

0.75	0.50	0.40	0.48

Route	Average Travel Cost (\$)				Average Travel Time (h)				Convenience (Score 1-10)				Extra Services (Score 1-10)				Effect on Environment (GHG in KG)				Overall Index per Route (0-1)			
Anaheim - Las Vegas	\$10.99	\$120.40	\$195.03	-	6h 03m	5h 42m	3h 57m	-	8.5	6.5	6.0	-	8.3	6.7	5.0	-	13.60	81.32	59.48	-	0.65	0.45	0.4	-
Eugene - San Jose	\$103.50	\$224.40	\$347.34	\$84.00	15h 09m	6h 43m	8h 47m	16h 45m	7.5	6.5	6.0	8.0	8.3	3.3	5.0	7.5	28.94	162.64	126.62	34.37	0.8	0.5	0.45	0.75
Eugene - Seattle	\$32.75	\$68.20	\$578.96	\$57.00	7h 08m	3h 02m	4h 29m	12h 36m	8.5	6.5	6.0	8.0	8.3	5.0	5.0	7.5	14.52	80.46	63.54	17.25	0.9	0.5	0.4	0.65
LA - Portland	\$115.50	\$112.33	\$215.31	\$120.00	22h 30m	4h 31m	14h 23m	29h 22m	8.5	6.5	6.0	8.0	8.3	7.5	5.0	7.5	49.64	287.19	217.20	58.95	0.85	0.65	0.4	0.55
LA - Sacramento	\$29.50	\$92.73	\$146.92	\$73.00	9h 30m	3h 20m	5h 54m	13h 49m	8.5	6.5	6.0	8.0	8.3	7.5	5.0	7.5	19.88	127.97	86.97	23.61	0.9	0.55	0.4	0.6
LA - Seattle	\$95.50	\$130.73	\$560.16	\$122.00	27h 00m	4h 48m	16h 58m	33h 46m	8.5	6.5	6.0	8.0	8.3	7.5	5.0	7.5	58.55	330.63	256.17	69.53	0.9	0.55	0.4	0.6
Las Vegas - Portland	\$109.50	\$152.27	\$380.49	-	28h 11m	7h 22m	15h 22m	-	8.0	6.5	6.0	-	8.3	6.7	5.0	-	49.90	262.79	218.32	-	0.65	0.5	0.35	-
Las Vegas - San Francisco	\$40.50	\$107.27	\$196.81	-	17h 20m	6h 14m	8h 56m	-	8.0	6.5	6.0	-	8.3	6.7	5.0	-	29.35	142.52	128.43	-	0.65	0.5	0.35	-
Las Vegas - Seattle	\$117.50	\$158.40	\$605.32	-	33h 24m	7h 50m	16h 57m	-	8.0	6.5	6.0	-	8.3	6.7	5.0	-	57.47	298.53	251.44	-	0.65	0.5	0.35	-
Los Angeles - Las Vegas	\$12.25	\$70.40	\$165.92	-	5h 18m	3h 05m	4h 00m	-	8.5	6.5	6.0	-	8.3	5.8	5.0	-	13.90	81.32	60.83	-	0.65	0.5	0.35	-
Los Angeles - Palm Springs	-	\$332.50	\$124.11	\$18.00	-	3h 39m	1h 41m	-	-	6.5	6.0	7.5	-	4.2	5.0	7.5	-	36.85	24.11	6.54	-	0.3	0.5	0.7
Los Angeles - San Diego	\$12.50	\$121.73	\$117.70	\$35.10	2h 32m	2h 35m	2h 17m	2h 55m	8.5	6.5	6.0	8.0	8.3	6.7	5.0	7.5	6.18	37.66	27.04	7.34	0.95	0.4	0.5	0.65
Phoenix - Las Vegas	\$7.66	\$105.93	\$114.46	-	8h 50m	4h 32m	4h 34m	-	8.5	6.5	6.0	-	8.3	6.7	5.0	-	15.35	90.74	67.14	-	0.65	0.5	0.35	-
Phoenix - Los Angeles	\$17.25	\$79.40	\$212.34	\$122.00	6h 48m	3h 02m	5h 30m	15h 10m	8.5	6.5	6.0	6.0	8.3	5.0	5.0	7.5	19.16	127.33	83.81	22.75	0.9	0.6	0.4	0.5
Sacramento - Palm Springs	-	\$223.60	\$201.63	\$95.00	-	5h 35m	7h 28m	-	-	6.0	6.0	7.5	-	5.0	5.0	7.5	-	151.30	110.40	29.97	-	0.35	0.4	0.65
Sacramento - Portland	\$78.50	\$154.60	\$264.26	\$83.00	14h 00m	6h 44m	9h 03m	15h 33m	8.5	6.0	6.0	8.0	8.3	5.0	5.0	7.5	29.87	164.78	130.68	35.47	0.9	0.45	0.4	0.65
San Diego - Las Vegas	\$17.25	\$91.40	\$225.90	-	8h 26m	5h 45m	4h 59m	-	8.0	6.5	6.0	-	8.3	5.0	5.0	-	17.10	89.45	74.80	-	0.65	0.4	0.4	-
San Diego - Phoenix	\$27.50	\$130.27	\$177.37	\$157.65	8h 06m	5h 08m	5h 41m	24h 20m	8.5	6.5	6.0	7.0	8.3	5.0	5.0	7.5	18.28	104.65	79.98	21.71	0.9	0.55	0.4	0.6
San Francisco - LA	\$21.33	\$101.07	\$253.94	\$83.00	8h 30m	3h 36m	5h 56m	12h 24m	8.5	6.5	6.0	8.0	8.3	7.5	5.0	7.5	19.72	116.20	86.29	23.42	0.9	0.55	0.4	0.6
San Francisco - Phoenix	\$112.50	\$143.27	\$180.64	\$181.00	17h 30m	4h 56m	11h 23m	23h 30m	8.0	6.5	6.0	7.5	8.3	5.0	5.0	7.5	38.83	224.06	169.88	46.11	0.9	0.55	0.45	0.55
San Francisco - Portland	\$94.50	\$162.60	\$287.85	\$91.00	22h 18m	6h 21m	9h 51m	18h 22m	8.0	6.5	6.0	8.0	8.3	7.5	5.0	7.5	32.70	189.60	143.07	38.83	0.75	0.55	0.4	0.7
San Francisco - San Diego	\$48.50	\$107.60	\$247.02	\$105.00	12h 30m	5h 27m	8h 47m	13h 47m	8.0	6.5	6.0	7.5	8.3	7.5	5.0	7.5	25.85	154.08	113.10	30.70	0.9	0.55	0.4	0.6
San Francisco - Seattle	\$94.50	\$168.40	\$181.66	\$110.00	22h 12m	6h 02m	12h 47m	22h 46m	8.0	6.5	6.0	8.0	8.3	6.7	5.0	7.5	41.61	233.90	182.05	49.41	0.85	0.55	0.4	0.65
San Francisco- Palm Springs	-	\$177.60	\$318.66	\$81.00	-	6h 53m	7h 28m	-	-	6.5	6.0	7.0	-	7.5	5.0	7.5	-	144.88	109.72	29.78	-	0.5	0.35	0.6
San Jose - Portland	\$93.50	\$105.40	\$271.68	\$96.00	23h 12m	7h 42m	10h 20m	19h 09m	7.5	6.5	6.0	8.0	8.3	7.5	5.0	7.5	34.35	189.60	150.28	40.79	0.8	0.55	0.4	0.7
Seattle - Phoenix	\$138.50	\$158.73	\$679.91	\$213.00	37h 06m	5h 26m	21h 31m	45h 30m	8.0	6.5	6.0	6.5	8.3	5.8	5.0	7.5	72.77	381.35	318.36	86.41	0.9	0.6	0.4	0.55
Seattle - Portland	\$18.25	\$63.20	\$225.90	\$26.00	3h 54m	2h 50m	2h 47m	3h 30m	8.5	6.5	6.0	7.5	8.3	3.3	5.0	7.5	8.96	44.51	39.20	10.64	0.85	0.45	0.5	0.7
Seattle - San Diego	\$131.50	\$162.73	\$725.81	\$136.00	31h 03m	7h 20m	18h 41m	39h 09m	8.0	6.5	6.0	7.0	8.3	7.5	5.0	7.5	64.68	362.09	282.99	76.81	0.9	0.55	0.4	0.6
Tucson - LA	\$34.50	\$101.73	\$241.08	\$38.00	10h 20m	4h 29m	7h 59m	10h 00m	8.5	6.5	6.0	8.0	8.3	6.7	5.0	7.5	24.98	155.36	109.27	29.66	0.85	0.55	0.4	0.7
Tucson - Phoenix	\$12.25	\$145.00	\$116.57	-	1h 59m	2h 28m	2h 00m	-	8.5	6.5	6.0	-	8.3	5.0	5.0	-	5.82	37.88	25.46	-	0.9	0.35	0.4	-
Tucson - Sacramento	\$134.50	\$159.60	\$294.16	\$141.00	18h 27m	6h 18m	18h 41m	28h 24m	8.0	6.5	6.0	7.5	8.3	5.0	5.0	7.5	44.70	258.94	195.57	53.08	0.9	0.5	0.4	0.65
Tucson - San Diego	\$65.50	\$141.67	\$187.83	\$83.10	13h 21m	5h 39m	5h 49m	14h 31m	8.0	6.0	6.0	7.5	8.3	5.0	5.0	7.5	20.96	126.26	91.70	24.89	0.9	0.45	0.4	0.65
Overall Index per Category (0-1)	0.82	0.52	0.29	0.53	0.38	0.84	0.70	0.23	0.82	0.49	0.25	0.56	0.85	0.40	0.27	0.52	0.85	0.25	0.50	0.59	0.75	0.50	0.40	0.48

Methodology

The 2018 West Coast Travel Index is an overview of the most convenient modes of transport, for travelers journeying across the West Coast of the United States, based on a number of selected factors, including Travel Cost, Travel Time, Convenience, Extra Services and Environmental Impact. The Index consists of 32 routes across the western coast of the United States, chosen based on popularity and importance.

2018 West Coast Travel Index

In order to provide an overview of how each individual mode of transport ranked in regard to each factor, across all respective routes, a method of ranking was used to provide a better understanding of differences between all transport methods. The results for each factor, for each individual route, across the four transport methods were scored from highest to lowest, with a maximum of 4 points for the best scoring mode of transport and a minimum score of zero, should the route not exist for that means of transport. The sum of all points in for each individual transport method in each factor was then added across all routes in order to achieve the total points for that factor, identifying the internal ranking categorised for that specific factor, which was then divided by the maximum number of points achievable (= Overall Index per Category). The same procedure was then used to gain an overall rank across all factors, for all routes (= Overall Index per Route).

Lastly, an average of the points for all categories for all routes was calculated, resulting in the overall index.

Travel Cost

The average cost of travel for each respective route, across all four modes of transport. In order to calculate the average cost, the biggest transport providers on the West Coast were identified, with the three most popular being selected for the calculation of the travel cost.

To know the average cost for mode of transportation, we started by analyzing the biggest providers in the West Coast. Then, we focused on the 3 biggest travel companies (+ FlixBus for bus) and calculated the average cost per route for a single traveler. In order to keep costs consistent, all booking prices were calculated on the 22nd June for a travel date of the 24th July, and are all based on economy ticket prices.

Bus: The average price per route calculated based on following providers websites:

- Greyhound (includes \$2.50 booking fee)
- Megabus (includes a \$2.50 booking fee)
- Boltbus (includes a \$2.00 service fee)
- FlixBus (includes a \$2.00 service fee)

Train: Being the only primary provider of train transport on the West Coast, travel costs by train on the selected routes were calculated using data from Amtrak's website.

Rental Car: Based on data sourced from statista.com (2017), we identified the 3 leading car rental companies in the United States and sourced average prices for an economy class car for each specific route. The data was found on the websites of the following providers:

- Enterprise (Kia Soul or similar)
- Budget (Volkswagen Jetta or similar)
- Hertz (VW Jetta or Similar)

Flights: The flight costs are based on booking data found on each providers ticket purchase platform. Costs were retrieved on the 22th June for a travel date of 24th July with a flight time of around 12 pm. Furthermore, in addition to the cost of one ticket per person, the transport costs to the airport from the city center, and back to the city center from the airport upon arrival were also included. The following flight transport providers were selected, with cost data being retrieved from their respective booking platforms:

- United Airlines
- American Airlines
- Delta Airlines

The cost from the airport- city center and city center- airport was estimated from the Uber fare estimator (e.g. Downtown Los Angeles - Los Angeles Airport costs \$33 - Uber X option). After this cost estimation, Google maps was used to double check the route.

Travel Time

The total average time it takes from the start to the end point of travel, on each respective route, for each specific mode of transport. Calculated on the 22nd June for the 24th July, for consistent results. Travel time data sourced from each specific providers aforementioned booking websites. The providers researched for this factor are consistent with the providers used to calculate travel cost.

Convenience

A further important factor in determining the most efficient modes of transport on specific travel routes is the level of convenience a traveler experiences when taking the selected transport method. In order to calculate a 'convenience score', six factors where taken into consideration. These six factor were chosen on the basis of being relevant to a travelers level of convenience and comfortability, and consist of:

- Total number of check-in touch points
- Assistance for disabled people
- Total number of payment options
- Hand luggage size/weight included
- Permitted amount of liquid in hand luggage (in ml)

As this is a mixture of binary and non-binary factors, the total convenience score was calculated by assigning each factor a ranking of 0-10. The highest

scoring mode of transport for each given factor was awarded a total score of max. 10 points, with the points awarded decreasing for lower ranked scores, until the minimum score of 0 point was awarded. The total convenience score was calculated by multiplying each factor's individual score by a weight of 20% in order to obtain a TOTAL and RANK, as the total score consists of 5 factors.

Extra Services

This factor depicts which extra services and luxuries each mode of transport has, for each route. The extra services score is compiled of 6 main factors which can be considered extra on any specific mode of transport:

- Wi-Fi
- Drinks and Food
- Electricity/Chargers
- TV/Radio/Entertainment
- Oversize Luggage
- Restrooms

The 6 factors, which make up the total 'extra services score' are all ranked using a basic binary method. The lowest score of 0 was awarded if the service does not exist. If the service is available, the factor regarding each mode of transport is awarded a score of 0.5. If the service is not only available but also included in the overall ticket price, as purchased over the same sources used to calculate the 'Travel Cost' factors, the factor was awarded 1 full point.

As there are 6 different factors, with each one being divided into 4 types of transport, each route has a combination of 6 * 4 = 24 values. Each one of which contributes to the final score with a maximum of 10 / 24 points. Since the scale was '0, no service', '0.5 included, but exclusive' and '1 service inclusive', FlixBus multiplied each one of these values with the maximum score of 10 / 24 points and summed the total for each route, obtaining the TOTAL and RANK.

Environment

In order to compare the effect on the planet of each mode of transport, we have included an environmental factor, ranking the methods of transport based on emissions, for each respective route.

Each specific route's distance was calculated with the help of Google Maps. For car, bus and train, the distance was calculated from the city center of the first city to the city center of the destination city, with the shortest route being chosen each time.

To identify the flight distance, the radical distance (two points, straight line) was calculated, between the airports of the two cities.

When calculating the total emissions for flights, the emissions resulting from a taxi driving from the city center to the airport were included in the overall amount of emissions, as well as the emissions resulting from a taxi drive from the destination airport to the destination city center.

The emissions of 5 different factors for each transportation mode were calculated:

- Particulates: Most commonly known as aerosol when mixed with air. Particulates are a danger for the environment and health.
- Carbon Monoxide (CO): Toxic for humans.
- Hydrocarbon: Source of Greenhouse Gases (GHG). Can be found in Petroleum and Natural gases.
- Nitrogen Oxide: Causes Air pollution and Greenhouse Gases (GHG).
- Greenhouse Gases: Gas type which includes Carbon Dioxide (CO2), water vapor, Methane (CH4) or Nitrous Oxide (N2O).

For each transportation type, the emissions of each component were calculated based on the distance. The quantity emitted for each component and each transportation type were included. Regarding plane emissions, data was calculated based on the flight distance.