

Should Juneau Accommodate 1.5 million Cruise Ship Visitors Per Year? How? Why? At what Benefits and Costs?

Bill Leighty, The Leighty Foundation
wleighty@earthlink.net
www.leightyfoundation.org/earth.php

“Making Tourism Work”
20 Feb 2019, 1600

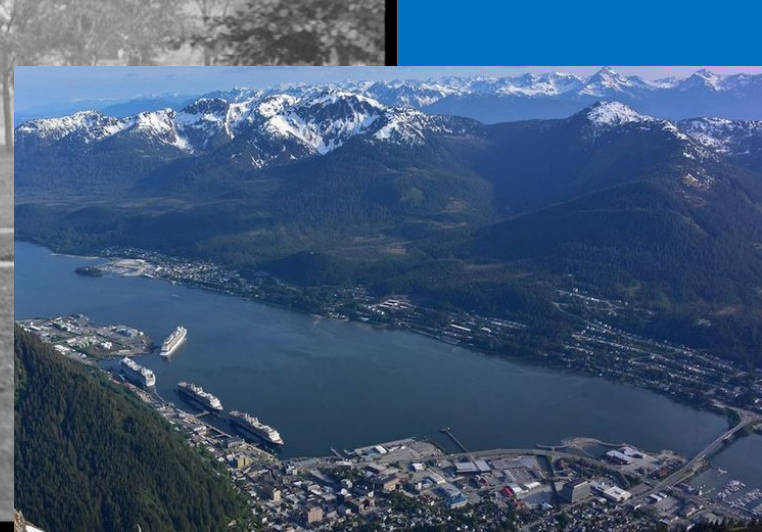
- Sheep, ships, pax, buses
- Pleasure, wonder, tranquility
- Noise, smoke, crowds, CO₂



Tragedy of the Commons: Unpriced, free, abused



Boston Common



Tragedy of the Commons



“ It's a difficult balance ... that you have to decide locally ... what kind of community do you want ... do you want that kind of an economy, that economic opportunity to come ... or is it too disruptive for some people ...

“ It's a local question and ultimately one that you have control over. The industry respects that. “

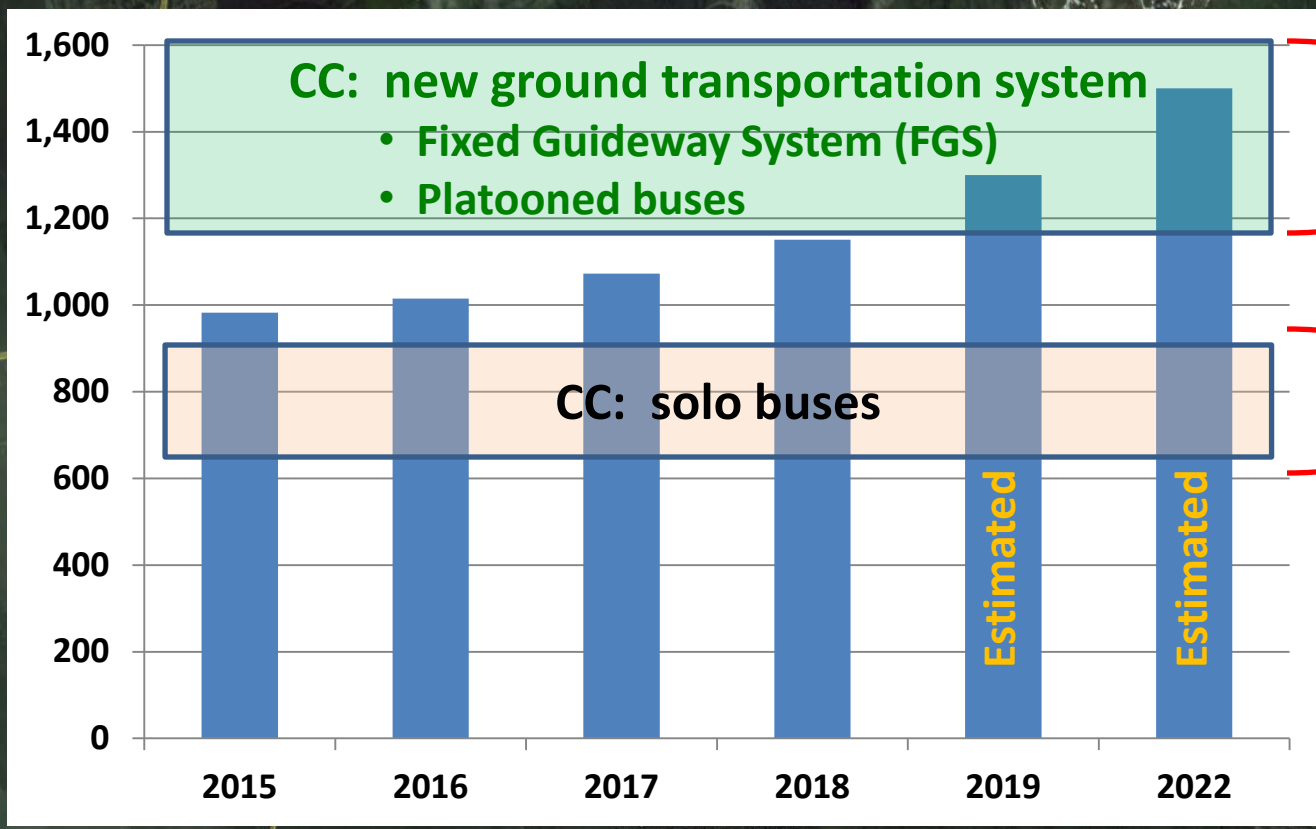
--- John Binkley, President, CLIA Alaska,
22 Feb 18, JEDC Innovation Summit

Has CBJ the authority to declare Juneau's
Carrying Capacity (CC) for cruise ship passengers,
and to administer and enforce that maximum ?

Juneau Total Cruise Ship Passengers, thousand

2019, 2022 estimated
CC: "Carrying Capacity"

Thousands of Passengers



CC increase

INNOVATION

Opportunity: Public Private Partnership

- Aside from “Judge Holland criterion”
- Increasing CC is win for all ?
- Already beyond CC ?
- CBJ declares so; limits cruise ship pax 2020
- People of Juneau, CLIA Alaska, CBJ, USFS agree:
 - CC increase plan
 - Capex investment plan
 - New ground transport system
 - “Quiet Technology” copters
 - Other:
 - Execute
- Increase cruise ship pax, profitability

What is “ Carrying Capacity “ (CC) ?

- How define ? By whom ?
- Consensus ? Process ? Defend ?
- How measure ? Limit(s), number(s)
- Can CBJ legally declare ? Administer ?
- Based on benefits, costs
- Eye of the Beholder
- “Tragedy of the Commons”
- Why ?
 - Visitor experience enhance
 - Juneau reputation
 - Residents’ QOL
 - Reduce fossil fuel use, CO2
 - Monopolist: restrict supply, raise prices

What is “ Carrying Capacity “ (CC) ?

- System:
 - SE AK, State
 - Balance
 - Optimized: many parameters
 - Weak links: identify, repair, invest
- Can CBJ legally declare ? Administer ? Enforce ?
 - Authority
 - Ordinances
 - Public – private collaboration
 - Who invests ? Owns ? Operates ?

Summer Tourism Carrying Capacity (CC)

Goals

- Reduce fossil fuel use
- Visitor pleasure
- Juneau's reputation
- Residents' QOL, tolerance

Sectors

- Cruise ships
- Independents
- Airline
- AMHS

Detractions

- Buses (all sizes), vans, taxis:
 - Noisy
 - Smelly
 - Smoky
 - Too fast
 - Too many
 - Congestion, traffic
 - Rude
 - Old + ugly

- Helicopters:
 - Noisy
 - Constant
 - Ubiquitous
- Fixed-wing av:
 - Noisy
 - Constant
 - Ubiquitous
- Tour boats:
 - Noisy
 - Too many
 - Hurried
 - Rude
- Trails: crowded ?



INNOVATION

“Quiet Technology”
Increase CC by
reducing nuisance:
Replace all copters

Airbus EC130 “Eco-Star”
~ \$ 3 million



Juneau: 20 @ \$ 3m = \$ 60m

Benefits:

- Juneau economy: cash, jobs
- Juneau economy: lower COL
- Juneau reputation: keep capital
- Juneau transport infrastructure
 - Year-round
 - Lower COL – fewer “cars”
 - 3x population -- refuge
- Global travel industry profit
- Alaska advocacy, protection
- Residents' hospitality, sharing

1.5 million ?

Cruise ship pax

Costs:

- Lost QOL: tranquility, solitude, charm
- Noise, congestion, air pollution
- CO₂ emission: global dangers
- Infrastructure capex, opex:
 - Ground transport
 - Aviation: aircraft, transport
 - Marine vessels, access
 - Emergency equip + staff
- Seasonal: low annual capacity factor

Image Landsat / Copernicus
Image © 2019 DigitalGlobe
© 2019 Google

Google Earth

"[The cruise ship companies] are not looking at it [carrying capacity] ... they're not saying, there's a lot of people coming into Juneau, what are we going to do to fix that problem ... "

"As the industry grows, it may be that if Juneau is not able to maintain that level of satisfaction, they'll find other communities or destinations to go to, around Alaska."

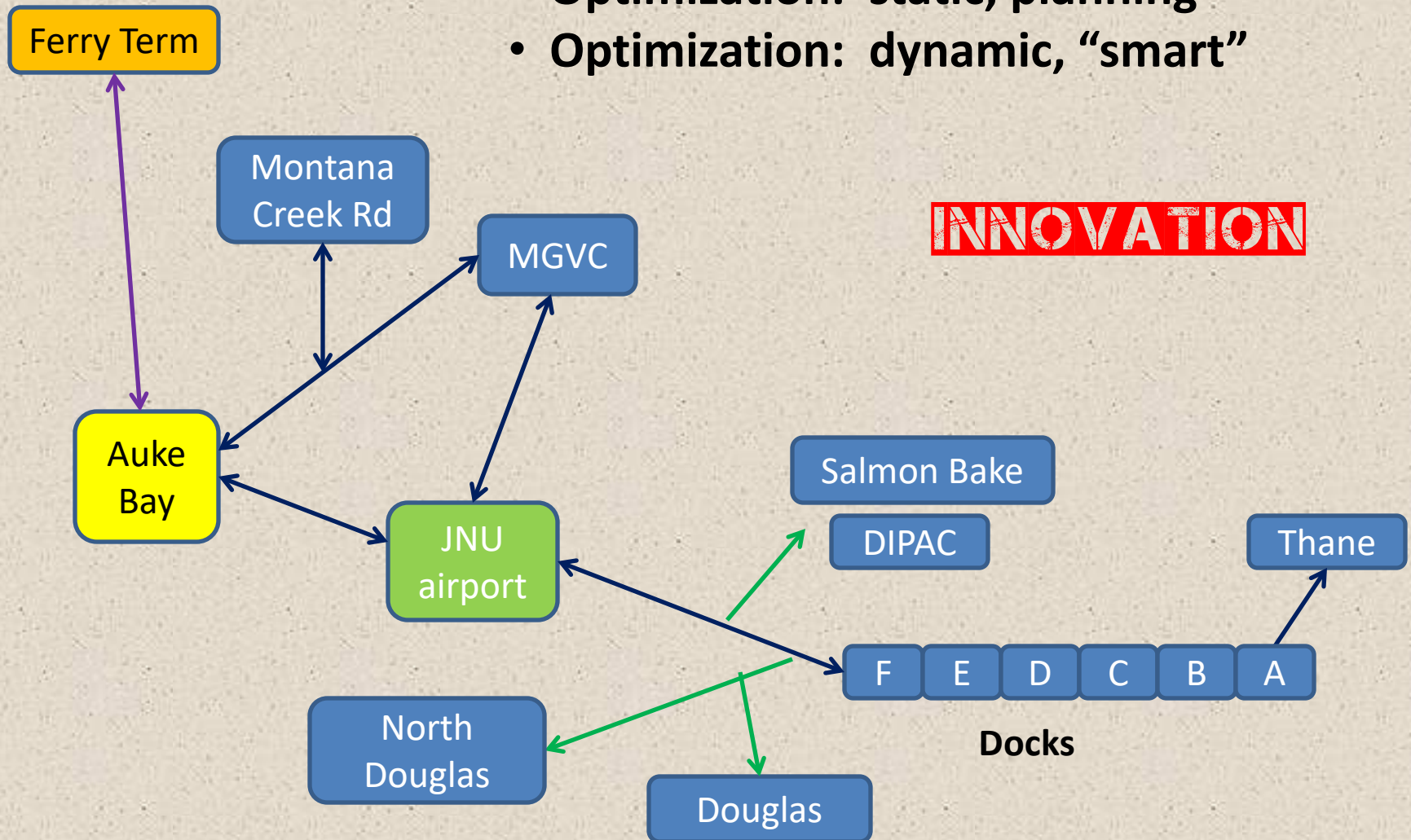
--- John Binkley, President, CLIA Alaska,
22 Feb 18, JEDC Innovation Summit

Juneau Visitor Industry Ground Transportation System

DESIGN

- System engineering: Resources, ops
- Optimization: static, planning
- Optimization: dynamic, “smart”

INNOVATION

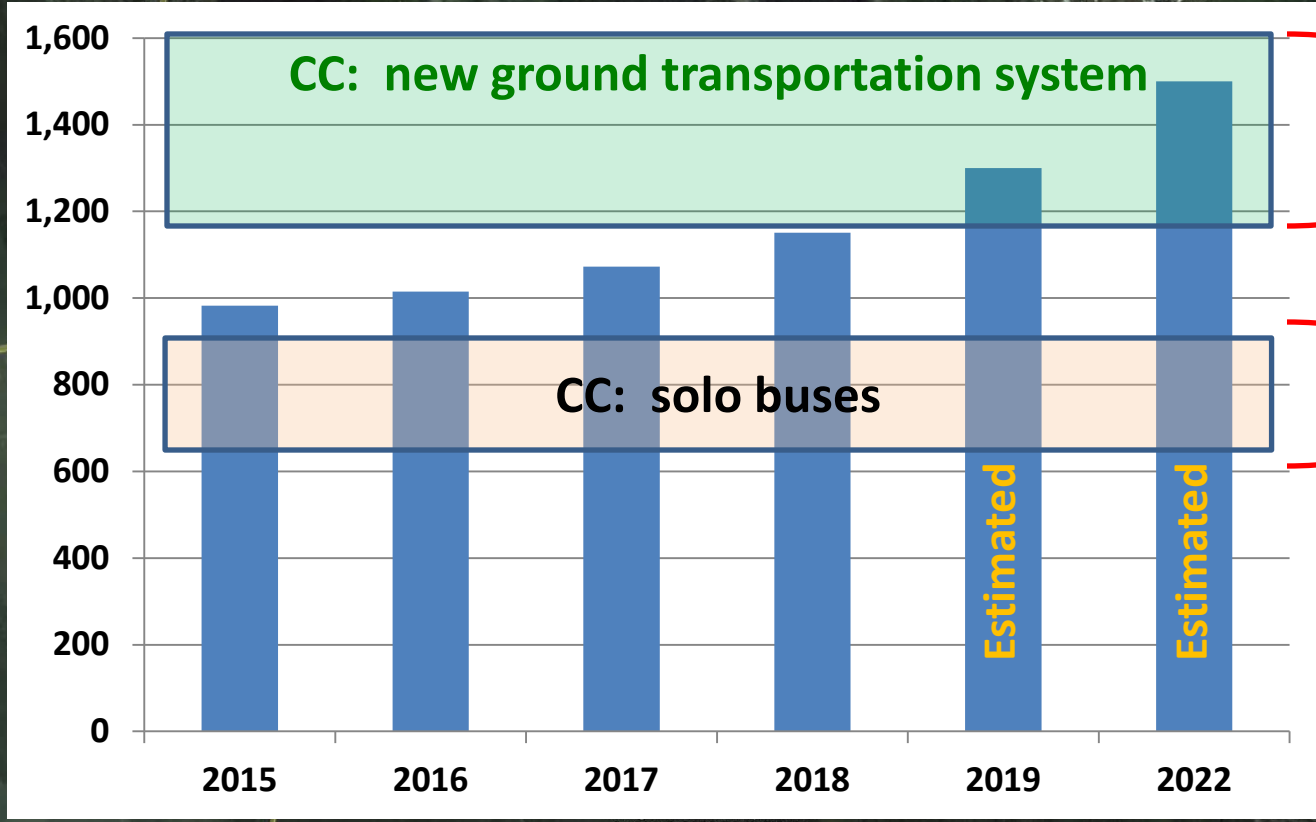


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2019, 2022 estimated

CC: "Carrying Capacity"

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CC increase

DESIGN



Image Landsat / Copernicus
Image © 2019 DigitalGlobe
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Juneau Visitor Industry Ground Transportation System

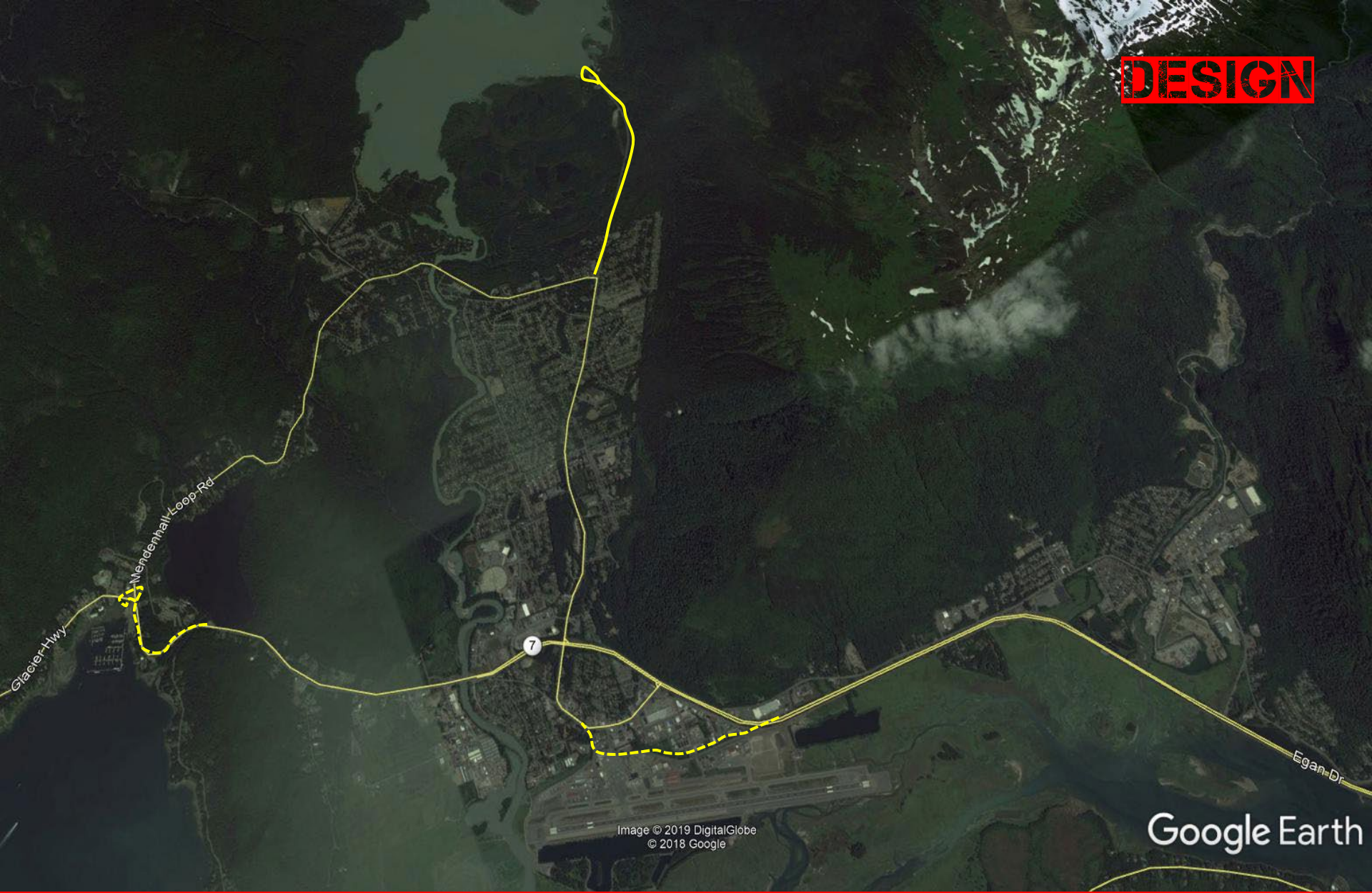
DESIGN



Image © 2019 DigitalGlobe
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Google Earth

DESIGN



Glacier Hwy

Mendenhall Loop Rd

7

Egan Dr

Image © 2019 DigitalGlobe
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DESIGN



Mendocino Loop Rd

Glacier Hwy

7

Image © 2019 DigitalGlobe
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Google Earth

DESIGN

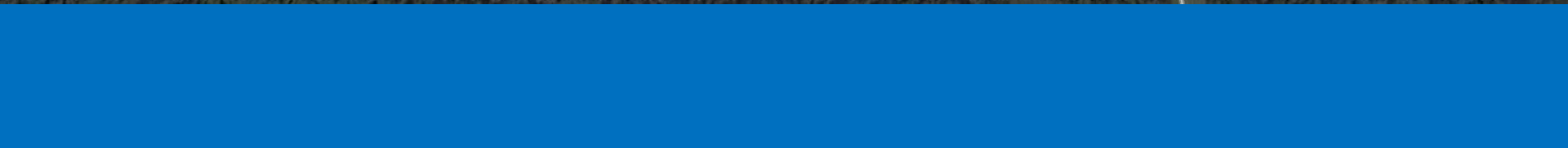
Photo Point Trail

E. Glacier Spur Rd

Glacier Spur Rd

Image © 2019 DigitalGlobe
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DESIGN

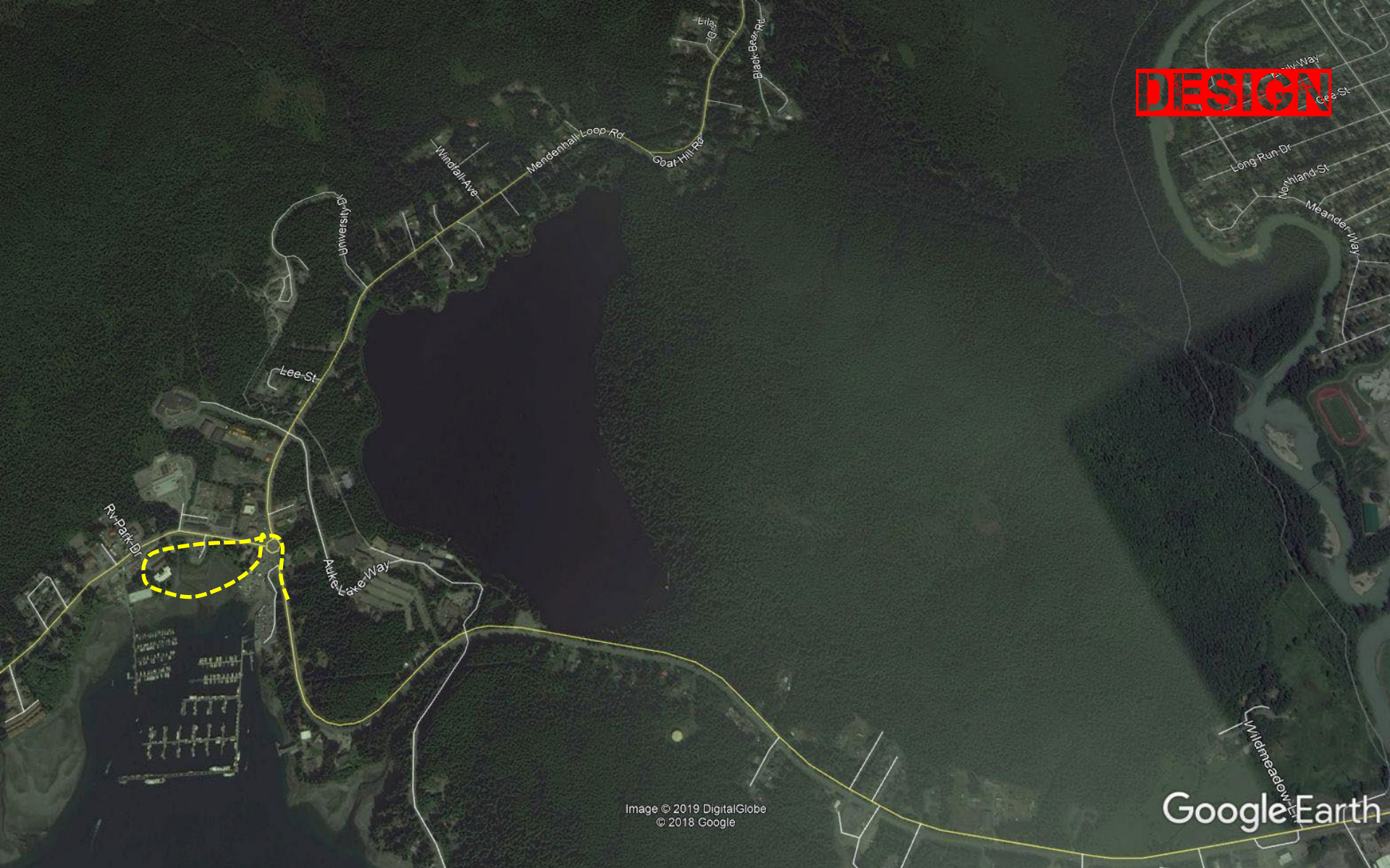


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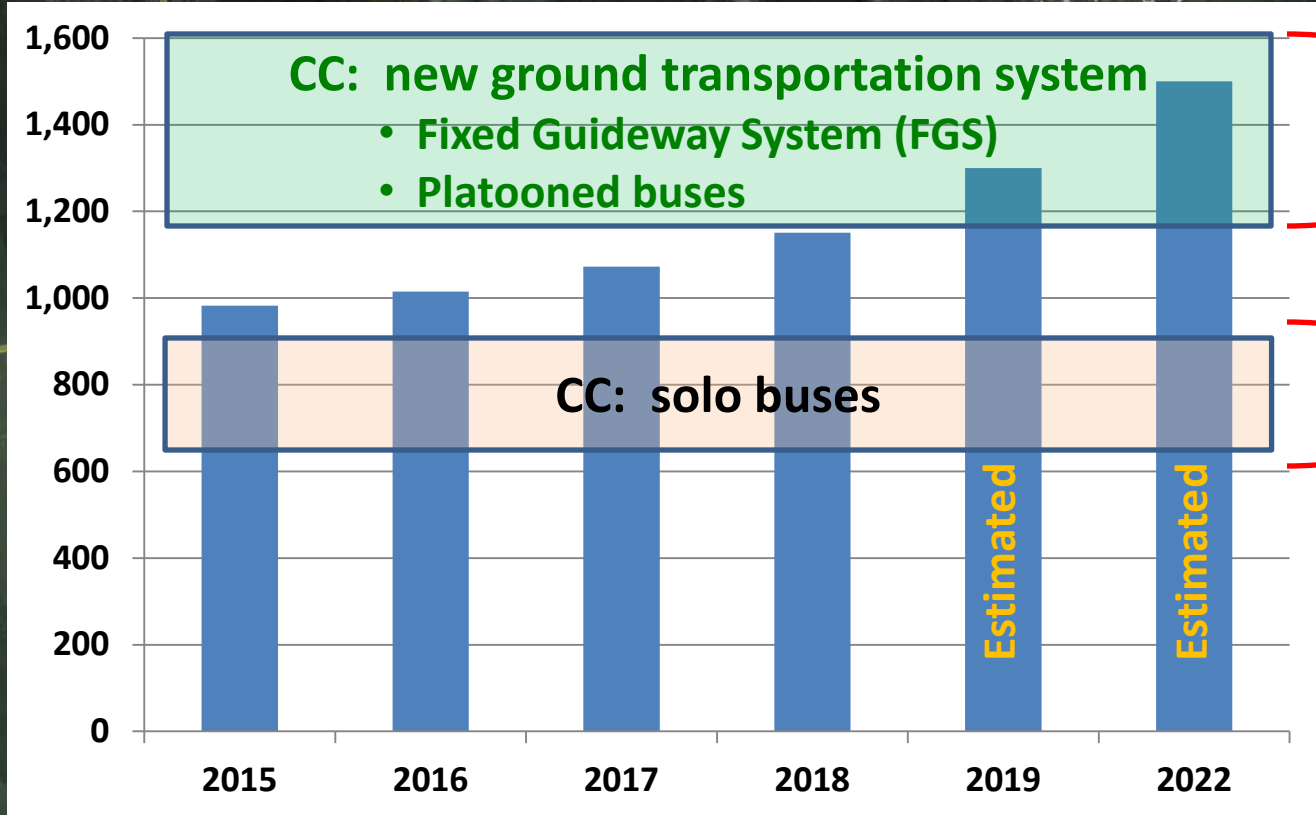
“Solo buses”: MCI “Coach” ~ 50 seats + baggage under high floor
Need the baggage level ?

Juneau Total Cruise Ship Passengers, thousand

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CC increase

“ We can solve congestion at the docks with electric buses ”

**John Binkley, President, CLIA Alaska, Feb 2018;
private conversation with Bill Leighty**

INNOVATION

- **Increase CC**
- **Reduce fossil fuel**
- **Solve congestion ?**



New Flyer Low-floor Battery Electric Vehicle (BEV)

~ \$ 800,000, 50 pax, 175 mile range “city” duty

Plus ~ \$ 30 – 50,000 charger per bus

**Replace 80 Juneau old diesels:
80 @ \$ 830,000 = \$ 66 million**



**Replace 80 Juneau old diesels:
80 @ \$ 830,000 = \$ 66 million**



**MCI Battery High-floor “Coach” Electric Vehicle (BEV)
~ \$ 800,000, 50 pax, 175 mile range “city” duty**

INNOVATION



Hydrogen Fuel Cell Bus



Typical “coach” interior, 48 – 54 seats

INNOVATION



Poland: 80 ft bus



Mercedes: Autonomous bus



INNOVATION

**China: autonomous “bus train”
Rubber-tired, autonomous
Disabled by snow ?**

“Trackless Tram” developed in Europe and China (CRRC Zhuzhou Institute)

Rubber-tired autonomous rail transit (ART) system.

Autonomous optical guidance system may be disabled by snow or water;

Perhaps summer-only use in Juneau.

One 3-segment vehicle; cannot release an autonomous vehicle to proceed to a different destination.

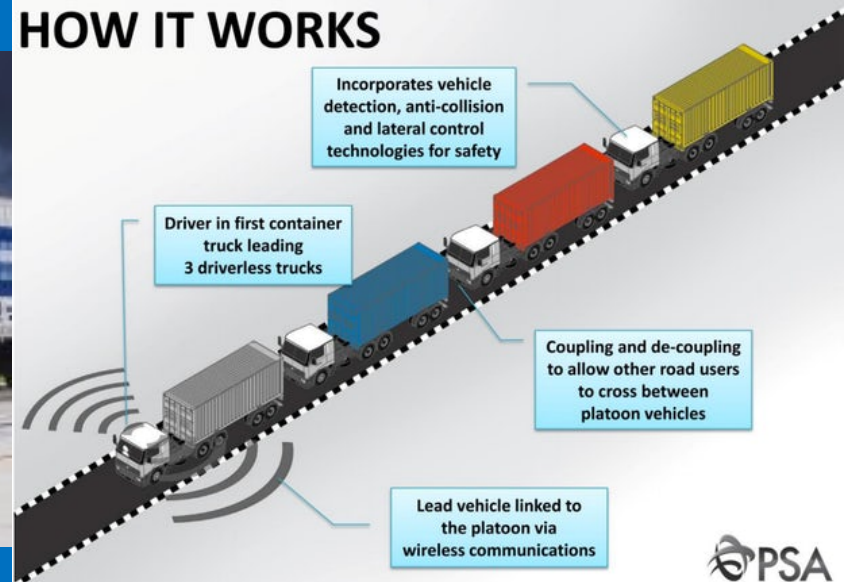
“Platooning” trucks, buses

INNOVATION

- Future: 5 years ?
- Autonomous, self-driving
- Wireless link, unlink
- “Bus train”



HOW IT WORKS





Light Rail Transit (LRT) Fixed Guideway System (FGS)



Fixed Guideway System (FGS)

- Light Rail Transit (LRT)
- Streetcar
- Hybrid: LRT – Streetcar
- Bus Rapid Transit (BRT)

INNOVATION



Alstom Hydrogen-fueled, Fuel Cell Train

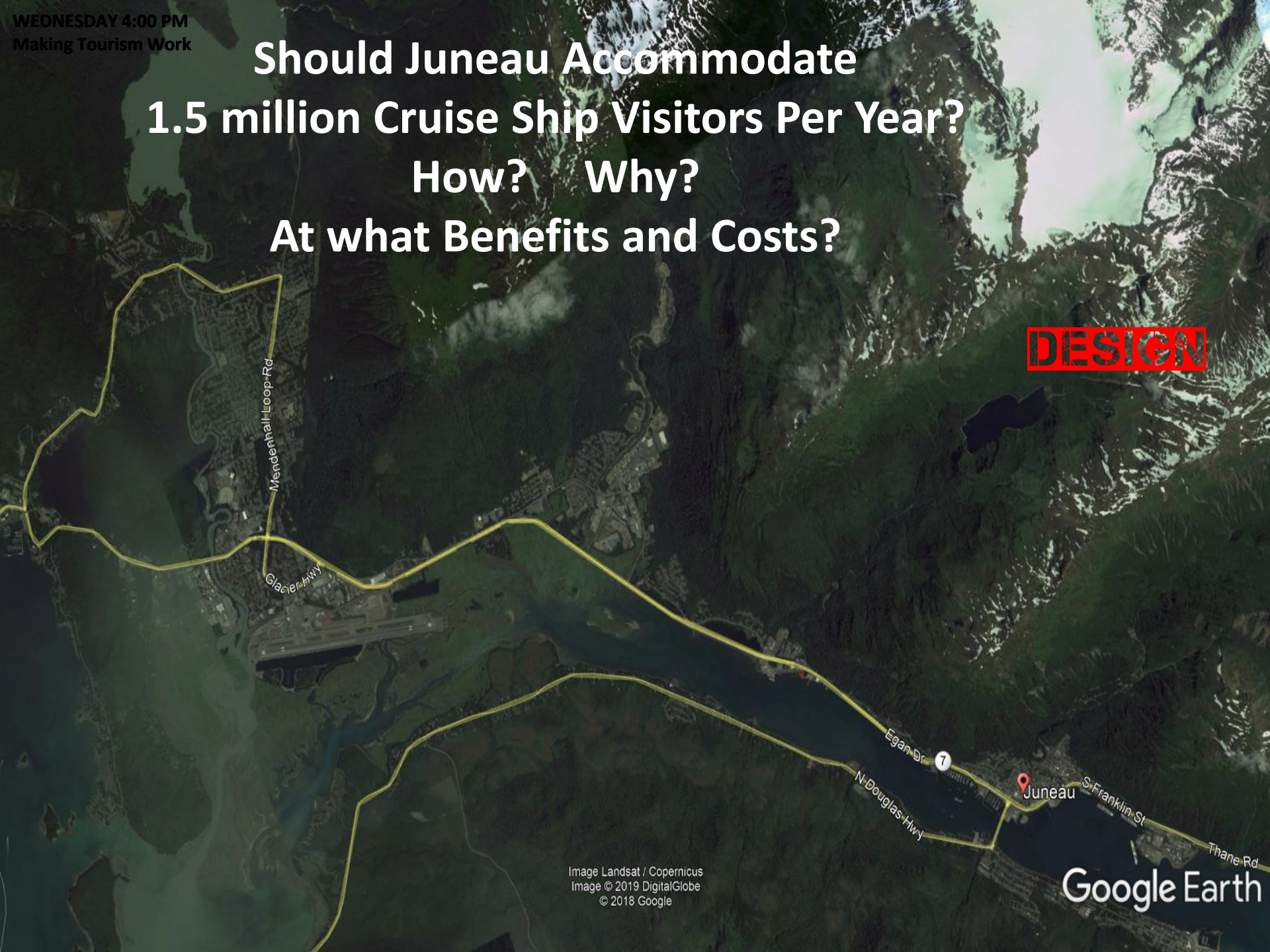
- No overhead wires
- 200 mile range
- 20 minute fueling
- Hydroelectric-source Hydrogen fuel: Zero Emission Vehicle (ZEV)



Sprinter Light Rail Transit (LRT)

Should Juneau Accommodate 1.5 million Cruise Ship Visitors Per Year? How? Why? At what Benefits and Costs?

DESIGN



Fixed Guideway System (FGS) COSTS: CAPEX

Bill Leighty estimate

- Light Rail Transit (LRT)
- CC = 1.5 million

FGS Capital Expense (CAPEX)				\$ million Each		\$ million Total
Rolling stock:	40	cars		3		120
Track, double:	15	miles		3		45
Stations, ordinary:	20	stations		2		40
Station, Mode chang	1	stations		20		20
Maintenance barn:	1			40		40
Hydrogen fueling sta	1			50		50
Controls + crossing s	1			10		10
Personnel training: ops, maintenance				2		2
Design, planning, consulting				4		4
Contingency				35		35
ROW purchase				0		0
Grade-separated intersections				0		0
Total Capex, gross, FGS					\$ million	366

DESIGN

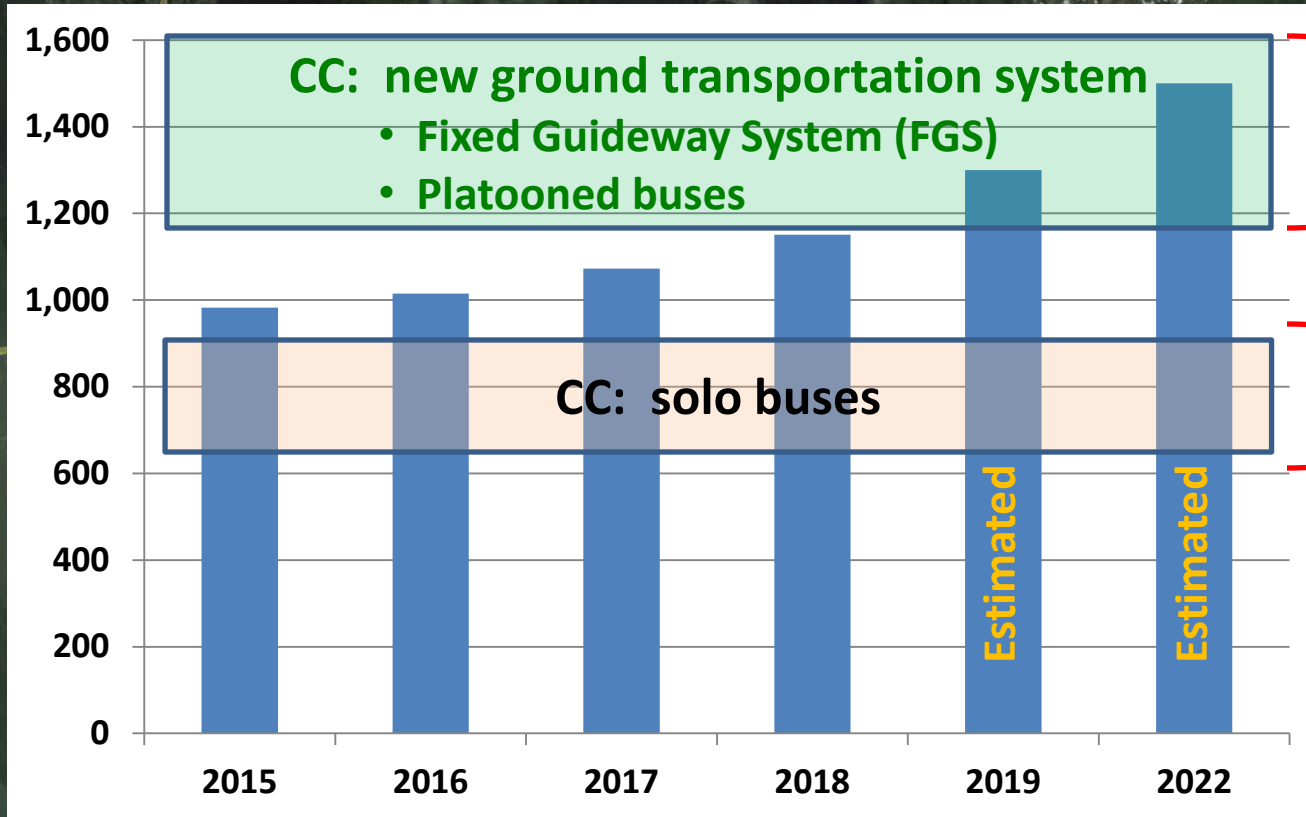
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INNOVATION

Thousands of Passengers



CC increase

Fixed Guideway System (FGS) COSTS: CAPEX

Bill Leighty estimate

- Light Rail Transit (LRT)
- CC = 1.5 million

FGS Capital Expense (CAPEX)				\$ million	\$ million
DEDUCTIONS AND SAVINGS: private and public				Each	Each
Diesel "MCI" 50-60 pax "hiway" tour buses NOT replaced	60	buses	0.8	48	
New parking structures not needed	3	garages	10	30	
Parking lots surplus; land recovered to develop	10	acres	3	30	
Highways projects not needed; fed funds repurposed	5	years	8	40	
Deploy surplus FGS rolling stock "Outside" 7 months	20	cars	1	20	
Total capex deductions and savings, gross, consequent of FGS				\$ million	148
CAPEX REDUCTIONS: private and public					\$ million
USDOT grant, FTA (Fed Transit Admin); theoretical; very uncertain					50
USFS USDA grant for MGVC improvement, CC increase					10
Private investment, misc: airlines, shore excursions					20
Other					0
Total capex reductions				\$ million	80
NET CAPEX REQUIRED FOR FGS: beyond replace all buses: BEV or FCV				\$138	\$ million
Cruise ship industry share, residual, balance				\$138	\$ million
NET CAPEX DEFICIENCY				\$0	\$ million

Fixed Guideway System (FGS)

- Light Rail Transit (LRT)
- CC = 1.5 million

COSTS: OPEX

Bill Leighty estimate

FGS Operating Expense (OPEX) \$ millions		
SUMMER 4 MONTHS, CRUISE SHIP INDUSTRY ALLOCATION		
FGS labor: drivers (operators)		10
FGS electric energy		10
FGS maintenance		5
FGS other		5
FGS subtotal		30
Cruise ship car host, hostess labor		10
Total cruise ship industry allocation		40
SUMMER 4 MONTHS, CBJ ALLOCATION "CAPITAL TRANSIT"		
FGS labor: drivers (operators)		2
FGS electric energy		1
FGS maintenance		1
FGS other		1
FGS subtotal		5
Less % "head tax" from CBJ	30	per cent
(Assume X million @ \$8)	1.5	3.6
CBJ share, net of "head tax" summer 4 months		1.4
OTHER 8 MONTHS, CBJ ALLOCATION "CAPITAL TRANSIT"		
FGS labor: drivers (operators)		3
FGS electric energy		3
FGS maintenance		3
FGS other		2
FGS subtotal		11

Fixed Guideway System (FGS) **BENEFITS – A**

Bill Leighty estimate

- Light Rail Transit (LRT)
- CC = 1.5 million

INNOVATION

FGS OPEX BENEFITS, SUMMER 4 MONTHS, CRUISE SHIP INDUSTRY: incremental margin increase						
0.6	million pax/yr CC increase @	\$500	margin per pax =	\$ million	300	Total gross margin
	Less opex, cruise ship share			\$ million	40	
	Net total annual incremental margin increase			\$ million	260	
	Simple annual ROI on total cruise ship industry capex			per cent	140	
240	short tons CO2 not emitted from burning diesel in "hiway" MCI buses; diesel buses replaced by FGS					
	Note: average 40 buses / day @ 30 miles / day x 100 days per summer = 120,000 miles per summer;					
	@ 5 mpg, = 24,000 gal diesel / summer @ 20 lbs CO2 / gallon = 480,000 lbs CO2 = 240 short tons CO2/yr					

Fixed Guideway System (FGS) **BENEFITS – B**

Bill Leighty estimate

- Light Rail Transit (LRT)
- CC = 1.5 million

FGS JUNEAU PUBLIC BENEFITS, PER 12 MONTHS							
1	\$ million	Estimated Capital Transit Opex savings: fewer vehicles (bus, railcar), fewer drivers					
1	\$ million	Estimated savings in school bus transportation					
36	\$ million	Estimated savings, after-tax expense; need fewer private-owned light duty vehicle (LDV's)					
		6,000	fewer LDV's @	\$6,000	total annual cost =	\$36	million
1	\$ million	Estimated savings in snow removal					
1	\$ million	Vacant garages converted to rental housing (small, inexpensive units): "affordable"					
10	\$ million	Health care costs reduction; walk more; healthier; health insur premiums lower					
0	\$ million	Other					
50	\$ million	Total annual Juneau benefits					
		Simple annual ROI on total FGS capex, before adjustments				14	per cent
		Simple annual ROI on adjusted total FGS capex				36	per cent
		Juneau population =	32,000				
\$1,563	Average cash saving per person, after tax, per year						

Fixed Guideway System (FGS) **BENEFITS – C**

Bill Leighty estimate

- Light Rail Transit (LRT)
- CC = 1.5 million

FGS TOTAL ANNUAL PUBLIC AND PRIVATE BENEFITS						
Cruise ship industry, net	\$260		million			
Juneau, private and CBJ	\$50		million			
Total	\$310		million			
Simple annual ROI on total FGS capex, before adjustments				85	per cent	
Simple annual ROI on adjusted total FGS capex				225	per cent	

Fixed Guideway System (FGS) **BENEFITS – D**

Bill Leighty estimate

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- CC = 1.5 million

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2019 Lab Experiment

- 1.3 million cruise ship pax
- + 18 % from 2018
- Bigger ship(s)
- All ground transport via solo:
 - Coaches
 - Medium & small buses
 - Vans, taxis, TNC's
- More aviation, marine
- How measure, assess CC effect ? Where are we ?
- "Solve congestion with electric buses" ?
- Take data, anecdotes
- Collect video at "congestion" places, times

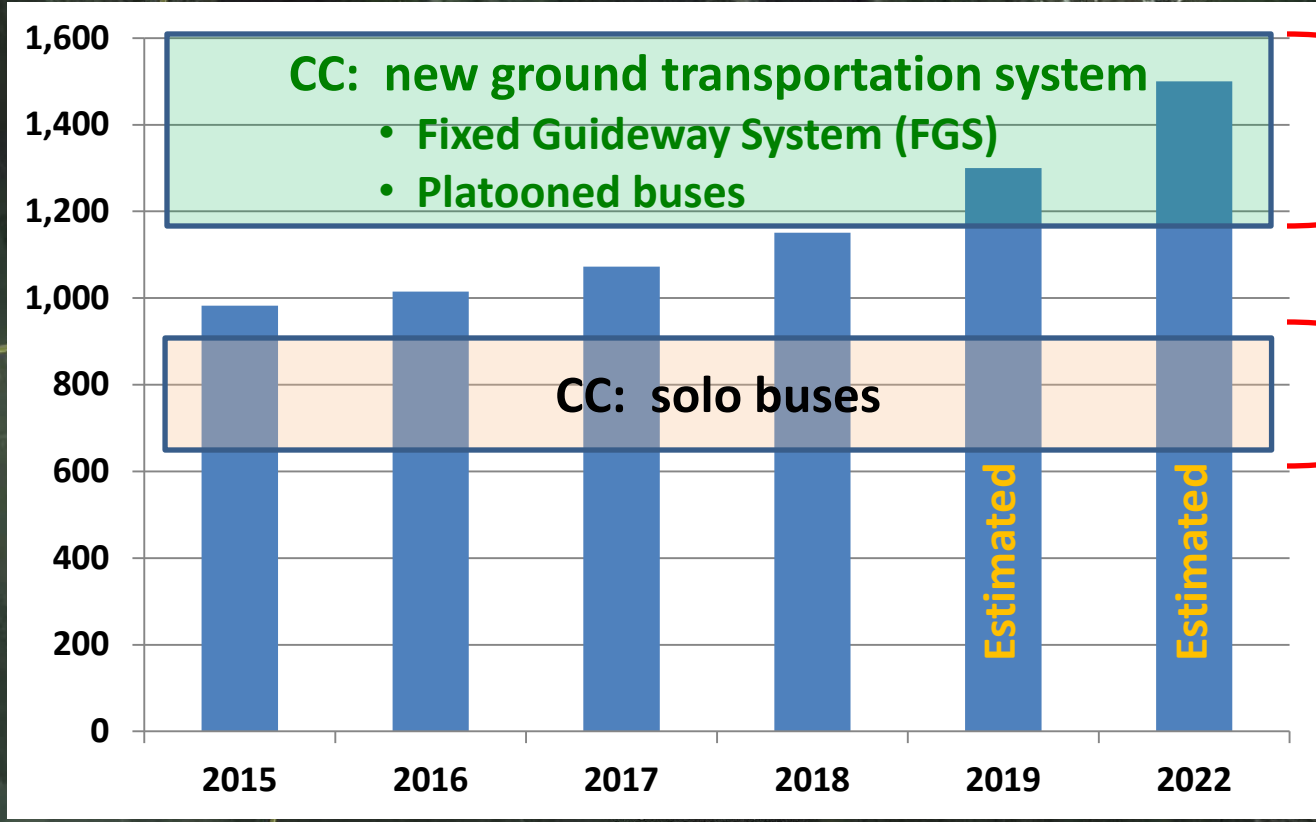
Juneau Total Cruise Ship Passengers, thousand

2019, 2022 estimated

CC: "Carrying Capacity"

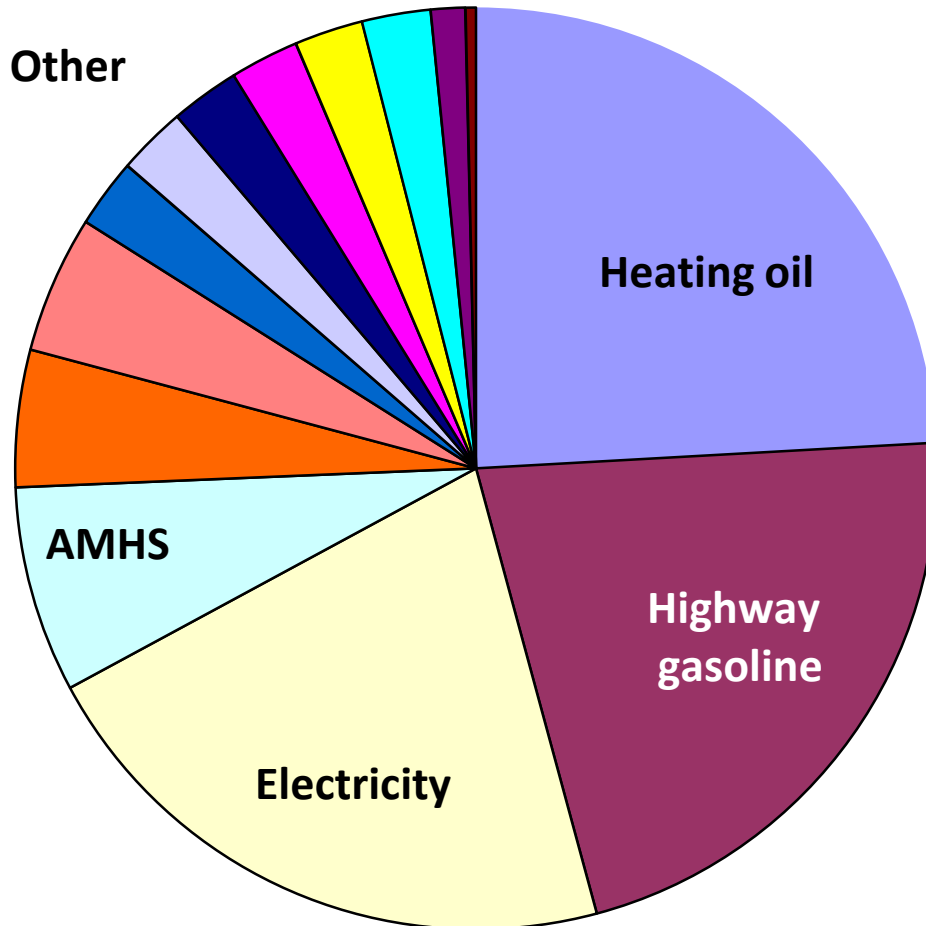
INNOVATION

Thousands of Passengers



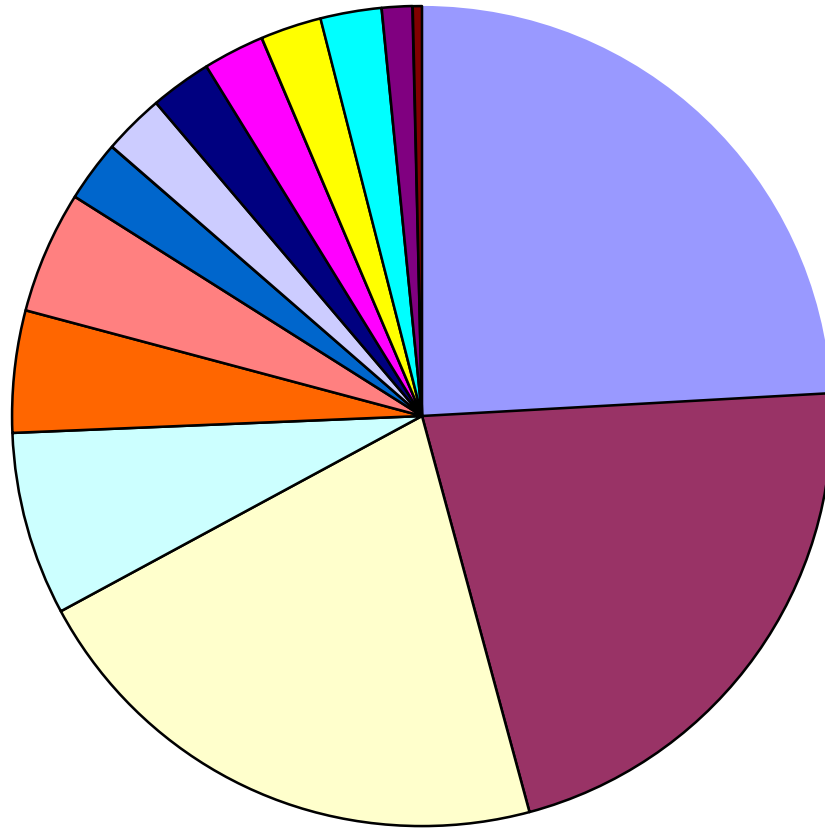
CC increase

Juneau INTERNAL energy 2009



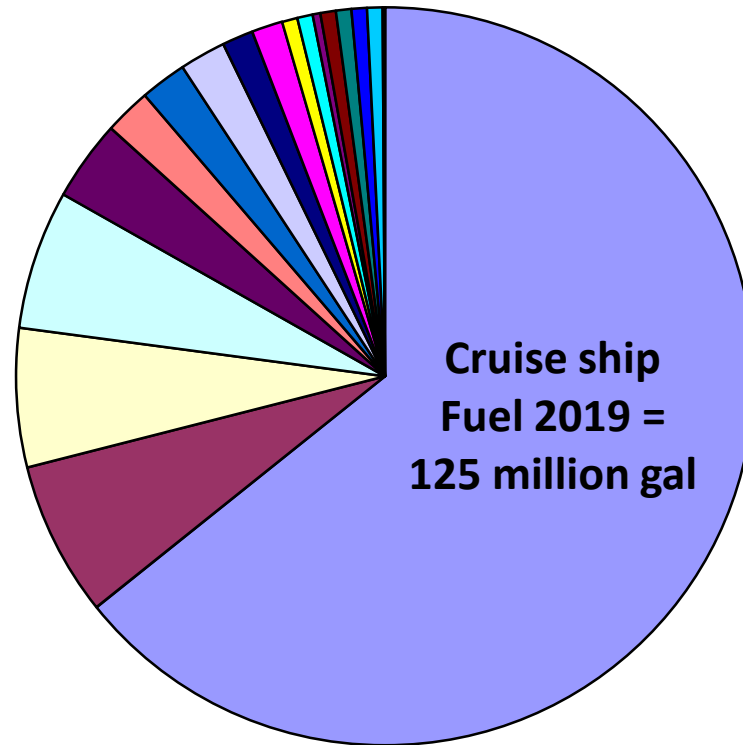
- | | | | | |
|-----------------|------------------|---------------------|----------|----------------|
| ■ Heating Oil | ■ Hiway Gasoline | □ Electricity | □ AMHS | ■ Av Turb AS |
| ■ Av Turb Other | ■ Hiway Diesel | □ Other Diesel | ■ Av Gas | ■ Marine Other |
| ■ Other | ■ Propane | ■ CapTransit Diesel | ■ Wood | |

**Juneau INTERNAL energy 2019, Estimated
[assumed same as 2009, but tourism up]**



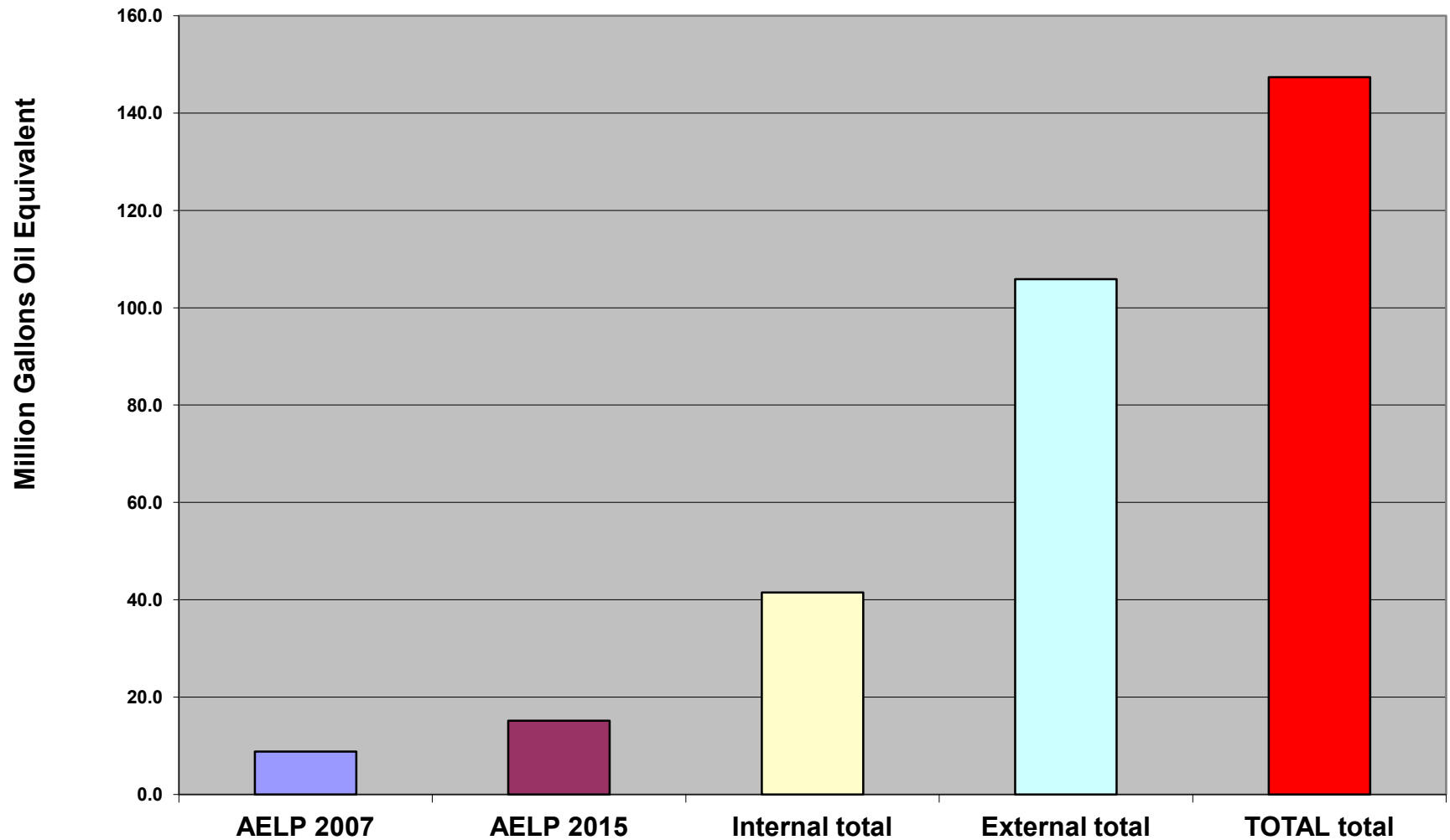
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Juneau TOTAL Energy 2009 [assume 2019 tourism up]



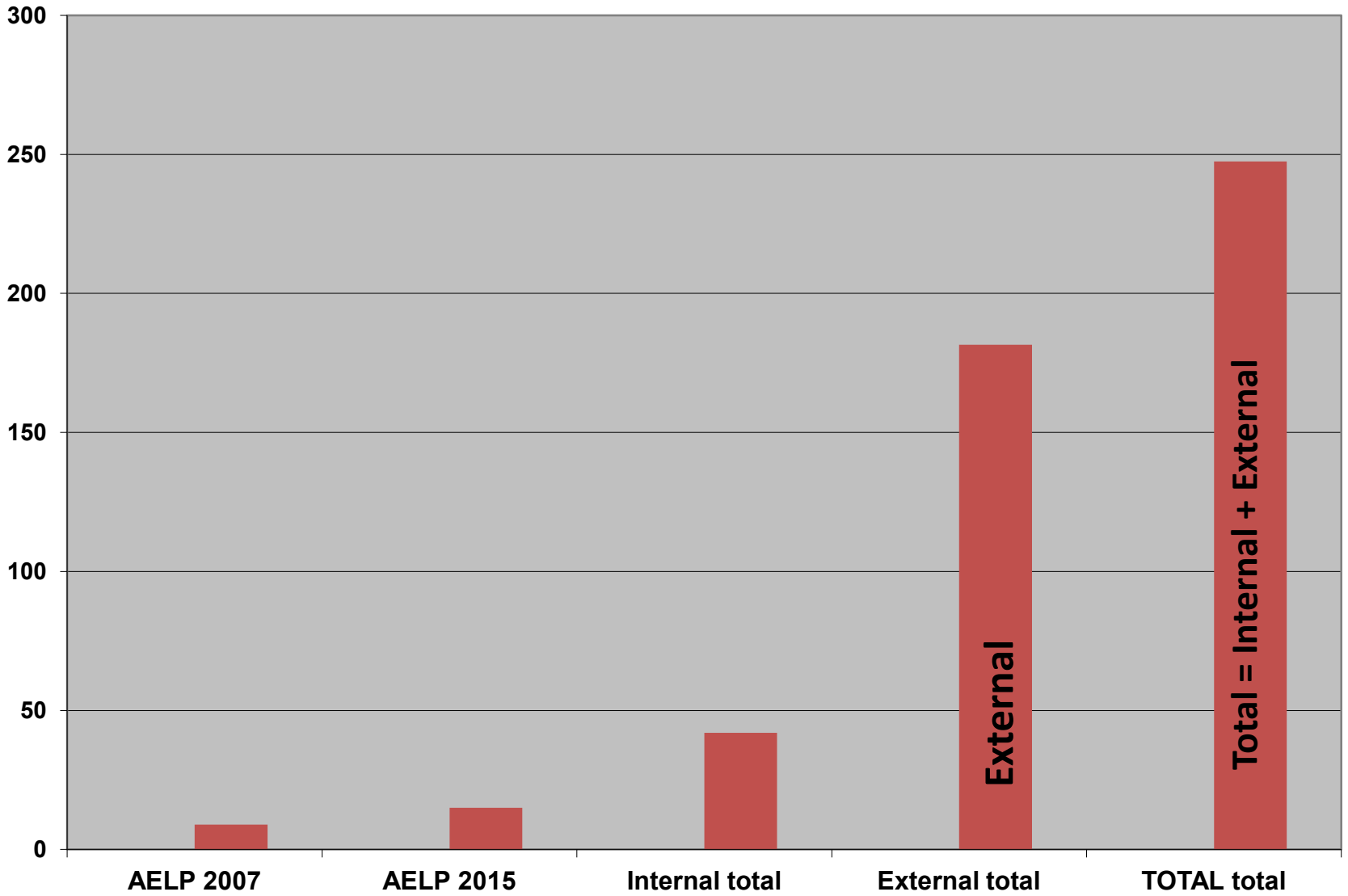
■ Cruise Ships	■ Heat Oil	■ Hiway Gas	■ Electric	■ Barge
■ AMHS	■ AS (external)	■ AMHS	■ Av Turb AS	■ Av Turb Other
■ Hiway Diesel	■ Other Diesel	■ CapTrans Diesel	■ Av Gas	■ Marine Other
■ Other	■ Propane	■ Wood		

Juneau Total Annual Energy Consumed to Enable Juneau as we know it 2009



Juneau Total Annual Energy 2019 Estimated

Million Gallons Oil Equivalent



Fossil Fuel Problem

- “Climate Change” -- GreenHouse Gas (GHG) emission
- 125 million gallons cruise ship fuel = 1.1 million tons CO₂
- Juneau: ground transport, aviation, marine
- Reduce Juneau’s carbon footprint – global commons
 - Juneau Commission on Sustainability (JCOS)
 - Juneau Climate Action & Implementation Plan – 2011
 - Juneau Renewable Energy Strategy – 2018
 - Juneau Comprehensive Plan – update, soon
 - Renewable Juneau
 - Juneau Interfaith Power and Light
 - Juneau 350.org
- Run Juneau on Renewables: hydropower +

DESIGN

Next Steps:

- CBJ authority: declare CC ? Analyze, apply 2020
- Consultant: options for CC increase
 - Ground transport system
 - Copter, aviation noise
 - Economics: benefits / cost, capex plan
 - Juneau visitor industry advice
 - Fossil fuel reduction
- Community conversation, decisions
- PPP with CLIA Alaska, USFS, tour industry
- Execute for 2020 or 2021

INNOVATION

Opportunity: Public Private Partnership

- Aside from “Holland criterion”
- Increasing CC is win for all ? Except Earth ?
- Already beyond CC
- CBJ declares so; limits cruise ship pax 2020
- People of Juneau, CLIA Alaska, CBJ, USFS agree:
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 - Increase cruise ship pax

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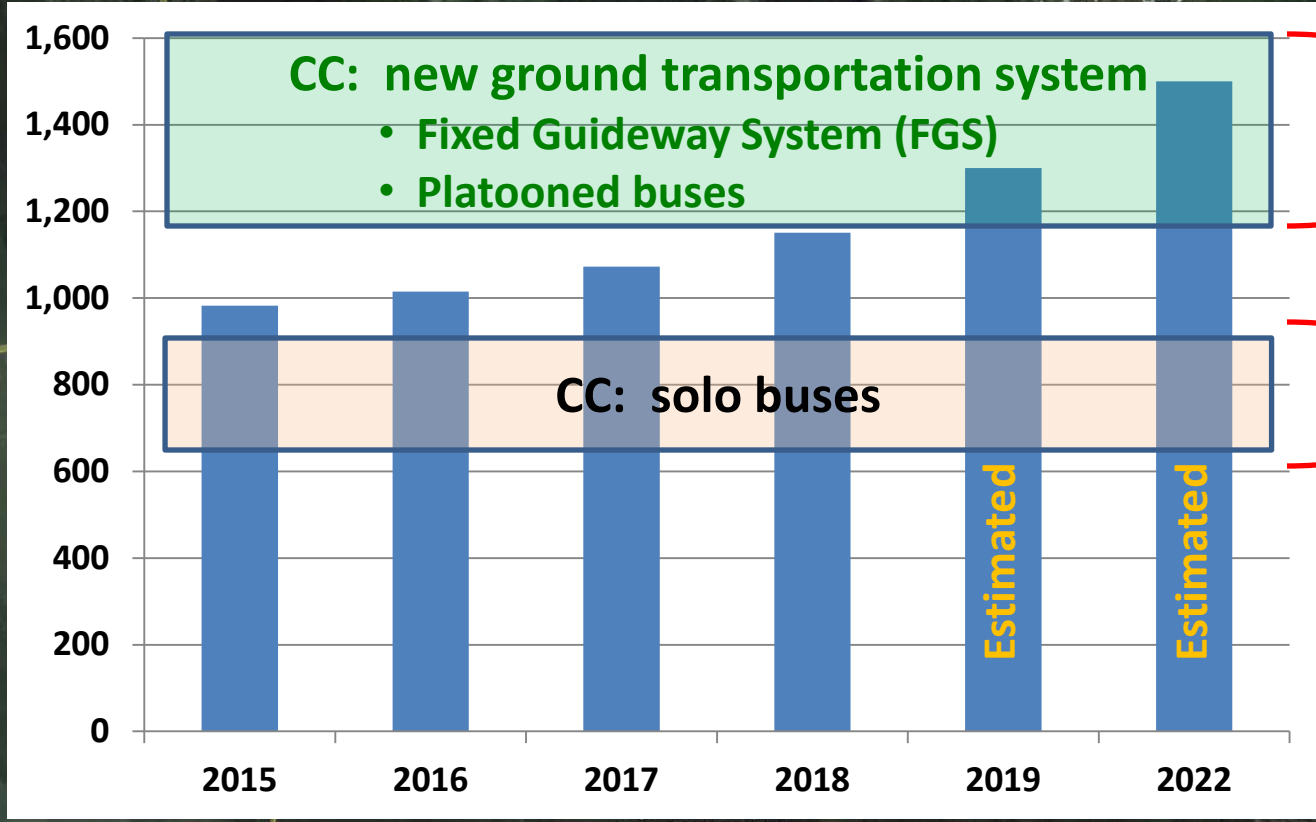
2019, 2022 estimated

CC: "Carrying Capacity"

DESIGN

INNOVATION

Thousands of Passengers



CC increase



The overarching planning that Maui did, which I think was good: they said, “ We’re only going to allow tourism in these particular ocean front areas. We’re going for the high level tourists, who will pay top dollar, spend lots of money, and support businesses on this island. We are not interested in mass tourism. “

They made a conscious choice to limit the areas where tourism could happen ... to attract the very top end of the tourism market. Strategically , that has been very good for Maui ... it’s kept the quality ... “

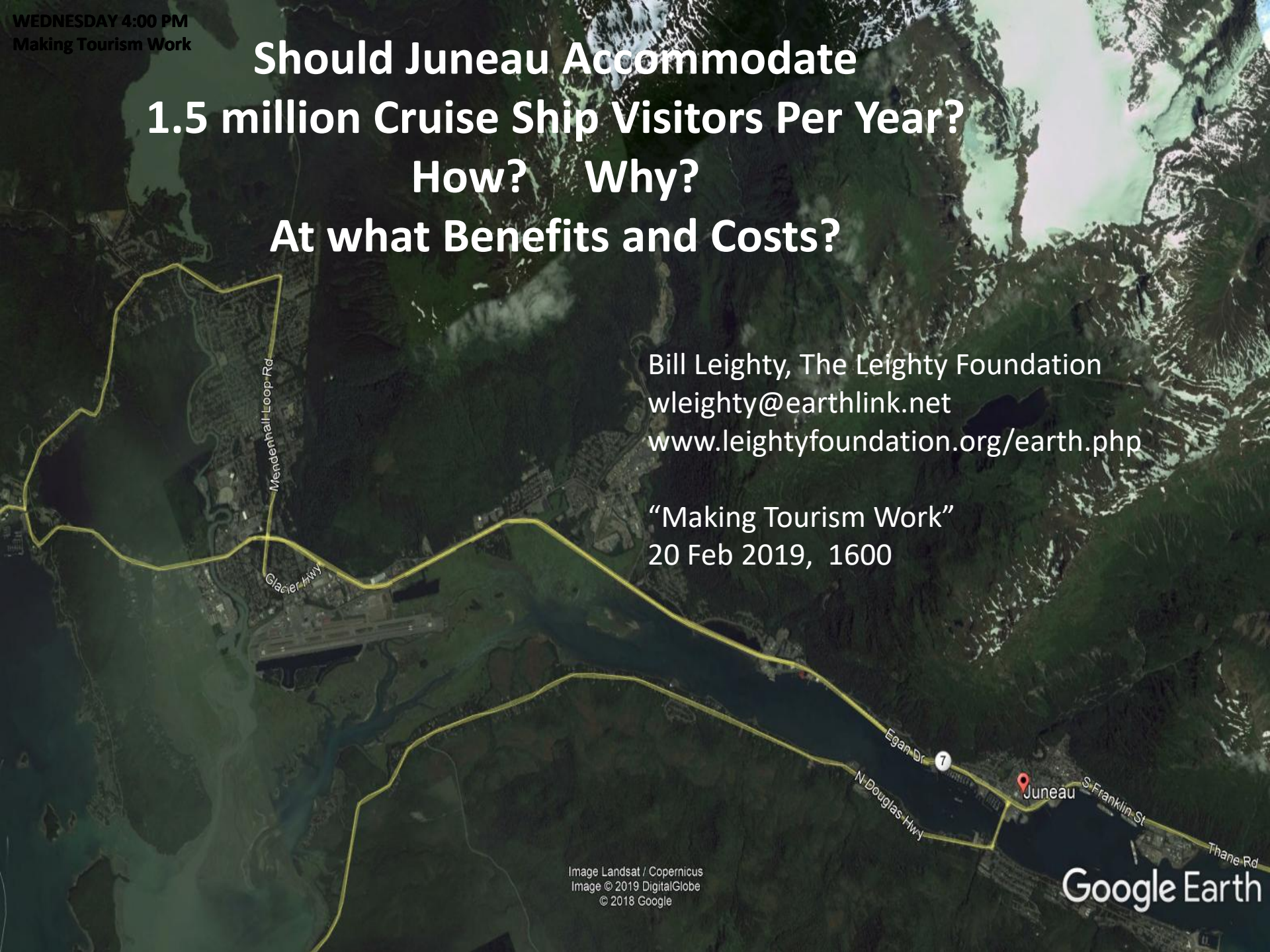
Captain Jim Coon, founding family,
Trilogy Excursions, Maui.

---- August, 2018 interview

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- Execute for 2020 - 2022

Global Commons



"There's always opportunities to work with the cruise lines. They welcome innovation, they need innovation ... for the growth of the industry, new products, new ideas, new experiences, around the world.

Be creative & persistent... People are innovative, think about opportunities to move people more efficiently ... “

--- John Binkley, President, CLIA Alaska,
22 Feb 18, JEDC Innovation Summit

“ But it really, ultimately, is the community's responsibility ... because they are publicly-traded companies ... as much as they love Juneau, their responsibility is to their shareholders ... they will move those assets [ships] to where they get the best return on their investment.

If there's a port that people aren't happy with ... they feel it's too crowded or they're overwhelmed by getting to and from places ... they won't come back, they'll simply find another itinerary to replace that. ”

--- John Binkley, President, Cruise Lines International Association Alaska, video resource A, 22 Feb 18

Resources, References

- Video A: JEDC Innovation Summit 2018, "Visitor Products" industry panel, 22 Feb: https://www.youtube.com/watch?v=ga_8mNhyIHI&list=PLAIO15Tss01PBnflkNbYV-PORf34v7Ur1U&index=11&t=2846s
Scroll to 44:15 minutes for Q&A conversation with John Binkley, President, Cruise Lines Industry Association Alaska
- Video B: Interview with Captain Jim Coon, founding family of Trilogy Excursions, Maui, on how that island has dealt with "carrying capacity". August, 2018, at the Coon family cabin at Killisnoo, near Angoon: <https://vimeo.com/286103842>
- Video C: Kate Troll and Bill Leighty "Innovation Short" at the JEDC Innovation Summit, February 2018: <https://vimeo.com/287808196>
" Elevator Juneau: Escaping Sea Level Rise "
- Video D: Bill Leighty talk to Juneau World Affairs Council, 12 May 2015, " Arresting Climate Change: Transforming the World's Largest Industry "
<https://vimeo.com/127890670>
- Video E: Discussing "The Commons" metaphor used by Garrett Hardin. David Bollier, Schumaker Center for a New Economy, delivered at "Prairie Festival", The Land Institute, Salina, KS, September 2018. <https://www.youtube.com/watch?v=DiM9Ivoikyo>