

APPENDIX I: COMMODITY MOVEMENTS



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INTRODUCTION

Freight rail volumes from 2012, as recorded and estimated in the IHS TRANSEARCH database for Virginia, are tabulated by major commodity types to understand freight movements.

- **Commodity Classification** - The Standard Transportation Commodity Code (STCC) is a seven-digit numeric code, categorized by 40 commodity groupings, based on physical product information used on shipping documents and published/maintained by the Association of American Railroads (AAR). A hierarchical STCC structure enables sub-totals to be produced for specific commodities¹. Although freight movements are tallied at the seven-digit STCC detail, the information summarized herein is at the aggregated two-digit level.
- **TRANSEARCH**- IHS² develops economic models for US Freight flows based on county level production data and freight data gathered from various sources. From these models, IHS develops TRANSEARCH databases tailored for a given state. These databases record the tonnage, units (carloads or truckloads), origin and destination (OD), the four-digit STCC and the route taken of freight flows entering, leaving or passing through the given state.

Year 2012 Virginia rail movements by direction (outbound, inbound, intrastate, and through) and term (defined as tons and carload units) are derived from the Virginia 2012 TRANSEARCH database. Each chapter summarizes rail movements by direction and term, and each identifies the top two-digit STCC commodity movements.

¹ For example, "01" represents "Farm Products", "011" identifies "Field Crops", "0112" indicates "Raw Cotton", etc, narrowing in specificity to a seven-digit level.

² <https://www.ihs.com/products/transearch-freight-transportation-research.html>

SUMMARY

Virginia rail movements in 2012 totaled 151 million tons³, carried within almost 2.1 million carload units, as seen in **Table I-1**. Rail movements inbound and through Virginia are much larger than other movements. Through-traffic rail movements comprise over a third of tonnage (37 percent) and units (40 percent). Inbound rail movements likewise comprise over a third of tonnage (41 percent) and units (37 percent). Outbound and intrastate rail movements were relatively small. Outbound rail movements comprised a just over a tenth of tonnage (12 percent) and units (15 percent). Intrastate movements were a tenth of tonnage (10 percent) and under a tenth of units (7 percent).

Table I-1: Rail Movements by Direction, 2012

Direction	Tons		Units (Carloads)		Tons/Unit Utilization
	Amount	Percent	Amount	Percent	Ratio
Outbound	18,256,425	12	327,996	15	56.7
Inbound	61,956,141	41	792,590	37	78.2
Intra	14,828,445	10	158,195	7	94.7
Through	56,291,706	37	860,722	40	65.4
Total	151,332,717	100	2,139,503	100	71.7

Source: IHS TRANSEARCH

³ Six million tons of through freight in the TRANSEARCH database was removed as it could not be confirmed this freight travelled through Virginia.

Major Commodity Movements – **Figure I-1** and **Table I-2** present rail commodities in Virginia (all directions) total 151 million tons, via 2.1 million carload units and top five commodities by tonnage and by units (i.e. by terms).

Figure I-1: Virginia's Major Commodities, 2012

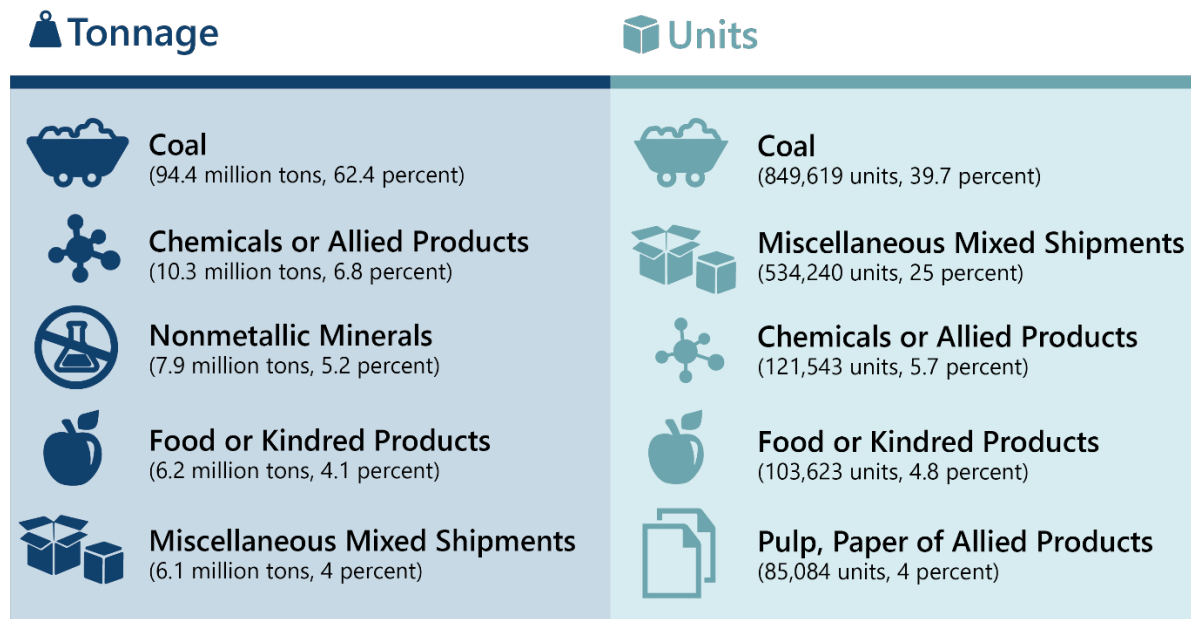


Table I-2: Rail Movement by Commodity (All Directions), 2012

STCC2	Commodity	Tons		Units (Carloads)	
		Amount	Percent	Amount	Percent
1	Farm Products	5,894,582	3.9	60,797	2.8
8	Forest Products	16,200	0.0	200	0.0
9	Fresh Fish or Marine Products	2,000	0.0	200	0.0
10	Metallic Ores	415,120	0.3	3,880	0.2
11	Coal	94,423,218	62.4	849,619	39.7
13	Petroleum Prod, Natural Gas	0	0.0	0	0.0
14	Nonmetallic Minerals	7,933,667	5.2	76,895	3.6
19	Ordinance or Accessories	15,160	0.0	712	0.0
20	Food or Kindred Products	6,229,418	4.1	103,623	4.8
21	Tobacco Products	800	0.0	80	0.0
22	Textile Mill Products	23,560	0.0	2,280	0.1
23	Apparel or Related Products	364,680	0.2	35,160	1.6
24	Logs, Lumber, Wood Prod.	2,283,584	1.5	31,952	1.5
25	Furniture or Fixtures	49,680	0.0	4,960	0.2
26	Pulp, Paper or Allied Products	4,446,828	2.9	85,084	4.0
27	Printed Matter	25,560	0.0	2,080	0.1
28	Chemicals or Allied Products	10,288,557	6.8	121,543	5.7
29	Petroleum or Coal Products	2,208,151	1.5	31,700	1.5
30	Rubber or Misc Plastics	126,560	0.1	10,400	0.5
31	Leather or Leather Products	400	0.0	40	0.0
32	Clay, Concrete, Glass or Stone	3,359,008	2.2	37,061	1.7
33	Primary Metal Products	2,685,000	1.8	33,228	1.6
34	Fabricated Metal Products	69,276	0.0	6,468	0.3
35	Machinery	39,120	0.0	3,320	0.2
36	Electrical Equipment	77,720	0.1	6,080	0.3
37	Transportation Equipment	905,039	0.6	44,260	2.1
38	Instrum, Photo Equip, Optical Eq	11,000	0.0	1,000	0.0



STCC2	Commodity	Tons		Units (Carloads)	
		Amount	Percent	Amount	Percent
39	Misc Manufacturing Products	25,440	0.0	2,640	0.1
40	Waste or Scrap Materials	3,216,683	2.1	45,279	2.1
41	Misc Freight Shipments	45,286	0.0	2,362	0.1
42	Shipping Containers	0	0.0	0	0.0
43	Mail or Contract Traffic	9,000	0.0	920	0.0
44	Freight Forwarder Traffic	0	0.0	0	0.0
45	Shipper Association Traffic	0	0.0	0	0.0
46	Misc Mixed Shipments	6,080,700	4.0	534,240	25.0
47	Small Pig Freight Shipments	9,240	0.0	880	0.0
48	Waste or Scrap Materials	52,480	0.0	560	0.0
49	Toxic Waste	0	0.0	0	0.0
	Total	151,332,717⁴	100	2,139,503	100

Source: IHS TRANSEARCH Data

⁴ Six million tons of through freight in the TRANSEARCH database was removed as it could not be confirmed this freight travelled through Virginia.



Figures I-2 and **Figure I-3** depict two-digit STCC commodities⁵ by movement types for Virginia freight rail, in terms of tonnage and units.

Figure I-2: Rail Commodity Direction by Tonnage, 2012

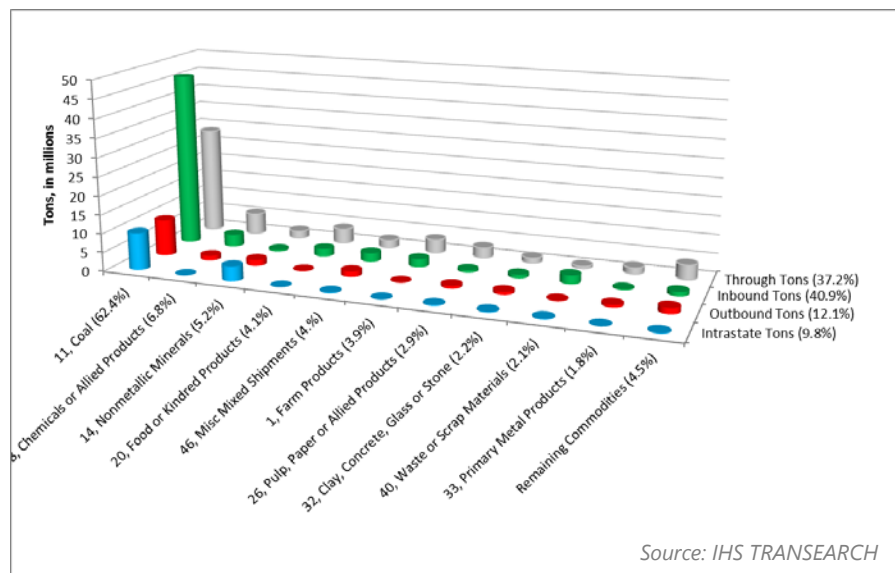
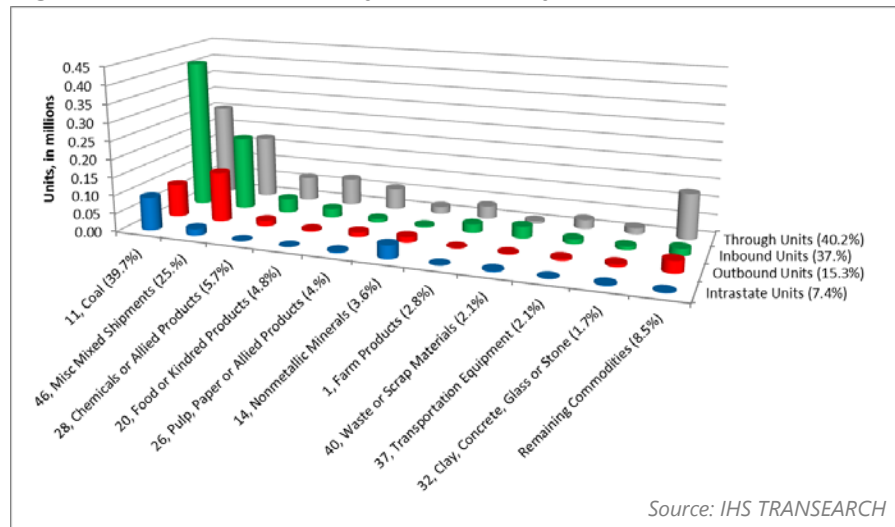


Figure I-3: Rail Commodity Direction by Unit, 2012



⁵ Note the number preceding the commodity names in the figures pertain to the two-digit STCC codes for such commodities.

RAIL OUTBOUND

Figure I-4 and **Table I-3** present outbound rail commodities from Virginia, in 2012, total 18.3 million tons, via 327,996 carload units and top five commodities.

Figure I-4: Virginia's Outbound Total, 2012

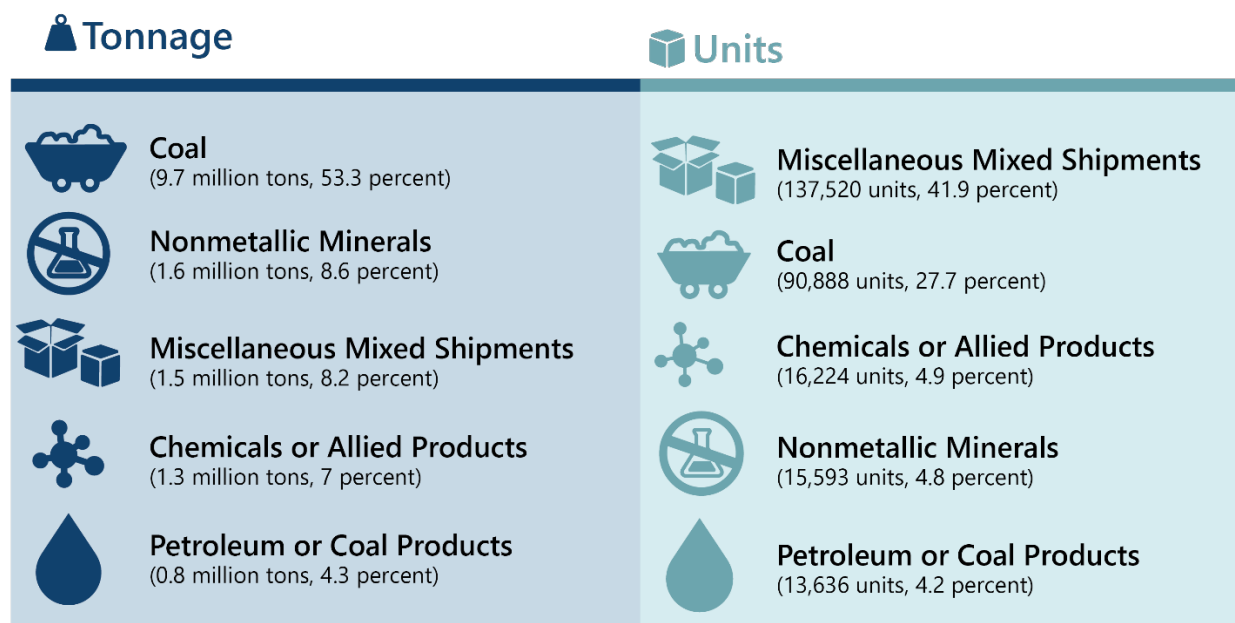


Table I-3: Rail Outbound Movements by Commodity, 2012

STCC2	Commodity	Tons		Units (Carloads)	
		Amount	Percent	Amount	Percent
1	Farm Products	72,704	0.4	1,296	0.4
8	Forest Products	6,720	0.0	80	0.0
9	Fresh Fish or Marine Products	0	0.0	0	0.0
10	Metallic Ores	271,960	1.5	2,400	0.7
11	Coal	9,731,225	53.3	90,888	27.7
13	Petroleum Prod, Natural Gas	0	0.0	0	0.0
14	Nonmetallic Minerals	1,574,659	8.6	15,593	4.8
19	Ordinance or Accessories	1,200	0.0	120	0.0
20	Food or Kindred Products	169,052	0.9	4,472	1.4
21	Tobacco Products	800	0.0	80	0.0
22	Textile Mill Products	400	0.0	40	0.0
23	Apparel or Related Products	3,440	0.0	400	0.1
24	Logs, Lumber, Wood Prod.	319,216	1.7	4,732	1.4
25	Furniture or Fixtures	800	0.0	80	0.0
26	Pulp, Paper or Allied Products	759,080	4.2	13,000	4.0
27	Printed Matter	0	0.0	0	0.0
28	Chemicals or Allied Products	1,275,744	7.0	16,224	4.9
29	Petroleum or Coal Products	781,999	4.3	13,636	4.2
30	Rubber or Misc Plastics	15,680	0.1	1,040	0.3
31	Leather or Leather Products	0	0.0	0	0.0
32	Clay, Concrete, Glass or Stone	778,104	4.3	7,813	2.4
33	Primary Metal Products	683,984	3.7	8,088	2.5
34	Fabricated Metal Products	1,996	0.0	148	0.0
35	Machinery	6,080	0.0	640	0.2
36	Electrical Equipment	7,520	0.0	720	0.2
37	Transportation Equipment	137,387	0.8	5,391	1.6
38	Instrum, Photo Equip, Optical Eq	400	0.0	40	0.0

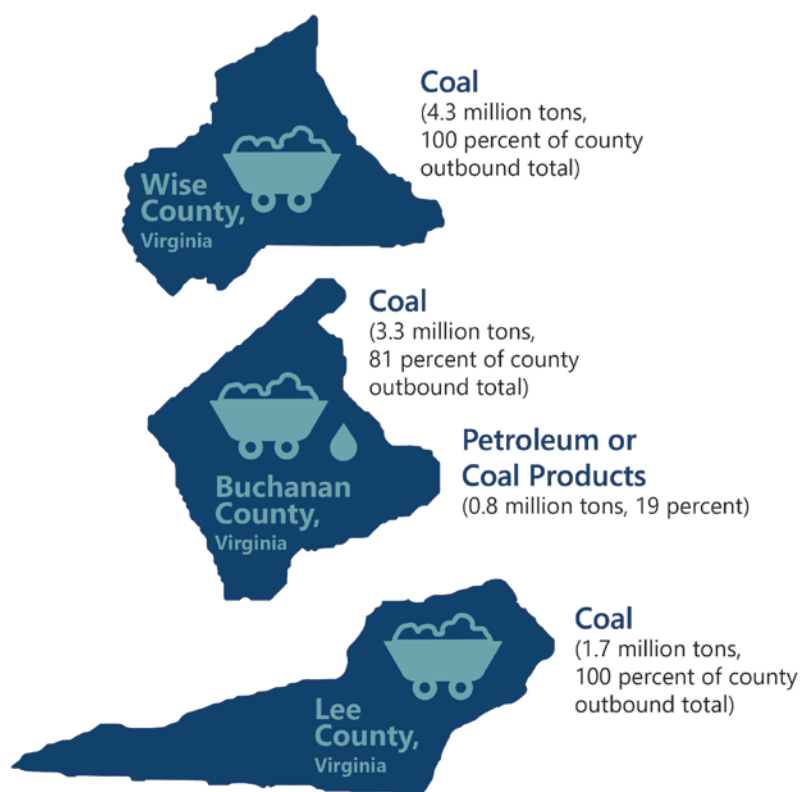
STCC2	Commodity	Tons		Units (Carloads)	
		Amount	Percent	Amount	Percent
39	Misc Manufacturing Products	2,080	0.0	160	0.0
40	Waste or Scrap Materials	141,840	0.8	2,320	0.7
41	Misc Freight Shipments	19,435	0.1	1,035	0.3
42	Shipping Containers	0	0.0	0	0.0
43	Mail or Contract Traffic	0	0.0	0	0.0
44	Freight Forwarder Traffic	0	0.0	0	0.0
45	Shipper Association Traffic	0	0.0	0	0.0
46	Misc Mixed Shipments	1,489,160	8.2	137,520	41.9
47	Small Pig Freight Shipments	0	0.0	0	0.0
48	Waste or Scrap Materials	3,760	0.0	40	0.0
49	Toxic Waste	0	0.0	0	0.0
	Total	18,256,425	100	327,996	100

Source: IHS TRANSEARCH Data



Outbound Tonnage Origin - Major outbound rail tonnages in 2012 are charted by county of origin in **Figure I-5**. Rail movements destined out-of state are primarily transported from Wise County (4.3 million tons, 23.4 percent of state outbound total), Buchanan County (4.1 million tons, 22.2 percent), and Lee County (1.7 million tons, 9.3percent).

Figure I-5: Major Outbound Rail Tonnages in Virginia, 2012



Outbound Tonnage Destination – Major outbound rail tonnages in 2012 are charted by destination in **Figure I-6** through **Figure I-10** and **Table I-4** through **Table I-5**. Rail movements destined out-of-state are transported to the following top three states: North Carolina (2.5 million tons, 13.4 percent), Ohio (2.4 million tons, 12.9 percent), and Georgia (2.1 million tons, 11.7 percent).

Figure I-6: Major Outbound Rail Tonnage Destinations, 2012

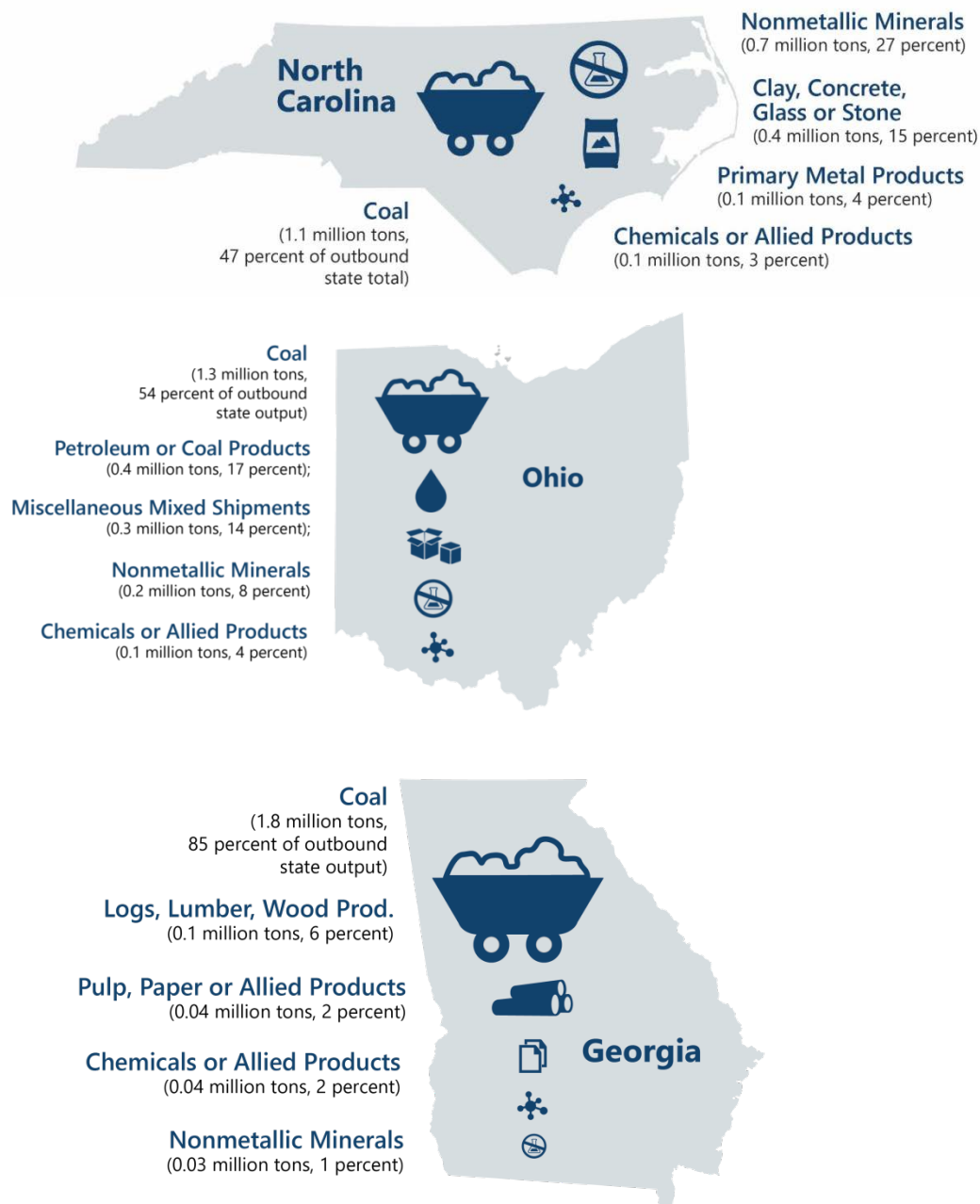


Figure I-7: Rail Outbound Commodity Tonnage by Virginia County Origin, 2012

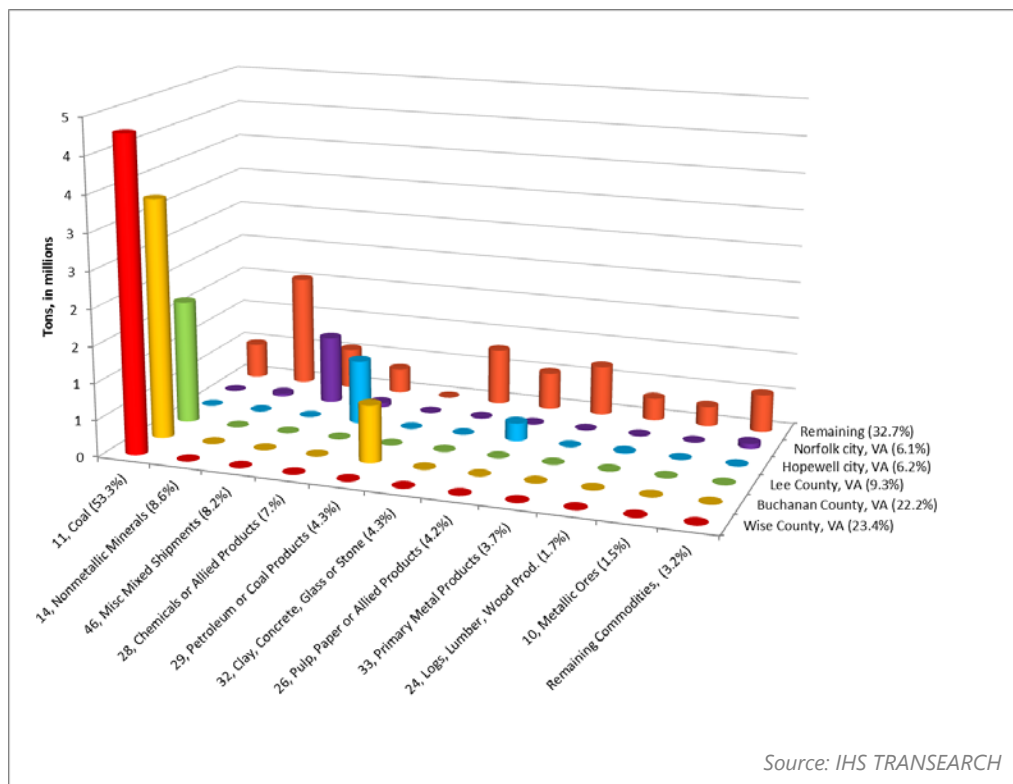


Figure I-8: Rail Outbound Total Tonnage by Virginia County Origin, 2012

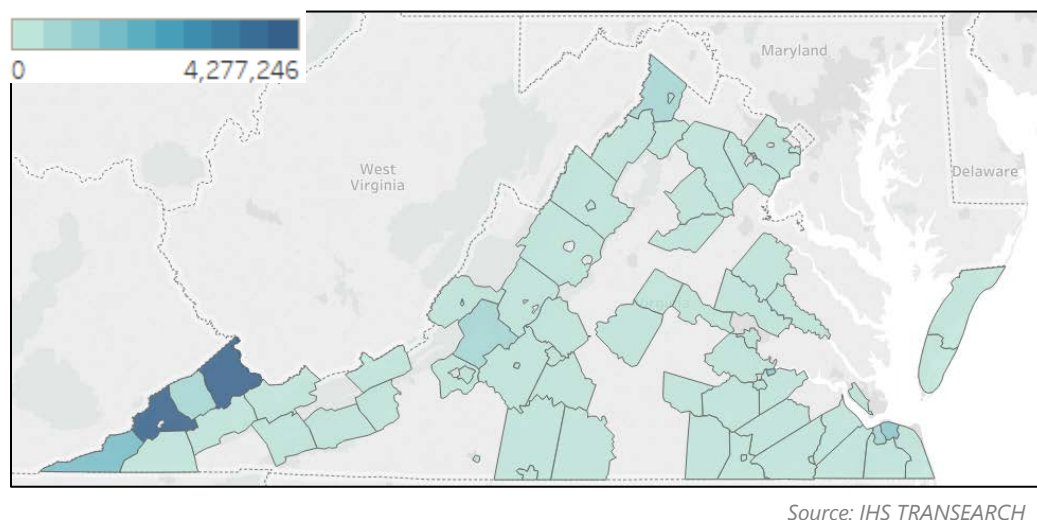


Figure I-9: Rail Outbound Commodity Tonnage by Destination State, 2012

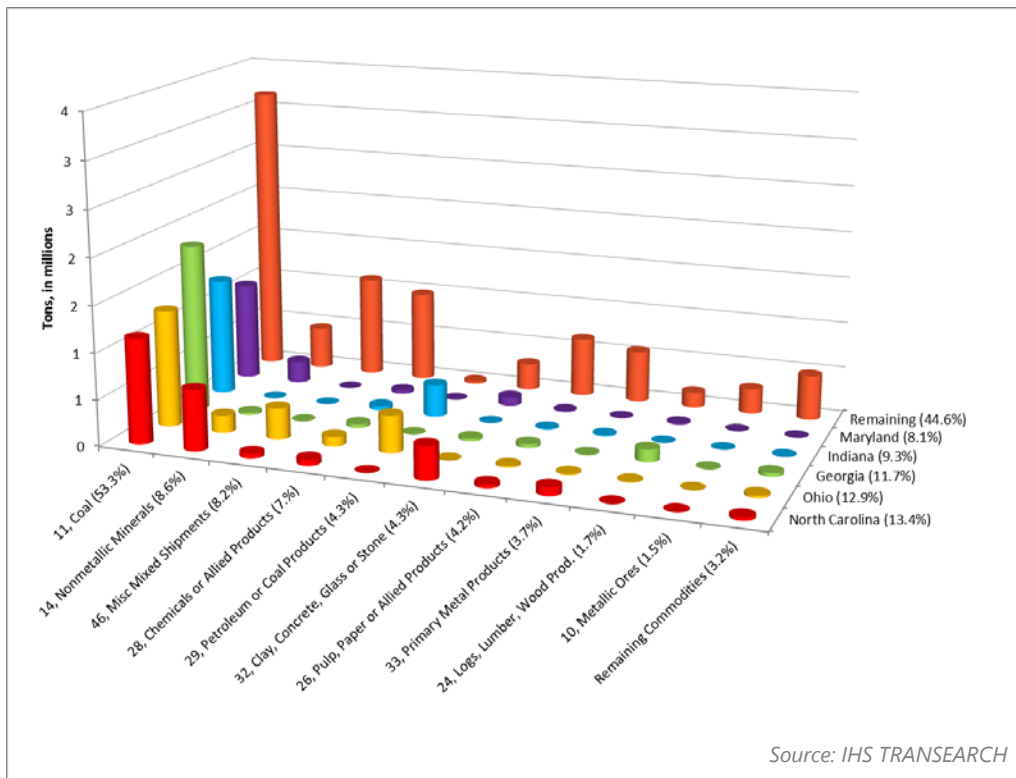


Figure I-10: Rail Outbound Total Tonnage by Destination State, 2012

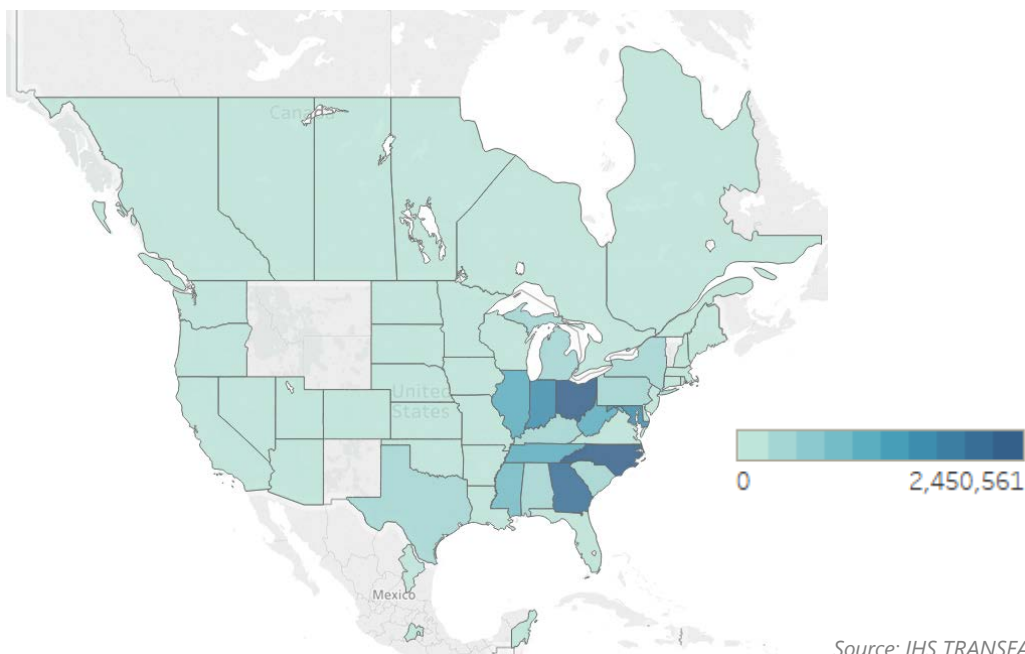


Table I-4: Rail Outbound Tons by Geography, Origin, 2012

Originating Virginia Counties/Independent Cities

STCC	Wise County, VA	Buchanan County, VA	Lee County, VA	Hopewell city, VA	Norfolk city, VA	Remaining	Total	Percent
11 Coal	4,277,246	3,276,740	1,690,771	0	0	486,468	9,731,225	54.6
14 Nonmetallic Minerals	0	0	0	0	39,440	1,535,219	1,574,659	8.8
46 Misc Mixed Shipments	0	0	0	0	932,720	556,440	1,489,160	8.4
28 Chemicals or Allied Products	0	0	0	876,744	60,000	339,000	1,275,744	7.2
29 Petroleum or Coal Products	0	781,599	0	0	0	400	781,999	4.4
32 Clay, Concrete, Glass or Stone	0	0	0	0	8,620	769,484	778,104	4.4
26 Pulp, Paper or Allied Products	0	0	0	246,640	3,200	509,240	759,080	4.3
33 Primary Metal Products	0	0	0	0	840	683,144	683,984	3.8
24 Logs, Lumber, Wood Prod.	0	0	0	7,760	4,880	306,576	319,216	1.8
10 Metallic Ores	0	0	0	0	0	271,960	271,960	1.5



Originating Virginia Counties/Independent Cities

STCC	Wise County, VA	Buchanan County, VA	Lee County, VA	Hopewell city, VA	Norfolk city, VA	Remaining	Total	Percent
Remaining Commodities	0	0	0	1,980	69,536	519,778	591,294	3.2
Total	4,277,246	4,058,339	1,690,771	1,133,124	1,119,236	5,977,709	18,256,425	100
Percent	23	22	9	6	6	33	100	

Source: IHS TRANSEARCH Data

Table I-5: Rail Outbound Tons by Geography, Destination, 2012

Terminating State

STCC	North Carolina	Ohio	Georgia	Indiana	Maryland	Remaining	Total	Percent
11 Coal	1,142,841	1,263,506	1,816,849	1,278,026	1,070,211	3,159,792	9,731,225	54.6
14 Nonmetallic Minerals	660,936	187,464	26,376	0	238,799	461,084	1,574,659	8.8
46 Misc Mixed Shipments	53,200	339,760	800	0	0	1,095,400	1,489,160	8.4
28 Chemicals or Allied Products	66,760	102,636	40,400	49,464	34,920	981,564	1,275,744	7.2
29 Petroleum or Coal Products	0	402,792	0	351,482	0	27,725	781,999	4.4
32 Clay, Concrete,	361,828	0	27,960	0	96,476	291,840	778,104	4.4



Terminating State

STCC	North Carolina	Ohio	Georgia	Indiana	Maryland	Remaining	Total	Percent
Glass or Stone								
26 Pulp, Paper or Allied Products	39,640	18,040	41,000	8,080	11,200	641,120	759,080	4.3
33 Primary Metal Products	92,200	10,200	3,600	10,800	3,520	563,664	683,984	3.8
24 Logs, Lumber, Wood Prod.	0	7,592	133,800	0	13,280	164,544	319,216	1.8
10 Metallic Ores	0	0	0	0	0	271,960	271,960	1.5
Remaining Commodities	33,156	26,200	39,528	0	1,980	490,430	591,294	3.2
Total	2,450,561	2,358,190	2,130,313	1,697,852	1,470,386	8,149,123	18,256,425	100
Percent	13	13	12	9	8	45	100	

Source: IHS TRANSEARCH Data



RAIL INBOUND

Figure I-11 and **Table I-6** present inbound rail commodities to Virginia, in 2012, which total 62 million tons, via 792,590 carload units and top five commodities.

Figure I-11: Inbound Rail Commodities, 2012

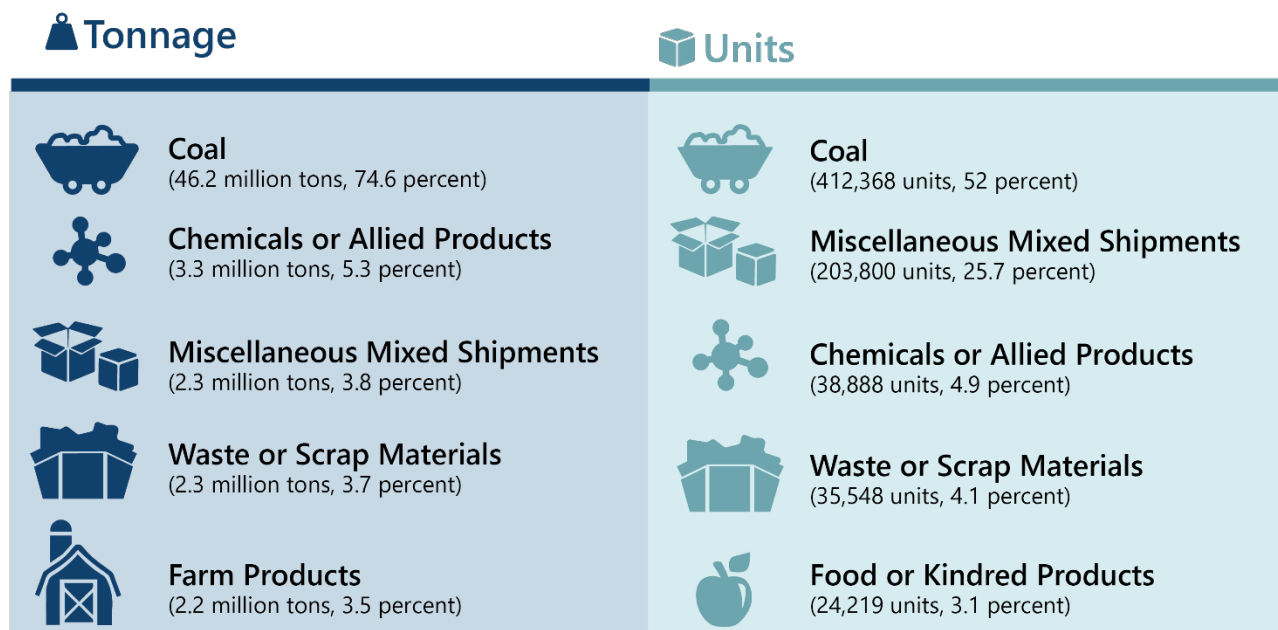


Table I-6: Rail Inbound Movement by Commodity, 2012

STCC2	Commodity	Tons		Units (Carloads)	
		Amount	Percent	Amount	Percent
1	Farm Products	2,178,872	3.5	23,633	3.0
8	Forest Products	0	0.0	0	0.0
9	Fresh Fish or Marine Products	2,000	0.0	200	0.0
10	Metallic Ores	40,880	0.1	440	0.1
11	Coal	46,208,864	74.6	412,368	52.0
13	Petroleum Prod, Natural Gas	0	0.0	0	0.0
14	Nonmetallic Minerals	464,156	0.7	4,736	0.6
19	Ordinance or Accessories	0	0.0	0	0.0
20	Food or Kindred Products	2,106,008	3.4	24,219	3.1
21	Tobacco Products	0	0.0	0	0.0
22	Textile Mill Products	0	0.0	0	0.0
23	Apparel or Related Products	22,360	0.0	2,160	0.3
24	Logs, Lumber, Wood Prod.	193,040	0.3	2,360	0.3
25	Furniture or Fixtures	800	0.0	80	0.0
26	Pulp, Paper or Allied Products	678,320	1.1	9,596	1.2
27	Printed Matter	1,240	0.0	80	0.0
28	Chemicals or Allied Products	3,291,869	5.3	38,888	4.9
29	Petroleum or Coal Products	563,800	0.9	7,428	0.9
30	Rubber or Misc Plastics	8,840	0.0	560	0.1
31	Leather or Leather Products	0	0.0	0	0.0
32	Clay, Concrete, Glass or Stone	966,932	1.6	9,888	1.2
33	Primary Metal Products	294,416	0.5	3,420	0.4
34	Fabricated Metal Products	4,400	0.0	440	0.1
35	Machinery	12,520	0.0	720	0.1
36	Electrical Equipment	6,520	0.0	600	0.1
37	Transportation Equipment	252,120	0.4	13,146	1.7
38	Instrum, Photo Equip, Optical Eq	2,920	0.0	200	0.0



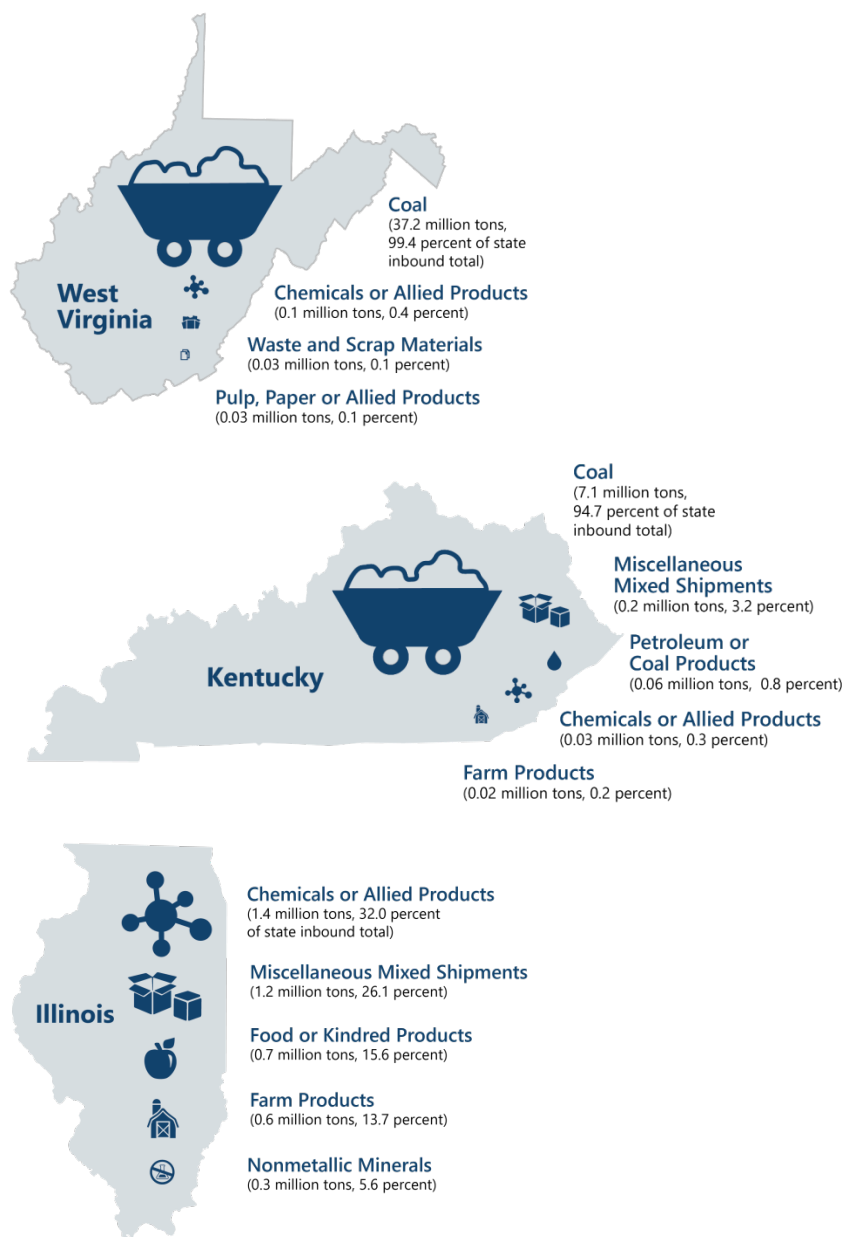
STCC2	Commodity	Tons		Units (Carloads)	
		Amount	Percent	Amount	Percent
39	Misc Manufacturing Products	2,640	0.0	320	0.0
40	Waste or Scrap Materials	2,302,984	3.7	32,548	4.1
41	Misc Freight Shipments	7,280	0.0	760	0.1
42	Shipping Containers	0	0.0	0	0.0
43	Mail or Contract Traffic	0	0.0	0	0.0
44	Freight Forwarder Traffic	0	0.0	0	0.0
45	Shipper Association Traffic	0	0.0	0	0.0
46	Misc Mixed Shipments	2,342,360	3.8	203,800	25.7
47	Small Pig Freight Shipments	0	0.0	0	0.0
48	Waste or Scrap Materials	0	0.0	0	0.0
49	Toxic Waste	0	0.0	0	0.0
	Total	61,956,141	100	792,590	100

Source: IHS TRANSEARCH Data



Inbound Tonnage Origin – Major inbound rail tonnages in 2012 are shown by state origin in **Figure I-12**. Rail movements originating out-of-state are transported from the following top three states: West Virginia (37.4 million tons, 60 percent), Kentucky (7.5 million tons, 12 percent), and Illinois (4.5 million tons, 7 percent).

Figure I-12: Origin of Major Inbound Rail Commodities, 2012



Major inbound rail tonnages in 2012 are shown by county and state destination in **Figure I-13** through **Figure I-17** and **Table I-7** through **Table I-8**. Rail movements originating out-of-state are transported to the following top three counties/independent cities: City of Newport News (29.9 million tons, 48.2 percent), City of Norfolk, (13.4 million tons, 21.7 percent), and Chesapeake city (2.2 million tons, 3.5 percent).

Figure I-14: Inbound Tonnage Destination, 2012



Figure I-14: Rail Inbound Commodity Tonnage by Origin State, 2012

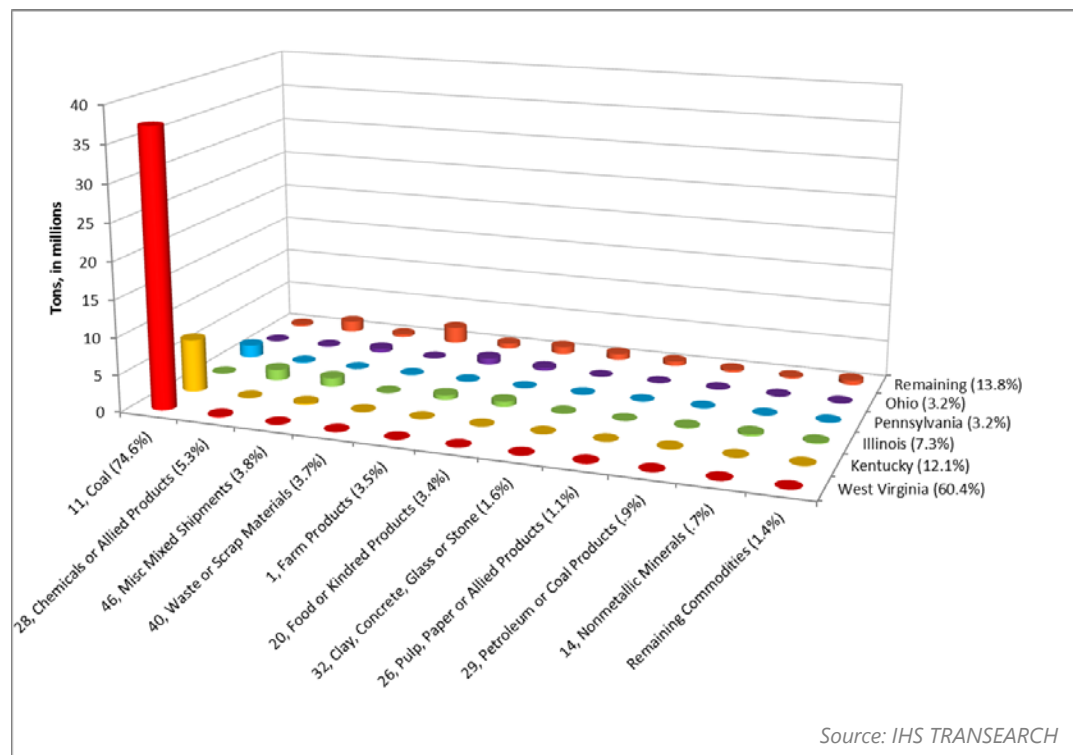


Figure I-15: Rail Inbound Total Tonnage by Origin State, 2012

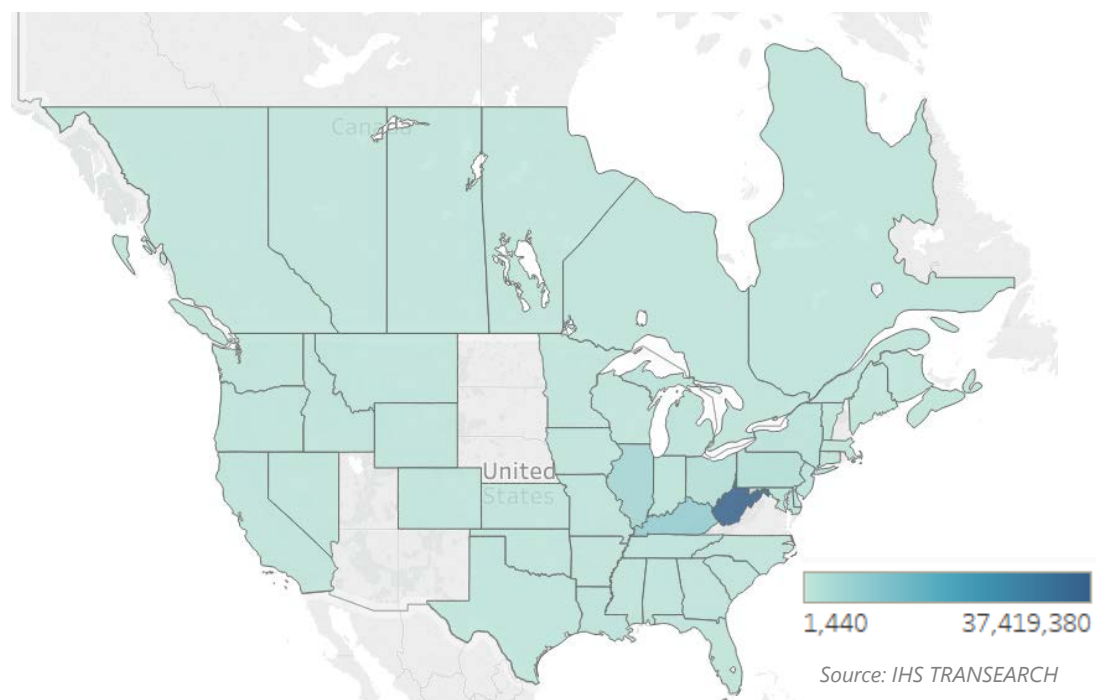


Figure I-16: Rail Inbound Commodity Tonnage by Virginia County Destination, 2012

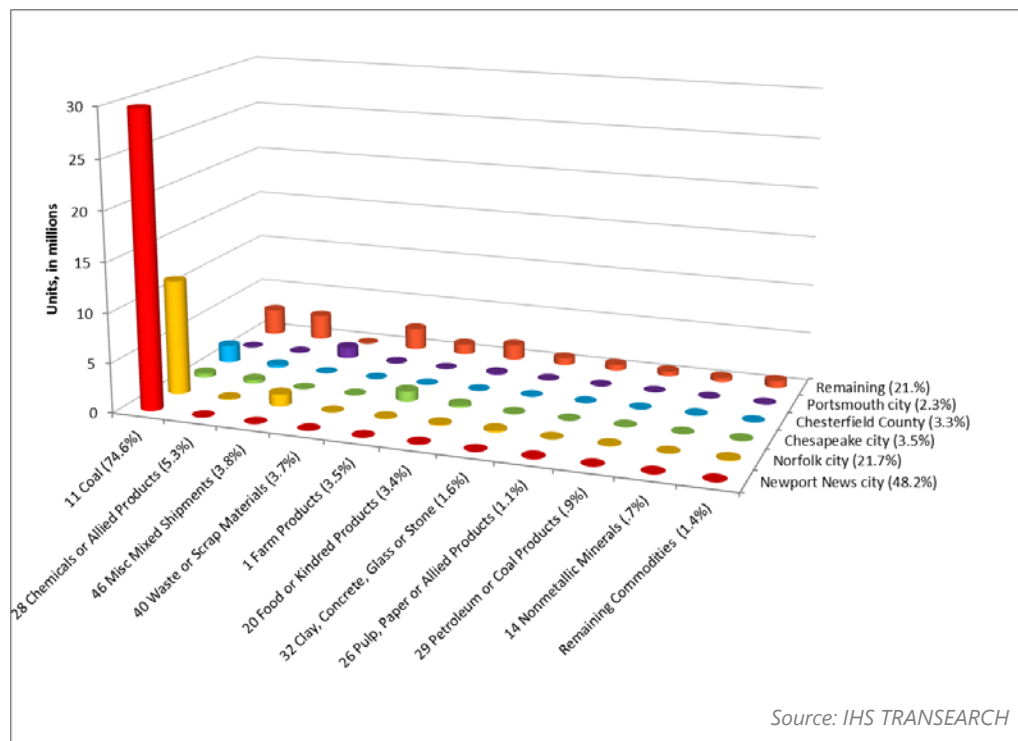


Figure I-17: Rail Inbound Total Tonnage by Virginia County Destination, 2012

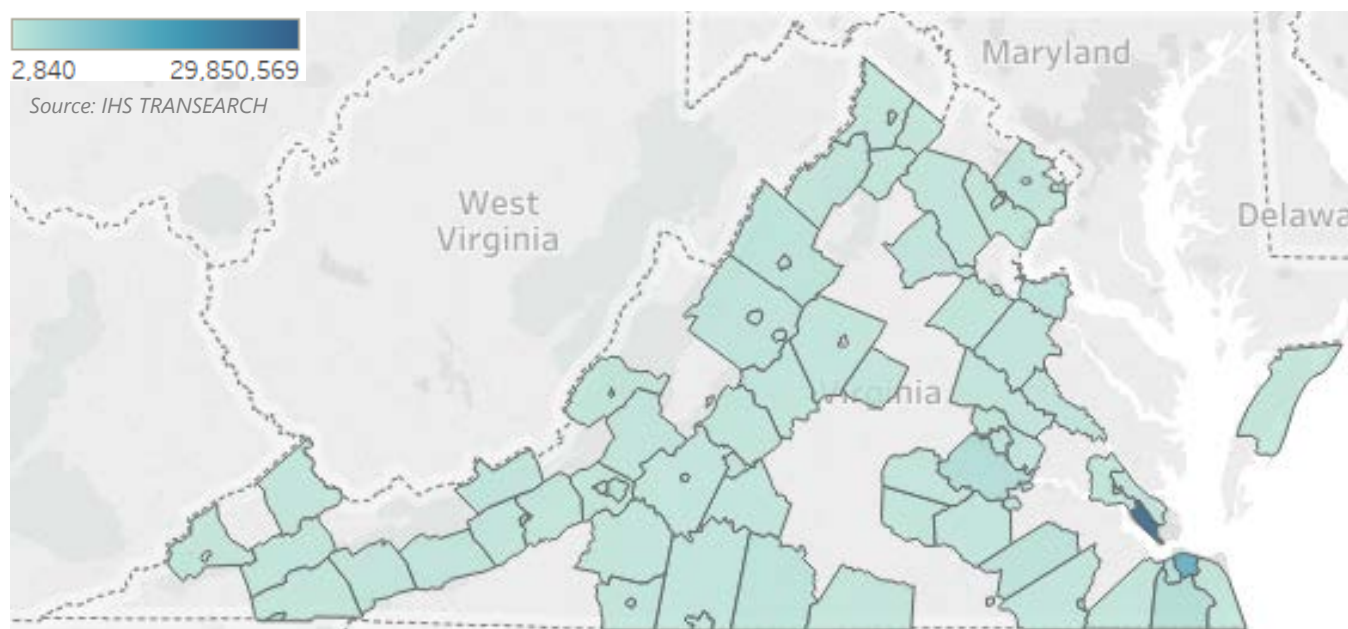


Table I-7: Rail Inbound Tons by Geography, Origin, 2012

STCC	Originating State						Total	Percent
	West Virginia	Kentucky	Illinois	Pennsylvania	Ohio	Remaining		
11 Coal	37,200,800	7,102,744	23,790	1,673,798	0	207,732	46,208,864	75
28 Chemicals or Allied Products	133,040	26,080	1,443,421	106,520	108,720	1,474,088	3,291,869	5
46 Misc Mixed Shipments	0	242,280	1,179,720	0	540,320	380,040	2,342,360	4
40 Waste or Scrap Materials	30,620	9,400	19,360	38,812	29,280	2,175,512	2,302,984	4
1 Farm Products	0	18,468	617,371	22,136	875,762	645,135	2,178,872	4
20 Food or Kindred Products	0	8,560	703,437	0	369,112	1,024,899	2,106,008	3
32 Clay, Concrete, Glass or Stone	7,640	8,480	48,612	38,200	0	864,000	966,932	2
26 Pulp, Paper or Allied Products	33,080	5,920	920	14,800	2,360	621,240	678,320	1
29 Petroleum or Coal Products	5,960	61,680	96,720	41,500	40,520	317,420	563,800	1
14 Nonmetallic Minerals	0	0	254,156	3,600	19,200	187,200	464,156	1
Remaining Commodities	0	89,860	40,520	0	28,040	693,556	851,976	1.40
Total	29,850,569	13,419,074	2,152,353	2,074,539	1,424,272	13,035,334	61,956,141	100.00



Originating State

STCC	West Virginia	Kentucky	Illinois	Pennsylvania	Ohio	Remaining	Total	Percent
Percent	48.20	21.70	3.50	3.30	2.30	21.00	100.00	

Source: IHS TRANSEARCH Data



Table I-8: Rail Inbound Tons by Geography, Destination, 2012

Terminating Virginia Counties/Independent Cities								
STCC	Newport News City, VA	Norfolk City, VA	Chesapeake City, VA	Chesterfield County, VA	Portsmouth City, VA	Remaining	Total	Percent
11 Coal	29,749,009	11,599,959	409,011	1,761,859	0	2,689,026	46,208,864	75
28 Chemicals or Allied Products	0	99,020	344,205	256,600	30,080	2,561,964	3,291,869	5
46 Misc Mixed Shipments	0	1,215,960	0	0	1,126,400	0	2,342,360	4
40 Waste or Scrap Materials	0	17,680	3,720	0	49,760	2,231,824	2,302,984	4
1 Farm Products	0	60,098	1,041,906	0	12,568	1,064,300	2,178,872	4
20 Food or Kindred Products	34920	108,973	250,671	0	141,240	1,570,204	2,106,008	3
32 Clay, Concrete, Glass or Stone	0	179,164	22,960	13,800	34064	716,944	966,932	2
26 Pulp, Paper or Allied Products	58,600	6,080	3200	0	920	609,520	678,320	1
29 Petroleum or Coal Products	0	42,280	36,160	0	1,200	484,160	563,800	1
14 Nonmetallic Minerals	8040	0	0	42,280	0	413,836	464,156	1
Remaining Commodities	0	89,860	40,520	0	28,040	693,556	851,976	1.40



Terminating Virginia Counties/Independent Cities

STCC	Newport News City, VA	Norfolk City, VA	Chesapeake City, VA	Chesterfield County, VA	Portsmouth City, VA	Remaining	Total	Percent
Total	29,850,569	13,419,074	2,152,353	2,074,539	1,424,272	13,035,334	61,956,141	100.00
Percent	48.20	21.70	3.50	3.30	2.30	21.00	100.00	

Source: IHS TRANSEARCH Data



RAIL INTRASTATE

Figure I-18 and **Table I-9** present intrastate rail commodities within Virginia, in 2012, which total 14.8 million tons, via 158,195 carload units and top five commodities.

Figure I-18: Intrastate Commodities, 2012

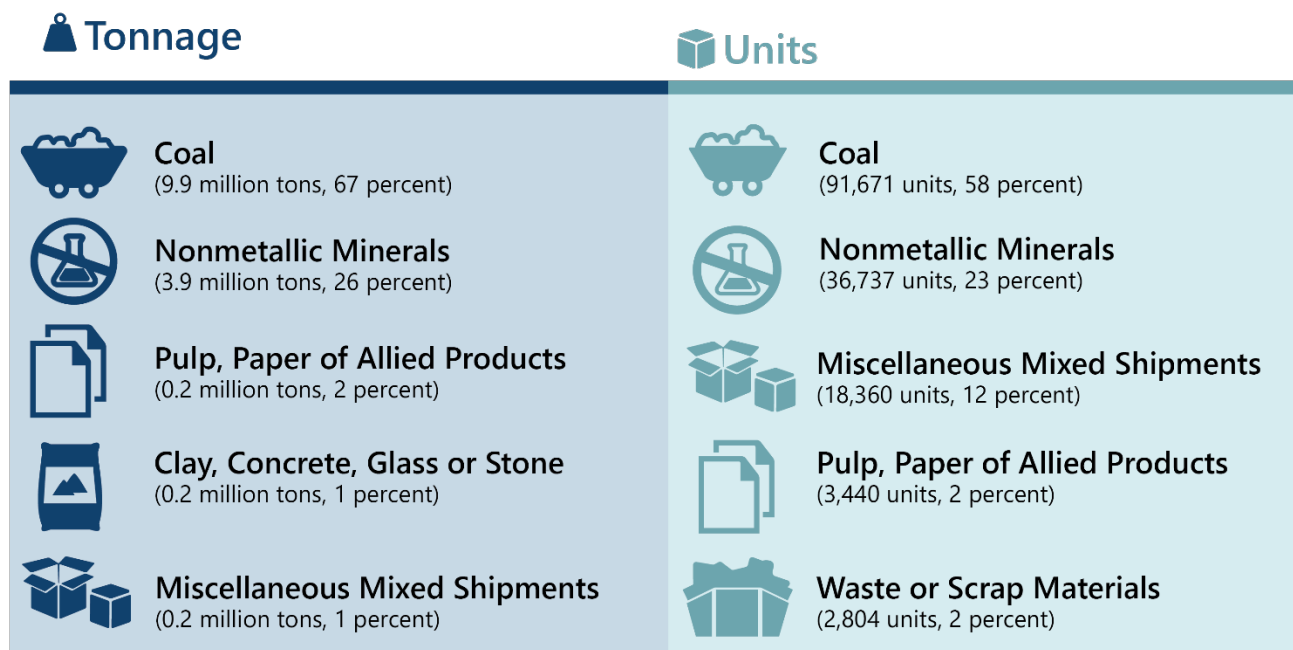


Table I-9: Rail Intra Movement by Commodity, 2012

STCC2	Commodity	Tons		Units (Carloads)	
		Amount	Percent	Amount	Percent
1	Farm Products	31,128	0.2	300	0.2
8	Forest Products	0	0.0	0	0.0
9	Fresh Fish or Marine Products	0	0.0	0	0.0
10	Metallic Ores	7,720	0.1	80	0.1
11	Coal	9,889,738	66.7	91,671	57.9
13	Petroleum Prod, Natural Gas	0	0.0	0	0.0
14	Nonmetallic Minerals	3,908,640	26.4	36,737	23.2
19	Ordinance or Accessories	0	0.0	0	0.0
20	Food or Kindred Products	0	0.0	0	0.0
21	Tobacco Products	0	0.0	0	0.0
22	Textile Mill Products	0	0.0	0	0.0
23	Apparel or Related Products	0	0.0	0	0.0
24	Logs, Lumber, Wood Prod.	117,648	0.8	1,300	0.8
25	Furniture or Fixtures	0	0.0	0	0.0
26	Pulp, Paper or Allied Products	223,920	1.5	3,440	2.2
27	Printed Matter	0	0.0	0	0.0
28	Chemicals or Allied Products	41,484	0.3	512	0.3
29	Petroleum or Coal Products	0	0.0	0	0.0
30	Rubber or Misc Plastics	0	0.0	0	0.0
31	Leather or Leather Products	0	0.0	0	0.0
32	Clay, Concrete, Glass or Stone	219,920	1.5	2,240	1.4
33	Primary Metal Products	10,880	0.1	120	0.1
34	Fabricated Metal Products	0	0.0	0	0.0
35	Machinery	0	0.0	0	0.0
36	Electrical Equipment	11,360	0.1	40	0.0
37	Transportation Equipment	12,240	0.1	408	0.3
38	Instrum, Photo Equip, Optical Eq	0	0.0	0	0.0



STCC2	Commodity	Tons		Units (Carloads)	
		Amount	Percent	Amount	Percent
39	Misc Manufacturing Products	0	0.0	0	0.0
40	Waste or Scrap Materials	163,552	1.1	2,804	1.8
41	Misc Freight Shipments	6,615	0.0	183	0.1
42	Shipping Containers	0	0.0	0	0.0
43	Mail or Contract Traffic	0	0.0	0	0.0
44	Freight Forwarder Traffic	0	0.0	0	0.0
45	Shipper Association Traffic	0	0.0	0	0.0
46	Misc Mixed Shipments	183,600	1.2	18,360	11.6
47	Small Pig Freight Shipments	0	0.0	0	0.0
48	Waste or Scrap Materials	0	0.0	0	0.0
49	Toxic Waste	0	0.0	0	0.0
	Total	14,828,445	100	158,195	100

Source: IHS TRANSEARCH Data



RAIL THROUGH

Figure I-19 and **Table I-10** present through rail commodities moving across Virginia, in 2012, which total 56.3 million tons, via 860,722 carload units and top five commodities.

Figure I-19: Rail Commodities in Virginia, 2012

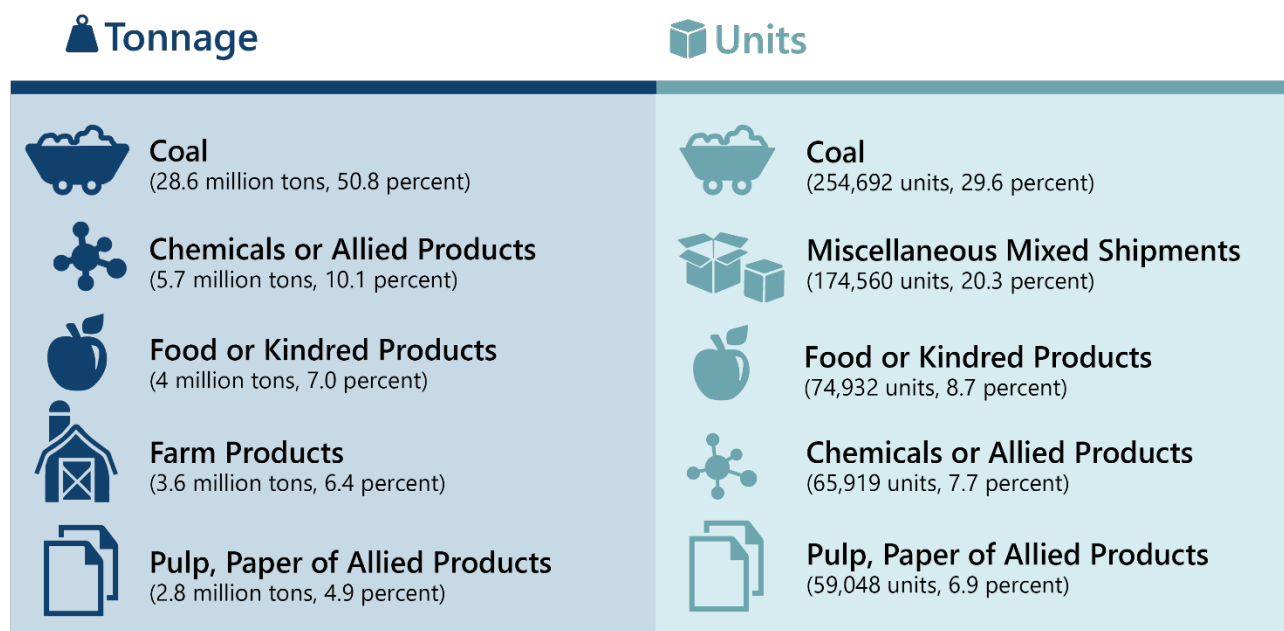


Table I-10: Rail Through Movement by Commodity, 2012

STCC2	Commodity	Tons		Units (Carloads)	
		Amount	Percent	Amount	Percent
1	Farm Products	3,611,878	6.40	35,568	4.10
8	Forest Products	9,480	0.00	120	0.00
10	Metallic Ores	94,560	0.20	960	0.10
11	Coal	28,593,391	50.80	254,692	29.60
14	Nonmetallic Minerals	1,986,212	3.50	19,829	2.30
19	Ordnance or Accessories	13,960	0.00	592	0.10
20	Food or Kindred Products	3,954,358	7.00	74,932	8.70
22	Textile Mill Products	23,160	0.00	2,240	0.30
23	Apparel or Related Products	338,880	0.60	32,600	3.80
24	Logs, Lumber, Wood Prod.	1,653,680	2.90	23,560	2.70
25	Furniture or Fixtures	48,080	0.10	4,800	0.60
26	Pulp, Paper or Allied Products	2,785,508	4.90	59,048	6.90
27	Printed Matter	24,320	0.00	2,000	0.20
28	Chemicals or Allied Products	5,679,460	10.10	65,919	7.70
29	Petroleum or Coal Products	862,352	1.50	10,636	1.20
30	Rubber or Misc Plastics	102,040	0.20	8,800	1.00
31	Leather or Leather Products	400	0.00	40	0.00
32	Clay, Concrete, Glass or Stone	1,394,052	2.50	17,120	2.00
33	Primary Metal Products	1,695,720	3.00	21,600	2.50
34	Fabricated Metal Products	62,880	0.10	5,880	0.70
35	Machinery	20,520	0.00	1,960	0.20
36	Electrical Equipment	52,320	0.10	4,720	0.50
37	Transportation Equipment	503,292	0.90	25,315	2.90
38	Instrum, Photo Equip, Optical Eq	7,680	0.00	760	0.10
39	Misc Manufacturing Products	20,720	0.00	2,160	0.30
40	Waste or Scrap Materials	608,307	1.10	7,607	0.90
41	Misc Freight Shipments	11,956	0.00	384	0.00



STCC2	Commodity	Tons		Units (Carloads)	
		Amount	Percent	Amount	Percent
43	Mail or Contract Traffic	9,000	0.00	920	0.10
46	Misc Mixed Shipments	2,065,580	3.70	174,560	20.30
47	Small Pig Freight Shipments	9,240	0.00	880	0.10
48	Waste or Scrap Materials	48,720	0.10	520	0.10
Total		56,291,706	100	860,722	100

Source: IHS TRANSEARCH Data



FREIGHT MOVEMENT SUMMARY

Table I-11 shows a comparison of the TRANSEARCH freight estimates for 2012 and forecast for 2040 by direction. Outbound freight movements are expected to grow 32 percent (0.99 percent CAGR)⁶. Inbound freight movements are expected to grow 8 percent (0.28 percent CAGR). Intra freight movements are expected to grow 17 percent (0.58 percent CAGR). Through freight movements have an expected growth of 19 percent (0.61 percent CAGR).

Table I-11: Rail Tonnage Forecast Summary, 2012-2040

Direction	2012		2040		Change		
	Amount	Percent	Amount	Percent	Amount	Percent	CAGR
Outbound	18,256,425	12	24,077,507	13	5,821,082	32	0.99%
Inbound	61,956,141	41	66,967,596	35	5,011,455	8	0.28%
Intra	14,828,445	10	17,415,078	9	2,586,633	17	0.58%
Through	56,291,706 ⁷	37	70,918,521 ⁸	40	14,626,815	26	0.83%
Total	151,332,717	100	179,378,703	100	28,045,986	19	0.61%

Source: IHS TRANSEARCH

Including all directional movements, total rail freight in Virginia is expected to grow 19 percent (0.61 percent CAGR) from 151 million tons in 2012 to 179 million tons in 2040. Through movement's share is projected to increase from 37 percent (in 2012) to 40 percent (in 2040) while inbound will decrease from 41 percent to 37 percent. Notably, coal tonnage drops by 1 million tons for outbound movements, 7.7 million tons for inbound freight movements and 1.6 million tons on intra-freight movements between 2012 and 2040. Chemical or Allied Products tonnage almost doubles for both inbound and outbound freight movements during the same time period.

Figure I-20 shows the projected leading commodities for 2040:

⁶ Compound Annual Growth Rate

⁷ 6 million tons of through freight in the TRANSEARCH database was removed as it could not be confirmed this freight travelled through Virginia.

⁸ 9.6 million tons of through freight in the TRANSEARCH database was removed as it could not be confirmed this freight travelled through Virginia.



Figure I-20: Leading Commodities for 2040

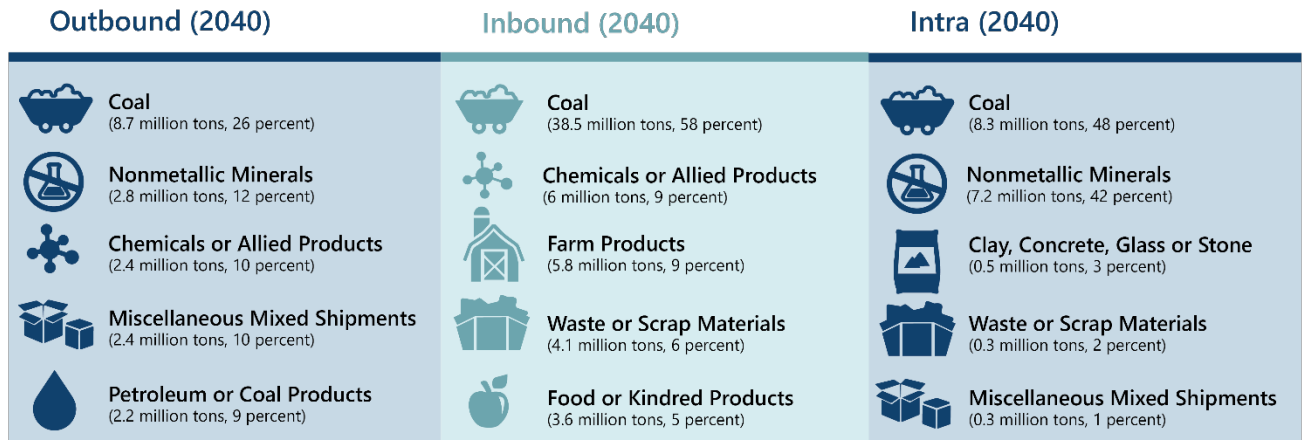


Table I-12 and **Table I-13** provide a detailed breakdown of the rail tons by STCC and SCTG for outbound, inbound, and intrastate movements.

Table I-12: Rail Tons by STCC, 2012 and 2040⁹

STCC2	Description	Outbound			Inbound			Intra		
		2012	2040	CAGR	2012	2040	CAGR	2012	2040	CAGR
1	Farm Products	72,704	145,467	3%	2,178,872	5,752,518	4%	31,128	50,722	2%
8	Forest Products	6,720	6,878	0%	0	0	0%	0	0	0%
9	Fresh Fish or Marine Products	0	0	0%	2,000	3,030	1%	0	0	0%
10	Metallic Ores	271,960	141,711	-2%	40,880	46,605	0%	7,720	4,023	-2%
11	Coal	9,731,225	8,671,970	0%	46,208,864	38,547,322	-1%	9,889,738	8,346,496	-1%
13	Petroleum Prod, Natural Gas	0	0	0%	0	0	0%	0	0	0%
14	Nonmetallic Minerals	1,574,659	2,800,628	2%	464,156	681,924	1%	3,908,640	7,242,911	2%
19	Ordnance or Accessories	1,200	2,200	2%	0	0	0%	0	0	0%
20	Food or Kindred Products	169,052	312,566	2%	2,106,008	3,632,022	2%	0	0	0%
21	Tobacco Products	800	329	-3%	0	0	0%	0	0	0%
22	Textile Mill Products	400	412	0%	0	0	0%	0	0	0%
23	Apparel or Related Products	3,440	9,566	4%	22,360	9,291	-3%	0	0	0%

⁹ For 2040, 9.6 million tons of through freight in the TRANSEARCH database was removed as it could not be confirmed this freight travelled through Virginia.

STCC2	Description	Outbound			Inbound			Intra		
		2012	2040	CAGR	2012	2040	CAGR	2012	2040	CAGR
24	Logs, Lumber, Wood Prod.	319,216	658,668	3%	193,040	331,431	2%	117,648	206,091	2%
25	Furniture or Fixtures	800	622	-1%	800	622	-1%	0	0	0%
26	Pulp, Paper or Allied Products	759,080	1,199,452	2%	678,320	1,095,894	2%	223,920	259,067	1%
27	Printed Matter	0	0	0%	1,240	2,863	3%	0	0	0%
28	Chemicals or Allied Products	1,275,744	2,433,175	2%	3,291,869	6,095,722	2%	41,484	71,289	2%
29	Petroleum or Coal Products	781,999	2,179,681	4%	563,800	735,116	1%	0	0	0%
30	Rubber or Misc Plastics	15,680	44,320	4%	8,840	22,803	3%	0	0	0%
31	Leather or Leather Products	0	0	0%	0	0	0%	0	0	0%
32	Clay, Concrete, Glass or Stone	778,104	1,603,183	3%	966,932	1,779,088	2%	219,920	576,250	4%
33	Primary Metal Products	683,984	914,435	1%	294,416	307,392	0%	10,880	11,344	0%
34	Fabricated Metal Products	1,996	2,112	0%	4,400	9,191	3%	0	0	0%
35	Machinery	6,080	13,937	3%	12,520	26,605	3%	0	0	0%
36	Electrical Equipment	7,520	22,223	4%	6,520	18,593	4%	11,360	44,306	5%



STCC2	Description	Outbound			Inbound			Intra		
		2012	2040	CAGR	2012	2040	CAGR	2012	2040	CAGR
37	Transportation Equipment	137,387	237,251	2%	252,120	500,599	2%	12,240	18,245	1%
38	Instrum, Photo Equip, Optical Eq	400	1,448	5%	2,920	13,132	6%	0	0	0%
39	Misc Manufacturing Products	2,080	11,665	6%	2,640	10,041	5%	0	0	0%
40	Waste or Scrap Materials	141,840	249,943	2%	2,302,984	4,142,048	2%	163,552	295,200	2%
41	Misc Freight Shipments	19,435	69,870	5%	7,280	10,631	1%	6,615	29,788	6%
42	Shipping Containers	0	0	0%	0	0	0%	0	0	0%
43	Mail or Contract Traffic	0	0	0%	0	0	0%	0	0	0%
44	Freight Forwarder Traffic	0	0	0%	0	0	0%	0	0	0%
45	Shipper Association Traffic	0	0	0%	0	0	0%	0	0	0%
46	Misc Mixed Shipments	1,489,160	2,336,886	2%	2,342,360	3,193,113	1%	183,600	259,347	1%
47	Small Pig Freight Shipments	0	0	0%	0	0	0%	0	0	0%



STCC2	Description	Outbound			Inbound			Intra		
		2012	2040	CAGR	2012	2040	CAGR	2012	2040	CAGR
48	Waste or Scrap Materials	3,760	6,908	2%	0	0	0%	0	0	0%
49	Toxic Waste	0	0	0%	0	0	0%	0	0	0%

Source: IHS TRANSEARCH Data



Table I-13: Rail Tons by SCTG, 2012 and 2040

SCTG2	Commodity	Industrial Sector	Outbound		Inbound		Intra	
			2012	2040	2012	2040	2012	2040
1	Live Animals/Fish	Agricultural	0	0	0	0	0	0
2	Cereal Grains	Agricultural	37,183	63,268	1,125,205	1,849,831	31,128	50,722
3	Other Ag Prods.	Agricultural	41,207	96,412	1,061,592	3,918,065	0	0
4	Animal Feed	Agricultural	22,319	44,454	392,485	653,942	0	0
5	Meat/Seafood	Agricultural	3,440	5,061	3,853	6,428	0	0
6	Milled Grain Prods.	Agricultural	37,977	60,862	413,814	624,840	0	0
7	Other Foodstuffs	Agricultural	38,365	80,070	452,260	813,184	374	1,387
8	Alcoholic Beverages	Agricultural	59,348	109,183	142,302	330,323	0	0
9	Tobacco Prods.	Agricultural	800	329	0	0	0	0
10	Building Stone	Mining / Extraction	10,418	18,589	0	0	0	0
11	Natural Sands	Mining / Extraction	177,750	287,336	24,346	38,064	7,170	11,590



SCTG2	Commodity	Industrial Sector	Outbound		Inbound		Intra	
			2012	2040	2012	2040	2012	2040
12	Gravel	Mining / Extraction	1,261,301	2,273,666	37,454	58,559	3,688,922	6,837,222
13	Nonmetallic	Mining / Extraction	141,157	247,695	355,075	533,609	212,549	394,099
14	Metallic Ores	Mining / Extraction	271,960	141,711	13,337	10,823	7,720	4,023
15	Coal	Mining / Extraction	9,731,225	8,671,970	46,208,864	38,547,322	9,889,738	8,346,496
16	Crude Petroleum	Mining / Extraction	0	0	0	0	0	0
17	Gasoline	Manufacturing	253	233	187,402	181,141	0	0
18	Fuel Oils	Manufacturing	117	108	86,797	83,897	0	0
19	Coal NEC	Manufacturing	782,244	2,179,932	293,957	479,104	0	0
20	Basic Chemicals	Manufacturing	402,721	604,858	1,805,106	3,050,760	21,436	28,883
21	Pharmaceuticals	Manufacturing	684	2,466	166	599	0	0
22	Fertilizers	Manufacturing	323,470	409,023	226,770	324,457	8,887	11,329



SCTG2	Commodity	Industrial Sector	Outbound		Inbound		Intra	
			2012	2040	2012	2040	2012	2040
23	Chemical Prods.	Manufacturing	703,019	1,559,026	1,604,976	3,270,386	16,289	39,143
24	Plastics/Rubber	Manufacturing	71,604	132,814	849,432	1,428,900	0	0
25	Logs	Manufacturing	131,247	385,310	3,318	6,029	85,460	155,267
26	Wood Prods.	Manufacturing	420,504	752,329	205,357	366,066	99,516	127,686
27	Newsprint/Paper	Manufacturing	509,186	804,719	298,344	479,660	151,091	172,752
28	Paper Articles	Manufacturing	7,976	11,017	41,076	69,100	0	0
29	Printed Prods.	Manufacturing	0	0	1,819	4,803	0	0
30	Textiles/Leather	Manufacturing	15,878	31,911	183,665	294,981	0	0
31	Nonmetal Min. Prods.	Manufacturing	553,227	1,225,494	556,754	1,068,227	219,920	576,250
32	Base Metals	Manufacturing	354,871	474,426	221,509	267,231	5,572	5,809
33	Articles-Base Metal	Manufacturing	336,128	457,545	140,640	154,994	5,308	5,534
34	Machinery	Manufacturing	4,847	10,126	8,505	20,482	0	0
35	Electronics	Manufacturing	2,122	7,248	4,706	13,492	11,360	44,306



SCTG2	Commodity	Industrial Sector	Outbound		Inbound		Intra	
			2012	2040	2012	2040	2012	2040
36	Motorized Vehicles	Manufacturing	11,451	51,737	218,472	431,479	0	0
37	Transport Equip.	Manufacturing	127,879	193,631	49,080	78,434	12,240	18,245
38	Precision Instruments	Manufacturing	288	510	2,022	8,561	0	0
39	Furniture	Manufacturing	3,196	5,498	78,072	139,805	0	0
40	Misc. Mfg. Prods.	Manufacturing	18,626	75,273	4,986	14,227	6,615	29,788
41	Waste/Scrap	Other	145,600	256,851	2,302,984	4,142,048	163,552	295,200
43	Mixed Freight	Other	1,494,840	2,344,816	2,349,640	3,203,744	183,600	259,347
99	Unknown	Other	0	0	0	0	0	0

INDUSTRIAL OUTLOOK BY SECTOR

TRANSEARCH also provides its estimates by four-digit Standard Classification of Transportation Goods (STCG) code. This code differs notably from the STCC¹⁰, but it is organized into four overarching industrial categories: Agricultural, Mining and Extraction, Manufacturing, and Other. Condensed tables of the industrial categories are provided in **Table I-14**.

TRANSEARCH suggests the largest, in terms of tonnage, outbound industrial category movement by rail pertains to Mining and Extraction products, which are not slated to grow between 2012 and 2040. In contrast, the Agricultural and Manufacturing sectors are expected to nearly double the tonnage outbound freight movement between 2012 and 2040.

Table I-14: Rail Tons by Industrial Sector, Outbound Freight Movements, 2012 and 2040

Sector	Outbound		
	2012	2040	CAGR
Agricultural	240,640	459,639	2.3%
Mining/Extraction	11,593,811	11,640,966	0%
Manufacturing	4,781,534	9,375,235	2.4%
Other	1,640,440	2,601,667	1.7%
Total	18,256,425	24,077,507	1%

The dominant industrial category with regards to inbound freight movements is Mining and Extraction products. However, a decrease in tonnage for inbound movement is expected between 2012 and 2040 for this industrial category, with a CAGR of -0.6 percent. Agricultural products inbound freight

¹⁰ STCC is a detailed 7-digit numeric code with about 750 product classifications, published/maintained by the Association of American Railroads (AAR), that are generally collapsed for analysis purposes into 4-digit or 2-digit summaries. Conversely, STCG is based on the Harmonized Commodity Description and Coding System product classifications tailored for transportation modes. The 5-digit SCTG comprises over 1,100 product classifications; however, FAF only provides information at the 2-digit summary level. Unfortunately, collapsibility between the two conventions differs due to the overarching needs of the organizations that developed them. While STCC is railroad-based commodity classification system, STCG is a broader-based multimodal classification system for all modes. So, developed for different purposes and modal use, STCC and STCG are different tools used for different purposes, which happened to overlap on quantification of rail movements.

movements are expected to increase from 3.6 million tons in 2012 to 8.2 million tons in 2040. Both Manufacturing and Other products are expected to have a healthy growth over this period as well, with Manufacturing's CAGR between 2012 and 2040 at 2 percent and Other's CAGR at 1.6 percent as shown in **Table I-15**.

Table I-15: Rail Tons by Industrial Sector, Inbound Freight Movements, 2012 and 2040

Sector	Inbound		
	2012	2040	CAGR
Agricultural	3,591,510	8,196,613	3.0%
Mining/Extraction	46,639,076	39,188,376	-0.6%
Manufacturing	7,072,931	12,236,815	2.0%
Other	4,652,624	7,345,792	1.6%
Total	61,956,141	66,967,596	0.3%

Source: IHS TRANSEARCH

The dominant industrial sector for intra-state movements is Manufacturing, with a CAGR between 2012 and 2040 at 2.3 percent. The Agricultural sector follows at 1.8 percent, then Other at 1.7 percent and finally Mining/Extraction which sees modest growth with a CAGR of 0.4 percent as shown in **Table I-16**.

Table I-16: Rail Tons by Industrial Sector, Intra Freight Movements, 2012 and 2040

Sector	Intra		
	2012	2040	CAGR
Agricultural	31,502	52,109	1.8%
Mining/Extraction	13,806,098	15,593,429	0.4%
Manufacturing	643,693	1,214,992	2.3%
Other	347,152	554,547	1.7%
Total	14,828,445	17,415,078	0.6%

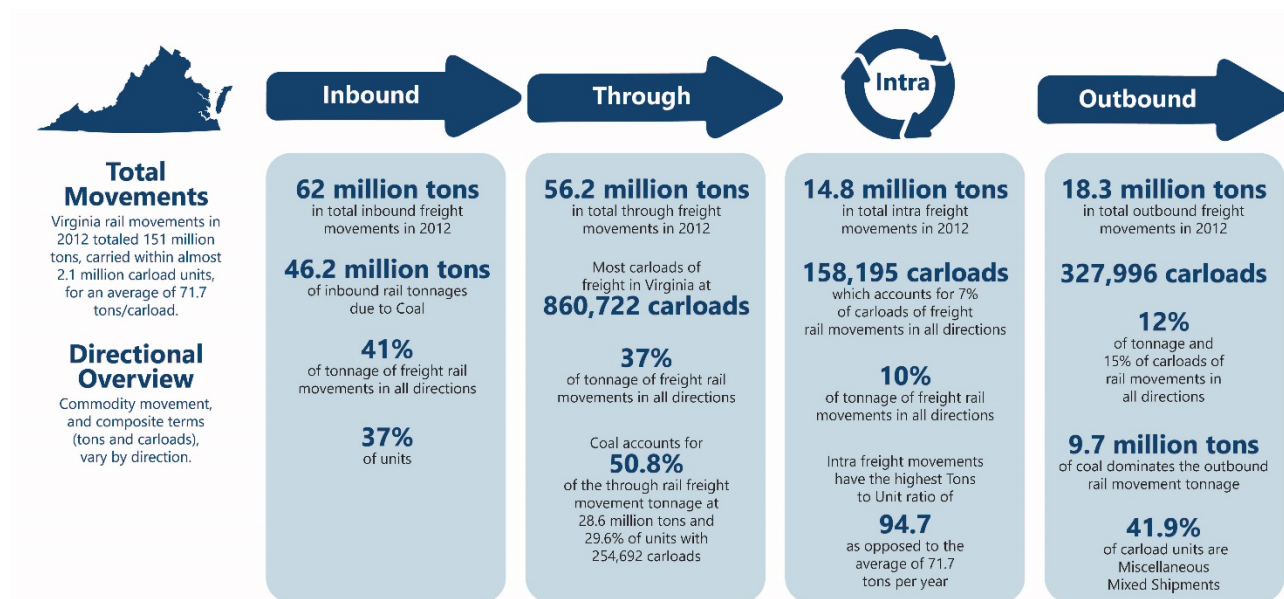
Source: IHS TRANSEARCH



CONCLUSIONS

Virginia freight rail flows move in different directions and have origins and destinations that vary by commodity shipped. The following summary in **Figure I-21** highlights major commodity movements by direction.

Figure I-21: Major Commodity Movements by Direction, 2012



Notable Commodity Movements – Commodity movements are compared and contrasted by their associated tonnage and carload units, as well as direction.

Coal (STCC 11) – The major single-commodity for movement in all directions for Virginia in 2012 and 2040. Coal accounts for 62.4 percent of all rail tonnage at 94.4 million tons in 2012 and 39.7 percent of all carloads. A majority of coal freight pertains to through movements (28.6 tons) and inbound movements (46.2 tons). 9.7 million tons of coal was carried in outbound rail movements, while 9.9 million tons was carried in intrastate rail movements. 29.6 percent of through carloads are coal, 52 percent of inbound carloads are coal, 27.7 percent of Outbound carloads carry coal and 58 percent of Intrastate carloads are coal.

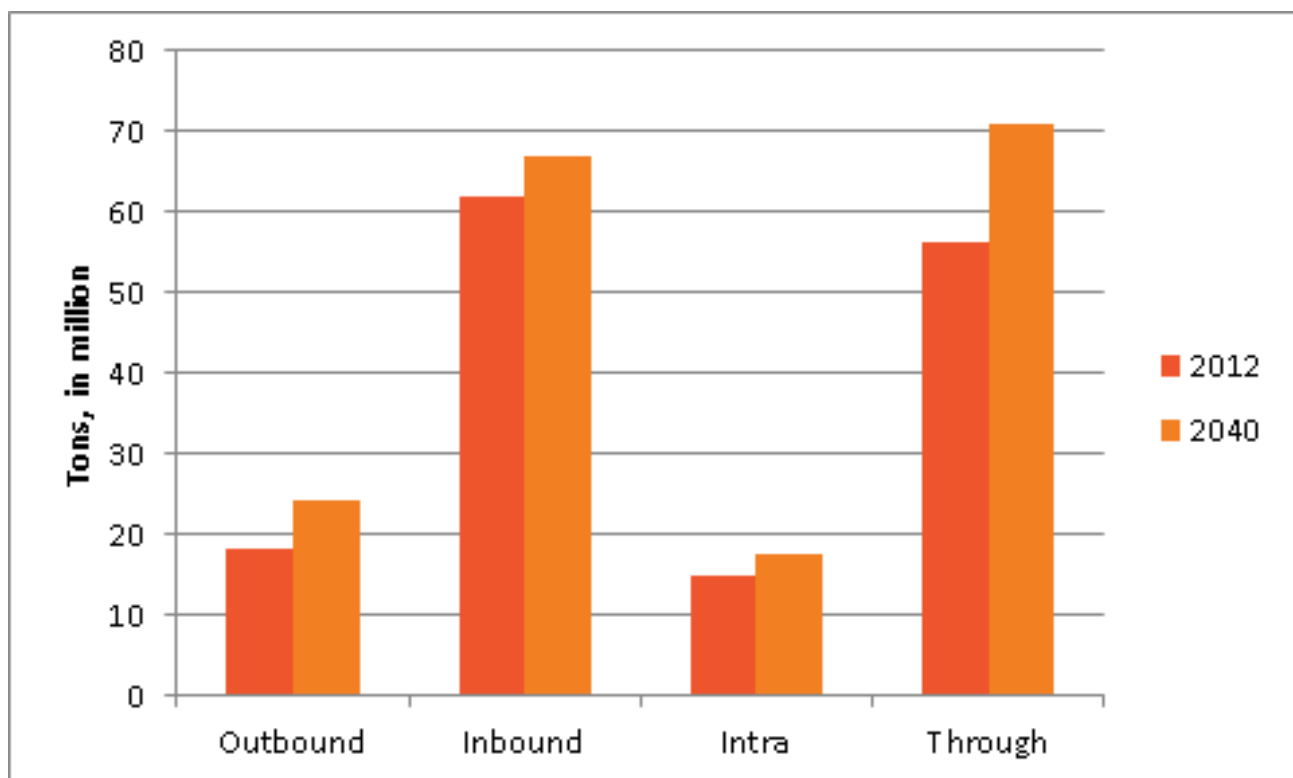
Chemicals or Allied Products (STCC 28) – 10.3 million tons of Chemicals or Allied Products was carried on Virginia’s rail network in 121,543 carloads. Chemicals or allied products are primarily carried by

through rail movements (5.7 million tons) in 65,919 carloads, followed by inbound rail movements (3.3 million tons) on 38,888 carloads and by Outbound rail movements (1.3 million tons).

Nonmetallic Minerals (STCC 14) – The third largest commodity by tonnage for freight rail movements in all directions, 7.9 million tons are carried on Virginia’s rail network by 76,895 carloads.

Forecasted Movements – Total rail traffic inbound, outbound, and intra-state is forecasted to 8 percent (0.28 CAGR), 32 percent (0.99 CAGR) and 17 percent (0.58 CAGR) between 2012 and 2040, respectively. Total growth for freight in all directions between 2012 and 2040 is estimated at 28 million tons, representing a 19 percent increase and a 0.61 percent CAGR. The Agricultural and Manufacturing and Industrial sectors will see significant growth, while the Mining and Extraction sector will either stagnant or decline. The forecasted growth in freight rail tonnage from 2012 to 2040 is shown in **Figure I-22**.

Figure I-22: Rail Tonnage Forecast Summary, 2012-2040



Source: IHS TRANSEARCH