JOINT TRANSPORTATION COMMITTEE
FERRIES FINANCING STUDY II

INITIAL FINDINGS - VESSEL ACQUISITION SIZING AND TIMING

JTC FERRY POLICY GROUP
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Legislative Direction

2007 Legislature directed JTC to:

- Make recommendations regarding the most efficient timing & sizing of future vessel acquisitions beyond those currently authorized by the legislation.
  - Up to 3 144-vehicle auto-passenger ferries
  - 2 Island Homes

- Base vessel recommendations on the work of the study, including:
  - Updated ridership projections
  - Level of service standards
  - Operational and pricing strategies

- Document impact of vessel recommendations on:
  - Terminal capital investments
  - WSF's operating and capital finance plans

Legislative Direction

Other legislative direction:

- Ferries shall continue to provide service to Sidney B.C. (ESHB 2878 (224) (3))
- Legislative approval required to add or eliminate a route. (ESHB 2358 (8) (2))
- In planning for vessel acquisitions, ferries must evaluate the long-term operating costs related to fuel efficiency and staffing. (SSB 6932 (6) (2 (h))

Framework for Vessel Analysis

- Baseline vessel scenario – Used to compare alternative fleet scenarios

- Report will evaluate different deployment scenarios looking at:
  - Fixed costs:
    - Non-variable costs of vessel ownership
    - Include vessel reserve capacity – emergencies
  - Variable Costs
    - Service Hours - Deployment Scenarios
  - Acquisition Costs – 09-11 fiscal year thru 29-31 (22 yr)
  - Annual Operating Costs
  - Terminal Requirements
  - Timing of acquisition – For preferred acquisition alternative

Baseline Fleet Scenario

- WSF's ridership projection based on 23 vessels
- 23 vessels in five size categories.

5 – Jumbo	(188-202 cars)
7 – Large	(144 cars)
5 – Medium	(124 cars)
3 – Mid-size	(87 - 90 cars)
3 – Small	(34 - 64 cars)

- Study focus
  - Is 23 the right number of vessels?
  - What is the right distribution of vessel sizes?

Baseline Fleet Scenario – Vessel Acquisitions

- 12 new vessels and 2 under construction in 09-30 planning period.

- 5 new vessels currently authorized:
  - Large Size - Up to 3 144s (baseline assumes 3)
  - Small Size - 2 Island Homes

- 7 vessels to be replaced in-kind
  - 4 Large Size – Replace Supers (1967)
  - 2 Mid-Size – Replace Evergreen States (1950s)
  - 1 Small – Replace Hiyu (1967)

- 2 vessels to be in construction 2 Jumbos
  - Replace Jumbo Mark I (1972)

- Total vessel acquisition cost
  - $815 million- in 2008 $

Baseline Fleet Scenario - Fixed costs (2008 $)

- Fixed costs are costs – such as insurance, engine room crew, preservation – that do not vary with service hours or deployment
- Analyzed at the system-wide level
- Expressed as fixed costs per service hour as a measure of efficiency

- Goal – Spread fixed costs over as many service hours as demand warrants – resulting in lowest fixed costs per service hour

Fixed Operating Budget Costs	$ 58.6 million
Fixed Capital Budget Costs	$ 35.0 million
60-year Depreciation of Acquisition Costs	$ 15.3 million
Total Annual Fixed Costs	**$108.9 million**
Fixed Costs Per Service Hour - Baseline	**$950.00**

Baseline Fleet Scenario – Fixed costs

Breakdown of Total = $108.9 M

Annual Fixed Operating Budget Costs - $58.6 million

- $35.9 million – Engine room labor
  - 2 of 23 vessels "de-crewed" – Hiyu & Hyak
  - Crewed = 24 hours a day/7 days a week
  - Crew size – range 3 to 4 in engine room
- $ 7.8 million – X 4 Maintenance (drydock, shipyard, repairs)
- $ 6.6 million – Engine room non-labor
- $ 4.1 million – Insurance (Program X only)
- $ 3.8 million – Eagle Harbor labor
- $ 0.4 million – X 7 Maintenance management & support

Annual Fixed Capital Budget Costs - $35.0 million (based on 09-11 submittal)

- Vessel Preservation – $33.9 million
- Vessel Improvement – $ 1.1 million

Annual Depreciation - $15.3 million

- Consultants reviewed Ferries 60 year life assumption
- Concluded it is reasonable & consistent with other ferry systems
- Need to reflect cost of acquisition – done through depreciation

Baseline Fleet Scenario - Fixed costs

How Can Fixed Costs Be Reduced?

- Reduce number of vessels needed to provide service level.
- Build smallest vessel to meet demand/service level. Smaller vessels have:
  - Smaller engine room crews
  - Lower preservation & acquisition costs
- Extend life of vessels – Will assess costs of lengthening life of 11 vessels acquired in the 1970s through the 1990s.
- Consider modifications to engine room crewing hours
  - Can a vessel in service 8 hours a day have a 12 hour engine room crew?/Should more vessels be de-crewed?
- Implement insurance and other cost reduction recommendations.

Baseline Fleet Scenario – Fixed Costs

Reserve Capacity

- Reserve capacity is used to cover 1) time boats are out of service for maintenance and 2) to cover emergency breakdowns

- Baseline maintenance reserve requirements:
  - Each vessel averages 7 weeks a year in maintenance
  - Continuing study of ways to reduce maintenance time

- Baseline emergency reserve capacity requirements:
  - Weeks available per year for emergency response – 115
    - Crewed vessels – 25 weeks (various sizes)
    - De-crewed – 90 weeks (1 small & 1 large)
  - Crewed response time 16-18 hrs faster than a de-crewed vessel
  - Reviewing whether 115 weeks is the appropriate emergency reserve

Baseline Fleet Scenario – Variable Costs

- Variable costs are costs, such as deck crew and fuel, that vary with the service hours and deployment.
- Vessels that operate 24 hours a day are the most efficient assuming sufficient demand.

# of vessels	**Deployed**
5	24 hrs/day - all year
8	16 hrs/day - all year
6	16 hrs/day – different seasons
1	8 hrs/day – summer/shoulder
2	De-crewed reserves – all year
1	Crewed reserve – all year
23	**114,728 service hours per year**

Baseline Fleet Scenario – Variable Costs

Deployment affects variable costs – Baseline deployment:

Route	**# Vessels**	**Size**
Bainbridge	2	2 Jumbo
Bremerton	2	2 Large except summer: 1 Jumbo & 1 Large
Clinton	2	1 Large & 1 Medium
Kingston	2	2 Jumbo
Triangle	3	2 Medium & 1 Mid-Size
Pt. Defiance	1	1 Mid-Size
Port Townsend	1 or 2	1 Small winter, fall, spring/2 shoulder & summer
San Juans & Sidney	4 or 5	2 Large, 1 Medium & 1 Mid-Size fall, winter, spring, shoulder 4 Large, 1 Mid-Size summer
Total Deployed	**17 or 19**	**17 – fall, spring, winter** **18 – shoulder** **19 - summer**

Baseline Fleet Scenario – Variable Costs

Systemwide annual variable costs (2008 $)

Non-Fuel	$ 50.5 million
Fuel	$ 56.4 million
Total	$106.9 million

- Goal –
  - Minimize total variable costs
  - Minimize variable costs/vehicle carried

Baseline Fleet Scenario – Variable Costs

Annual Non-Fuel Variable Costs - $50.5 million

- $48.3 million – Deck labor
  - Crew size varies from 4 to 11 based on vessel size
    - +2 crew for international service – Sidney
- $1.8 million – Deck non-labor
  - Examples – cleaning supplies, uniforms, mileage
- $0.4 million – Engine room supplies affected by service hours

Baseline Fleet Scenario – Variable Costs

Annual Fuel Costs – $56.4 million – (08 $)

- Vary by route, vessel class/size, speed & docking

Route	Fuel Cost	Per Service Hour
Bainbridge	$11.0 million	$758
Bremerton	$ 8.6 million	$586
Clinton	$ 4.6 million	$318
Kingston	$10.5 million	$718
Triangle	$ 5.2 million	$266
Pt. Defiance	$ 2.1 million	$366
Port Townsend	$1.7 million	$270
San Juans & Sidney	$12.7 million	$527
Total	**$56.4 million**	**$491**

Baseline Fleet Scenario – Variable Costs

Factors Effecting Annual Fuel Costs

Route

- Longer routes have longer running vs. docking time > fuel use.
  - Medium size vessel Bremerton 16.5 kts – 133 gal/svc hr.
  - Medium size vessel Clinton 16.5 kts – 83 gal/svc hr.

Vessel Size/Class

- Jumbo ships account for largest total fuel consumption
  - 3 Jumbo Mark II (202 car) account for approx 1/3 of total fuel.
  - Jumbo Mark II priority for fuel conservation – Ferries has reduced fuel consumption 10.5 %.
- Design – particularly length to beam ration – affects fuel efficiency.

Baseline Fleet Scenario – Variable Costs

Potential Strategies for Reducing Annual Fuel Costs

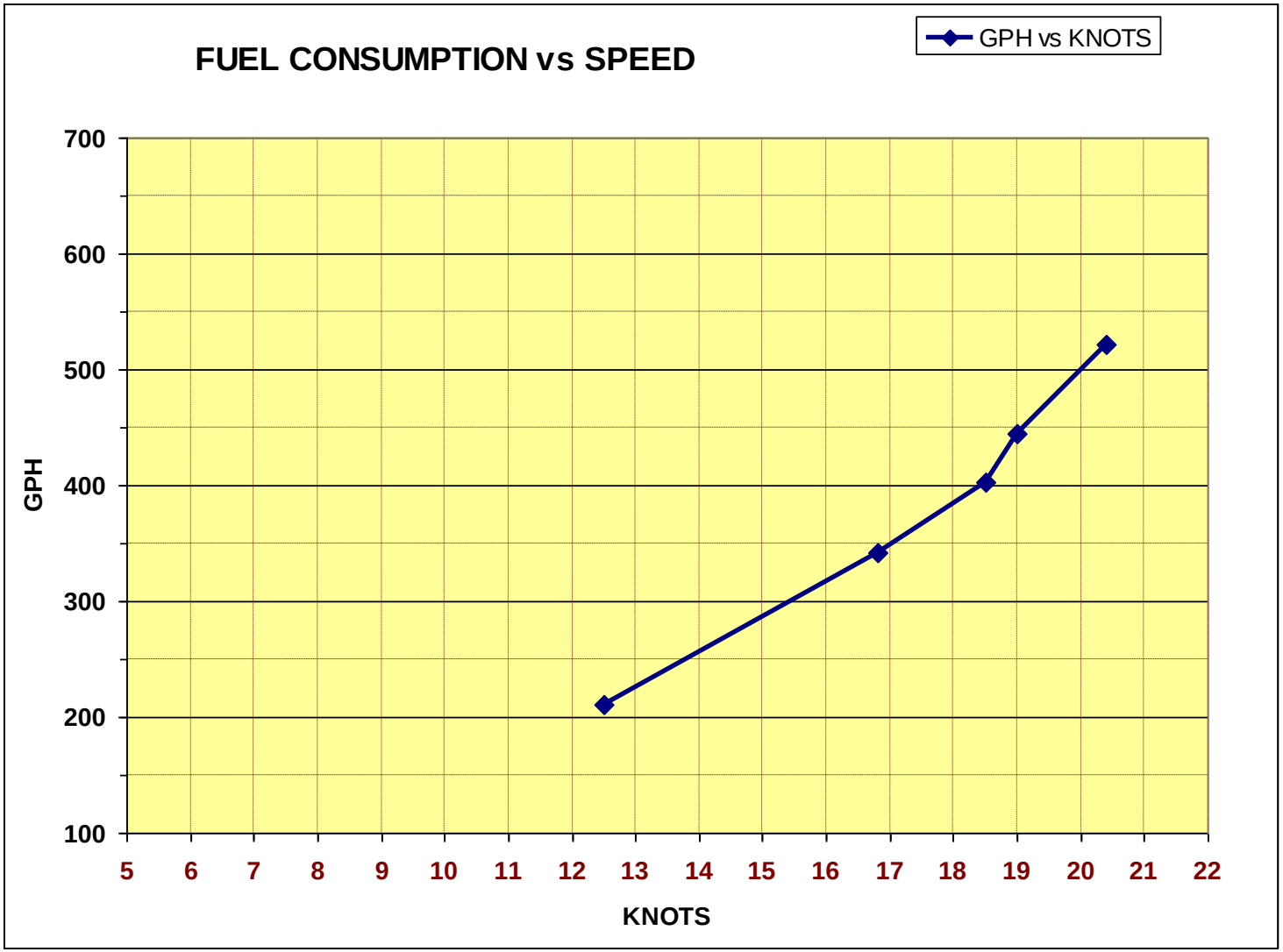
Docking

- Preliminary results show reducing engine speed at docking has potential for large savings.
- Assessing viable vessel/terminal modifications.

Baseline Fleet Scenario – Variable Costs

Potential Strategies for Reducing Annual Fuel Costs

Speed – Minor changes in speed can result in significant fuel savings.



Baseline Fleet Scenario – Variable Costs

Potential Strategies for Reducing Annual Fuel Costs

Speed

- Preliminary results show changes in speed result in relatively small increases in crossing time **per sailing** & significant reductions in consumption :

Route	Speed (kts)	Crossing Time (minutes)	Fuel $ (08) Per Svc Hr.
Bainbridge Jumbo Mark II (202)	18.0	31.7	$758
	17.5	33.0 (+1.3)	$713 (-$45/-6%)
	17.0	33.4 (+2.1)	$687 (-$71/-9%)
Bremerton Jumbo Mark I (188)	17.5	53.9	$857
	17	55.7 (+1.8)	$713 (-$144/-17%)
	16	58.3 (+4.2)	$648 (-$200/-23%)

- Potential fuel savings need to be balanced against **cumulative** schedule affect & any impact on deck crew.

Baseline Fleet Scenario – Variable Costs

Potential Deployment and Service Strategies for Reducing Variable Costs

- Examining 3 key indicators based on 2030 ridership projection
  - Percentage of vehicle capacity utilized.
  - # of sailings sold out or fully reserved.
  - Variable cost/car carried.

Baseline Fleet Scenario - 2030 Route Performance

Route	**% Vehicle Capacity Used** Summer/Winter	**% of Sailings Vehicle Capacity Sold Out** Summer/Winter	**Variable Cost Car Carried** (08$) Summer/Winter
Bainbridge	102%/83%	55%/35%	$ 5.65/$ 6.82
Bremerton	62%/49%	19%/ 6%	$15.14/$20.86
Clinton	84%/70%	44%/20%	$ 3.19/$ 4.16
Edmonds	108%/83%	66%/33%	$ 4.66/$ 6.08
Triangle	75%/69%	31%/25%	$ 5.69/$ 5.97
Pt. Defiance	52%/46%	4%/ 2%	$ 8.22/$ 9.37
P. Townsend	146%/ 101%	99%/50%	$ 7.53/$ 7.47
San Juans	125%/ 61%	54%/10%	$11.41/$20.31
InterIsland	25%/ 46%	0%/ 0%	$28.58/$77.93
Sidney (2nd # spring)	56%/93%	50%/ 0%	$39.53/$123.07

Baseline Fleet Scenario – Variable Costs

Potential Deployment and Service Strategies for Reducing Variable Costs

- The three indicators help identify routes where modifications might be considered, should as:
  - Changing the size of the vessel assigned to the route.
  - Changing the vessel service hours.
  - Changing the route vessel assignment.
  - More direct sailings on the two multi-stop routes - the Triangle and San Juans.

Baseline Variable Cost Modification Constraints

Landside/navigation constraints on alternative vessel deployments

- Seattle-Bainbridge – No increase in # of boats
- Triangle – Medium size boat (124 cars) largest possible
- Pt. Defiance – Medium size boat (124 cars) largest possible
- Port Townsend – Only Island Homes (64 cars)
- San Juans – Large boat (144 cars) largest possible
- Clinton - Large boat (144 cars) largest possible