



BETTERBRICKS  
Bottom line thinking on energy.

## THE CARBON FACTOR: NEEA SCREENS POTENTIAL OFFICE SITES BY CARBON IMPACT OF EMPLOYEE COMMUTES

With a name like the Northwest Energy Efficiency Alliance (NEEA), it was a sure bet that our search for new office space would consider the energy and carbon implications of potential sites. In an assessment of possible locations for our growing staff, we pondered two central questions – how could we emit the least amount of carbon to get our employees to work, and how could our offices use the least amount of energy possible?

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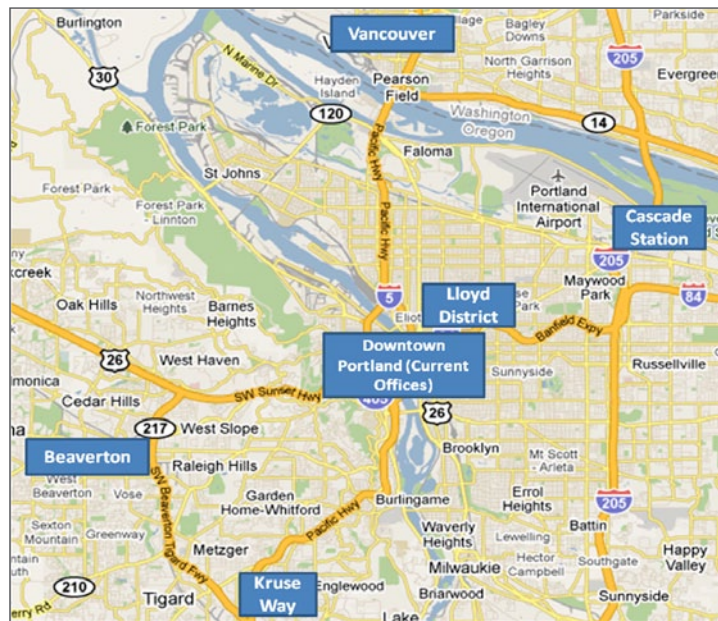
– Lloyd Johson, NEEA Consultant

Many organizations today are exploring the second question as part of their office searches, as evidenced by the growing demand for energy-efficient, “green” buildings. Tenants simply expect more from their facilities –

more efficient lighting and equipment, environmentally sensitive materials and construction practices, and healthier indoor air – as they develop and implement sustainability initiatives. This market shift ties directly to the work of NEEA’s commercial building initiative, BetterBricks, which aims to build awareness and demand for energy efficiency in buildings, providing practical, comprehensive information to move the market toward higher-performing real estate.

However prevalent energy efficiency and green building best practices are becoming, fewer organizations are making conscious efforts to reduce the energy and greenhouse gas emissions associated with their employees’ commutes. In search of a new lease in the Portland, Oregon metro area, NEEA analyzed different potential submarkets, from downtown to outlying areas, and the carbon implications of our employees’ commutes to and from each location. Said Lloyd Johnson, the NEEA consultant leading the leasing project, “You simply have to get your employees to and from work, and it just makes sense to do it in the way that it is least impactful on the environment.”

The analysis was based on six possible locations – downtown Portland, the Lloyd District, Cascade Station, Vancouver, Beaverton, and Kruse Way – several of which we were considering for our offices, and some that were selected for demonstration purposes only. Lloyd calculated the distance from each employee’s home to each of the six locations using common GPS tools, and turned these distances into annual mileage based on the average number of in-office working days across the organization (minus weekends, holidays, vacations, business travel, and flex days). These annual driving distances were used as the commuting mileage baseline.



But not all employees drive to work. Especially in a sustainability-minded organization like NEEA – and in a bike- and mass transit-friendly area like Portland – alternative methods of commuting are common. Lloyd

surveyed each of NEEA’s forty employees individually to assess the methods they would use to get to each of the possible locations: car, bus, light rail, bicycle, walking, or a combination. With only forty employees, it was easy to walk around to people’s desks with a laptop and spend five minutes taking each through the survey, but larger organizations could develop a simple survey instrument.

For occasions when mass transit would be used, Lloyd also factored in how far the employee would need to drive to the bus stop or rail station, if at all. It was assumed that any potential site, no matter the submarket, would be within three or four blocks from mass transit lines. Sites without public transportation would have such a high carbon footprint in terms of employees’ commutes that they weren’t even an option for us.



Several NEEA employees commute by bike

In a customized spreadsheet tool, Lloyd calculated the carbon associated with employees’ commutes to each of the six locations based on their selected modes of transportation. Automobile carbon emissions per mile were calculated using a single average figure from the U.S. Environmental Protection Agency’s greenhouse gas inventory ([www.epa.gov/climatechange/emissions/usinventoryreport.html](http://www.epa.gov/climatechange/emissions/usinventoryreport.html)); bus and light rail emissions used the World Resources Institute Greenhouse Gas Protocol calculation tool ([www.ghgprotocol.org/calculation-tools](http://www.ghgprotocol.org/calculation-tools)) for transportation. We could have introduced other layers of complexity into the analysis – for example, by factoring in the specific types of cars that employees drive, or the additional mileage of a bus commute versus a rail commute – but we determined that without those factors, the results would still be meaningful enough to use as a screening tool.

In fact, they were (see chart). It turned out that a downtown or Lloyd District location would have the lowest daily carbon impact by far – less than 500 pounds, compared with 746 to 930 for the other four options. From these results, we essentially narrowed our search to those two areas, where nearly a quarter of our employees would be able to walk or bike to work, compared with less than 10 percent for the other four sites. Without even looking at rental rates, we were able to rule out certain parts of town.

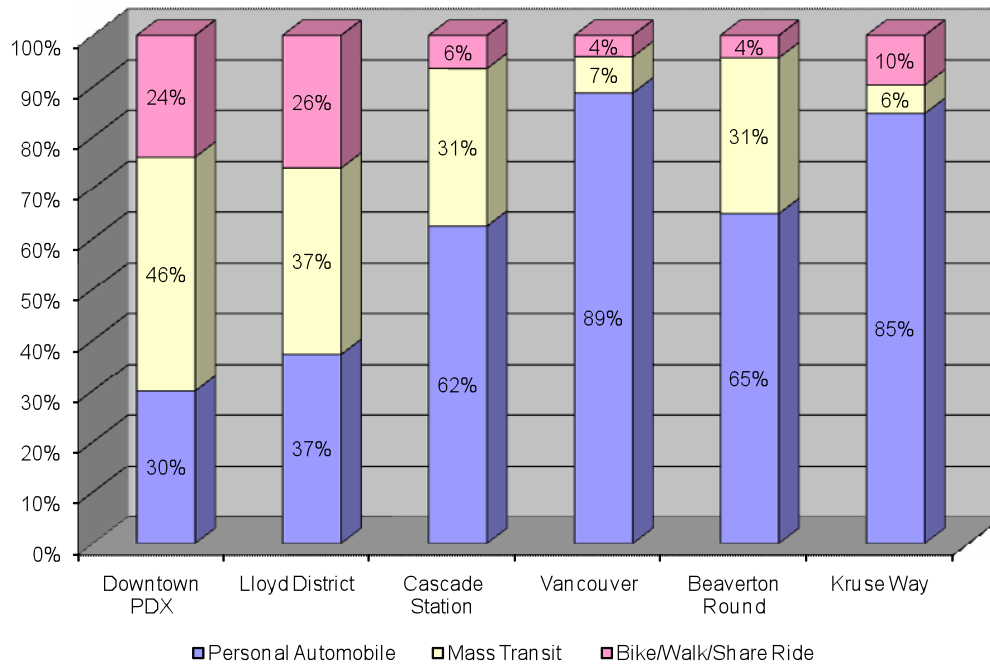
### Carbon Emissions From Employee Commuting

	Downtown Portland	Lloyd District	Cascade Station	Vancouver	Beaverton Round	Kruse Way
Personal car	38,539	47,606	123,047	180,228	119,335	162,815
Mass transit	51,360	45,230	25,171	4,912	24,164	6,599
Bike/walk	0	0	0	0	0	0
Annual lbs carbon	89,899	92,836	148,218	185,139	143,500	169,414
Daily lbs carbon	465	476	746	930	749	883

Employee satisfaction was another factor that helped rule out certain areas. With some further-out locations, employees joked that instead of commuting via any method of transportation, they’d just go out and find a new job. In reality, we realized that to maintain satisfaction and quality of life, we would have to offer a convenient location with multiple transportation options.

Even though the suburban sites may have been near public transportation nodes, the number of employees who would have elected to use mass transit to get there was drastically smaller than those who would use mass transit to get downtown. Public transit into the suburbs might take longer, so most

## Frequency of Commuting Methods



employees would simply drive. On the other hand, as one might expect, the inconvenience of taking a car into the city would lead more employees to find another way downtown. From this rose an intriguing conclusion: the location closest to the most employees' homes was not necessarily the location with the lowest carbon footprint.

Lloyd also performed an interesting calculation: how much carbon emissions do NEEA employees prevent by using other forms of transportation besides personal autos? In the top two locations, the avoided emissions would be in the range of 30,000 pounds of CO<sub>2</sub> annually (equivalent to planting 350 trees or powering a typical home for a year).

Wherever employees may have had the option to take either the train or the bus, many inquired which would be more carbon-friendly. Light rail was found to be less carbon-intensive per commuting mile than the bus, and in fact, in some cases, driving to the train station may have been less carbon intensive than walking to the bus.

So how did the other initial question – the energy performance of the selected office building itself – factor into our decision-making

**“A top priority is a space where our suite’s energy usage can be separately metered and monitored; another is being in a building with a sharp management team that is knowledgeable about high performance buildings.”**

process? This particular analysis assumed the same building in each of the potential locations, which simplified the process to hone in on commuting but obviously isn't realistic. NEEA is exploring various options to find the best-performing building in the most carbon-friendly location while staying within budget. We are looking at buildings that are already ENERGY STAR labeled for superior energy performance, along with options where simple retrofits and improvements could immediately enhance efficiency upon move-in. A top priority is a space where our suite's energy usage can be separately metered and monitored; another is being in a building with a sharp management team that is knowledgeable about high performance buildings.



Mass transit in Portland, Oregon

Ultimately, the carbon impact of employees' commutes is one of many factors in the search (other factors are viewable at <http://neesuitesearch.wordpress.com/whats-important-in-an-office-space/>), but it carries considerable weight because of NEEA's organizational commitment to transit, bike accessibility, and sustainability. Would other organizations need to go through this thorough of an analysis? Maybe not, unless they were tracking and reporting carbon emissions at an organizational level – in which case it would be imperative.

Obviously there are limitations to the methodology. For example, staff will change over time, and their home locations have a lot to do with the results (for simplicity we assumed that the current distribution of their home locations is representative of any future distribution). But the methodology and lessons learned can still be valuable.

In fact, the broker helping NEEA find our space said that he would love to be able to provide this type of comparable information to his other clients, as more and more people are asking about commuting miles and environmental impacts. But currently, most commuter programs and resources focus reducing emissions from commuting to an already-established business location: pre-tax transit pass subsidies, preferred parking for carpools, incentives for hybrid vehicles. Actually choosing an office location based on its potential carbon impact is truly groundbreaking.

**To learn more about NEEA's search for new space, visit <http://neesuitesearch.wordpress.com/>**