



Distribution of Petroleum in the Northeast

Slides and Talking Points for a Presentation by

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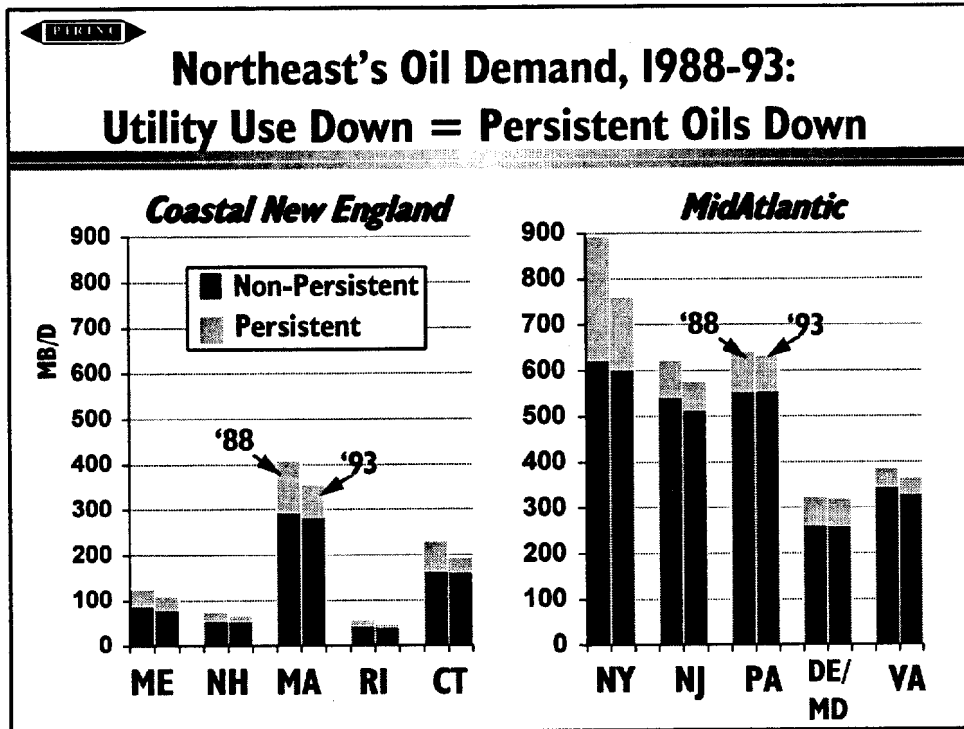
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Distribution of Petroleum in the Northeast

- **Start with Demand: Where do we use it?**
- **Move to Supply: Where does it come from?**
 - ➔ Imports (tanker, direct, then truck, barge)
 - ➔ Pipeline to Distribution Centers (then truck, barge)
 - ➔ Refinery Centers (tanker, some barge, in; barge out)
- **Product type**
 - ➔ Light = Non-persistent: distillate, kerosene, jet, gasoline
 - ➔ Heavy = Persistent: residual fuel oil, asphalt, (crude)
- **Sources**
 - ➔ Energy Information Admin. (demand); API (imports); Army Corps of Engineers (tank barge traffic)

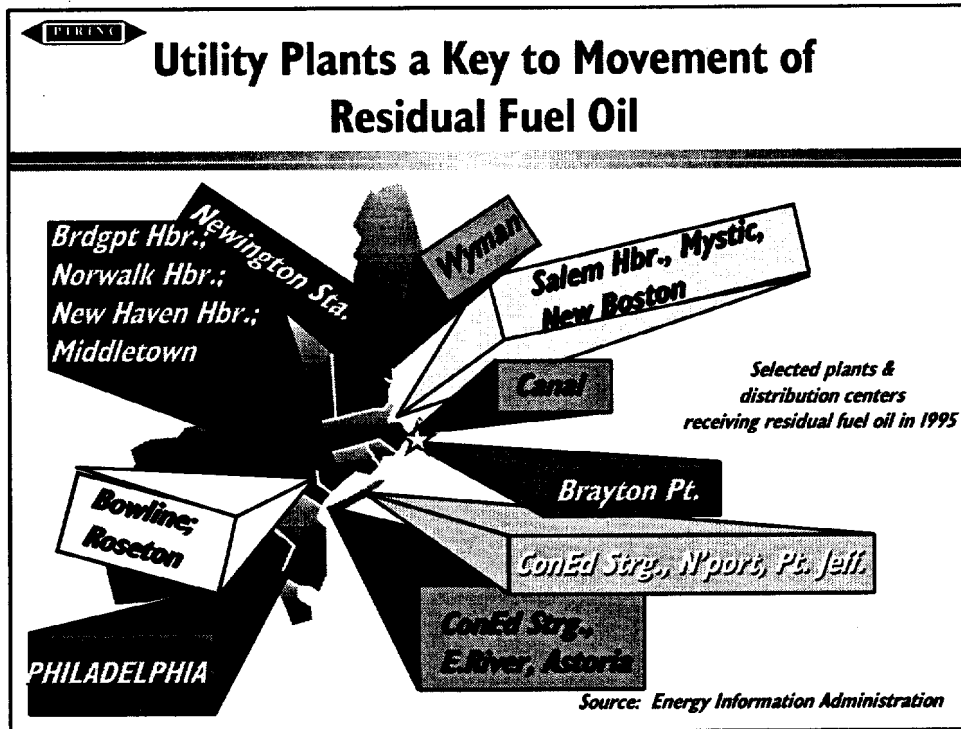
- To track petroleum traffic, we look first to demand ("Where do we use it?"), and then to supply patterns ("Where does it come from?").
- Supply can come to consumption centers directly as *imports* (generally via tanker, with re-distribution and/or delivery via barge or truck), as *pipeline shipments* to distribution centers (then by barge or truck), or as *refinery output* from area refineries (traffic into Northeast refineries is generally tanker [some barge], with product moving out largely via barge).
- "Non-Persistent" (or clean) products are light: distillate/diesel fuel oil, kerosene, jet fuel, gasoline. "Persistent" (or dirty) products are heavy: residual fuel oil, asphalt, and crude (crude oil is treated separately throughout).
- A variety of sources: Energy Information Administration for demand, American Petroleum Institute for imports, and Army Corps of Engineers for barge traffic (a special query of the Waterborne Commerce Statistics Center database)



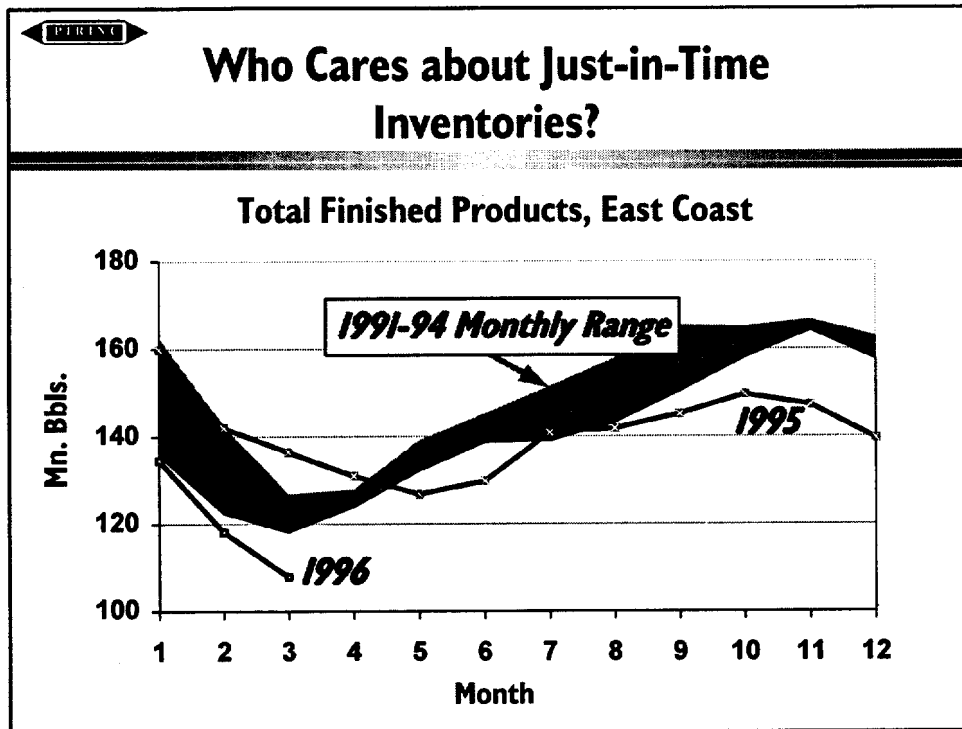
- Comparing oil consumption in 1988 with 1993 in the Northeastern states, we see a decline in the use of persistent oils that comes from utility demand for residual fuel oil. The big factor: gas availability. The decline is sharpest in NY (also largest consumer), 63%. In MA, New England's largest user, the decline is 43%. The reductions obviously carry implications for transport of persistent oil.

- In New England and New York, almost 25% of annual oil use is for "comfort" (heat, hot water) and 55% for transportation. Here we see the implications for seasonality of traffic. Further south, consumption is skewed more to transportation (PA, for example, use 13% of its oil for comfort and 67% for transportation), a reflection of historical gas availability to the residential/commercial sector.

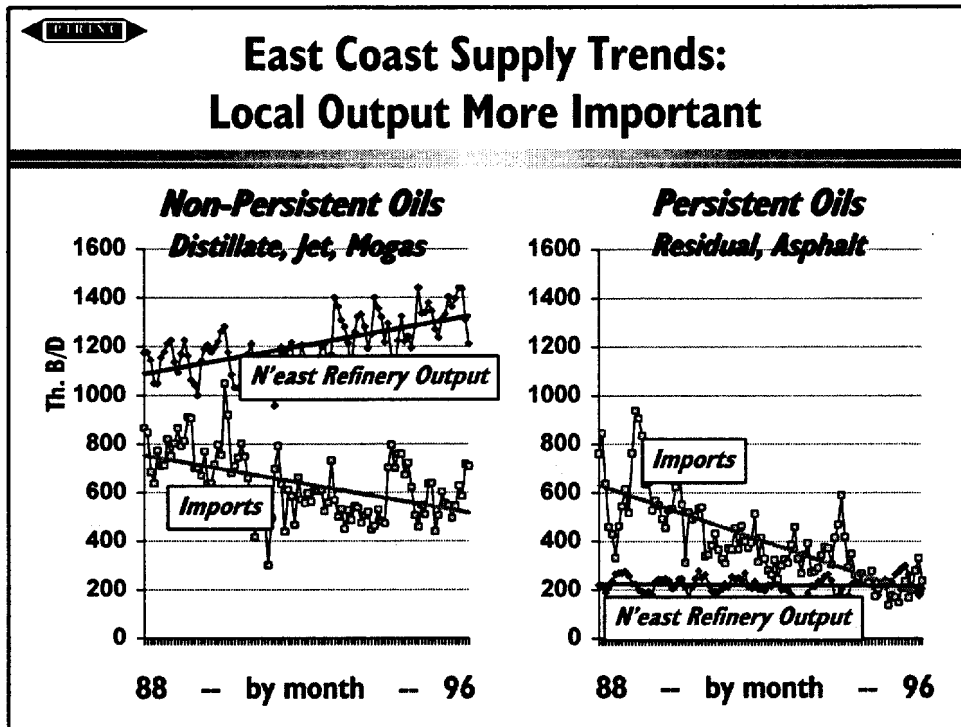
- New York has by far the largest share of "comfort" demand met by "persistent" oils, 27%. (Contrast Massachusetts at 7%.) New York has 83% of the Northeast's (and hence the nation's) apartments heated with residual fuel oil.



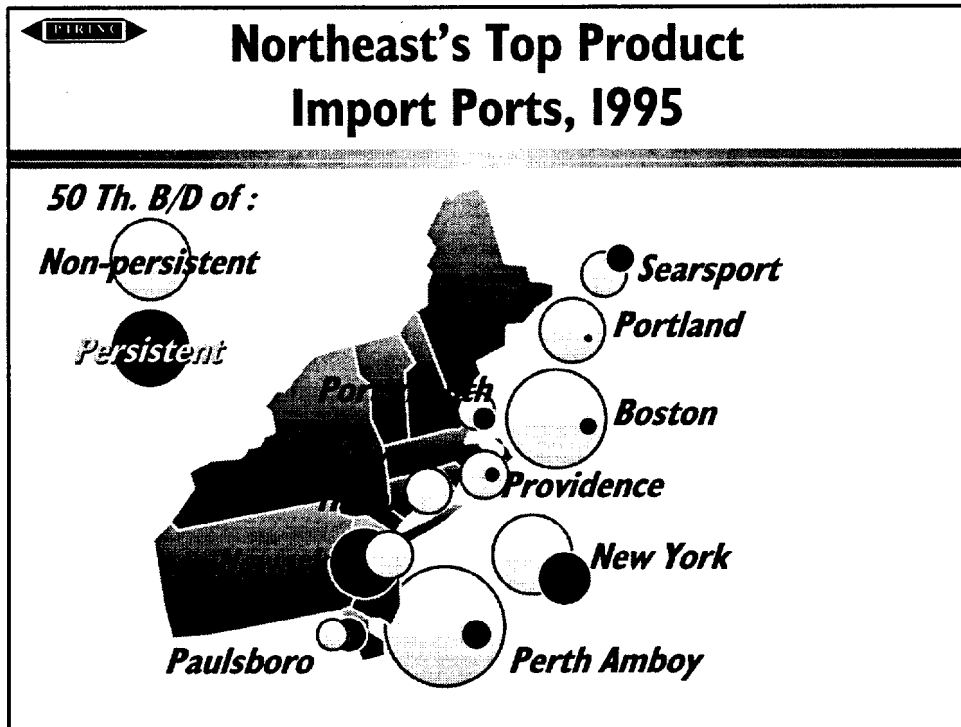
- This map illustrates the utility plant and utility storage locations that received residual fuel oil in 1995. The largest plant location was Canal Electric in Sandwich, MA, marked with a star. (Canal Electric is converting one of its two units to gas on a limited seasonal basis).
- Some of the largest utility plants are located south of the area shown, hence the capital letters for "PHILADELPHIA." Examples: Marcus Hook (Pennsylvania Power and Light), Yorktown (VEPCO), Edgemoor (Delmarva), storage for PP&L and for VEPCO. Also not specified but important are New Jersey's Linden and Sewaren locations and Niagara Mohawk's Albany plant.



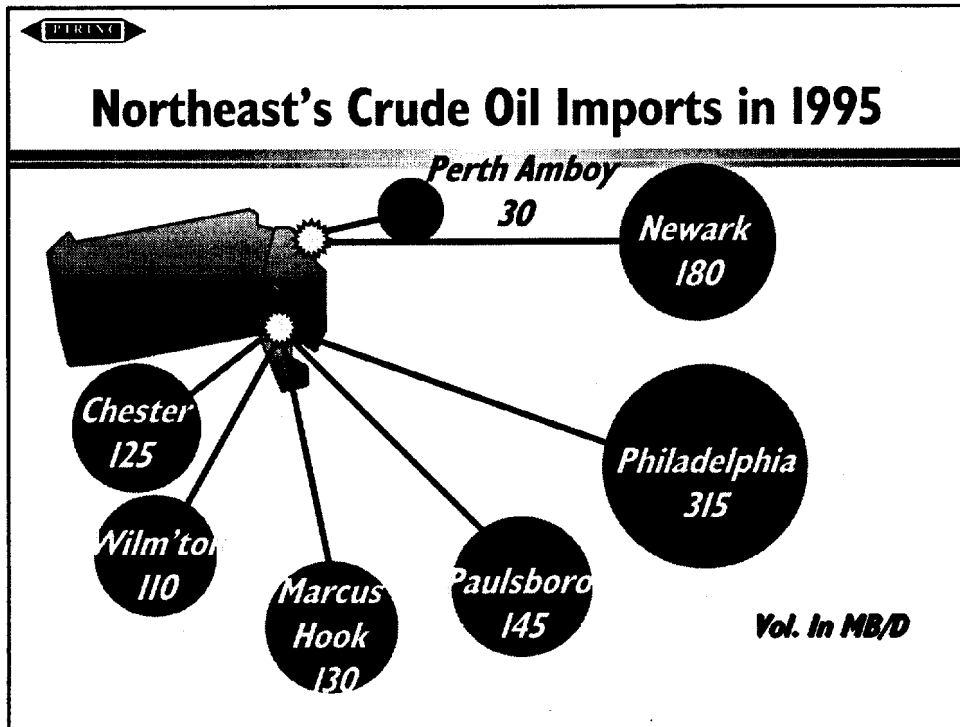
- Having looked at demand patterns, we can look at supply. Sources:
 - Stocks
 - Imports
 - Local (Northeast) refineries
 - Pipeline from the refining centers at the Gulf Coast
- REMEMBER THIS PICTURE: The new operating norm keeps stocks at their minimum efficient level, a level established by calculating when the delivery system can supply new volumes “just in time” before a run-out. The move is economy-wide, and minimizes the amount of capital tied up in non-producing assets.
- Just-in-time oil inventories mean lower stocks on-site, thus increasing the need for a steady stream from the next closest supply source
 - Less cushion, both in time and in volume
 - Barge transport more important



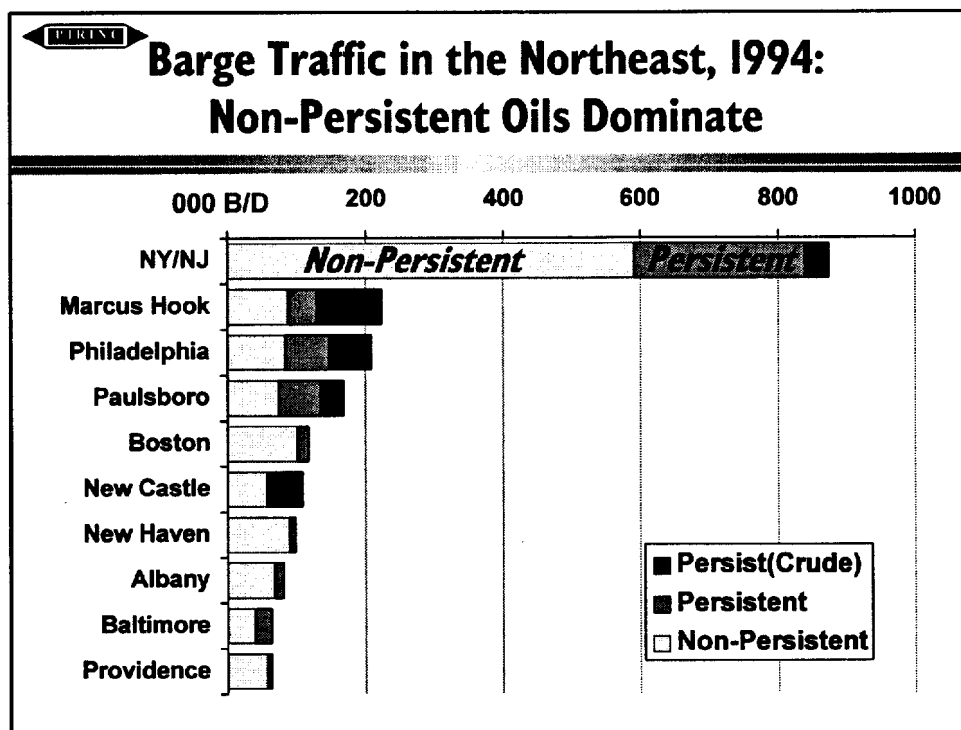
- REMEMBER THIS PICTURE: Less reliance on imports means more dependence on barge operations to distribute product throughout the region. Imports generally come by tanker, while barges distribute both the volumes produced at area refineries and much of the light product shipped via pipeline from the Gulf Coast.
- Contrast downward trend in imports with trends in Northeast refinery output (upward for non-persistent oils, steady for persistent).
 - ➔ Not shown on the graph is the supply of non-persistent oil coming by pipeline to the New York area from Gulf Coast refineries. This volume is greater than either imports or local refinery output, and it, too, has shown an upward trend in recent years. These supplies are re-distributed throughout the Northeast by barge, again enhancing the importance of smooth, safe, uninterrupted barge operations.



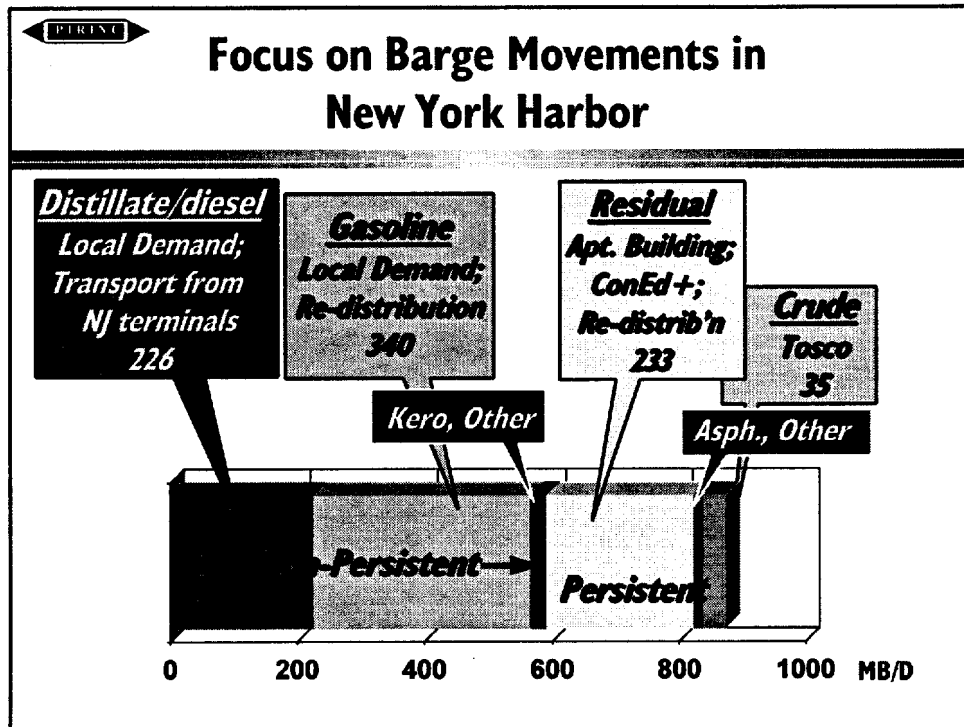
- First, a look at Northeast product imports, port-by-port. Imports are generally coming by tanker, not barge, but port traffic and congestion carry implications for barge and towboat operations. The circles are scaled; those in upper left show 50 thousand barrels/day. Crude oil imports are excluded, but shipments to the refining centers shown on this slide include some feedstocks.
- First conclusion: non-persistent oils dominate. The circles total about 400 thousand barrels/day of non-persistent oils and 125 thousand barrels/day of persistent. Note the relative *unimportance* of persistent oils in Boston, for example, or Portland.
- Perth Amboy is feeding the terminals on the Kill Van Kull and Arthur Kill, as are some of the volumes in New York and Newark. These volumes combine with pipeline supplies from the Gulf Coast to make New York Harbor a central source of volumes for barge transport.



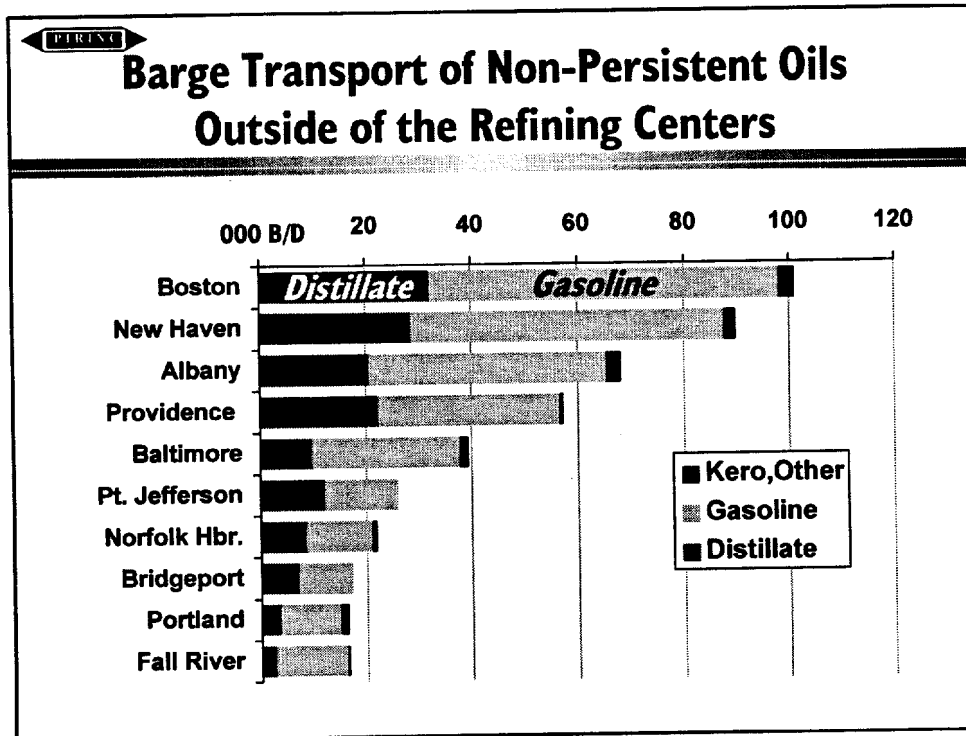
- This slide shows the movement of crude oil to the Northeast's import-dependent refineries. As developed in earlier slides, the refining centers in the Northeast are another critical, increasingly important, origin for barge movements of petroleum product. Furthermore, it illustrates crude oil's contribution to local marine traffic.
- The Northeast's refineries are grouped in the New York area (Tosco Bayway and Chevron's asphalt facility in Perth Amboy), and the Philadelphia area:
 - ➔ Star Enterprise in Delaware City
 - ➔ Sun and Tosco at Marcus Hook (Tosco shut down in January 1996)
 - ➔ Sun (two plants) at Philadelphia
 - ➔ Mobil and Citgo Asphalt in Paulsboro, NJ
 - ➔ Coastal in Westville, NJ



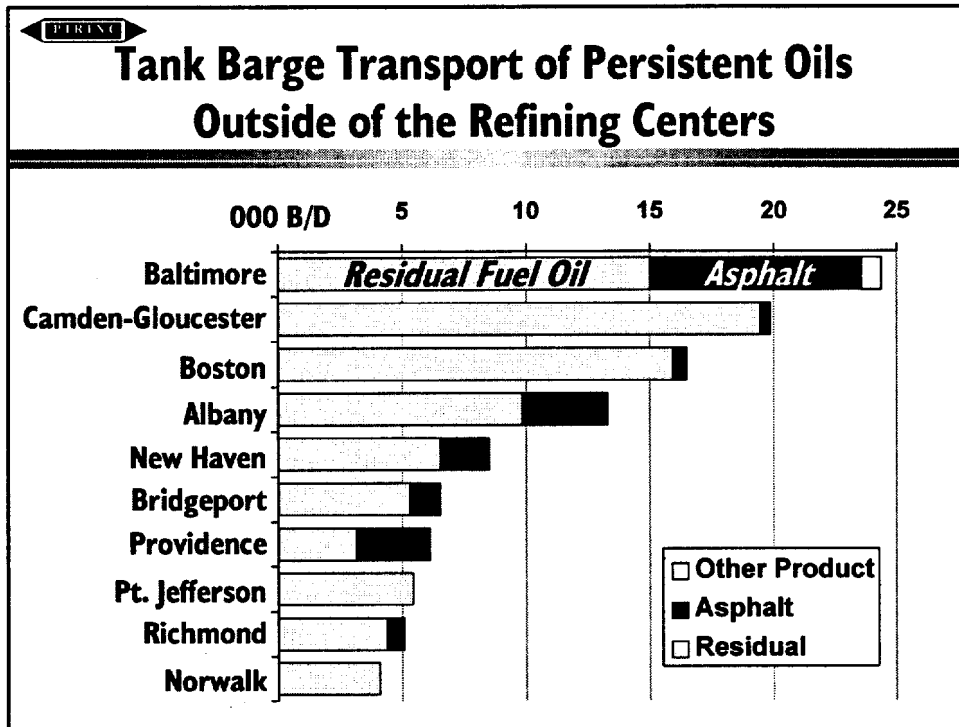
- Finally, to barge traffic. The data shown on this and the following graphics come from the Army Corps of Engineers, so the port definitions are the Corps': the Port of New York, for instance, encompasses some of the New York and New Jersey locations shown separately in the import data. The data represent traffic, so a movement out of one area can become a movement through or into another port.
- First conclusion: New York far surpasses any other port, with about 900 thousand barrels/day moving in, out and through the area. The next largest, Marcus Hook, is just over 200 thousand barrels/day.
- Second conclusion: The refining centers account for 5 out of the top 6 ports.
- Third conclusion: Excluding crude oil, non-persistent oil dominates in each of these top ten ports.



- Because of New York's dominance, it deserves a special look.
- The data represent the Port of New York/New Jersey, the area that the oil industry would commonly call "New York Harbor."
- Gasoline is the most important single product, feeding both local demand and re-distribution of product from the New York/New Jersey terminals.
- Residual fuel oil movements are feeding apartment demand, Con Ed plants and storage, and other utility facilities such as Public Service Electric and Gas at Linden.



- Leaving aside New York and the refining centers, we can more easily see activity in other ports in the Northeast.
- We look first at the top ten ports for barge movements of non-persistent or clean products.
- Boston, the largest, has about 100 thousand barrels/day of barge traffic. The tenth-ranked port, Fall River, has less than 20 thousand barrels/day.
- Gasoline is the most important product for barge movements in each of the ports.
- Only distillate fuel oil (and/or diesel) and gasoline show significant volumes. Other products such as kerosene are unimportant.



- Now we look at the top ten ports for barge movements of persistent products such as residual fuel oil or asphalt.
- The barge traffic in the largest port for persistent oil, Baltimore, amounts to less than one-quarter of the volume of non-persistent oil shown in the previous slide for that category's largest port, Boston.
- Baltimore becomes the top port because of its asphalt shipments. Baltimore's residual fuel oil traffic also supplies volumes to Baltimore Gas and Electric.
- The utility plant locations shown earlier help to explain the residual fuel oil movements -- Boston, New Haven, Bridgeport, Port Jefferson, Norwalk. (Some of the utility locations were not shown, because the slide couldn't show each facility).

Imports of Petroleum into the Northeast, 1995

State	Port	-----Volume, in thousand barrels/day-----				Total
		Non-Persistent	Crude	Persistent Prod	Other	
CT	BRIDGEPORT	1	0	0	0	1
	NEW HAVEN	17	0	0	0	17
	NEW LONDON	5	0	0	0	5
CT Total		23	0	0	0	23
DE	WILMINGTON	1	110	3	0	114
DE Total		1	110	3	0	114
MA	BOSTON	76	0	3	0	79
	NEW BEDFORD	0	0	0	0	0
	PROVINCETOWN	0	0	0	0	0
	SALEM	0	0	2	0	3
MA Total		77	0	5	0	82
ME	BANGOR	0	0	0	0	0
	BELFAST	4	0	3	0	7
	BUCKSPORT	1	0	0	0	1
	CALAIS	0	0	1	0	1
	FT. KENT	0	0	0	0	0
	HOULTON	1	0	1	0	2
	MADAWASKA	0	0	0	1	1
	PORTLAND	33	0	1	0	34
	SEARSPORT	16	0	7	0	23
	ME Total		54	0	12	1
NH	NEWINGTON	1	0	0	0	1
	PORTSMOUTH	11	0	5	8	23
NH Total		12	0	5	8	24
NJ	CAMDEN	0	0	0	0	0
	NEWARK	18	183	39	1	241
	PAULSBORO	7	147	10	0	165
	PERTH AMBOY	112	32	8	0	152
NJ Total		137	362	57	2	558
NY	ALBANY	5	0	4	0	9
	ALEXANDRIA BAY	0	0	0	0	0
	BUFFALO	1	62	1	4	68
	CHAMPLAIN	2	0	1	0	3
	MASSENA	1	0	0	0	1
	NEW YORK	49	0	23	0	73
	OGDENSBURG	0	0	0	0	1
	OSWEGO	0	0	1	0	1
	SYRACUSE	0	0	1	0	1
	TROUT RIVER	0	0	0	0	0
NY Total		58	62	31	5	156
PA	CHESTER	5	123	3	0	131
	MARCUS HOOK	6	131	4	8	148
	PHILADELPHIA	7	314	5	0	326
PA Total		18	568	12	8	605
RI	MELVILLE	1	0	0	0	1
	PROVIDENCE	18	0	2	1	21
RI Total		19	0	2	1	22
Grand Total		398	1101	127	25	1651

Source: American Petroleum Institute compilation of Energy Information Administration data

Tank Barge Movement of Petroleum in the Northeast, 1994

in thousands of barrels per day

State	Port	-----Non-Persistent-----				-----Persistent Product-----				Crude	Total
		Distillate	Gasoline	Kerosene	Other	Asphalt	Residual	Other	Total		
CT	Bridgeport	7108	10122	0	0	1221	5317	50	6588	0	23818
	New Haven	28709	59026	617	1387	1960	6549	0	8510	0	98248
	New London	5581	0	126	0	0	1781	0	1781	0	7489
	Norwalk	605	0	0	0	0	4102	0	4102	0	4707
	Stamford	3577	0	19	0	0	0	0	0	0	3596
DC	Washington	1923	2642	0	0	0	298	0	298	0	4863
DE	New Castle	26832	29996	27	173	0	2251	0	2251	49001	108281
	Wilmington	4345	0	282	0	0	5320	0	5320	188	10134
MA	Boston	32304	65865	2728	0	563	15901	7	16471	0	117368
	Cuttyhunk Harbor	2	1	0	0	0	0	0	0	0	3
	Fall River	2832	13497	82	0	0	835	0	835	0	17246
	Nantucket	503	142	0	0	0	0	0	0	0	645
	New Bedford	1826	120	0	0	0	1880	0	1880	0	3825
	Salem	1485	0	0	0	0	2517	0	2517	0	4001
Vineyard Haven	355	291	0	0	0	0	0	0	0	647	
MD	Baltimore	9873	28033	890	452	8560	15011	790	24362	0	63611
	Crisfield	13	4	1	0	0	0	0	0	0	18
ME	Bucksport	1070	1469	159	0	0	2700	0	2700	0	5398
	Portland	3624	11413	1233	81	175	3239	329	3743	0	20093
	Searsport	0	803	0	0	0	1482	0	1482	0	2284
NH	Portsmouth	2998	0	919	0	452	1430	155	2037	0	5954
NJ	Camden-Glouceste	4184	2388	772	67	401	19445	16	19862	0	27271
	Paulsboro	33131	31419	1525	7328	16124	44934	157	61215	33515	168133
	Trenton	269	3224	0	0	0	0	0	0	0	3492

Tank Barge Movement of Petroleum in the Northeast, 1994

in thousands of barrels per day

State	Port	-----Non-Persistent-----				-----Persistent Product-----				Crude Crude	Total	
		Distillate	Gasoline	Kerosene	Other	Asphalt	Residual	Other	Total			
NY	Albany	20682	44823	2455	99	68059	3456	9838	0	13293	203	81555
	Hempstead	2495	5105	0	0	7601	0	0	0	0	0	7601
	Northport	0	0	0	0	0	0	64	0	64	0	64
	Oswego	0	0	0	0	0	0	212	0	212	0	212
	Port Jefferson	12173	13754	0	0	25927	0	5436	0	5436	0	31363
	Rondout	69	0	0	0	69	0	0	0	0	0	69
Tarrytown	885	0	0	0	885	0	59	0	59	0	944	
NY & NJ	New York	226462	340144	14831	9544	590981	13954	232829	1176	247959	35419	874359
PA	Chester	1562	2	457	130	2151	0	7170	0	7170	0	9320
	Marcus Hook	24934	49225	772	12121	87053	0	41440	310	41750	94731	223534
	Penn Manor	1973	0	0	0	1973	0	0	0	0	0	1973
	Philadelphia	28540	41945	1570	11893	83947	17749	45264	45	63059	62149	209155
RI	Providence	22392	34377	350	0	57119	2976	3149	0	6125	0	63244
VA	Hopewell	104	0	0	0	104	2182	814	0	2995	0	3100
	Newport News	1658	97	0	120	1875	308	3485	0	3793	0	5668
	Norfolk Harbor	8647	12486	554	174	21861	1252	20014	0	21266	1762	44889
	Richmond	2674	1264	0	0	3939	718	4378	0	5095	0	9034

Based on data extracted from Army Corps of Engineers database for all waterborne commerce