost and the impact upon existing transportation sectors.

This Comment illustrates how the application of high-speed rail transit would serve as a meaningful form of alternative transportation. The author argues that despite the challenges in adopting high-speed trains within existing transportation schemes, the political will and growing public-private partnerships within several nations are spurring high-speed rail service to better serve commuters. This trend includes a healthy dose of environmental issues as a means to reduce our overall dependence on conventional transport such as trains, automobiles, airplanes, and buses, as well as to protect communities affected by newly-constructed rail lines.

Part II and Part III describe the technological fixation with transportation sectors and the history and technology of high-speed rail transit, respectively. Part IV elaborates on the economics behind the high-speed rail system, and how feasibility studies and public-private partnerships form an important part of high-speed train development. Part V illustrates the environmental impact of high-speed trains upon society, and how such technology is actually beneficial to transportation policy. Finally, Part VI outlines the ambitions of selected nations in applying the latest high-speed rail transit projects. Particular attention is paid to the United States to show

how trends in legislative enactments and environmental protection are favoring the need for high-speed passenger trains in a newly emerging alternative transportation market.

## II. CURRENT FIXATION ON TRANSPORTATION SCHEMES

### i. Current Transportation Challenges and Issues

Modern society is gripped with many transportation challenges in the form of traffic congestion, long delays for commuters between destinations, and increasing pollution. Existing transportation schemes pose many problems for alternative transportation plans. First, network grids (such as railroad tracks) built long ago still remain a part of the transportation corridors. Second, conventional rail lines still carry box cars that travel painfully slow, often contributing to long delays in traffic and accidents at major railway crossings. Thus, transportation planners encounter problems when seeking to integrate more refined rail networks onto pre-existing rail lines or finding space to construct such schemes. For high-speed trains designated to operate on existing railway lines, there is the additional challenge of dealing with slower freight traffic.

The fixation with existing railway network grids has forced transportation authorities to conduct feasibility studies for high-speed travel, which include an extensive review of construction and operating costs, rates of traffic congestion, the impact of tourism and integrated markets, and environmental impact assessments. Feasibility studies typically include a description of current corridor conditions, track characteristics, preliminary passenger analysis, and policy recommendations as to whether or not high-speed rail transit would be practical. But the emergence of new technology companies, and the added input from an innovative private sector, has bolstered support for research and development of high-speed rail transit.

Legal issues such as environmental protection and land use form an integral part of the discussion on high-speed rail transit. For instance, the construction of new tracks for high-speed travel can impact various communities in some fashion. This begs the question of whether the high-speed rail line should use existing railroad tracks, or travel upon newly constructed tracks designed for very high speed locomotives. Additionally, land use issues are relevant considerations when high-speed passenger stations are built. Those involved with constructing these high-speed lines should consider whether the construction and maintenance of high-speed lines would provide minimal disruption to surrounding communities, both in urban and rural areas, as well as upon local ecosystems.

With these challenges in mind, transportation planners are showing a keen interest in high speed rail transit as an effective alternative to existing transportation schemes. Key factors that are contributing to this process include: (1) market analysis through feasibility studies; (2) public-private partnerships; (3) increased recognition by transportation planners that existing transportation sectors are overextended; and (4) changing political attitudes that reflect in alternative transportation legislation.<sup>1</sup>

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\* BSc from the University of Calgary (June 1997) and J.D. from the University of Tulsa (May 2004). Starting an LLM in Natural Resources, Energy, Environmental Law in January 2008 at University of

### III. THE HISTORY AND TECHNOLOGY BEHIND HIGH SPEED TRAINS

High-speed rail transit was first established to link major cities in order to reduce travel times for commuters. In 1964, the first genuine high-speed rail service began in Japan when the *Shinkansen* train was introduced to link Tokyo and Osaka.<sup>2</sup> The 1960's also saw France develop major innovations in high-speed train technology, and in 1981, France introduced the *Train À Grande Vitesse* (TGV) as a service between Paris and Lyon.<sup>3</sup> Spurred by the success of the Japanese and French high-speed train systems as efficient modes of transportation, current high-speed rail projects are incorporating elements of more environmentally-sensitive considerations.

#### i. The Technological Design, Structure, and Maintenance of High-Speed Trains and Tracks

Typically, the average high speed train travels at speeds of up to 250 km/h and 300 km/h (150 mph and 185 mph, respectively).<sup>4</sup> High speed trains generally refer to passenger trains traveling between 200 and 300 kilometers per hour.<sup>5</sup> The technology behind high speed rail transit systems runs on specially supported train tracks. High-speed rail systems often require an existing railroad track, or may use separate, uniquely-designed tracks known as 'dedicated' tracks.<sup>6</sup> Due to economic considerations, most high-speed trains in the world use both existing railroad tracks and newly constructed tracks limited to high-speed travel.

But the use of these tracks requires formidable maintenance, as well as designing trains with specific technologies to travel on such tracks.<sup>7</sup> That is, specially manufactured high-speed trains must travel upon tracks designed with certain materials that can withstand the load-bearing weight and speed of the train which can

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Calgary. Mr. Zaidi is currently practicing immigration law in Calgary, Alberta at Millrise Law Office. Mr. Zaidi would like to thank Professors Janet Levit and Tamara Piety for providing him with the inspiration for pursuing legal research and writing.

<sup>1</sup> See, e.g., History of High Speed Rail in Florida, <http://www.floridabullettrain.com/content/history.htm> (last visited Mar. 19, 2007).

<sup>2</sup> Lisa London, *A History of Bullet Trains in a Global Economy: Bullet Trains are an Unknown in America*, Sept. 1, 2006, [http://www.associatedcontent.com/article/55766/a\\_history\\_bullet\\_trains\\_in\\_a\\_global.html](http://www.associatedcontent.com/article/55766/a_history_bullet_trains_in_a_global.html) [hereinafter *Bullet Trains in a Global Economy*]. The Shinkansen was so successful that Japan introduced another bullet train service between Osaka and Okayama in 1972. *Id.*

<sup>3</sup> *Id.* France has been a leader in developing efficient train technology, and has been a strong proponent of economic integration, enough to connect major French cities with the surrounding European neighbors, including Belgium, United Kingdom, Germany, Switzerland, Spain, and the Netherlands. *Id.*

<sup>4</sup> Cynthia Graber, *High-Speed Railways in Spain*, TECHNOLOGY REVIEW, Nov. 7, 2006, at S2, available at [http://www.technologyreview.com/microsites/spain/train/docs/TR\\_Spain\\_train.pdf](http://www.technologyreview.com/microsites/spain/train/docs/TR_Spain_train.pdf). The world speeding record for a high speed train was recorded in Japan, with the JR-Maglev MLX01 model, which reached a speed of 581 km/h (361 mph). Overview of Maglev R&D (February 20, 2004), [http://www.rtri.or.jp/rd/maglev/html/english/maglev\\_frame\\_E.html](http://www.rtri.or.jp/rd/maglev/html/english/maglev_frame_E.html).

<sup>5</sup> Dr. Claude Comtois & Dr. Jean-Paul Rodrigue, High Speed Trains, <http://people.hofstra.edu/geotrans/eng/ch3en/appl3en/ch3a2en.html> (last visited Mar. 19, 2007).

<sup>6</sup> Richard M. Soberman, High Speed Trains for Canada: Technological Excellence, Groundless Conviction, or Bureaucratic Obsession?, in *Essays in Canadian Surface Transportation* (Filip Palda, ed., 1985), available at <http://oldfraser.lexi.net/publications/books/essays/chapter3.html>; see also Oliver Keating, Tilting Trains, <http://www.o-keating.com/hsr/tilt.htm> (last visited Mar. 19, 2007) (comparing the differences in speed, cost, congestion, and passenger comfort of high-speed rail systems that use existing track with those that use dedicated tracks).

<sup>7</sup> Soberman, *supra* note 6.

produce the normal wear and tear of any track.<sup>8</sup> Considering that high operational costs are associated with the building of railway tracks, the life of a railroad track is dependent upon the frequency of train travel.<sup>9</sup>

Due to the high speeds related to train travel, signaling installations at various train stations are constructed to allow high-speed trains to gradually reduce speed when approaching train stations, while technicians monitor other trains to reduce their speed as well.<sup>10</sup> As an integral component of safe high-speed travel, ‘bogies’ are structures that are placed underneath the rail car, and serve to: (1) support the train’s body weight; (2) ensure stability when trains run on straight and curved tracks; and (3) absorb vibrations generated by the track and reduce the effect of centrifugal forces that pull on persons when the train negotiates a curve at high speeds.<sup>11</sup> As such, modern high-speed train companies coordinate with local authorities who operate railway tracks by designing the most efficient and long-lasting methods for high-speed train travel.

Together with the maintenance of existing tracks and the special design of new tracks, another essential component of high speed transit is power generation through various stations, or ‘maintenance depots’.<sup>12</sup> Power generation is crucial to the operation and maintenance of high-speed trains. Normally, a high-speed train unit is fitted with electrical monitoring units that link with a mother power station located elsewhere along the track.<sup>13</sup> These technical features are important in the event a high-speed train unit travels beyond its maximum speed.<sup>14</sup> The electrical monitoring units would detect this problem by automatically applying the braking system for the entire train.<sup>15</sup>

## ii. Types of High-Speed Trains

There are two main types of modern high-speed trains: (1) Maglev trains, and (2) Tilting trains, or Talgo trains.<sup>16</sup> These trains form several prototype high-speed

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<sup>8</sup> *Id.*

<sup>9</sup> *Id.*

<sup>10</sup> Graber, *supra* note 4, at S6-S7. Typically, high-speed trains require at least 8 kilometers to brake before entering a train station, and 12 kilometers to brake comfortably without disturbing onboard passengers. *Id.* at S6. This signaling system proves particularly challenging when existing traffic lights are encountered along the railroad line. *Id.* To address this issue, in the early 1990’s, the European Union adopted a standardized system known as ERTMS. *Id.* at S7. This system operates by trains coordinating information that is sent and received to and from signal control systems when the trains cross various nations. *Id.* This is significant in that nations apply their own signaling standards for transportation locomotives. *Id.* The ERTMS system effectively allows moving trains between the member states of the European Union to travel without operators worrying about possible collisions with other trains along the same route. *Id.* at 6. The most common form of ERTMS comprises a system of devices which collects information from all the tracks, such as the locations of trains, and inputs the information into a central database. *Id.* at 7. This information is then relayed back to the train operators through ‘balises’ (pieces of equipment along the track). *Id.* This system thus allows trains to travel at very high speeds (between 250 to 300 km/h). *Id.*

<sup>11</sup> Isao Okamoto, *How Bogies Work*, 18 JAPAN RAILWAY & TRANSPORT REV. 52, 52 (1998), available at [http://www.jrtr.net/jrtr18/pdf/f52\\_technology.pdf](http://www.jrtr.net/jrtr18/pdf/f52_technology.pdf).

<sup>12</sup> Railway-Technology.com, TGV France High-Speed Rail Network, <http://www.railway-technology.com/projects/frenchtgv/> (last visited Mar. 17, 2007).

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

<sup>16</sup> Austl. Acad. of Sci., Nova: Science in the News, Looking Down the Track at Very Fast Trains

designs that have been built and tested over time. Various countries use any of these types of trains depending on the system preferred by their local transportation planners, or the feasibility of contracting between public and private entities involved in high-speed rail transit. A brief discussion of the two types of high-speed trains would help in providing the technological background of high-speed trains.

### *Maglev Trains*

The first type of high-speed train is known as the magnetic levitation train (or Maglev train).<sup>17</sup> The Maglev train does not physically touch the rail track, but moves between two electro-magnetic fields, thereby producing forward motion.<sup>18</sup> There are electromagnets attached to the moving railcar, but they are positioned facing the underside of the guideway's steel rails.<sup>19</sup> Maglev trains do not have engines, and the railcar is interlocked with the guideway so there is no risk of derailment.<sup>20</sup> This physical configuration also allows the railcar to accelerate and decelerate at ease, move at steep inclines and tight curves, and to produce very little wear and tear on the track itself (in contrast to conventional train wheels).<sup>21</sup> Rather, magnetic fields created by the electrified coils in the guideway walls and the track come together to propel the train.<sup>22</sup>

The guideway is a magnetized coil running along the track that repels the large magnets on the train's undercarriage, thereby allowing the train to levitate above the guideway.<sup>23</sup> Once the train is levitated, power is supplied to the coils within the guideway walls and this creates a magnetic field that pulls and pushes the train along the guideway.<sup>24</sup> As a result of this levitation and the friction-reducing, aerodynamic design of the train, Maglev trains essentially float on a cushion of air at very high speeds.<sup>25</sup>

The Maglev train has been the central focus of technological research and application on modern high-speed rail transit systems for many years. Maglev technology has received the most attention, particularly in North America, as a result of its ability to greatly reduce its environmental impact on surrounding

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(1998), <http://www.science.org.au/nova/025/025print.htm>.

<sup>17</sup> Kevin Bonsor, *How Maglev Trains Work*, <http://science.howstuffworks.com/maglev-train.htm> (last visited Mar. 19, 2007).

<sup>18</sup> London, *supra* note 2; see Bonsor, *supra* note 17 (identifying electromagnetic propulsion as the basic principle that produces movement for an object traveling between two poles).

<sup>19</sup> Munenobu Murai & Masao Tanaka, *Normal-conducting HSST Maglev*, 25 JAPAN RAILWAY & TRANSPORT REV. 61, 62 (2000), available at [http://www.jrtr.net/jrtr25/pdf/t58\\_tec1.pdf](http://www.jrtr.net/jrtr25/pdf/t58_tec1.pdf).

<sup>20</sup> *Id.*

<sup>21</sup> *Id.* at 63.

<sup>22</sup> Bonsor, *supra* note 17.

<sup>23</sup> *Id.*

<sup>24</sup> *Id.* The electrical current supplied to the coils in the guideway walls receive a constantly alternating electrical current which changes the coils' polarity. *Id.* The polarity change forces the magnetic field in front of the train to drag the train forward, while the magnetic field in the train's rear produces a forward motion thrust. *Id.*

<sup>25</sup> *Id.* Germany and Japan have been pioneers of Maglev technology and trains. *Id.* German engineers have produced an electrodynamic suspension (EMS) system, known as Transrapid. *Id.* Here, the train's bottom wraps itself around a steel guideway. *Id.* Electromagnets attached to the bottom of the train undercarriage are pointed up towards the guideway and train remains levitated about 1 centimeter, even when stationary. *Id.*

communities.<sup>26</sup> Some nations utilizing Maglev technology include Germany and Japan.<sup>27</sup> Japan has developed the High Speed Surface Transport (HSST), while Germany has developed the Transrapid system.<sup>28</sup> Most recently, Japan has been promoting a newer version of the Maglev known as the superconducting Maglev technology.<sup>29</sup> This technology is aimed at producing faster trains with the convenience of greater comfort and functional efficiency.<sup>30</sup>

#### *Tilting Trains (Talgo)*

The tilting train is a second type of high-speed train.<sup>31</sup> Tilting trains are those that travel at high speeds around curving railway tracks, particularly on existing railroad tracks.<sup>32</sup> The centrifugal force which is produced on tilting trains creates a sudden shift in a passenger's body weight within the train towards the outside curve that the vehicle travels.<sup>33</sup> To avoid this form of discomfort, manufacturers build calculated curves in the railway track to withstand the high speeds of the trains.<sup>34</sup> The advantage of tilting trains is that they can take curves faster than ordinary trains, thus reducing the level of discomfort that passengers normally experience.<sup>35</sup>

Some tilting trains are referred to as 'Talgo' trains.<sup>36</sup> The Talgo train is named after a Spanish engineer who worked on a project in 1942 to learn how to avoid the normal wear and tear of railcar wheels upon railroad tracks.<sup>37</sup> In 1996, Germany introduced its latest ICE2 trains as tilting trains, which can travel at an average speed of 235 km/h (145 mph).<sup>38</sup> Some countries that employ the tilting train include Italy, Finland, Portugal, Slovenia, England, Switzerland, and Norway.<sup>39</sup>

#### iii. The Advantages and Disadvantages of High-Speed Trains

With any new form of transportation technology, there are advantages and disadvantages to its implementation on a mass scale. Generally, the main advantages of high-speed rail transit include:

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<sup>26</sup> Soberman, *supra* note 6.

<sup>27</sup> Bonsor, *supra* note 17.

<sup>28</sup> Murai, *supra* note 19, at 61-62. The Japanese and German systems are similar in that they both use linear motors for propulsion and electromagnets for levitation of the high-speed railcar. The HSST technology began in 1974 when Japan Airlines researched methods to improve its new linear motor car system. *Id.* at 62.

<sup>29</sup> Kazuo Sawada, *Superconducting Maglev Developed by RTRI and JR Central*, 25 JAPAN RAILWAY & TRANSPORT REV. 58, 59 (2000), available at [http://www.jrtr.net/jrtr25/pdf/f58\\_tec1.pdf](http://www.jrtr.net/jrtr25/pdf/f58_tec1.pdf).

<sup>30</sup> *Id.* at 59-61.

<sup>31</sup> Hitachi-Rail.com, Tilting Train, <http://www.hitachi-rail.com/products/rv/tilting/index.html> (last visited Mar. 19, 2007).

<sup>32</sup> Keating, *supra* note 6.

<sup>33</sup> *Id.* Centrifugal force is defined as "the apparent force that is felt by an object moving in a curved path that acts outwardly away from the center of rotation." See WEBSTER'S NEW WORLD COLLEGE DICTIONARY 238 (4th ed 2006), available at <http://www.m-w.com/dictionary/centrifugal+force>.

<sup>34</sup> See Keating, *supra* note 6.

<sup>35</sup> *Id.*

<sup>36</sup> Graber, *supra* note 4.

<sup>37</sup> *Id.*

<sup>38</sup> Railway-Technology.com, Germany Intercity Express High-Speed Rail Network, Germany, <http://www.railway-technology.com/projects/germany/> (last visited March 19, 2007).

<sup>39</sup> London, *supra* note 2.

- (a) stronger engines creating high speed travel;
- (b) reduction in travel times;
- (c) reduction in the pollution of air, land, and water - environmentally-friendly effects with lighter construction materials;
- (d) the need to reduce rising operating costs of traditional transportation devices such as airplanes, autos, buses, and trains;
- (e) integrating existing transportation modes by linking existing train stations or airports with each other, thus creating a streamlined transportation grid and promoting tourism;
- (f) enhanced traveling experience with aesthetic qualities of greater comfort, provision of online services, and spacious seating; and
- (g) promoting economic integration<sup>40</sup>

Some general disadvantages are also associated with high-speed rail transit, including:

- (a) the enormous costs of constructing lines and using specialized materials, as well as installation and maintenance;
- (b) acquisition of land
- (c) negotiating the geographical terrain to build newer lines –
- (d) the need for specialized labor;
- (e) the incompatibility of high-speed rail transit with existing transportation infrastructure (setting aside land to build new ‘dedicated’ tracks)<sup>41</sup>

The most notable disadvantages of high-speed rail transit are its effects on communities, particularly the need for more land and the high construction costs of building new lines.<sup>42</sup> In building a new high-speed line, planners must negotiate around natural geographical barriers such as mountains, hard rocks, existing urban and rural communities, and other land. In order to create high-speed lines specialist engineers and technicians are required to participate in the construction and planning of high-speed train services. However, large parcels of land must often be purchased or set aside to build new, dedicated high-speed tracks. This is where active community participation and environmental assessments become critical, particularly in the initial planning stages of the high-speed project.

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<sup>40</sup> See, e.g., New Trains, Smart Transportation to Save the Planet, <http://www.newtrains.org/pages/354051/index.htm> (last visited Oct. 10, 2007).

<sup>41</sup> See, e.g., Maglevs (Magnetically Levitated Trains), <http://www.o-keating.com/hsr/maglev.htm> (last visited Oct. 11, 2007).

<sup>42</sup> *Id.*

## IV. THE POLITICS AND ECONOMICS BEHIND HIGH-SPEED RAIL TRANSIT

## i. Construction and Operative Costs

Before any major public policy is considered to meet existing transportation challenges, market analysis is necessary to achieve a practical plan. Considering that high-speed rail transit supplement existing modes of transportation, the costs of construction and operation become relevant. Determining the sources of funding is necessary because public-private partnerships are heavily involved in kick-starting high-speed rail projects. Major investments from private and public bodies are being made with a view to make practical yet profitable projects.

Based on the quality of construction materials, application, and maintenance, high-speed rail transit, from a purely economic perspective, involves enormous operating and technological costs.<sup>43</sup> Significant costs that are taken into consideration in building high-speed rail systems are: (1) length of railway track required for travel within a corridor; (2) evaluating terrain and land use for construction and maintenance; (3) laying electrification and signaling on the railway tracks; (4) the need for specialized labor (engineers, construction workers, technicians); and (5) costs for advanced materials used for constructing high-speed rail cars.<sup>44</sup>

An additional cost of high-speed transit involves demolition through mountains in those countries that are dominated by a rugged terrain.<sup>45</sup> Critics of high-speed rail transit argue that these costs far outweigh the benefits of introducing such alternative schemes. The debate is fueled by two different arguments: (1) would it be more practical to spend money on repairs to existing transportation corridors, or (2) would it be feasible to spend money on forward-looking plans that would alleviate traffic congestion, while creating newer jobs in a new industry?

## ii. Emerging Trends: Public-Private Partnerships, the Public Consultative Process, and Corporate Involvement with Government

In several countries that use high-speed rail transit, the initial operating or capital costs come from government subsidies.<sup>46</sup> By qualifying for these government subsidies under various technical and market criteria, a joint partnership between local authorities and the private sector would receive the necessary funding to begin construction of any high-speed project. Technology companies have emerged as a means to stimulate the development of high-speed rail transit technology.

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<sup>43</sup> See, e.g., David Levinson et al., *The Full Cost of High-Speed Rail: An Engineering Approach*, 31 ANNALS OF REGIONAL SCIENCE 189, 193-195 (1997), available at <http://nexus.umn.edu/Papers/HighSpeedRail.pdf>.

<sup>44</sup> See, e.g., *id.*

<sup>45</sup> See, e.g., *id.*

<sup>46</sup> See, e.g., High-speed rail to link Beijing, Tianjin before 2008, [http://english.china.com/zh\\_cn/business/economy/11021617/20061127/13770477.html](http://english.china.com/zh_cn/business/economy/11021617/20061127/13770477.html) (last visited Mar. 19, 2007) [hereinafter China.com].

In particular, the corporate sector is working closely with government agencies by allowing several companies to apply for government grants towards research and development of train technology. Typically, corporations would compete with one another by placing bids on large or small projects. Thereafter, the company with the winning bid would be awarded with a grant. Later that company would begin construction of the project in close cooperation with local transportation authorities and government agencies. In several nations, this public-private partnership includes a public consultation process, whereby communities that are directly affected by high-speed train development would have an opportunity to be heard at public meetings.<sup>47</sup> Much of this public consultative process addresses environmental issues that high-speed rail transit may trigger.<sup>48</sup>

## V. THE IMPACT ON THE ENVIRONMENT

### i. The Pollution Effects of Conventional Transportation

In the transportation sector, with every new technology comes the question of how that technology will impact the environment. Given that conventional modes of transportation, which use fossil-fuels, contribute to rising levels of air, noise, and land pollution, alternative forms of energy such as wind energy and solar energy are gaining popularity. This rising popularity of “greener” technologies such as high-speed rail transit includes some form of environmental impact assessment to determine whether or not such technology is applicable. Currently, there are several environmental impacts by railway transport, including air pollution (e.g. idling of stationary vehicles during traffic), noise pollution, and water pollution.<sup>49</sup> Modern efforts to combat noise pollution have focused on noise abatement.

High-speed rail transit has the distinct advantage of being more environmentally friendly in terms of requiring less fuel than conventional forms of travel like air or road travel.<sup>50</sup> For example, while idling cars contribute to higher levels of air pollution during traffic congestion, high-speed rail transit operate mainly on electrification and signaling systems that produce very little emissions. Moreover, traveling vehicles produce excessive noise for surrounding communities, while high-speed trains run on tracks specially manufactured for noise abatement. For these reasons, several nations are actively promoting high-speed transit to protect the environment, including wildlife and rural communities.

Perhaps the most significant environmental benefits associated with high-

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<sup>47</sup> See, e.g., Fed. Railroad Admin., Environment, <http://www.fra.dot.gov/us/content/33> (last visited Sept. 27, 2007).

<sup>48</sup> See, e.g., *id.*

<sup>49</sup> See, e.g., Levinson et al., *supra* note 43.

<sup>50</sup> A PLAN TO FLY CALIFORNIA . . . WITHOUT EVER LEAVING THE GROUND at 4, available at [http://www.cahighspeedrail.ca.gov/eir\\_final/pdf/EIR-EIS\\_brochure\\_8-2005.pdf](http://www.cahighspeedrail.ca.gov/eir_final/pdf/EIR-EIS_brochure_8-2005.pdf) (last visited Mar. 19, 2007) [hereinafter CALIFORNIA HIGH-SPEED PLAN].

speed rail transit can be summarized as follows:

- Decreased energy consumption;
- Reduced air pollution;
- Using less land to expand highways and airports; and
- Fewer impacts on sensitive habits and water resources such as floodplains, streams, and wetlands<sup>51</sup>

ii. Remedial Environmental Practices and Considerations

Along with the possibility of building high-speed rail transit is a host of environmental legal issues, including rights-of-way, the building of boundaries to provide safety fencing, the impact upon agricultural communities, and noise pollution.<sup>52</sup> Other considerations include the impact on water and natural resources, including wildlife and other biotic communities are considered. Methods to reduce noise pollution generally include specially-designed train equipment, train wheels, continuous welded rail, and noise barriers.<sup>53</sup> Such noise abatement measures, as prominently featured in the U.S., would follow federal, state, and local guidelines to plan for final designs of high-speed rail projects.<sup>54</sup>

Protecting water quality in communities adjacent to the high-speed rail line involves environmental practices such as silt fencing as well as stabilizing and seeding of soils.<sup>55</sup> Long-term maintenance of high-speed rail lines may produce temporary discharge of pollutants.<sup>56</sup> In applying environmental protection, local authorities often work with the government to review construction plans involving bridge abutments, pier placements, and timing of developmental activities to avoid impacts on aquatic species.<sup>57</sup> Track replacement, embankment repairs, and new freight siding construction would directly affect wetlands.<sup>58</sup>

The impact on wildlife can be reduced by clearing, excavating, filling, and re-grading the railroad line in various locations along the track.<sup>59</sup> Upon thorough review of local environments, it may be determined that the construction and maintenance of high-speed rail lines may have minimal impact upon wildlife, as improvements to the corridor may be isolated.<sup>60</sup>

Concerns about the impact upon endangered animal and plant species in protected habitats are relevant because high-speed rail lines may adversely affect

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<sup>51</sup> *Id.*

<sup>52</sup> WISCONSIN DEPARTMENT OF TRANSPORTATION, EXECUTIVE SUMMARY § 4.1, available at <http://www.dot.wisconsin.gov/projects/d1/hsrail/docs/ea-execsum.pdf> (last visited Mar. 19, 2007).

<sup>53</sup> *See id.* at § 4.6.

<sup>54</sup> *Id.*

<sup>55</sup> Silt Fencing is a temporary sediment barrier designed to prevent against accumulation of sediment that forms rills and gullies. *See* Silt Fence, <http://www.stormwaterauthority.org/assets/Silt%20Fence.pdf> (last visited March 19, 2007). *See also* Silt Fence, [http://www.state.tn.us/environment/wpc/sed\\_ero\\_controlhandbook/sf.pdf](http://www.state.tn.us/environment/wpc/sed_ero_controlhandbook/sf.pdf) (last visited March 19, 2007). Silt Fencing is commonly used to provide perimeter controls around sites where construction activities take place, and runoff occurs. *See id.*

<sup>56</sup> *See* WISCONSIN DEPARTMENT OF TRANSPORTATION, *supra* note 52, at § 4.7.

<sup>57</sup> *See id.* at § 4.7.

<sup>58</sup> *See id.* at § 4.9.

<sup>59</sup> *See id.* at § 4.10.

<sup>60</sup> *Id.*

areas with documented cases of rare species.<sup>61</sup> For instance, rare species associated with sensitive aquatic environments like streams or lakes may be affected by construction activities at water-crossings.<sup>62</sup> Here, constant vigilance is required by coordinating construction activities with federal or state agencies to protect listed species from extinction.

In assisting with environmental protection, the manufacturing and design of high-speed trains becomes significant. Various high-speed train manufacturers are advancing new technologies to reduce noise pollution and its effects on surrounding communities and natural habitats.<sup>63</sup> For instance, Hitachi introduced interior and exterior noise reduction, hybrid aerodynamic analysis, micro-pressure wave reduction, and a rolling stock propulsion system dynamic simulator, which tests the effects of vibration and noise generated during high-speed travel.<sup>64</sup> Exterior noise reduction involves isolating various sound sources emanating from the train by using microphones when the train travels at top speed.<sup>65</sup> Hybrid aerodynamic analysis involves testing through wind tunnels and numerical analysis in order to deal with the problem of noise produced by highly accelerated vehicles.<sup>66</sup> This type of research from the private sector influences the selection of design among various high-speed rail cars such as Maglev and tilting trains.

A common problem encountered by high-speed rail passengers is the production of micro-pressure waves.<sup>67</sup> This occurs when a high-speed train enters a tunnel, which suddenly changes the air pressure and creates compressive waves.<sup>68</sup> These waves produce an explosive sound that would be disturbing to ordinary passengers within the train.<sup>69</sup> To counteract this problem, designers of high-speed trains attempt to modify the shape of the nose on the front end of the train.<sup>70</sup> Here, the science of design and manufacturing come together to create efficient models of high-speed rail cars that reduce noise both outside and inside the vehicle.

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<sup>61</sup> *See id.* at § 4.11.

<sup>62</sup> *Id.*

<sup>63</sup> *See, e.g.*, Hitachi-Rail.com, High Speed Train, [http://www.hitachi-rail.com/products/rv/high\\_speed/index.html](http://www.hitachi-rail.com/products/rv/high_speed/index.html) (last visited Mar. 19, 2007).

<sup>64</sup> *Id.*; *see generally* Hitachi-Rail.com, Rolling Stock Propulsion System Dynamic Simulator, [http://www.hitachi-rail.com/products/rv/high\\_speed/features/index\\_5.html](http://www.hitachi-rail.com/products/rv/high_speed/features/index_5.html) (last visited Mar. 19, 2007).

<sup>65</sup> Hitachi-Rail.com, Exterior Noise Reduction Technology, [http://www.hitachi-rail.com/products/rv/high\\_speed/features/index.html](http://www.hitachi-rail.com/products/rv/high_speed/features/index.html) (last visited March 19, 2007).

<sup>66</sup> Hitachi-Rail.com, Hybrid Aerodynamic Analysis Technology, [http://www.hitachi-rail.com/products/rv/high\\_speed/features/index\\_2.html](http://www.hitachi-rail.com/products/rv/high_speed/features/index_2.html) (last visited March 19, 2007).

<sup>67</sup> Hitachi-Rail.com, Attempts to Reduce Micro-Pressure Waves, available at [http://www.hitachi-rail.com/products/rv/high\\_speed/features/index\\_4.html](http://www.hitachi-rail.com/products/rv/high_speed/features/index_4.html) (last visited March 19, 2007).

<sup>68</sup> *Id.*

<sup>69</sup> *Id.*

<sup>70</sup> *Id.* Hitachi uses its SR8000 ultra high-speed parallel digital computer to study how noise can be reduced by the nose of the train using three-dimensional compressive fluid computation analysis. *Id.*

## VI. NATIONS WITH HIGH SPEED RAIL TRANSIT

## i. EUROPEAN UNION

Although Japan and France pioneered high-speed rail transit, over the years, several other nations have embarked upon the journey to develop similar high-speed rail transit, but tailoring such progress to their own interests.<sup>71</sup> Legislative efforts, in lieu of funding mechanisms, are responsible for the current trend of pursuing extensive projects. High speed rail transit systems have a long history in Europe.<sup>72</sup> France was the first European country to formally introduce high-speed trains into their transportation regime.<sup>73</sup>

Soon other European neighbors, such as Germany and Spain, followed in pursuing high-speed train technology and application.<sup>74</sup> With the emergence of the European Union (EU) as a political and economic entity, railway transport was viewed as the most sustainable means of transportation for both freight and passenger traffic.<sup>75</sup> The EC provides generous funding to member states in order to better link European cities.<sup>76</sup> The geographical proximity between European nations has also enabled transportation authorities to conduct testing protocols for potentially large-scale high speed networks between member states.

Drawing from Japan's high-speed train projects, and with the higher degree of political integration within the European Union, Europe's transportation sector receives funding from individual member states along with EU-sponsored initiatives.<sup>77</sup> The reduction of pollution and noise are a top priority in the EU, leading to legislative-driven policies such as the Environmental Noise Directive (END).<sup>78</sup> This policy requires member states to provide noise maps and action

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<sup>71</sup> See Int'l Union of Railways (UIC), Milestones, [http://www.uic.asso.fr/gv/article.php3?id\\_article=20](http://www.uic.asso.fr/gv/article.php3?id_article=20) (last visited Mar. 19, 2007).

<sup>72</sup> *Id.*

<sup>73</sup> *Id.*

<sup>74</sup> *Id.*

<sup>75</sup> See THE CENTRE FOR SUSTAINABLE TRANSPORTATION, DEFINING SUSTAINABLE TRANSPORTATION: PREPARED FOR TRANSPORT CANADA 12 (2005), available at [http://cst.uwinnipeg.ca/documents/Defining\\_Sustainable\\_2005.pdf](http://cst.uwinnipeg.ca/documents/Defining_Sustainable_2005.pdf) (finding that revitalizing rail transport is the target of the Common Transport Policy) [hereinafter CANADIAN ALTERNATE TRANSPORT]. The Common Transport Policy articulates the EU's goal to facilitate the free movement of persons and goods among EU member states with an eye towards sustainable development. Europa Glossary, Common Transport Policy, [http://europa.eu/scadplus/glossary/common\\_transport\\_policy\\_en.htm](http://europa.eu/scadplus/glossary/common_transport_policy_en.htm) (last visited Oct. 2, 2007).

<sup>76</sup> See High Speed Brussels-France Link Signals Vital Step Towards Completion of the TransEuropean Transport Network, Dec. 10, 1997, <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/97/1098&format=HTML&aged=0&language=EN&guiLanguage=en> (last visited Oct. 2, 2007) (finding that the EU has committed millions of dollars to fund to certain transportation projects) [hereinafter Brussels-France Link].

<sup>77</sup> See *id.* (explaining that the EU contributes money to fund to certain transportation projects).

<sup>78</sup> See Noise, The Directive on Environmental Noise, <http://ec.europa.eu/environment/noise/directive.htm> (last visited Sept. 20, 2007). The END Directive is also known as 2002/49/EC, and requires the assessment and management of environmental noise through noise maps and actions plans for major railways (more than 60,000 trains per year). See Scottish Environment Protection Agency, The EU directive on environmental noise, <http://www.sepa.org.uk/noise/index.htm> (last visited Sept 20, 2007). In the future, noise maps and actions plans will be required to be drafted for railways with more than 30,000 trains per year. *Id.*

plans for major railways.<sup>79</sup> Noise reduction is not only meant to alleviate environmental irritants, but also to create better cost-effectiveness by retrofitting freight wagon fleets with specific brake blocks.<sup>80</sup>

High-speed rail transit remains a top priority with the EC and member states, and transportation planners consider both environmental standards and economic integration when adopting high-speed train service.<sup>81</sup> These goals are achieved through the European Environment Agency, which applies the Transport and Environment Reporting Mechanism (TERM).<sup>82</sup> The TERM program lists seven major categories as part of developing high-speed rail initiatives (and which are found as preliminary considerations in several nations):

- Environmental consequences of transport
- Transport demand and intensity
- Spatial planning and accessibility
- Supply of transport infrastructure and services
- Transport costs and prices
- Technology and utilization efficiency
- Management integration<sup>83</sup>

*a. France*

As far as European technology for high-speed travel is concerned, France has been a major innovator since the advent of the Japanese Shinkansen trains.<sup>84</sup> In 1955, a test run by the SNCF (Société Nationale des Chemins de fer Français) produced a locomotive to reach 330 km/h.<sup>85</sup> Then, in 1967, The French National Railways (today's version of the SNCF) began operating commercial high-speed trains at 200 km/h between Paris and Toulouse.<sup>86</sup> Through the efforts of the SNCF, the French TGV (commonly known as the Train à Grande Vitesse) network began operations in 1981.<sup>87</sup>

At present, the TGV travels at an average speed of 300 km/h (186 miles per hour), and links Paris with much of eastern France under Phase 1 of the TGV's most recent operation.<sup>88</sup> France's high-speed train system has traditionally gathered input from affected communities, which TGV operators then

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<sup>79</sup> Scottish Environment Protection Agency, *supra* note 78.

<sup>80</sup> See European Rail Sector Supports Railway Noise Abatement Initiative (Aug. 28, 2007), <http://engineers.ihs.com/news/euro-rail-noise.htm?WBCMODE=Pre>.

<sup>81</sup> See CANADIAN ALTERNATE TRANSPORT, *supra* note 75, at 5-6.

<sup>82</sup> *Id.* at 12.

<sup>83</sup> *Id.*

<sup>84</sup> Jean Bouley, *A Short History of "High Speed" Railway in France Before the TGV*, JAPAN RAILWAY & TRANSPORT REV., Oct. 1994, at 49, 50, available at [http://www.jrtr.net/jrtr03/pdf/f49\\_bou.pdf](http://www.jrtr.net/jrtr03/pdf/f49_bou.pdf).

<sup>85</sup> *Id.* The SNCF is a public enterprise in France that operates rail services for passengers and freight services, as well as maintaining France's railroad infrastructure. See SNCF donner au train des idées d'avance, <http://www.sncf.com/indexe.htm> (last visited Sept. 20, 2007).

<sup>86</sup> *High-Speed Trains Worldwide*, JAPAN RAILWAY & TRANSPORT REV., Oct. 1994, at 63, available at [http://www.jrtr.net/jrtr03/pdf/photo\\_63.pdf](http://www.jrtr.net/jrtr03/pdf/photo_63.pdf).

<sup>87</sup> High Speed Trains of Europe, History of TGV, <http://www.ecsel.psu.edu/~dbieryla/highspeed/history.html> (last visited Mar. 19, 2007).

<sup>88</sup> See *id.*

incorporated into the future plans of high-speed travel. Such plans include the construction of noise-reducing trains that would have a limited impact on smaller communities where the trains travel. The latest plans in France aim to link the TGV with the commercial centers of Germany, including Stuttgart, Munich, and Frankfurt.<sup>89</sup>

In recent years, the average travel time between Paris and many of France's eastern cities was around 4.5 hours, but with the introduction of the new phase of TGV trains, it is now under 2 hours and 19 minutes.<sup>90</sup> France has contracted with Alstom<sup>91</sup> to create a new generation TGV train called the *Automotric À Grand Vitesse* (AGV).<sup>92</sup> The AGV is a new generation high-speed railcar that is expected to provide stability at top speeds and require less bogies fitted for the track, which will ultimately reduce both track wear and noise pollution.<sup>93</sup>

#### b. Germany

In 1965, the German Federal Railways began demonstration runs for high-speed trains at 200 km/h near Munich.<sup>94</sup> After reunification in 1990, Germany's politicians focused on integrating and modernizing the railway transport systems of the former West Germany and East Germany.<sup>95</sup> In 1991, Germany implemented its first comprehensive high speed train system known as the Intercity Express concept (ICE trains).<sup>96</sup> The ICE high-speed line linked the cities of Hanover and Wurzburg, as well as Mannheim and Stuttgart, and it subsequently added other cities such as Hamburg, Hannover, Fulda, Frankfurt, and Munich.<sup>97</sup>

<sup>89</sup> See *French superfast rail link to Germany launched*, THE AGE, June 11, 2007, available at <http://www.theage.com.au/news/travel/french-superfast-rail-link-to-germany-launched/2007/06/11/1181414175494.html>.

<sup>90</sup> TGV France High-Speed Rail Network, France, railway-technology.com, <http://www.railway-technology.com/projects/frenchtgv/> (last visited Sept. 20, 2007) [hereinafter TGV Train]. Phase 2 is in its initial stages, and is planned to link France's TGV trains with services in Germany via the Rhine bridge at Kehl, or via Forbach and Saarbrücken to Frankfurt. *Id.* Phase 2 is planned to begin in 2010. *Id.*

<sup>91</sup> Based in Paris, France, Alstom (formerly GEC-Alstom) is a global corporation which supplies equipment and technology in the transportation and energy sectors. See generally About Us, [http://www.alstom.com/home/about\\_us/index.EN.php?languageId=EN&docId=&dir=/home/about\\_us/](http://www.alstom.com/home/about_us/index.EN.php?languageId=EN&docId=&dir=/home/about_us/) (last visited Sept. 20, 2007). It also provides environmental control systems. *Id.* Alstom was responsible for building TGV trains in the late 1970's, and builds tilting trains. *Id.* As of March 28, 2006, Alstom was awarded an \$80 million agreement to supply parts to the Northeast corridor of the United States. See Railway-Technology.com, Alstom Signs US\$80 Million (€67 Million) Agreement with Amtrak for Five-Year Parts Supply to Railway's Northeast Passenger Fleet, Mar. 28, 2006, <http://www.railway-technology.com/contractors/suburban/alstom/press21.html>. It is also expected that Alstom will provide technical advice to Amtrak's Acela passenger service. *Id.*

<sup>92</sup> See TGV Train, *supra* note 90. The AGVs consist of 9 modules, with single and double-deck vehicles. *Id.* The main difference between TGV and AGV trains is that AGV trains are constructed by distributing its traction throughout the train, as opposed to the TGV train which is designed to concentrate traction at the both ends of the power cars. *Id.*

<sup>93</sup> *Id.*

<sup>94</sup> 30 Years of High-speed Railways, High-Speed Trains Worldwide, JAPAN RAILWAY & TRANSPORT REV., October 1994, at 63, available at [http://www.jrtr.net/jrtr03/pdf/photo\\_63.pdf](http://www.jrtr.net/jrtr03/pdf/photo_63.pdf).

<sup>95</sup> See Railway-Technology.com, Germany Intercity Express High-Speed Rail Network, Germany, <http://www.railway-technology.com/projects/germany/> (last visited Mar. 19, 2007).

<sup>96</sup> *Id.*

<sup>97</sup> See Int'l Union of Railways (UIC), Milestones, [http://www.uic.asso.fr/gv/article.php?id\\_article=20](http://www.uic.asso.fr/gv/article.php?id_article=20)

In 1993, Germany enacted the General Railway Restructuring Act, which later created the Deutsche Bahn<sup>98</sup> (DB) in 1994 as the agency to implement high-speed travel throughout Germany.<sup>99</sup> Deutsche Bahn is Europe's largest railway company. In 1999, with the help of Nortel, Deutsche Bahn deployed its GSM-R high-speed audio technology to create efficient rail network communications without using traditional analog radio signals.<sup>100</sup> Signaling communications between train stations are vital to the safety of passengers using high-speed rail transit. The Deutsche Bahn advanced signaling technology that is part of the European Railway Traffic Management System (ERTMS).<sup>101</sup>

As mentioned *supra*, EU transportation policies often supplement the railway transportation sectors of member states.<sup>102</sup> In 1997, the European Commission (EC) granted €2 million (\$2.65 million U.S.) to construct the high-speed route between Frankfurt and Köln.<sup>103</sup> Here, a fleet of uniquely-designed ICE3 trains and Siemens / Adtranz ICE3M trains run at 330 km/h to reduce traveling times from an average of 2.5 hours to 1 hour.<sup>104</sup> 3.6 billion Euros are funding another major route, an 89 kilometer-long journey between the cities of Nürnberg and Ingolstadt.<sup>105</sup> This route runs parallel to the Autobahn highway to minimize environmental damage on surrounding lands.<sup>106</sup>

The Nürnberg-Ingolstadt line indicates that Germany's transportation planners are sensitive to issues that relate to the construction and maintenance of high-speed lines that pass through parcels of land. For instance, this project requires extensive tunneling through mountainous regions, where tunnel engineers must fill large cavities of porous mountain ranges with concrete in order to keep the tunnels stable.<sup>107</sup> From the perspective of cost-benefit analysis, this modification in high-speed transit operations contributes to greater construction costs.<sup>108</sup> The counterargument, however, posits that planners will

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(last visited Mar. 19, 2007).

<sup>98</sup> Deutsche Bahn was created after the merger of two groups: (1) Deutsche Bundesbahn (German Federal Railway, originally from West Germany) and (2) Deutsche Reichsbahn (German State Railway, originally from East Germany). *Deutsche Bahn, AG*, in 4 ENCYCLOPEDIA BRITANNICA 42, 42 (15th ed. 2005), available at <http://www.britannica.com/eb/article-9030129/Deutsche-Bahn-AG>.

<sup>99</sup> See Railway-Technology.com, Frankfurt-Köln High Speed Line, Germany, <http://www.railway-technology.com/projects/frankfurt/> (last visited Mar. 19, 2007). Deutsche Bahn (DB) is a holding company that is responsible for passenger, freight, infrastructure, and traction. *Id.*

<sup>100</sup> NORTEL, THIS IS THE WAY TO IMPLEMENT GSM-R COMMUNICATIONS WHILE MAINTAINING DAILY OPERATIONS 2 (2004), available at [http://www.nortel.com/corporate/global/emea/germany/collateral/deutsche\\_bahn.pdf](http://www.nortel.com/corporate/global/emea/germany/collateral/deutsche_bahn.pdf).

<sup>101</sup> See *id.* at 2. See also Graber, *supra* note 4, at 7.

<sup>102</sup> See Brussels-France Link, *supra* note 76.

<sup>103</sup> See Stefan Roseanu, *A Moving World – Germany*, CLUB FERROVIAR, available at [http://www.club-ferroviar.ro/club/index.php?option=com\\_content&task=view&id=6671&Itemid=162](http://www.club-ferroviar.ro/club/index.php?option=com_content&task=view&id=6671&Itemid=162) (last visited Sept. 20, 2007). The Frankfurt-Köln line opened in December 2002. See Int'l Union of Railways (UIC), *supra* note 97.

<sup>104</sup> See NORTEL, *supra* note 100, at 2-3. See also Int'l Union of Railways (UIC), *supra* note 97.

<sup>105</sup> See Int'l Union of Railways (UIC), *supra* note 97.

<sup>106</sup> Railway Technology.com, Nürnberg-München High-Speed Line, <http://www.railway-technology.com/projects/Nurnberg/> (last visited Oct. 3, 2007).

<sup>107</sup> *Id.*

<sup>108</sup> See generally *id.*

not have to interfere with or purchase further parcels of land for track development.

*c. Spain*

With the city of Seville hosting the 1992 Expo, high-speed rail transit was introduced as part of Spain's alternative transportation sector.<sup>109</sup> Spain decided to invest heavily in transportation infrastructure development, linking many Spanish cities with the capital Madrid. In 1992, Spain's first high-speed line was established between Madrid and Seville.<sup>110</sup> This high-speed link was unique in that two types of trains, a dedicated TGV-style and a locomotive-hauled Talgo train, were simultaneously used.<sup>111</sup>

The Spanish government has allocated approximately €41 billion (Euros) in order to construct Spain's new high-speed rail transit system.<sup>112</sup> As part of this ambitious initiative, Spain's *Alta Velocidad Espanola (AVE)* is currently under construction with the aim of connecting all of Spain's cities with the capital Madrid in less than 4 hours travel time.<sup>113</sup> By 2020, Spain intends to develop over 10,000 kilometers of high-speed rail lines.<sup>114</sup> Although most of this high-speed route runs over the existing railway line between Madrid and Badajoz, a majority of the track has been remodeled to accommodate high-speed locomotive travel.<sup>115</sup>

Even though the Talgo train adopts French and German high-speed technologies, it represents Spain's past contribution to high-speed rail technology. Started in 1949, the Talgo company began manufacturing high-speed locomotives during the 1970s and 1980s in order to meet demand from Spain's growing transportation corridors.<sup>116</sup> Talgo developed a unique automatic gauge-switching system, whereby the approaching train transfers its weight to unlock the wheels connected to the track, and adjusts to a new track line.<sup>117</sup> This system of track maintenance can be seen in virtually every high-speed rail transit project around the world.

As part of this gradual evolution of alternative transportation, corporations such as Siemens provide sophisticated communications systems that transmit

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<sup>109</sup> Railway-Technology.com, AVE Spain- High Speed Rail Network by Spanish National Railways, <http://www.railway-technology.com/projects/spain/> (last visited March 19, 2007) [hereinafter Spain high speed rail].

<sup>110</sup> *See id.*

<sup>111</sup> *Id.* The Talgo 350 trains can carry 318 passengers, including a bar and buffet. *Id.* The Siemens 8-car Velaro E train carries 404 passengers. *Id.* Other trains ordered by the Spanish government include 30 AVE trains which can travel at speeds of up to 330 km/h. *Id.* These trains are being manufactured by Talgo/Bombardier, and will be delivered between August 2008 and December 2010. *Id.*

<sup>112</sup> *Id.*

<sup>113</sup> *Id.* This high-speed link will also connect the southern provincial cities of Malaga, Granada, Cadiz, Algeciras, Huelva, and Jaen, along a 1,079 kilometer network. *Id.*

<sup>114</sup> Graber, *supra* note 4.

<sup>115</sup> Spain high speed rail, *supra* note 109.

<sup>116</sup> Graber, *supra* note 4.

<sup>117</sup> *Id.*

speech, data, and images to Spain's train stations.<sup>118</sup> Moreover, the dual-operating high-speed line in Spain uses a cab signaling system (which is coupled to a speed control facility) to switch between the Talgo and TGV railway lines.<sup>119</sup> In recent times and in keeping with the economic integration theme for high-speed rail transit, both Spain and Portugal have agreed to construct a high-speed link between their respective capitals, Madrid and Lisbon.<sup>120</sup> This high-speed line, scheduled to be completed by 2013, will cost approximately €7.2 billion (Euros).<sup>121</sup>

ii. ASIA

d. Japan

In 1958, facing serious transportation problems due to a growing population<sup>122</sup> and a burgeoning international trade market, Japan formed a government panel to discuss how rising infrastructure demands would be met, particularly between Tokyo and Osaka.<sup>123</sup> The panel eventually decided to construct a high-speed gauge line, a decision largely based upon the Railway Technology Research Institute's recommendation that a high-speed line could significantly reduce time travel between Tokyo and Osaka.<sup>124</sup> Construction on the *Tokaido Shinkansen* began in 1959 with the goal of linking the two cities to assist in both the economic integration of Japan and the hosting of future international events.<sup>125</sup>

On October 1, 1964, largely as a promotion for the Tokyo Summer Olympics, the *Tokaido Shinkansen* line became Japan's first high-speed train service between Tokyo and Osaka, reaching speeds of 210 km/h and covering a distance

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<sup>118</sup> Spain high speed rail, *supra* note 109.

<sup>119</sup> *Id.* The latest signaling contract has Alcatel, Dimetronic, and Siemens work on the Madrid-Segovia and Valdestillas-Valladolid lines, and is worth approximately €151.1 million (Euros). *See generally* Nexans Signs Contract for New lines in Spain's High-Speed Train Network, Sep. 20, 2004, <http://www.nema.org/media/ind/20040920b.cfm>. On September 20, 2004, Nexans signed a €5 million (Euros) contract as part of a joint venture with Siemens and Alcatel to supply signaling cables for the high-speed train lines currently under construction throughout Spain. *Id.* These lines include: (1) Madrid-Toledo; (2) Lleida-Barcelona; and (3) Segovia-Valladolid. *Id.*

<sup>120</sup> James Martin, GoEurope, *The Cost of High Speed Rail*, Dec. 9, 2005, <http://goeurope.about.com/b/a/226010.htm>.

<sup>121</sup> *Id.*

<sup>122</sup> Yasuo Wakuda, *Japanese Railway History 11, Improvement of Urban Railways* JAPANESE RAILWAY AND TRANSPORT REVIEW, June 1997, at 46, available at [http://www.jrtr.net/jrtr12/pdf/History\\_Wakuda.pdf](http://www.jrtr.net/jrtr12/pdf/History_Wakuda.pdf). The Japanese population grew from 99 million in 1965 to 112 million in 1975, and to 121 million in 1985. *Id.* The population of the capital city Tokyo reached 30 million in 1985. *Id.* The Japanese government promoted the policy of suppressing industrial development in the major cities, and focusing on other areas of the country. *Id.*

<sup>123</sup> Yasuo Wakuda, *Japanese Railway History 10, Railway Modernization and Shinkansen*, JAPANESE RAILWAY AND TRANSPORT REV., April 1997, at 62 available at <http://www.jrtr.net/jrtr11/pdf/history.pdf>.

<sup>124</sup> *Id.*

<sup>125</sup> *Id.* The Tokaido Shinkansen line was financed mainly through loans provided by the International Bank for Reconstruction and Development. *Id.* As indicated throughout this Note, high-speed rail transit seems to have a strong correlation with the hosting of major international events.

of 322 miles.<sup>126</sup> This high-speed service effectively reduced travel time from 6 hours to 3 hours.<sup>127</sup> Given the high level of success experienced with the *Tokaido Shinkansen* line, the *Sanyo Shinkansen* line was opened in 1972 between Osaka and Okayama, and by the end of the year the Shinkansen network had carried approximately 500 million passengers.<sup>128</sup> By 1985, the *Shinkansen* lines stretched for over 1,125 miles, with the average train traveling at 130 mph.<sup>129</sup>

Today, two major projects, aimed at linking cities to Sapporo (on the island of Hokkaido) and Fukuoka (on the island of Kyushu), are currently underway, including one set on a 211 kilometer line from Funagoya to Kagoshima.<sup>130</sup> The next major undertaking is a high-speed line from Nagano to Joetsu.<sup>131</sup> Japan also continues to play an important role in developing high-speed technology and maintenance services for other countries such as South Korea.

*e. China*

The remarkable growth of the Chinese economy has brought numerous challenges and has forced transportation planners to radically alter the country's infrastructure. As massive foreign investments continue to flood China's marketplace, funds are being used for technological innovations that help the Chinese government design newer models of transportation policy in order to ease traffic congestion and promote economic development.<sup>132</sup> In China, there are generally three different classes of high-speed trains: (1) those with a top speed of up to 200 km/h; (2) those traveling between 250 and 300 km/h; and (3) those traveling between 350 to 370 km/h.<sup>133</sup>

China has ordered high-speed train parts from various nations and corporations, and has embarked upon an aggressive mass rapid transportation plan.<sup>134</sup> In particular, the Chinese government has contracted with various private

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<sup>126</sup> *Id.*

<sup>127</sup> HUGH WILSON ET AL., HIGH SPEED TRAINS FOR THE U.S. HISTORY AND OPTIONS--TRANSPORTATION SERIES 2 (2001), available at <http://www.ncsl.org/programs/transportation/transer2.htm>.

<sup>128</sup> International Union of Railways (UIC), Milestones, 1972, available at [http://www.uic.asso.fr/gv/article.php?id\\_article=20](http://www.uic.asso.fr/gv/article.php?id_article=20) (last visited Mar. 19, 2007). The Sanyo Shinkansen line extended to the western regions of Japan, reaching Hakata (Fukuoka City) in Kyushu in 1975. See generally Wakuda, *supra* note 122.

<sup>129</sup> WILSON ET AL., *supra* note 127.

<sup>130</sup> Railway Technology.com, Shinkansen High Speed 'Bullet Train' Operated by JR Central, Japan, <http://www.railway-technology.com/projects/shinkansen/> (last visited Mar. 19, 2007).

<sup>131</sup> *Id.*

<sup>132</sup> See, e.g., Marco Di Capua, *Technology Innovation in China*, 28 THE BRIDGE (1998), available at <http://www.nae.edu/nae/bridgcom.nsf/weblinks/NAEW-4NHMEH?OpenDocument>.

<sup>133</sup> Railway Technology.com, Front Noses for New Chinese High Speed Trains (2005), <http://www.railway-technology.com/contractors/diesel/voith/press37.html>.

<sup>134</sup> In particular, China has ordered 20 high-speed trains worth approximately \$700 million from the Canadian transportation manufacturer Bombardier in 2005. Bombardier to Deliver an Additional 20 High-Speed Trains to China Business Wire- Find Articles (2005), [http://www.findarticles.com/p/articles/mi\\_m0EIN/is\\_2005\\_May\\_31/ai\\_n13787242](http://www.findarticles.com/p/articles/mi_m0EIN/is_2005_May_31/ai_n13787242). Bombardier Transportation and its joint venture partners, Power Corporation of Canada and China South Locomotive and Rolling Stock Industry (Group) Corporation have received an additional order from the Ministry of Railways of China for the

companies to first learn about the technology, and then later participate in a technology transfer arrangement by teaching local workers about high-speed train manufacturing and processing. For example, in 2004 China's Ministry of Railways awarded a contract to Kawasaki with an order of 480 cars.<sup>135</sup> The Chinese Ministry of Railways also submitted plans in 2005 to allow Voith Turbo to build up to 1,200 high-speed trains which would be operational by 2015.<sup>136</sup> Other companies such as the German-based Siemens are involved in manufacturing high-speed cars with a capacity of traveling 300 km/h.<sup>137</sup>

Following the trend of building high-speed trains for hosting major international events, the upcoming 2008 Summer Olympic games in Beijing has encouraged the Chinese Ministry of Railways to build a high-speed line between Beijing and Shanghai, which stretches approximately 1,318 km (818.97 miles) and runs parallel to existing passenger rail lines.<sup>138</sup> Part of this network is the Beijing-Tianjin line, in which the trains are designed to reach a speed of 200 km/h, but can reach speeds of 350 km/h.<sup>139</sup> The municipal government of Tianjin and the Ministry of Railways have contributed approximately 2.6 billion yuan (U.S. \$325 million), and the project is believed to be a pilot project for future high-speed rail transit development in other parts of China.<sup>140</sup>

During this process, the city of Beijing requisitioned land and paid monies to resettle residents.<sup>141</sup> The 2008 Olympic project is estimated to reach completion by August 2008, and will certainly help alleviate the daily load of over 25 million passengers.<sup>142</sup> Designed as a five-year plan, this project is intended to reduce travel times and ease pressure on existing railway corridors between cities

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production and delivery of 20 high-speed train sets. *Id.* The trains will be manufactured in Vasteras, Sweden, with final assembly being in China. *Id.*

<sup>135</sup> Kawasaki Wins High-Speed Train Order for China (2004), [http://www.khi.co.jp/sharyo/topic\\_final/oct\\_2004.html](http://www.khi.co.jp/sharyo/topic_final/oct_2004.html). Kawasaki is part of a Japanese consortium, including Mitsubishi Corporation, Mitsubishi Electric Corporation, Hitachi Ltd., Itochu Corporation, and Marubeni Corporation. *Id.* Kawasaki participates in the overall design and manufacture of the high-speed rail cars, and the total contractual value of the Chinese plan is approximately \$140 billion yen. *Id.*

<sup>136</sup> Holger Costard & Thomas Bassman, *Front Noses and Even Quieter Final Drives*, NEWS, THE CUSTOMER MAGAZINE OF VOITH TURBO, 02.2005, at 22, available at [http://www.voithturbo.com/media/VT\\_News\\_02-2005\\_GB.pdf](http://www.voithturbo.com/media/VT_News_02-2005_GB.pdf) (2005). Voith Turbo is a leading supplier of power drive systems and components for rail vehicles, including turbo transmissions, couplers, and retarders. See generally Railway Technology.com, Voith Turbo, <http://www.railway-technology.com/contractors/diesel/voith/> (last visited Mar. 19, 2007).

<sup>137</sup> High-speed rail to link Beijing, Tianjin before 2008, [http://english.china.com/zh\\_cn/business/economy/11021617/20061127/13770477.html](http://english.china.com/zh_cn/business/economy/11021617/20061127/13770477.html) (last visited Mar. 19, 2007) [hereinafter China.com]. Siemens has been an active participant in providing China with signal telecommunication and electrical supply systems for high-speed rail. *Id.*

<sup>138</sup> Railway Technology.com, Beijing-Shanghai High Speed Line Operated by Chinese Railways, <http://www.railway-technology.com/projects/beijing/> (last visited Mar. 19, 2007).

<sup>139</sup> China.com, *supra* note 137.

<sup>140</sup> *Id.* The Bohai Rim is an economic region consisting of various cities and provinces around the Bohai Inner Sea, along China's Northeast coastline. The region includes Beijing, Tianjin, Hebei, Liaoning, and Shandong. See generally *Fostering innovation and creativity in Bohai Rim*, available at [http://en.ce.cn/Insight/200512/09/t20051209\\_5466230.shtml](http://en.ce.cn/Insight/200512/09/t20051209_5466230.shtml) (last visited Mar. 19, 2007). This region boasts China's political, technological, educational, and cultural centers. *Id.*

<sup>141</sup> *Id.*

<sup>142</sup> China.com, *supra* note 137. See Xin Dingding, *Fast Rail to Link Beijing, Tianjin*, CHINA DAILY, Nov. 27, 2006, available at [http://www.chinadaily.com.cn/china/2006-11/27/content\\_743154.htm](http://www.chinadaily.com.cn/china/2006-11/27/content_743154.htm).

and towns.<sup>143</sup> More importantly, however, the Beijing-Tianjin high-speed network is part of a greater plan to promote economic integration in the surrounding Bohai Rim region.<sup>144</sup>

*f. South Korea*

On April 1, 2004, South Korea introduced the KTX high-speed rail transit system, between the capital city Seoul and Pusan.<sup>145</sup> This corridor is approximately 412 kilometers (255 miles) long, and is South Korea's most densely populated region, containing approximately 70% of the nation's population.<sup>146</sup> Korail (Korean Railroad, and formerly the Korean National Railroad) began operating the first high-speed trains in April 2004.<sup>147</sup> Deriving its technology from France's Alstom TGV, and traveling at speeds up to 300 km/h, the KTX also has seats are designed for the physically handicapped, who are entitled to a 50% discount on tickets.<sup>148</sup> The Korea High Speed Rail Construction Authority (KHRC) is the federal body responsible for building South Korea's high-speed rail transit system.<sup>149</sup>

As part of the \$16 billion Korea High Speed Rail Project, the KHRC signed a \$2.1 billion (U.S.) contract with GEC-Alsthom of France for purchase of 46 sets of TGV trains for the Seoul-Pusan high-speed corridor.<sup>150</sup> Since the introduction of the KTX high-speed rail transit, the average travel time between Seoul and Pusan has been reduced from 4 hours to 2 hours.<sup>151</sup> However, a major challenge was that the construction of the new railway line cost two to three times more than a conventional line.<sup>152</sup> Special measures are incorporated in the South Korean line to prevent against earthquakes, and the KHRC is responsible for monitoring poor construction practices by developers.<sup>153</sup>

Further, South Korean engineers have utilized French-based technology to

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<sup>143</sup> China.com, *supra* note 137.

<sup>144</sup> Dingding, *supra* note 142.

<sup>145</sup> Railway Technology.com, TGV South Korea High Speed Rail Route Operated by Korail, <http://www.railway-technology.com/projects/koreatgv/> (last visited Mar. 19, 2007) [hereinafter TGV South Korea].

<sup>146</sup> *Id.*

<sup>147</sup> *Id.*

<sup>148</sup> *Id.*

<sup>149</sup> The Korean high speed rail project, <http://www.o-keating.com/hsr/korea.htm> (last visited Mar. 19, 2007) [hereinafter Korea high speed project].

<sup>150</sup> TGV South Korea, *supra* note 134. This route is grade-separated and is almost half in tunnels, with 27% on viaduct, and 27% at-grade. *Id.* The first 12 trainsets were built in Belfort, France, and the others in South Korea. *Id.* Each trainset consists of two power cars, two booster cars and 16 coaches, and advanced safety features include triple friction, regenerative and rheostatic braking, and an integral fire alarm system. *Id.* Each train is 387meters long, and has seating for approximately 935 passengers. *Id.*

<sup>151</sup> Korea High Speed Rail, available at [http://www.bechtel.com/PDF/Rail\\_KoreaHSR.pdf](http://www.bechtel.com/PDF/Rail_KoreaHSR.pdf) (last visited Sept. 20, 2007). Bechtel is a company that provided project management services to the Korea High Speed Rail Construction Authority. *Id.* Such assistance came in the form of design management, railway operations, quality control, safety, cost issues, and schedule management. *Id.*

<sup>152</sup> TGV South Korea, *supra* note 145. The delays experienced in the Korean high-speed project stem from the existence of old mines in areas through which long tunnels are to be built, particularly through rugged terrain. Korea high speed project, *supra* note 149.

<sup>153</sup> TGV South Korea, *supra* note 145.

develop modern high-speed rail cars, a byproduct of which was the HSR-350x train, built independently of the KTX train by the National Rail Technology Institute of Korea and Rotem.<sup>154</sup> Current technological innovations for high-speed rail cars include the use of aluminum bodies, digital traffic controls, and pressure compensation systems, all of which differ from the French TGV system.<sup>155</sup> The South Korean government is committed to improving high-speed rail transit technology, and plans to introduce a high-speed train system called the HEMU (High Speed Electric Multiple Unit) by 2012.<sup>156</sup> Although the present trains in South Korea continue to travel over classic railway lines, the high-speed rail system will form part of a new rail construction plan between 2006 and 2015.<sup>157</sup>

*g. Taiwan*

Taiwan has committed itself to introducing high-speed rail transit with its 345-kilometer link between the capital city of Taipei and Kaohsiung, a corridor which boasts 8 major cities.<sup>158</sup> Having experienced the Asian economic crisis in the 1990's, Taiwan's infrastructure budget suffered tremendous losses, and the high-speed rail concept was delayed for several years. As such, the Taiwanese government looked to Japan to model its high-speed rail system. Beginning construction in 2000, Taiwan has managed to create an effective high-speed link in the Taipei-Kaohsiung corridor with trains traveling at average speeds of 300 km/h (186 mph).<sup>159</sup> It is estimated by Taiwanese officials that this high-speed network will reduce travel times from 4 hours to 90 minutes between Taipei and Kaohsiung.<sup>160</sup>

The Taiwanese project is privately-funded at approximately \$13 billion U.S., and is funded by the Taiwan High Speed Rail Corporation (THSRC) under a 35-year concession agreement.<sup>161</sup> From this is planned an extensive network of bridges, tunnels, and viaducts to avoid interrupting other forms of transportation lines within the country.<sup>162</sup> Although initial consideration was given to French and German high-speed technologies, Taiwan ultimately chose Japan's Kawasaki 700T series of Shinkansen trains.<sup>163</sup> Taiwan's high-speed rail system

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<sup>154</sup> See Korea Railroad Research Institute, Korea High Speed Train, [http://www.krri.re.kr/krri/np/high/20060727/1\\_13328.html](http://www.krri.re.kr/krri/np/high/20060727/1_13328.html) (last visited Sept. 20, 2007).

<sup>155</sup> *Id.*

<sup>156</sup> Kim Tae-gyu, *Korea Plans to Develop Super-Fast Train by 2012*, KOREA TIMES, Mar. 16, 2007, available at [http://www.koreatimes.co.kr/www/news/nation/news\\_view.asp?newsIdx=3096285](http://www.koreatimes.co.kr/www/news/nation/news_view.asp?newsIdx=3096285)

<sup>157</sup> TGV South Korea, *supra* note 145.

<sup>158</sup> Taiwan High-Speed Rail Line Network, Taiwan, Railway-Technology.com, available at <http://www.railway-technology.com/projects/taiwan/> (last visited March 19, 2007) [hereinafter THSRC].

<sup>159</sup> *Id.*

<sup>160</sup> *Id.*

<sup>161</sup> *Id.* The THSR is comprised of five companies – Continental Engineering Corporation, Fubon Group, TECO Group, PEWC Group, and Evergreen Group. THSR Profile, available at <http://www.thsrc.com.tw/en/about/about.asp> (last visited March 19, 2007). This consortium launched the construction plan for Taiwan's first high-speed rail network in 1998. *Id.*

<sup>162</sup> THSRC *supra* note 158.

<sup>163</sup> *Id.* These 700T trains were co-developed by Central Japan and West Japan Railway Companies, and were modified to accommodate for the topography of Taiwan's high-speed lines, including an exterior

separates existing conventional railway lines with specifically-designed high-speed lines. Moreover, the Taiwanese high-speed network links only the major cities, while access to the smaller towns runs on existing railroad lines.<sup>164</sup>

A unique environmental feature of Taiwan's rail system is the construction of dedicated crossings for animals.<sup>165</sup> As part of this arrangement, the environment surrounding the high-speed tracks will include the re-planting of uprooted trees and plants.<sup>166</sup> The THSRC expects 163,000 passengers to use the high-speed line on a daily basis, but the newer trains are slated for 300,000 passengers.<sup>167</sup> It is estimated that by 2030, 336,000 passengers are expected to travel on this line, and will account for 5.5% of Taiwan's transportation market.<sup>168</sup>

### iii. North America

Despite having great technological capacity in several industry sectors, the United States and Canada are showing greater interest in high-speed rail transit in specific regional corridors. Although considerable public input has been received in the past about the challenges facing the transportation sector, transportation planners in both the United States and Canada have chosen similar paths by establishing a national railway system in the form of Amtrak and Via Rail, respectively.<sup>169</sup> While high-speed rail transit has been studied over the years, lobbyist pressures from other transportation sectors have prevented this type of alternative transportation from achieving its full potential. Thus, the degree of success of high-speed rail transit depends mainly upon adequate funding for its research and development, and public policy implementation.

Similar to other regions of the world, efforts in North America to establish alternative transportation schemes (such as high-speed rail transit) have relied upon on feasibility studies, which involve extensive environmental and technical analysis. Along with these feasibility studies, moreover, changing political attitudes are fostering new forms of alternative transportation legislation. In particular, Florida is a good example of how high-speed rail transit has met with success mainly because of political support and growing public-private partnerships.<sup>170</sup>

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designed specifically for Taiwan's hotter climate). *Id.*

<sup>164</sup> *Id.*

<sup>165</sup> *Id.*

<sup>166</sup> *Id.*

<sup>167</sup> *Id.*

<sup>168</sup> *Id.*

<sup>169</sup> Soberman, *supra* note 6.

<sup>170</sup> See, e.g., History of High Speed Rail in Florida, <http://www.floridabullettrain.com/content/history.htm> (last visited Mar. 19, 2007).

*h. United States*

*The Federal Railroad Administration, State High-Speed Authorities, and Alternative Transportation Legislation*

High-speed rail transit is gaining impressive momentum in the United States. With the assistance of the federal government there is a growing recognition by state legislatures that alternative transportation schemes are desperately needed to combat traffic congestion around the country.<sup>171</sup> In 1999, a report submitted to the United States General Accounting Office outlined the general prospects and limitations of high-speed rail transit:

High-speed rail systems that travel 90 miles per hour or more are a common mode of ground transportation throughout Europe and Japan. The systems in operation have proven to be a relatively safe and effective means of transportation. Most systems receive some operating or capital subsidies from their governments. While high-speed rail is not in widespread use in the United States, these systems may be an effective alternative in corridors where travel is increasing and it is difficult to expand highway and airport capacity. However, high-speed rail systems are costly, and thus ridership levels may not be high enough in the United States for systems to cover their cost.<sup>172</sup>

In populous states such as California, Florida, and Texas, high-speed rail transit is quickly becoming a popular choice of alternative transportation policy and planning.<sup>173</sup> As part of this growing initiative, municipal governments seek to link various cities and states to not only ease traffic congestion, but also to help promote tourism and economic integration, similar to European Union efforts.<sup>174</sup> In making high-speed rail transit a reality, state authorities have developed a strong partnership with the federal government to establish high-speed rail transit.<sup>175</sup>

The Federal Railroad Administration (FRA) is the main federal agency responsible for implementing high-speed rail transit measures.<sup>176</sup> In 1998, Congress enacted the Transportation Equity Act for the 21<sup>st</sup> Century as a means

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<sup>171</sup> U.S. General Accounting Office, Report to the Chairman, Committee on the Budget, House of Representatives, Surface Infrastructure High-Speed Rail Projects in the United States 1 (Jan. 14, 1999), <http://www.gao.gov/archive/1999/rc99044.pdf> [hereinafter U.S. GAO Report]. At the time, this report was prepared by Phyllis F. Scheinberg, Associate Director, Transportation Issues. *Id.*

<sup>172</sup> *Id.*

<sup>173</sup> See, e.g., History of High Speed Rail in Florida, *supra* note 170.

<sup>174</sup> North Carolina Department of Transportation Rail Division, *Feasibility Study Summary, Executive Summary*, available at <http://sehsr.org/reports/feasibility/chapter1.html>. (last visited Oct. 19, 2007).

<sup>175</sup> See, e.g., Boston to Montreal High-Speed Rail Planning and Feasibility Study Phase I, Final Report, available at [http://www.nh.gov/dot/bureaus/railandtransit/documents/FinalReport4-30-03Boston-MontrealHSR\\_complete.pdf](http://www.nh.gov/dot/bureaus/railandtransit/documents/FinalReport4-30-03Boston-MontrealHSR_complete.pdf) (April 2003) [hereinafter High-Speed Rail Corridors].

<sup>176</sup> Federal Railroad Administration, <http://www.fra.dot.gov/us> (last visited Mar. 19, 2007). The FRA is a unit of the Department of Transportation, and was created by the Department of Transportation Act of 1966. Federal Railroad Administration, About the FRA, <http://www.fra.dot.gov/us/Content/2> (last visited Sept. 17, 2007).

to earmark over \$218 billion over 6 years for surface transportation projects for state and local authorities.<sup>177</sup> In particular, section 1218 of the Act describes the National Magnetic Levitation Transportation Technology Deployment Program.<sup>178</sup> Administered by the FRA, this program's objective is to introduce high-speed magnetic levitation technology in the commercial sector, and to apply it to high-speed lines approximately 40 miles in length.<sup>179</sup>

Such initiatives would serve as test runs for longer distance high-speed corridors. Section 7201 of the Act relates to the High Speed Rail Development, which allocates funds for corridor planning and technology improvements.<sup>180</sup> The Transportation Equity Act also includes environmental protection measures which evaluate how traffic congestion can be mitigated and how air quality can be improved.<sup>181</sup> These measures also focus on traffic flow improvement strategies and ozone standards.<sup>182</sup>

Under this initiative, a Project Description would be submitted by the various states and their authorities for: (1) projected environmental effects; (2) construction costs of equipment, operations, and maintenance; (3) feasibility studies in the form of estimates of ridership and revenues; (4) an implementation schedule; and (5) a management and financial plan involving public and private partnerships.<sup>183</sup> Thereafter, a multi-disciplinary committee from the federal Department of Transportation reviews the Project Descriptions, and recommends to the Secretary of Transportation which of these projects should receive federal funding for preconstruction planning.<sup>184</sup> Federal funding comprises \$55 million for preconstruction planning on the most promising projects, and up to \$950 million for the final construction of a guideway.<sup>185</sup>

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<sup>177</sup> Transportation Equity Act for the 21st Century, Pub. L. No. 105-178, §1218, 112 Stat. 107, 216-219 (1998). Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) was enacted on June 9, 1998 as Public Law 105-178, and passed by the 105<sup>th</sup> Congress. *See id.*; *see also* U.S. Dept. of Transp., <http://www.fhwa.dot.gov/tea21/sumtoc.htm> (last visited Mar. 16, 2007); Fed. Railroad Admin., Magnetic Levitation Technology Deployment Program, <http://www.fra.dot.gov/us/content/567> (last visited Mar. 19, 2007).

<sup>178</sup> Transportation Equity Act for the 21st Century § 1218.

<sup>179</sup> *Id.*

<sup>180</sup> U.S. Dept. of Transp., TEA-21 Transportation Equity Act for the 21<sup>st</sup> Century, A Summary – Rebuilding America's Infrastructure, <http://www.fhwa.dot.gov/tea21/suminfra.htm#hsrd> (last visited Mar. 16, 2007); Transportation Equity Act for the 21st Century § 7201.

<sup>181</sup> U.S. Dept. of Transp., TEA-21 Transportation Equity Act for the 21<sup>st</sup> Century, A Summary – Protecting Our Environment, <http://www.fhwa.dot.gov/tea21/sumenvir.htm> (last visited Mar. 16, 2007).

<sup>182</sup> *Id.*

<sup>183</sup> Fed. Railroad Admin., Magnetic Levitation Technology Deployment Program, Chapter 6, <http://www.fra.dot.gov/us/content/585> (last visited Mar. 19, 2007).

<sup>184</sup> *Id.*

<sup>185</sup> *Id.* The federal funds must be matched 1/3 or 2/3 by state, local, or private contributions. *Id.* To be eligible for federal funds, the high-speed project must demonstrate that the operating revenues must exceed operating costs, and that the total benefits must be greater total costs over a 40 year period. *Id.* Applications for various projects were submitted by various states or their transportation planning authorities. *Id.* In May 1999, seven projects were chosen for a one-year program of preconstruction planning to assess the potential of high-speed rail transit. *Id.* Several sponsors participated in this program, including: (1) Los Angeles, CA; (2) Cape Canaveral, FL; (3) Atlanta, GA, to Chattanooga, TN; (5) New Orleans, LA; (6) Baltimore, MD, to Washington, DC; (8) Las Vegas, NV, to Anaheim, CA; and (9) Pittsburgh, PA. *Id.*

At present, eleven major high-speed rail transit projects are being planned by the FRA throughout the United States, including the corridors of:

- (1) Pacific Northwest (from Eugene, Oregon to Vancouver, British Columbia);
- (2) California (from Sacramento to San Diego);
- (3) Chicago Hub Network (including several cities in Illinois, Indiana, Minnesota, Wisconsin, Missouri, Michigan, and Ohio);
- (4) South Central (including cities in Texas, Oklahoma, and Arkansas);
- (5) Gulf Coast (including Houston, parts of Louisiana, Mississippi, Alabama, and Georgia);
- (6) Florida;
- (7) Southeast (including North Carolina and South Carolina);
- (8) Keystone (including Pennsylvania, District of Columbia, and Maryland);
- (9) Empire State, Northern New England, and Northeast (including New York, Massachusetts, Connecticut, and Montreal, Québec).<sup>186</sup>

The FRA invites federal, state, and local authorities to consider the environmental impact of proposed development plans in various communities throughout the United States.<sup>187</sup> This includes cooperation and consultation with other federal agencies such as the Surface Transportation Board, the Federal Highway Administration, and the Bureau of Land Management.<sup>188</sup> The general public actively participates in this process by commenting on proposed developmental plans, from which the FRA issues an Environmental Impact Statement (EIS).<sup>189</sup> The EIS is part of a larger federal administrative procedure under the National Environmental Policy Act (NEPA).<sup>190</sup> As part of this broad

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<sup>186</sup> U.S. Dept. of Transp., Fed. Railroad Admin., Chronology of High-Speed Rail Corridors, <http://www.fra.dot.gov/us/content/618> (last visited Feb. 4, 2007). The Northern New England corridor includes sections within Vermont between White River Junction and the Canadian border using the New England Central Railroad and Canadian National rights-of-way. High-Speed Rail Corridors, *supra* note 175. The Northern New England corridor is unique because of its link with Canada. *See id.* In fact, a final report of Phase 1 of the Boston to Montreal High Speed Rail Feasibility and Planning Study was sponsored in 2003 by a three-way partnership between the states of Vermont, New Hampshire, and Massachusetts. *Id.* The study concluded that a further evaluation of the Boston to Montreal corridor is needed, and the three states are finalizing an interstate agreement to provide matching funds with the Federal Railroad Administration for Phase 2 of the study. *Id.*

<sup>187</sup> *See, e.g.*, Fed. Railroad Admin., Environment, <http://www.fra.dot.gov/us/content/33> (last visited Sept. 27, 2007).

<sup>188</sup> Fed. Railroad Admin., DesertXpress – Las Vegas to Victorville, <http://www.fra.dot.gov/us/content/1703> (last visited Mar. 19, 2007) [hereinafter DesertXpress].

<sup>189</sup> *See* “Train Horn Rule Glossary,” [http://www.fra.dot.gov/downloads/safety/train\\_horn\\_rule/definitions\\_121603.pdf](http://www.fra.dot.gov/downloads/safety/train_horn_rule/definitions_121603.pdf) (last visited Sept. 17, 2007). The Environmental Impact Statement (EIS) is an integral part of the National Environmental Policy Act, which requires a thorough examination of project development projects studied and assessed by federal and state authorities to determine the relative impact each development project has on surrounding environments. *See id.*

<sup>190</sup> *See* National Environmental Policy Act, 42 U.S.C. § 4321 (2006); U.S. Environmental Protection Agency (EPA), National Environmental Policy Act (NEPA), <http://www.epa.gov/compliance/nepa/index.html> (last visited Mar. 19, 2007). The National Environmental Policy Act (NEPA) is a federal statute enacted by Congress in 1969. 42 U.S.C. § 4321. NEPA requires federal agencies to incorporate environmental impacts into their administrative decisions. U.S. Environmental Protection Agency (EPA), *supra* note 190. The U.S. EPA reviews and comments on EIS’s prepared by other federal agencies, maintains a national filing system for EIS’s, and ensures compliance of regulations. *Id.*

federal environmental procedural framework, the EIS is normally produced as a draft prior to being fully implemented as a proposed development plan.

The FRA follows its own environmental procedures and ensures that any development complies with federal, state, and local environmental laws and regulations, while giving advance notice to affected communities by publishing notices in the Federal Register.<sup>191</sup> These environmental reviews consider whether the development plan can follow reasonable alternatives, mitigation measures, or not be permitted to proceed at all.<sup>192</sup>

Federal legislation designed to support high-speed rail transit in the United States traces to the early 1990's.<sup>193</sup> On December 18, 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA) was enacted to have the U.S. Department of Transportation (DOT) designate five high-speed rail corridors, including: (1) Washington D.C.-Charlotte, North Carolina; (2) Tampa – Orlando – Miami; (3) Chicago – Detroit – Milwaukee – St. Louis; (4) Eugene, Oregon – Seattle – Vancouver, B.C.; (5) San Diego – Los Angeles – Bay Area – Sacramento.<sup>194</sup>

The ISTEA legislation allocated \$30 million in federal funds for conducting feasibility studies and a grade crossing hazard program for the five corridors.<sup>195</sup> The grade crossing program was intended to reduce the number of accidents at railway-highway intersections.<sup>196</sup> Thereafter, in 1992 several regional high-speed corridors were announced for the Chicago Hub Network, Florida, California, Southeast, and the Pacific Northwest.<sup>197</sup>

In 1994, the Swift High Speed Rail Act was enacted by Congress, which provided funding for research, development, and carefully-chosen demonstration projects for high-speed rail technology.<sup>198</sup> These projects involved a joint

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<sup>191</sup> See U.S. Gov't. Printing Office, The Federal Register – Main Page, <http://www.gpoaccess.gov/fr/index.html> (last visited Mar. 19, 2007). The Federal Register is a daily publication of rules, proposed rules, and notices of federal agencies and organizations including executive orders and presidential documents. *Id.*

<sup>192</sup> Fed. Railroad Admin., Environmental Impact Assessment, <http://www.fra.dot.gov/us/content/249> (last visited Mar. 19, 2007).

<sup>193</sup> See, e.g., High-Speed Rail Corridors, *supra* note 175.

<sup>194</sup> *Id.* See also National Conference of State Legislatures, Environment, Energy, and Transportation Program, High Speed Trains for the United States? History and Options, Transportation Series No. 2 (March 1996), available at <http://www.ncsl.org/programs/transportation/transer2.htm> [hereinafter National Conference Transportation]. The 5 corridors were chosen for their potential for ridership and state interest in adopting high-speed rail transit. High-Speed Rail Corridors, *supra* note 175. This designation prompted various safety features of railway travel to be brought to the forefront, including grade crossing elimination, warning device improvements and new high-speed train technology. *Id.*

<sup>195</sup> National Conference Transportation, *supra* note 194.

<sup>196</sup> *Id.*

<sup>197</sup> *Id.* On October 15, 1992, Secretary of Transportation Andrew H. Card, Jr. announced the designation of the Midwest corridor for Chicago, IL, St. Louis, MO, and Milwaukee, WI. *Id.* On October 16, 1992, the federal government announced the designation for Florida link between Orlando and Tampa. *Id.* On October 19, 1992, the federal government designated the California corridor between Los Angeles with the Bay area, and Sacramento via the San Joaquin Valley. *Id.* On October 20, 1992 the federal government designated the Southeast corridor between North Carolina, Richmond, VA, and Washington, D.C. *Id.* On October 20, 1992, FRA Administrator Gil Carmichael announced the designation for the Pacific Northwest corridor between Portland, OR with Seattle, WA, and Vancouver, BC, Canada. *Id.*

<sup>198</sup> *Id.* In 1995, around \$20 million was applied towards research and development of high-speed, non-electric locomotives that were capable of reaching 125 mph, as well as developing train control systems

venture between the Federal Railway Administration (FRA) and the states.<sup>199</sup> On June 9, 1998, Congress enacted the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) as a means to designate additional regional corridors.<sup>200</sup>

Also in 1998, the Transportation Infrastructure Finance and Innovation Act (TIFIA) was enacted as a means to fund large infrastructure projects involving high-speed rail transit.<sup>201</sup> The TIFIA provisions allow federal funds to flow to state authorities interested in pursuing major high-speed ground transportation projects.<sup>202</sup> More specifically, three credit instruments under TIFIA are applied towards funding up to one-third of the costs, including: (1) secured loans; (2) loan guarantees; and (3) lines of credit.<sup>203</sup> Generally, state transportation authorities may receive federal funds through four main sources: (1) High-Speed Rail program; (2) the Magnetic Levitation Transportation Technology Deployment program; (3) the Railroad Rehabilitation and Improvement Financing program; and (4) the finance provisions under the Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA).<sup>204</sup>

The rising popularity of high-speed rail transit in the United States can be revealed with a brief discussion of high-speed rail transit in the states of Florida, California, Texas, and Pennsylvania. These states have developed the basic foundation for establishing high-speed travel in similar ways, particularly through feasibility studies, environmental assessments reviews, and joint partnerships between federal and state transportation authorities.<sup>205</sup> The trend of high-speed rail transit has much to do with the political will of the states and federal government, as well as the private sector in harnessing the technology to apply alternative transportation measures.

### *Florida*

In 1976, the Florida Legislature formally mandated the Florida Transit Corridor Study to determine the feasibility of introducing high-speed rail transit between Daytona Beach and St. Petersburg.<sup>206</sup> In 1982, Florida Governor Bob Graham visited Japan and was so impressed with the Japanese Shinkansen high-speed rail transit system that he formally created Florida High Speed Rail Committee.<sup>207</sup> In 1984, the state enacted the Florida High Speed Rail Transportation Commission Act, which established a seven-member body that

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technology, and grade crossing protection. *Id.*

<sup>199</sup> *Id.*

<sup>200</sup> *Id.*

<sup>201</sup> U.S. GAO Report, *supra* note 171, at 3. The Transportation Infrastructure Finance and Innovation Act (TIFIA) helps states access capital from federal funds to leverage private investments, but only for large infrastructure projects costing at least \$100 million or 50 percent of a state's federal-aid highway apportionment for the preceding fiscal year. *Id.* at 2.

<sup>202</sup> *Id.*

<sup>203</sup> *See id.* at 4.

<sup>204</sup> *Id.* at 3.

<sup>205</sup> *See, e.g.*, High-Speed Rail Corridors, *supra* note 175.

<sup>206</sup> History of High Speed Rail in Florida, <http://www.floridabulletrain.com/content/history.htm> (last visited Mar. 19, 2007).

<sup>207</sup> *Id.*

was responsible for high-speed rail planning among various corridors.<sup>208</sup>

Thereafter, in 1992, the Florida Legislature enacted the High Speed Rail Act to transfer responsibility from the High Speed Rail Committee to the Florida Department of Transportation (FDOT).<sup>209</sup> The Act also streamlined the franchise and certification process, and limited the use of real estate development as a means for project funding.<sup>210</sup> To this day, the Act serves as a foundation for legislative action within the framework of developing Florida's alternative transportation policy. Between 1995 and 1996, FDOT issued its Request for Proposal (by inviting prospective applicants), and eventually selected the FOX consortium to build a new grade separated, dedicated high-speed rail system connecting Miami, Orlando, and Tampa.<sup>211</sup>

In 2001, Florida enacted the Florida High Speed Rail Authority Act to respond to mounting transportation challenges in a state experiencing a steady increase in population.<sup>212</sup> Largely in response to angry demands from state residents who were concerned about increasing traffic congestion, Florida enacted an Amendment to the Florida Constitution for High Speed Ground Transportation System.<sup>213</sup> In November 2000, the Florida legislature encouraged the development of a high-speed rail transit system by November 1, 2003, that

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<sup>208</sup> *Id.* By 1988, two major proposals were presented by Florida TGV Inc. and the Florida High Speed Rail Corporation. *Id.* The first proposal included the recommendation to use the French TGV train (traveling at speeds up to 170 mph) would be used. *Id.* The total cost of this project was estimated at \$2.2 billion, with a ridership capacity of 5.8 million per year. *Id.* The second proposal suggested that the Swedish built ABB X2000 train technology be introduced with tilt capabilities. *Id.* The proposal had emphasized that extensive real estate development rights would be required to finance the system. *Id.* These two proposals confirm the various approaches used in arriving at a decision to build high-speed, such as with TGV technology or tilting trains. *Id.*

<sup>209</sup> *Id.* In 1995, the Florida Department of Transportation (FDOT) approved funding of \$70 million per year for the next thirty years. *Id.*

<sup>210</sup> *See id.*

<sup>211</sup> *See id.* The FOX consortium consists of Fluor Daniel, Odebrecht Contractors, Bombardier, and GEC Alstom. *Id.* The capital cost for this project was estimated at \$6.1 billion, with a ridership capacity projected at 8.5 million per year. *Id.* The FOX consortium proposed to finance the system with mostly debt financing with bonds fully repaid from system revenues, coupled with Florida's annual contribution of \$70 million. Moreover, an additional \$350 million in equity funding would be given by four FOX partner affiliates. *Id.*

<sup>212</sup> *See* Fla. High Speed Rail Auth. Act, FLA. STAT. § 341.8202(1)(a) (2007).

<sup>213</sup> *See* The High Speed Rail Amendment to the Florida Constitution, <http://www.floridabullettrain.com/content/amend.htm> (last visited Mar. 19, 2007). More specifically, the Amendment to the Florida Constitution, Article X, Section 19, outlines the legislative purpose of the high-speed rail transit system, and states: "To reduce traffic congestion and provide alternatives to the traveling public, it is hereby declared to be in the public interest that a high speed ground transportation system consisting of a monorail, fixed guideway or magnetic levitation system, capable of speeds in excess of 120 miles per hour, be developed and operated in the State of Florida to provide high speed ground transportation by innovative, efficient and effective technologies consisting of dedicated rails or guideways separated from motor vehicular traffic that will link the five largest urban areas of the State as determined by the Legislature and provide for access to existing air and ground transportation facilities and services. The Legislature, the Cabinet and the Governor are hereby directed to proceed with the development of such a system by the State and/or by a private entity pursuant to state approval and authorization, including the acquisition of right-of-way, the financing of design and construction of the system, and the operation of the system, as provided by specific appropriation and by law, with construction to begin on or before November 1, 2003." *Id.*, FLA. CONST., art. X, § 19. (NOTE: this provision of the Florida Constitution was repealed effective January 4, 2004).

would link the five largest urban areas in the state.<sup>214</sup> The system encourages private entities to work with state authorities in developing such a system primarily through the awarding of contracts to contractors who were required to cooperate with passenger rail providers, commuter rail authorities, and public transit providers.<sup>215</sup>

Overseeing the implementation of this Act is the Florida High-Speed Rail Authority, which consists of nine voting members chosen from the Governor, the President of the Senate, and the Speaker of the House of Representatives.<sup>216</sup> The governing body is also authorized to seek and obtain federal matching funds as a means to plan, finance, and maintain the high-speed rail transit system.<sup>217</sup> The Florida Transportation Commission, the Department of Community Affairs, and the Department of Environmental Protection are actively involved in providing technical and scientific information in efforts to assist the governing body.<sup>218</sup> More specifically, the Department of Environmental Protection analyzes the environmental impact of the high-speed train system on surrounding communities and ecosystems, and expedites the necessary environmental permits in the process.<sup>219</sup>

Considering that Florida's population will double over the next 25 years, marketing plans (devised by companies in the high-speed train sector) are

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<sup>214</sup> See FLA. STAT. § 341.8202(1)(a). Pursuant to §341.827, the initial segments of the system will operate between the St. Petersburg area, the Tampa area, and the Orlando area, with future service to the Miami area. FLA. STAT. § 341.827 (2007). Additionally, subsequent segments of the high-speed rail system will connect Port Canaveral/Cocoa Beach, Ft. Pierce, West Palm Beach, Ft. Lauderdale, Daytona Beach, St. Augustine, Jacksonville, Ft. Myers/Naples, Sarasota/Bradenton, Gainesville/Ocala, Tallahassee, and Pensacola. *Id.* In 2003, four proposals were submitted by: (1) et3.com; (2) Fluor Bombardier; (3) Georgia Monorail Consortium; and (4) Global Rail Consortium. History of High Speed Rail in Florida, *supra* note 170. Two of the proposals, Fluor Bombardier and Global Rail Consortium, were responsive to the Request for Proposal. *Id.* Later in October 2003, the Florida High Speed Rail Authority ultimately approved Fluor Bombardier as the preferred applicant (Proposer). *Id.*

<sup>215</sup> FLA. STAT. § 341.834(2).

<sup>216</sup> See *id.* § 341.821. Pursuant to § 341.821(2)(a)(1)-(3), the first three members of this governing body must have a background in environmental science, the legislative process, and business. *Id.* § 341.821(2)(a)(1)-(3). The next three members must have backgrounds in civil engineering, and the remaining three members must have backgrounds in law and business. *Id.* In a February 5, 2002 letter addressed to the Honorable Frederick Dudley (Chairman of the Florida High Speed Rail Authority) from Senators Bob Graham and Bill Nelson, it was revealed how Congress and the state of Florida cooperates by having federal funding of state high-speed rail projects. Letter from Bob Graham and Bill Nelson, Senators, to the Frederick Douglas, Chairman of the Florida High Speed Rail Authority (Feb. 5, 2002), available at [http://www.floridahighspeedrail.org/downloads/Letter\\_from\\_%20SenatorsBGrahamBNelson.pdf](http://www.floridahighspeedrail.org/downloads/Letter_from_%20SenatorsBGrahamBNelson.pdf). More specifically, the letter states, "We are very pleased that we were able to assist the Authority by gaining approval in the fiscal 2002 appropriation bill for the Department of Transportation of a \$3 million appropriation in furtherance of your efforts. The program from which that money flows can be a source of additional study funds in the future. We will also continue to work to enhance Federal funding opportunities for High Speed Rail in Florida." *Id.* Earlier on August 6, 2001, Chairman Dudley of the Florida High speed Rail Authority passed Resolution Number 01-1 Regarding Support for Federal High Speed Rail Funding, in which the Florida Congressional Delegation was urged to support the "High-Speed Rail Investment Act" for the purpose of providing \$12 billion across the United States in capital funding for the construction of high-speed rail systems. Resolution Number 01 -1, Regarding Support for Federal High Speed Rail Funding, available at [http://www.floridahighspeedrail.org/downloads/Resolution\(Aug.6,2001\)](http://www.floridahighspeedrail.org/downloads/Resolution(Aug.6,2001)).

<sup>217</sup> FLA. STAT. § 341.822.

<sup>218</sup> *Id.* at §341.824(1).

<sup>219</sup> *Id.* at §341.824(3).

essential in supplementing feasibility studies.<sup>220</sup> For example, the Fluor-Bombardier Marketing Plan, which outlines a plan for the high-speed link between the international airports of Tampa and Orlando, provides a management plan for the operations and maintenance for a high-speed train system.<sup>221</sup> The marketing plan summarizes the benefits and challenges that high-speed rail faces in terms of reducing travel times:

The availability of High Speed Rail Service in the marketplace can be seen as both a source of competition and complimentary to existing transportation options. High Speed Rail poses no direct competition to international or interstate air travel, but will compete directly with air travel in the common markets that it serves. Air travel may provide faster flight plan times, but once airport access, check-in, security and baggage claim wait times are factored in, the total travel time by rail is very competitive.<sup>222</sup>

The Tampa-Orlando High Speed Rail link will utilize Bombardier's JetTrain technology.<sup>223</sup> As part of a public-private partnership in high-speed rail development, the JetTrain technology is a byproduct of a joint development partnership with the Federal Railroad Administration.<sup>224</sup> In terms of providing benefits, the Fluor-Bombardier project estimates to produce \$2.5 billion in total revenue, \$813 million in employment earnings, and 6,790 jobs during the 5-year construction phase.<sup>225</sup> Such a project aims to develop partnerships with other transportation service providers, resorts, and travel attractions. This is significant considering that many observers argue that high-speed rail transit will take away jobs from existing transportation sectors.

As part of its objective in building high-speed rail projects, the Florida High Speed Rail Authority Act exclusively adopts environmental preservation and conservation principles.<sup>226</sup> For instance, section 341.8202(1)(a) states:

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<sup>220</sup> FLUOR-BOMBARDIER, FLORIDA HIGH SPEED RAIL MARKETING PLAN, PHASE 1 TAMPA-ORLANDO 2 (October 2003), <http://www.floridabullettrain.com/content/plan.pdf> [hereinafter FLOUR-BOMBARDIER MARKETING PLAN]. In October 2002, both Fluor and Bombardier submitted a joint proposal to participate in the high speed rail network to connect Orlando and Tampa Bay. *Id.* Fluor Corporation is a company that is publicly owned and provides engineering, construction, and maintenance services. *See* Fluor, <http://www.fluor.com/about/default.asp> (last visited Mar. 16, 2007) (Fluor has expanded its operations to petrochemical, infrastructure, and environmental projects). Bombardier is headquartered in Montreal, Quebec. Bombardier, <http://www.bombardier.com/> (last visited Sept. 9, 2007).

<sup>221</sup> FLOUR-BOMBARDIER MARKETING PLAN, *supra* note 220, at 10. The Tampa-Orlando high-speed line would include 14 daily round trips between Tampa and Orlando international airports, and not less than 8 shuttle roundtrips per day. *Id.* Service hours would be between 6 a.m. and 11 p.m. *Id.* Stations are planned for Tampa, Lakeland, Disney, and Orlando. *Id.* Joint sales and marketing programs exist to include website links and special packages offering high-speed tickets at reasonable prices for tourists. *Id.* These marketing schemes will be pursued with local area resorts and hotels, as it is thought that the largest potential market segment for high-speed rail service exists for passengers traveling between the Orlando and Tampa Bay corridor. *Id.*

<sup>222</sup> *Id.* at 7.

<sup>223</sup> *Id.* at 10. The marketing plan states: "A key objective was to develop a meaningful alternative to the unsightly and often cost-prohibitive practice of electrification of railroad right-of-ways." *Id.*

<sup>224</sup> *Id.*

<sup>225</sup> *Id.* at 8.

<sup>226</sup> *See, e.g.*, FLA. STAT. § 341.8202(1)(a) (2007).

The implementation of a high-speed rail system in the state will result in overall social and environmental benefits, improvements in ambient air quality, better protection of water quality, greater preservation of wildlife habitat, less use of open space, and enhanced conservation of natural resources and energy.<sup>227</sup>

Thus, the Florida legislation is couched in very comprehensive public land use and environmental protection measures. The Florida legislation also encourages a public-private partnership in planning and financing the high-speed rail transit system.<sup>228</sup> The Florida legislation also provides legal recourse for those citizens opposed to the Florida High Speed Rail Authority's decision to install and operate a high-speed rail network.<sup>229</sup> Section 341.829 of the Florida High Speed Rail Authority Act states: ". . . any person who disagrees with the alignment decision must file a complaint with the authority within 20 days after the authority's final adoption of the alignment."<sup>230</sup>

Florida's approach to high-speed projects demonstrates the degree of legislative commitment towards applying high-speed rail transit for the practical benefits of reducing traffic congestion and also encouraging environmental awareness and protection. Florida's transportation statutes are tightly interwoven with broader federal statutes that require strict compliance with regulations. While Florida acknowledges its tourism industry as a key motivator for planning for high-speed rail transit development, the project also promotes environmental sustainability.

### *California*

Being the most populated state in the United States, California has embarked upon an aggressive environmental approach in adopting high-speed rail transit.<sup>231</sup> The California High-Speed Rail Authority (CHSRA) is the main state body responsible for planning, designing, and building high-speed rail transit system in California.<sup>232</sup> The most recent plan involving high-speed rail transit includes a connection between the northern cities of San Francisco, Oakland, and Sacramento, with the southern cities of Los Angeles and San Diego.<sup>233</sup> Depending on the physical terrain, this high-speed network is planned to include exclusive tracks that are fully grade-separated, either in open trench or tunnel, or on elevated guideways.<sup>234</sup> The high-speed train line will be built within or

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<sup>227</sup> *Id.*

<sup>228</sup> *Id.* at § 341.8202(3).

<sup>229</sup> *See id.* at § 341.829(2).

<sup>230</sup> *Id.*

<sup>231</sup> *See, e.g.*, California High-Speed Rail Authority, Welcome!, <http://www.cahighspeedrail.ca.gov/> (last visited Feb. 14, 2007).

<sup>232</sup> *Id.* This authority was established in 1996 and consists of 9 members (5 appointed by the Governor, 2 appointed by the Senate Rules Committee, and 2 by the Speaker of the Assembly). *Id.*

<sup>233</sup> *Id.* The bullet trains would operate at speeds up to 220 mph, with the estimated time travel between Los Angeles and downtown San Francisco under 2.5 hours. *Id.*

<sup>234</sup> California High Speed Rail Authority, Appendix A, Mitigation, Monitoring, and Reporting Plan for

adjacent to existing railways.<sup>235</sup>

An important partnership has developed between the CHSRA and the Federal Railroad Administration in providing environmental assessments for high-speed rail transit within the state.<sup>236</sup> For instance, the latest Environmental Impact Report and Statement (EIR/EIS) released by the CHSRA (CHSRA report) summarizes the benefits that high-speed trains would provide for Californians:

- (1) being approximately 2-3 times less costly than expanding highways and airports to serve the enormous travel demands;
- (2) improving intercity transportation by easing growing demand on highways and airports;
- (3) allowing to carry as many as 68 million passengers yearly by 2020;
- (4) energy efficiency;
- (5) quick travel times;
- (6) provide low passenger costs per mile;
- (7) being safer and more reliable than highway and air travel, while offering a new choice in intercity travel<sup>237</sup>; and
- (8) connecting existing airports and transit terminals along high-speed train corridors.<sup>238</sup>

The CHSRA report illustrates how highway capacity would be insufficient to accommodate the growth in travel expected in future years.<sup>239</sup> Considering that many of California's existing highways and airports are already reaching their capacity, the prospect of introducing alternative transportation schemes like high-speed trains is certainly practical.<sup>240</sup> Given the rising construction costs often associated with maintenance of highways and airports, not to mention the maintenance costs for buses and taxis, the costs related to building and maintaining newer forms of technology like high-speed trains certainly come into question. For instance, in 2003 the CHSRA report estimated the total costs of construction for the entire California high-speed project at over \$33 billion.<sup>241</sup>

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the California High-Speed Rail Program EIR/EIS 2-3, 5-6, [http://www.fra.dot.gov/downloads/RRDev/appendix\\_a-mmmp.pdf](http://www.fra.dot.gov/downloads/RRDev/appendix_a-mmmp.pdf) (last visited Mar. 19, 2007) [hereinafter California Reporting Plan].

<sup>235</sup> *Id.* at 4.

<sup>236</sup> *See, e.g.*, CALIFORNIA HIGH-SPEED PLAN, *supra* note 50, at 2.

<sup>237</sup> *Id.* The California High-Speed Rail Authority explicitly stated that due to 22-year safety record in both Europe and Japan, the high-speed train concept is the "preferred alternative." *Id.* at 6.

<sup>238</sup> *Id.* at 2. This new high-speed rail transit system is planned to be over 700 miles in length, with trains capable of traveling at speeds up to 220 mph. *Id.* The EIS helps comply with the federal mandate under the National Environmental Policy Act (NEPA) and the state mandate (California Environmental Quality Act). *Id.* at 6. More specifically, Section 21081.6 of the California Environmental Quality Act requires public agencies to adopt a reporting or monitoring program when a project is approved. California Reporting Plan, *supra* note 234. This includes mitigation measures such as improving traffic flow, reducing travel times, coordinate with public and private agencies, watering active construction sites, and clean surrounding construction sites. *Id.*

<sup>239</sup> *See, e.g.*, CALIFORNIA HIGH-SPEED PLAN, *supra* note 50, at 2-3.

<sup>240</sup> *See id.* at 3.

<sup>241</sup> *Id.* The 2007-07 state budget provides for \$14.3 million to start implementing the financial plan, project management activities, identification of critical rights-of-way acquisitions, and project design and environmental studies. *See generally* California High-Speed Rail Authority, [http://www.cahighspeedrail.ca.gov/whats\\_new/](http://www.cahighspeedrail.ca.gov/whats_new/) (last visited Mar. 19, 2007). Here, the bond funding for the project must still be authorized by voters in 2008. *Id.*

Aside from changing demographics, the CHSRA report also reveals several negative environmental impacts associated with society's dependence upon existing modes of transport, including:

- Increased energy use and dependence on petroleum
- Increased emissions of air pollutants
- Impacts on property and land uses
- Increased suburban sprawl
- Impacts to wetlands and biological resources
- Effects on cultural resources, such as historic sites
- Impacts on water quality
- Impacts on park lands<sup>242</sup>
- Noise and vibration impacts<sup>243</sup>

These environmental considerations are commonly used to promote the use of high-speed rail transit in the form of feasibility studies.

Keeping in line with the economic integration theme of high-speed rail transit found in other countries, the latest high-speed corridor plan that links California and Nevada includes a proposal by DesertXpress Enterprises, LLC to connect Victorville, California, with Las Vegas, Nevada in a 170-mile long interstate high-speed line.<sup>244</sup> This plan is privately financed, and involves construction of a fully grade separated, dedicated double track that would be set apart from existing railroad lines for about 30 miles.<sup>245</sup>

#### *Texas*

The state of Texas began serious plans to build high-speed trains in the late 1980's. During that period, the Texas Turnpike Authority (TTA) was directed by the Texas Legislature to conduct a feasibility study for the "Texas Triangle" between Dallas-Houston, Dallas-San Antonio, and San Antonio-Houston.<sup>246</sup> Later, through legislative efforts of the 71<sup>st</sup> Legislature, the Texas High Speed Rail Authority ("Texas Authority") was created in 1989.<sup>247</sup> The purpose of the Texas Authority was to determine whether high-speed rail transit was in the public interest, and to award the most qualified applicants to help build such a project.<sup>248</sup> Similar to the Florida bidding process, franchise applications were submitted and reviewed by the Texas Authority by various firms interested in developing the high-speed projects.<sup>249</sup>

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<sup>242</sup> See California High-Speed Plan, *supra* note 50, at 4.

<sup>243</sup> *Id.* at 5.

<sup>244</sup> DesertXpress, *supra* note 188.

<sup>245</sup> *Id.*

<sup>246</sup> Texas High Speed Rail Authority, An Inventory of Records at the Texas State Archives, 1970-95, Texas Archival Records Online, <http://www.lib.utexas.edu/taro/tslac/20071/tsl-20071.html>, (last visited Mar. 19, 2007). This feasibility study began in February 1988. *Id.* In July 1989, the Texas Turnpike Authority (TTA) determined that, under certain assumptions, high-speed transit would be feasible. *Id.*

<sup>247</sup> *Id.* The Texas Authority consisted of 11 members, from which were chosen by the governor 3 members of the public, and the rest of the members with experience in metropolitan transit and regional transportation authority sectors. *Id.*

<sup>248</sup> See *id.*

<sup>249</sup> *Id.* Here, letters of intent are submitted by potential applicants. On July 19, 1990, two letters of intent

On January 31, 1992, the Texas Authority awarded a franchise agreement to Texas TGV Consortium to build a high-speed rail system.<sup>250</sup> The franchise agreement required that an independent feasibility study be conducted for viewing by the public as to the potential of high-speed travel.<sup>251</sup> In order to comply with the requirements under the National Environmental Policy Act (NEPA), the franchise agreement also required that an Environmental Impact Statement (EIS) be prepared.<sup>252</sup> The preparation of an EIS would be part of a multi-step process involving public meetings in communities affected by the high-speed project.<sup>253</sup> A key feature of the franchise agreement involved the Baseline Implementation Plan, which focused on the financing, engineering, designing, program management, and construction of the high-speed rail project.<sup>254</sup>

Texas planned to develop high-speed rail transit in the early 1990's, but primarily due to opposition from interest groups such as Southwest Airlines, the Texas TGV project, which proposed to connect Houston, Dallas, and San Antonio in 1991, was discarded in 1994.<sup>255</sup> However, in recent times, a unique partnership has been developing between the airline industry and high-speed transit companies.<sup>256</sup> For instance, the Texas High Speed Rail and Transportation Corporation (THSRTC) has motivated large airline carriers such as American Airlines and Continental Airlines to join the group in efforts to create a passenger collector system as part of the airport transportation sector.<sup>257</sup> This cooperation between transportation authorities and the airline industry represents a change considering that these two groups were once at odds with respect to introducing alternative transportation planning.

### *Pennsylvania*

The state of Pennsylvania participates in the Maglev Deployment Program, which is a broad federal initiative to introduce Maglev high-speed trains in various states.<sup>258</sup> The Pennsylvania High-Speed Maglev project is a 54-mile line connecting Pittsburgh International Airport with downtown Pittsburgh (and

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were submitted by Texas FasTrac and Texas TGV Consortium to the Texas High Speed Rail Authority. *Id.*

<sup>250</sup> *Id.*

<sup>251</sup> *See id.*

<sup>252</sup> *Id.* Woodward-Clyde Consultants, Inc. was selected by the Texas High Speed Rail Authority to prepare the EIS. *Id.*

<sup>253</sup> *Id.* At each public meeting, representatives of the Texas High Speed Rail Authority, Woodward-Clyde Consultants, Inc., and Texas TGV were in attendance to answer questions. *Id.* Some representatives from the Federal Railroad Administration (FRA) were also present at these meetings. *Id.* Over 4,000 people attended a series of meetings in both urban and rural communities. *Id.*

<sup>254</sup> *Id.* The Baseline Implementation Plan was submitted on March 25, 1993. *Id.*

<sup>255</sup> Steve Jacobs, *High-Speed Trains of Europe*, BUSINESSWEEK ONLINE, Jun. 13, 2006, [http://www.businessweek.com/globalbiz/content/jun2006/gb20060613\\_790699.htm](http://www.businessweek.com/globalbiz/content/jun2006/gb20060613_790699.htm).

<sup>256</sup> *See, e.g.*, Texas High Speed Rail and Transportation Corporation, <http://www.thsrc.com> (last visited Mar. 19, 2007).

<sup>257</sup> *Id.*

<sup>258</sup> *See* Magnetic Levitation Technology Deployment Program, *supra* note 177.

Monroeville and Greensburg) with multiple modal stations.<sup>259</sup> Like other state transportation authorities, this federal-state partnership employs various administrative procedures such as the Environmental Impact Statement (EIS).<sup>260</sup> The Pennsylvania Maglev project issued an EIS draft in September 2005, with the public commenting on December 7, 2005.<sup>261</sup>

The EIS draft revealed several aspects of the quality of environmental assessment upon lands surrounding potential high-speed projects.<sup>262</sup> For instance, the EIS draft discussed the impact of construction in terms of air emission, vibration, water quality, and excavation waste.<sup>263</sup> The cost of the Pennsylvania Maglev project is estimated to be \$3.5 billion.<sup>264</sup>

*i. Canada*

In 1969, the Canadian Transport Commission (CTC) first studied the prospect for high density travel corridors in the provinces of Ontario and Québec.<sup>265</sup> Since then, as Canada's population has grown considerably in various corridors, including those in Ontario, Quebec, and western Canada, high-speed rail transit is gaining popularity in developing alternative transportation policies.<sup>266</sup> During the 1970's and 1980's, the Canadian Institute of Guided Transport published a report entitled 'Alternatives to Air', which considered the possibility of ground transportation schemes serving as an alternative to the airline industry.<sup>267</sup>

In 2004, the federal Minister of Transport introduced the Sustainable Development Strategy, a concept envisioned for developing sustainable transportation system throughout Canada.<sup>268</sup> This strategy was important because for the first time it integrated environmental considerations within transportation policy planning.<sup>269</sup> As part of this initiative, the Sustainable Development Strategy included public-private partnerships as a means to create "an integrated, coherent transportation policy framework".<sup>270</sup> Like the United States, the political will is growing steadily in recognizing that high-speed rail transit could become part of Canada's transportation sector. Similar to other

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<sup>259</sup> Federal Railroad Administration, Passenger Rail (2007), <http://www.fra.dot.gov/us/content/1196>.

<sup>260</sup> Pennsylvania High-Speed Maglev Project, <http://www.portauthority.org/PAAC/Portals/Capital/maglev/magFrame.asp> (last visited Sept. 20, 2007).

<sup>261</sup> Federal Railroad Administration, Passenger Rail (2007), <http://www.fra.dot.gov/us/content/1196>. See generally Draft Environmental Impact Statement (DEIS) (2005), <http://www.portauthority.org/PAAC/Portals/Capital/DEIS/DEISFrame.asp> (containing the Pennsylvania Maglev project's draft EIS).

<sup>262</sup> See *id.*

<sup>263</sup> *Id.*

<sup>264</sup> Pennsylvania High-Speed Maglev Project, *supra* note 260.

<sup>265</sup> Soberman, *supra* note 6, at 2.

<sup>266</sup> See *id.*

<sup>267</sup> See Comtois and Rodrigue, *supra* note 5. The Canadian Institute of Guided Transport is located at Queen's University in Kingston, Ontario. See Study of Professional and Technical Transportation Training in Canada (2005), <http://www.tc.gc.ca/pol/en/report/research/TransportationTraining/1e-02.htm>. Since 1994, however, the Institute has ceased operations. *Id.*

<sup>268</sup> CANADIAN ALTERNATE TRANSPORT, *supra* note 75, at 2-3

<sup>269</sup> See *id.*

<sup>270</sup> *Id.* at 3; see *id.* at 5-6. (providing definition of Environmentally Sustainable Transport System).

countries, Canadian transportation authorities are relying upon feasibility studies to trigger the process in building high-speed rail service, particularly in specific regional corridors.

#### *Ontario and Quebec*

The corridor between the provinces of Ontario and Québec represents the most heavily populated region of Canada with Ontario home to 12.69 million people and Québec containing 7.65 million people.<sup>271</sup> In 1989, the governments of Ontario and Québec created the Québec-Ontario Rapid Train Task Force.<sup>272</sup> This task force, with the cooperation of the federal government, conducted a six million dollar feasibility study to assess whether high-speed trains should be introduced in densely populated corridors.<sup>273</sup> Like Florida, the task force members, along with independent consultants, traveled to Europe, Japan, and the United States to observe high-speed rail transit currently in operation.<sup>274</sup>

At present there is a strong interest in developing a modern high-speed train service for the Québec-Windsor corridor.<sup>275</sup> The benefits associated with the Québec-Windsor corridor project include reduced traffic congestion on highways and airports, environmental protection, and employment creation in the manufacturing and construction sectors.<sup>276</sup> In particular, the environmental benefits are estimated to reduce carbon dioxide emissions (thought to be the cause of ozone depletion in the atmosphere) from vehicles consuming fuel.<sup>277</sup>

#### *Alberta*

The Government of Alberta has conducted several feasibility studies on the prospect of introducing high-speed rail transit, especially between the Calgary-Edmonton corridor (which is home to 2.2 million citizens).<sup>278</sup> However, the recent economic surge in Alberta, has seen a large increase in population, and has therefore raised issues about transportation safety in the province's corridors.<sup>279</sup> In response to these transportation issues, the Government of

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<sup>271</sup> Market Demographics, Ontario's thriving markets, [http://www.2ontario.com/welcome/oomp\\_505.asp](http://www.2ontario.com/welcome/oomp_505.asp) (last visited Mar. 16, 2007) (discussing population figures provided by the 2006 census).

<sup>272</sup> Soberman, *supra* note 6.

<sup>273</sup> *Id.*

<sup>274</sup> *Id.*

<sup>275</sup> *See id.*

<sup>276</sup> *Id.*

<sup>277</sup> *Id.*

<sup>278</sup> *See* TD Bank Financial Group, The Calgary-Edmonton Corridor – Take Action Now to Ensure Tiger's Roar Doesn't Fade, TD Economics Special Report, Apr. 22, 2003, <http://www.td.com/economics/special/alta03.pdf>. A study conducted by TD Bank Financial Group adequately summarizes the potential that exists for incorporating high-speed rail transit into Alberta's alternative transportation policy, and states: "The Calgary-Edmonton Corridor is Canada's Western Tiger. Over the past decade, the region has registered explosive real economic growth and population increases, surpassing rates chalked up in the Northern American urban centers . . . Given all of its assets, the Corridor enjoys enormous potential . . . The adverse impact of sprawl on a society is considerable. Because public transit is relatively expensive in low-density suburban areas, sprawl contributes to increased reliance on roads, worsening overall transport problems, and increased congestion and pollution." *Id.*

<sup>279</sup> *See id.* at 3.

Alberta, Transport Canada, the Department of Western Economic Diversification, and several federal agencies have all funded the Van Horne Institute to conduct a preliminary feasibility study for possible high-speed transit service between Calgary and Edmonton.<sup>280</sup>

In October 2004, the Van Horne Institute concluded that high-speed rail transit would benefit the corridor between Calgary and Edmonton by generating between \$3.7 billion and \$6.1 billion (Canadian dollars) in overall benefit, particularly if Bombardier's Jet Train technology is utilized.<sup>281</sup> More specifically, the Van Horne Institute also indicated that high-speed rail would generate revenue for both the federal and provincial government through income taxes on construction, as well as corporate taxes.<sup>282</sup>

Bombardier's Jet Train technology is eco-friendly in that a non-electric locomotive uses turbine engines to generate power, rather than from a diesel engine.<sup>283</sup> As part of this feasibility study, the Van Horne Institute focused on two main "user benefits" associated with high-speed rail: (1) travel time and (2) cost savings relative to existing transportation modes.<sup>284</sup> The estimated travel time between Calgary and Edmonton with high-speed rail transit would save 20 minutes compared to conventional vehicles traveling by road.<sup>285</sup>

The Van Horne Institute further elaborated that operating costs of the high-speed transit system would cost approximately \$72 million.<sup>286</sup> The Van Horne Institute also focused on the impact of high-speed trains on other transportation sectors.<sup>287</sup> In particular, the Institute noted that both Greyhound and Red Arrow (which are busing companies operating throughout Canada) may be adversely affected through loss of employment, unless they re-orient their business to link with feeder services to high speed rail.<sup>288</sup>

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<sup>280</sup> Economic Development Research Group, Calgary-Edmonton: Socio-Economic Benefits (2004), [http://www.edrgroup.com/edr1/consulting/2\\_8/p129-calgary-edmonton-train.shtml](http://www.edrgroup.com/edr1/consulting/2_8/p129-calgary-edmonton-train.shtml). The EDR is a consulting firm formed in 1996 that focuses on high technology methods of economic development. *See generally* Economic Development Research Group: About us, [http://www.edrgroup.com/edr1/about\\_us/index.shtml](http://www.edrgroup.com/edr1/about_us/index.shtml) (last visited Oct. 23, 2007). The EDR gathers information and conducts economic analysis to evaluate current economic development projects in both the public and private sectors, including government agencies. *Id.* The EDR generally focuses on 3 issues: (1) Market Analysis; (2) Economic Strategy; and (3) Cost-Benefit Analysis. *Id.*

<sup>281</sup> *See* Bombardier, [www.bombardier.com/en/0\\_0/0\\_0\\_1\\_6\\_2.html](http://www.bombardier.com/en/0_0/0_0_1_6_2.html) (last visited Mar. 19, 2007) (providing general background information of Bombardier's JetTrain technology). Bombardier, Inc. is a global corporation headquartered in Montreal, Quebec, Canada, and is a leading transportation manufacturer of regional aircrafts and business jets to rail transportation equipment. *See generally* Bombardier, [www.bombardier.com/en/0\\_0/0\\_0\\_1\\_6\\_1.html](http://www.bombardier.com/en/0_0/0_0_1_6_1.html) (last visited Mar. 19, 2007) (providing general background information of Bombardier).

<sup>282</sup> College Transportation Consulting and Economic Development Research Group, Inc., *Chapter 10 – Socio-Economic benefits*, in CALGARY/EDMONTON HIGH SPEED RAIL – AN INTEGRATED ECONOMIC REGION 111 (Oct. 2004), available at <http://www.edrgroup.com/pages/pdf/Alberta-HSR-Socio-Economic-Impact.pdf> [Hereinafter *Van Horne Report*].

<sup>283</sup> Railway-Technology.com, Bombardier Unveils Jet Train Technology (Oct. 15, 2002), <http://www.railway-technology.com/contractors/suburban/bombardier5/press19.html>.

<sup>284</sup> *Van Horne Report*, *supra* note 282, at 92.

<sup>285</sup> *Id.* at 94.

<sup>286</sup> *Id.* at 112.

<sup>287</sup> *See id.* at 106.

<sup>288</sup> *Id.* at 106.

Thus, there is an acknowledgement that existing transportation sectors may be affected if high-speed rail service is introduced. But the Institute also recognizes that loss of employment in existing sectors will translate to new jobs in the high-speed rail industry.<sup>289</sup> Ultimately, however, it is the political will of both the provincial and federal governments, and the impact of feasibility studies that will determine whether Alberta will embrace high-speed rail transit.

## VII. CONCLUSION

High speed rail transit is quickly gaining popularity as a key alternative in transportation policy planning. With concerns over traffic congestion, longer commute times, and increasing levels of pollution, public pressure has mounted and caused a noticeable thawing in legislators' reluctance to introduce major reforms to passenger rail service in order to break free from the technological fixation with existing transportation schemes such as airplanes, cars, and buses. Several nations are actively promoting cleaner forms of transportation technology to enhance the modern travel experience for its citizens. Given the rise of other forms of alternative energy such as wind, solar, and biomass energy, it is no wonder that alternative energy has met with success in the transportation sector.

The evolution of high-speed trains has involved growing partnerships between federal and local transportation authorities, along with technology companies, to help establish newer high-speed rail projects to modernize the transportation sector. This public-private partnership allows funding for various projects, but also helps create economic integration among various regions. Interestingly enough, many high-speed rail projects around the world were created as a means to promote international events. Here, tourism has played a key role in developing high-speed rail service. Given the demographic pressures placed upon existing transportation sectors, the tourism industry can serve major international airports and tourist destinations by transporting commuters to connecting hotels and train stations, while reducing dependence upon existing transport carriers that would reduce traffic congestion.

Efforts at promoting high-speed rail transit also signal the environment's importance. High-speed rail transit now represents an alternative to existing forms of transportation that have traditionally relied heavily upon fossil fuel technology. As many nations have found, the advantage of adopting high-speed rail transit is that its energy derives from cleaner forms of nuclear energy, and not from traditional fossil fuels. Environmental assessments are routinely conducted prior to establishing high-speed rail projects, mainly because of the need to protect local communities and wildlife from adverse effects. These environmental assessments supplement feasibility studies that are often reviewed by transportation authorities. So important are these environmental considerations that many jurisdictions around the world are enacting legislation with strict environmental compliance measures.

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<sup>289</sup> *Id.*

The recent success of high-speed rail transit has much to do with the woefully inadequate services of existing transportation sectors and demographic pressures on the world's cities and towns. But this success will largely depend upon the political will of nations to promote high-speed rail transit. Together with the private sector and transparent administrative procedures that incorporate strong environmental considerations, high-speed rail transit will continue to grow, and soon will become a fixture in the context of transportation law and policy planning.