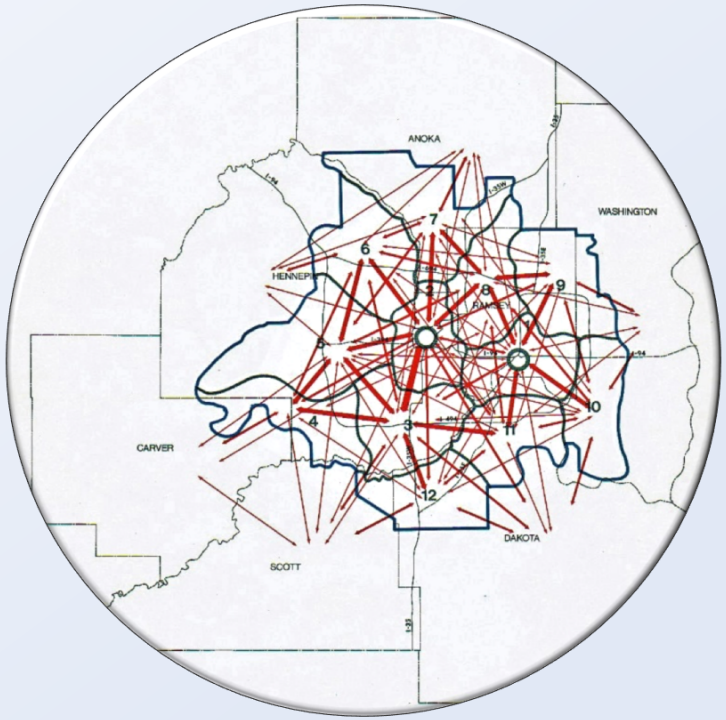
ATN: Game-Changer?

A study of the State-of-the Industry for Automated Transit Networks

Burford Furman, PI
Sam Ellis
Lawrence Fabian
Grant Kleinman
Peter Muller
Ron Swenson

October 25, 2013



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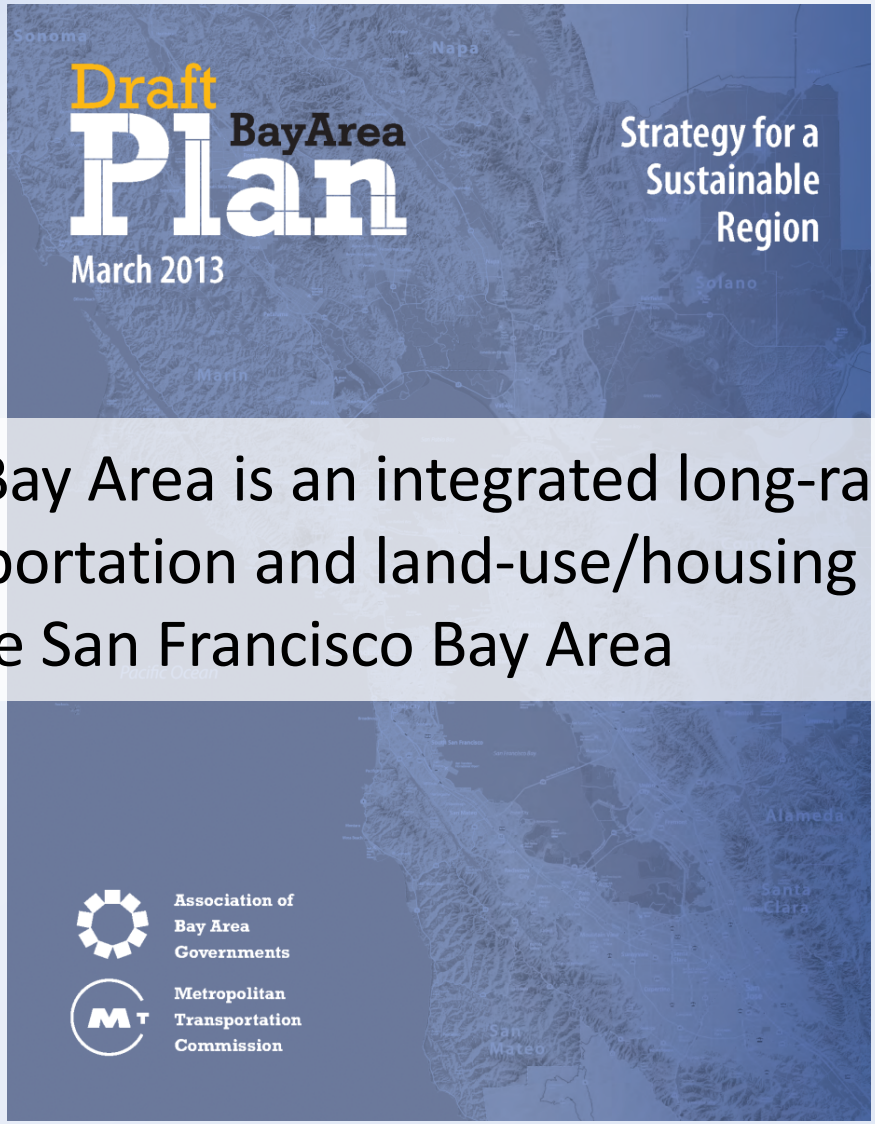
Acknowledgement

This material is based upon work supported by the U.S. Department of Transportation's University Transportation Centers Program under Grant Number DTRT12-G-UTC21.

The study is an informative tool for planners, urban designers, and policy makers



Plan Bay Area is an integrated long-range transportation and land-use/housing plan for the San Francisco Bay Area

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- Background, classification, characteristics, history

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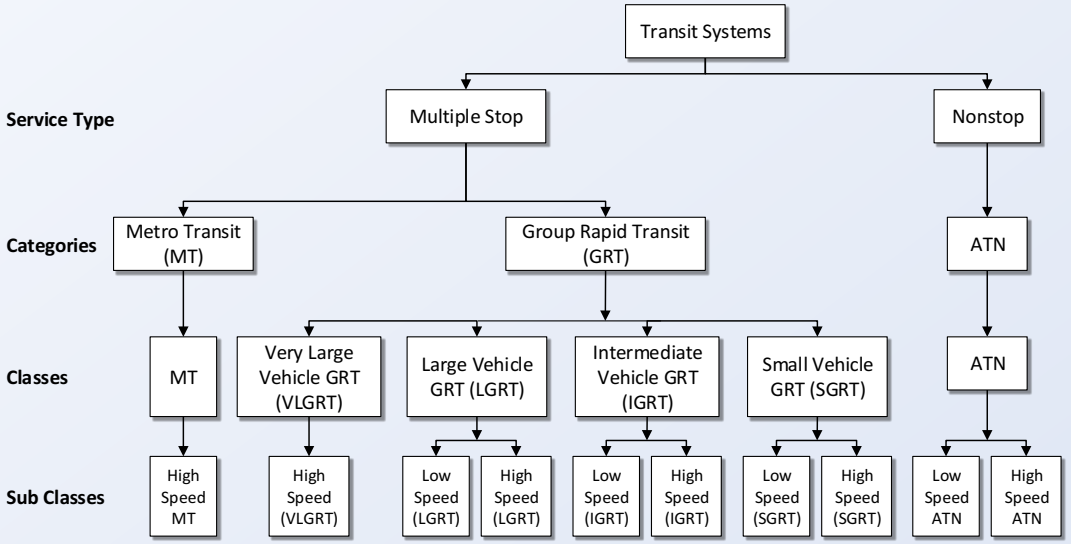

http://www.vectusprt.com/EN/vehicles/

The study is an informative tool for planners, urban designers, and policy makers

- Background, classification, characteristics, history
- Status of current ATN suppliers

http://www.vectusprt.com/EN/tech-test-info/

http://www.2getthere.eu/

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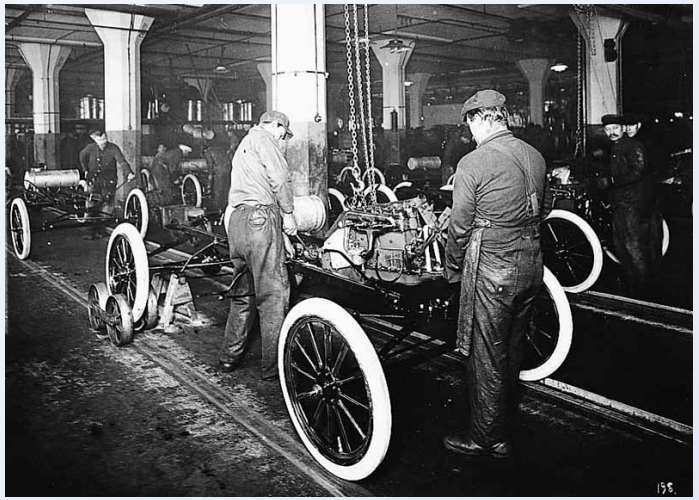

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http://tinyurl.com/loryxno

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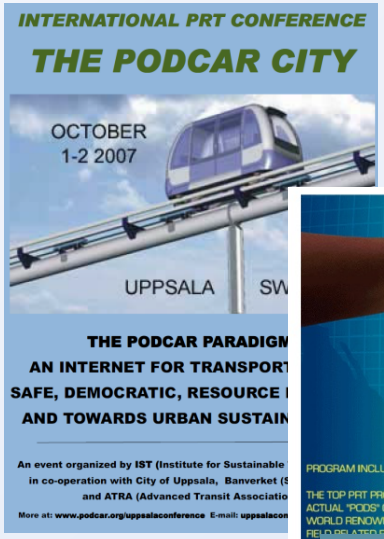

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September 30, 2010

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- ATN linkages to existing transit systems

http://www.socketsite.com/Transbay%20Transit%20Center%20Cross%20Section.jpg

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- Planning and funding ATN systems

http://www.t4america.org/docs/081809_stranded_at_thestation.PDF

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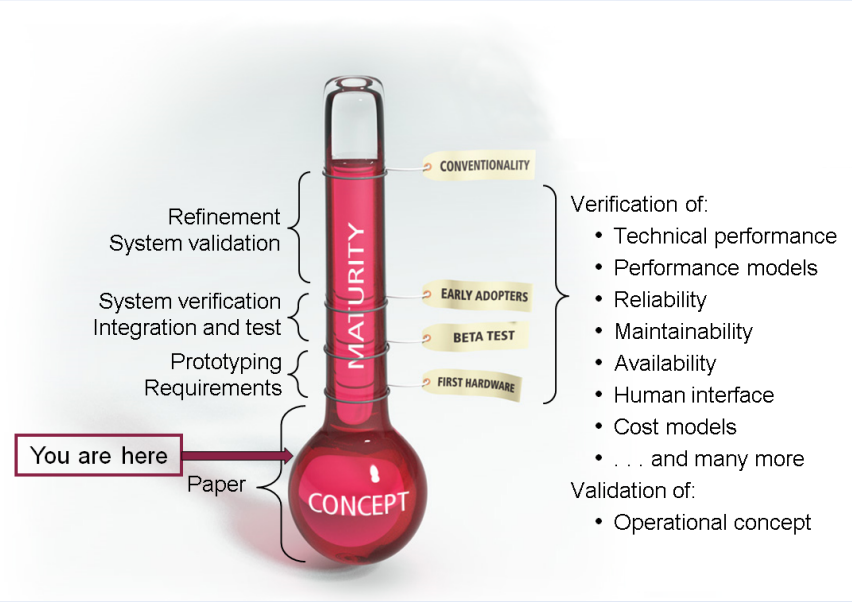
- Challenges and opportunities



Courtesy of T. Paige, Aerospace Corp. 2013

State-of-the-Industry – Lawrence Fabian

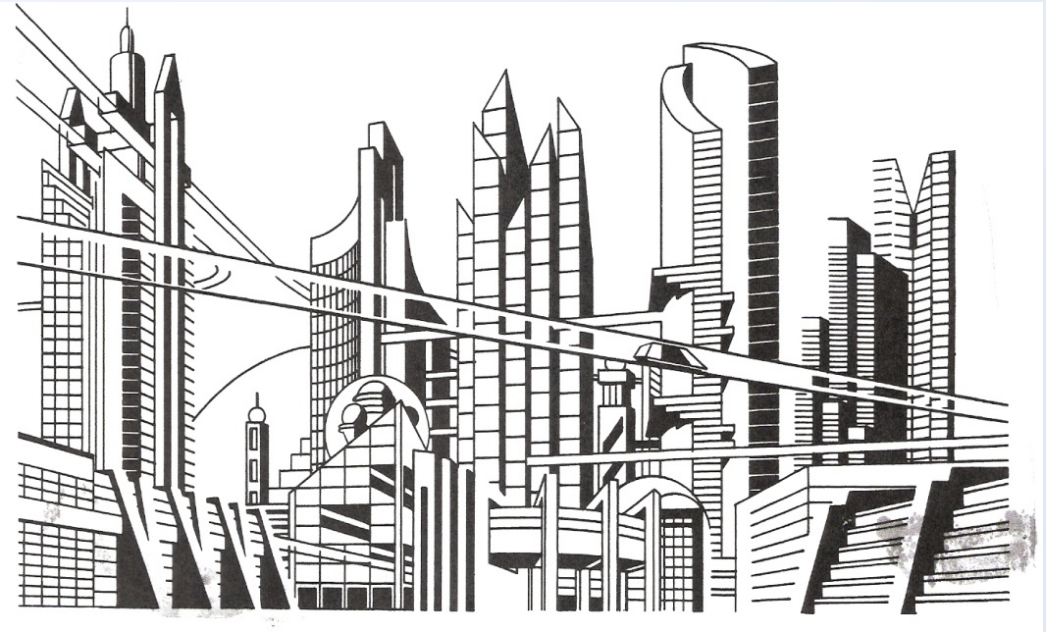
We are assessing the state-of-the-ATN-industry and its prospects

Demand →

Market

← Industry

Not an assessment of ATN technology



The context flows from ongoing U.S. – Swedish collaboration

- Engendered by U.S. - Swedish MOC
- Fostered by PCC conference series
- Focusing on procurement options and international industry prospects

There is no regular ATN market

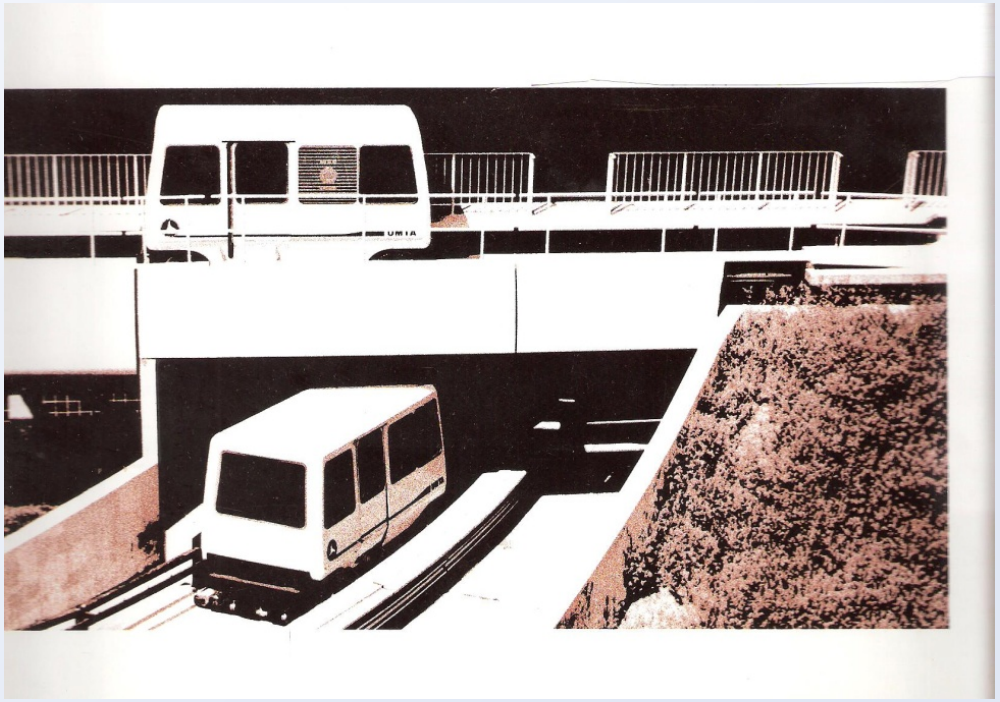
A *market*:

- exists when buyers and sellers meet and transact on a regularly basis
- generates professional and trade associations and conferences
- has a dynamic of its own, with news media

This conference may be the closest there is to an ATN market

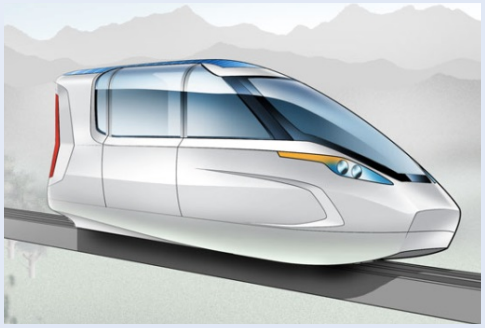
A small number of limited ATNs are in service

- Morgantown + upgrades
- Handful of small, new projects
  - Masdar (UAE) -- 2getthere
  - Heathrow (London) -- Ultra
  - Suncheon (S. Korea) -- Vectus



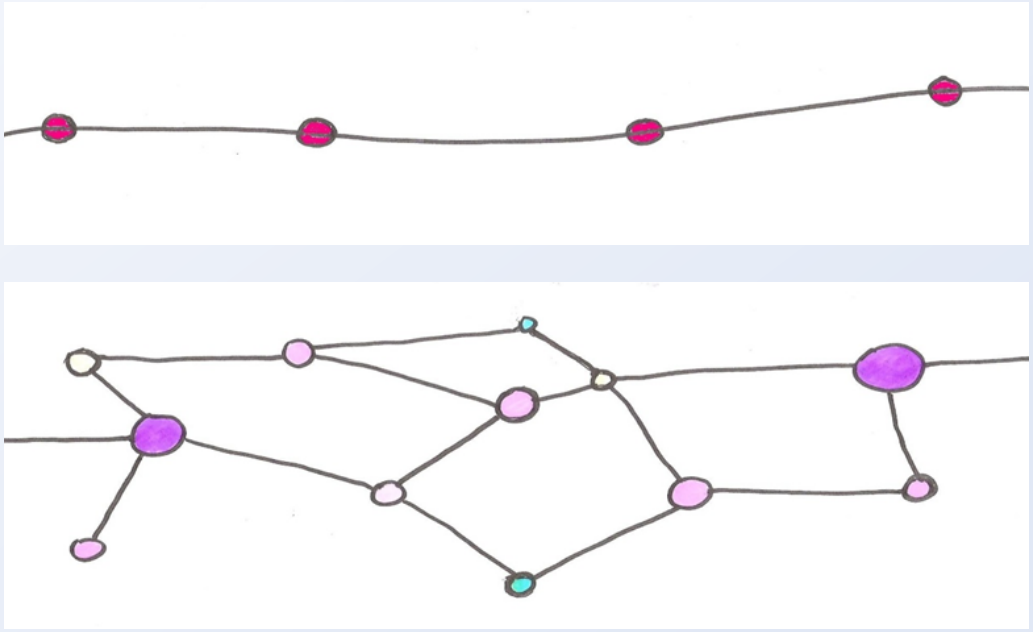
There are many next-tier suppliers with serious technology developments

Easy enter/Easy exit



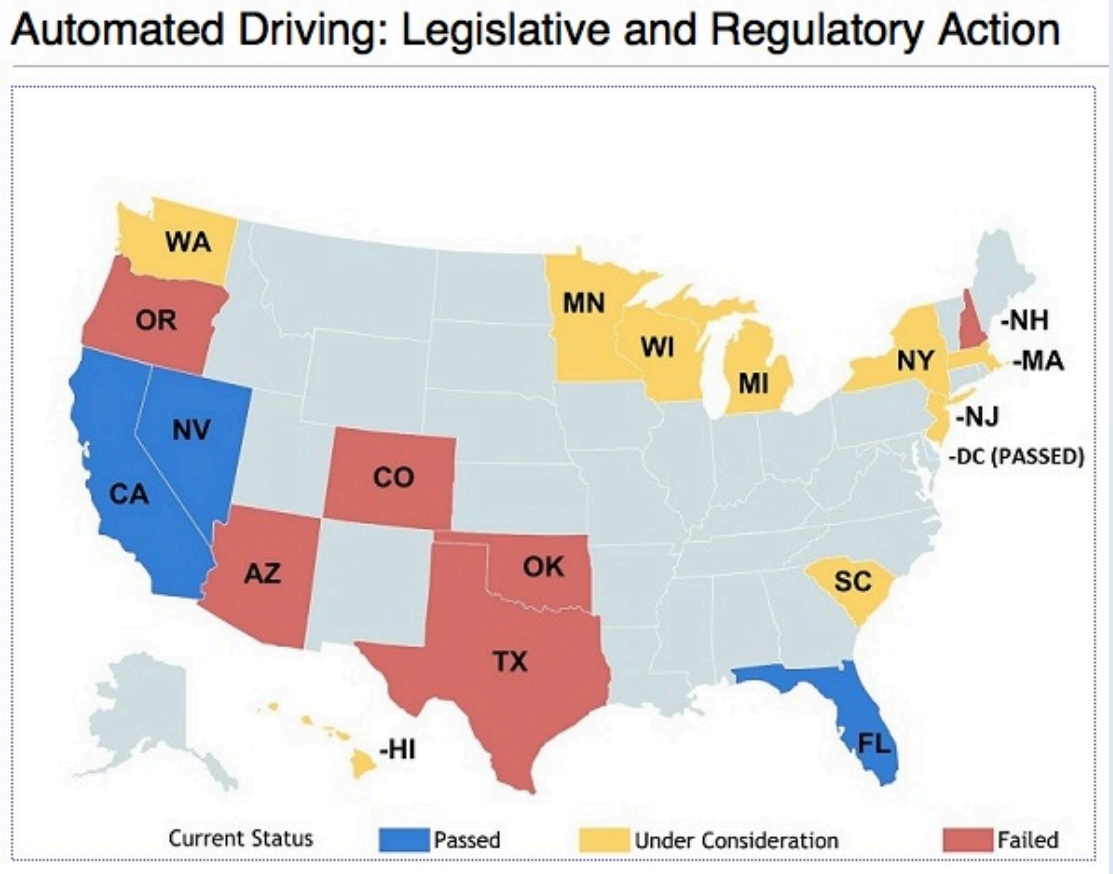
MPOs and consultants are not knowledgeable about ATN parameters and features

- FTA corridor approach blocks network thinking
- TRB 165 capacity manual lacks ATN
- No ATN in MPO pipelines
  - Ithaca and Albany exceptions



Self-driving cars are being tested

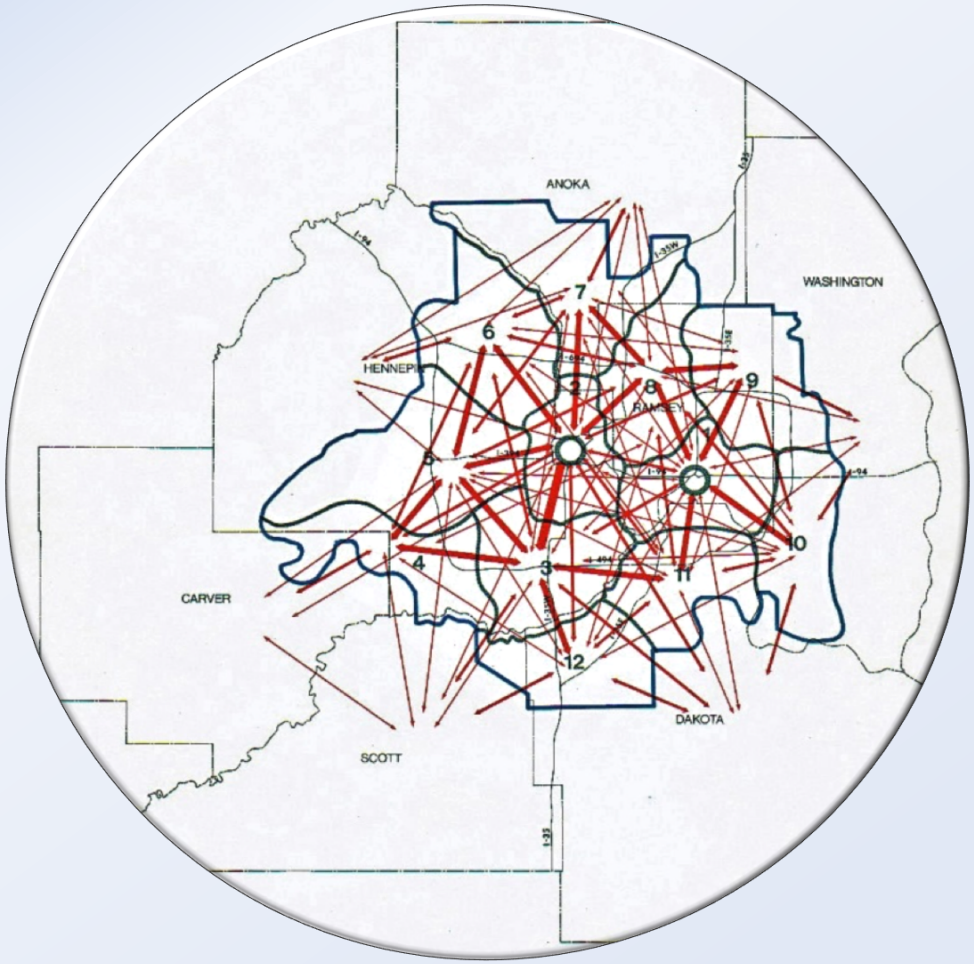
- Google, Tesla, Volvo, Toyota, etc.
- When and what level?
- Public sector response?
- Dual-mode policies?
- Liability – uncharted waters



The market for ATN depends primarily on public priorities

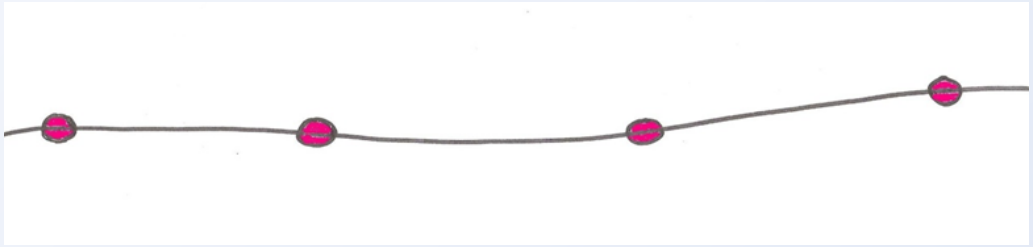
- GHG reductions – how serious?
- Transit reform and ATN reinforcement
- Mobility for seniors and special districts
- ATN as exports, jobs?

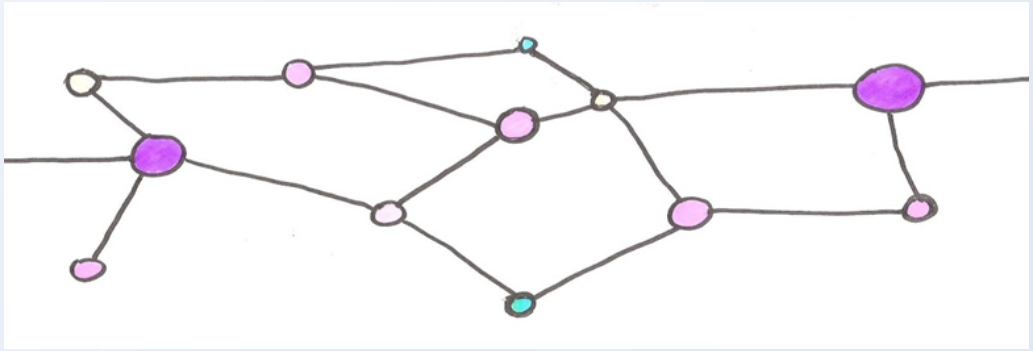
Planning and Procurement – Peter Muller



ATN planning is different and requires new knowledge

- Corridor vs. network





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- Corridor vs. network
- On demand vs. scheduled

	Mountain View Station	Whisman Station	Lockheed Martin Transit Center	Fair Oaks Station	Old Ironsides Light Rail Station	Tasman Station	Metro Light Rail Station	Civic Center Light Rail Station	Santa Clara Light Rail Station	San Jose Convention Center	San Jose Diridon Station	Fruitdale Station	Bascom Station	Winchester Station
Trip 21	8:49a	8:52a	9:01a	9:07a	9:13a	9:21a	9:32a	9:37a	9:45a	9:50a	9:56a	10:01a	10:03a	10:09a
Trip 22	9:04a	9:07a	9:16a	9:22a	9:28a	9:36a	9:47a	--	--	--	--	--	--	--
Trip 23	9:19a	9:22a	9:31a	9:37a	9:43a	9:51a	10:02a	10:07a	10:15a	10:20a	10:26a	10:31a	10:33a	10:39a
Trip 24	9:35a	9:38a	9:47a	9:53a	9:59a	10:07a	10:18a	--	--	--	--	--	--	--
Trip 25	9:51a	9:54a	10:03a	10:09a	10:15a	10:23a	10:33a	10:38a	10:46a	10:51a	10:57a	11:02a	11:04a	11:10a
Trip 26	10:21a	10:24a	10:33a	10:39a	10:45a	10:53a	11:03a	11:08a	11:16a	11:21a	11:27a	11:32a	11:34a	11:40a
Trip 27	10:51a	10:54a	11:03a	11:09a	11:15a	11:23a	11:33a	11:38a	11:46a	11:51a	11:57a	12:02p	12:04p	12:10p
Trip 28	11:21a	11:24a	11:33a	11:39a	11:45a	11:53a	12:03p	12:08p	12:16p	12:21p	12:27p	12:32p	12:34p	12:40p
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Trip 30	12:21p	12:24p	12:33p	12:39p	12:45p	12:53p	1:03p	1:08p	1:16p	1:21p	1:27p	1:32p	1:34p	1:40p
Trip 31	12:51p	12:54p	1:03p	1:09p	1:15p	1:23p	1:33p	1:38p	1:46p	1:51p	1:57p	2:02p	2:04p	2:10p
Trip 32	1:21p	1:24p	1:33p	1:39p	1:45p	1:53p	2:03p	2:08p	2:16p	2:21p	2:27p	2:32p	2:34p	2:40p
Trip 33	--	--	--	--	--	--	--	2:23p	2:31p	2:36p	2:42p	2:47p	2:49p	2:55p
Trip 34	1:51p	1:54p	2:03p	2:09p	2:15p	2:23p	2:33p	2:38p	2:46p	2:51p	2:57p	3:02p	3:04p	3:10p
Trip 35	--	--	--	--	--	--	--	2:53p	3:01p	3:06p	3:12p	3:17p	3:19p	3:25p

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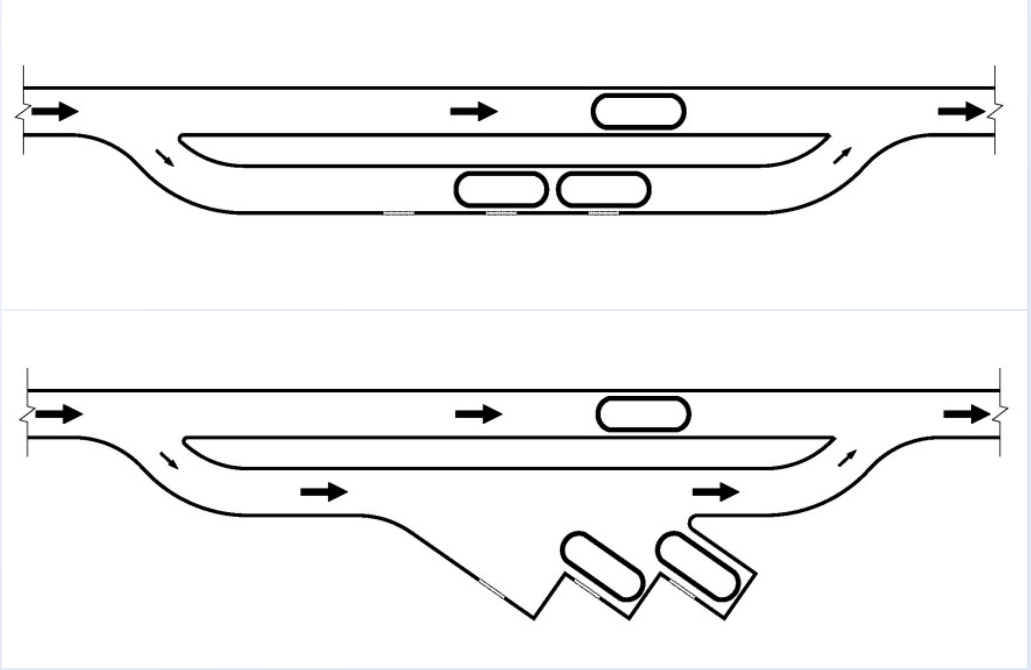
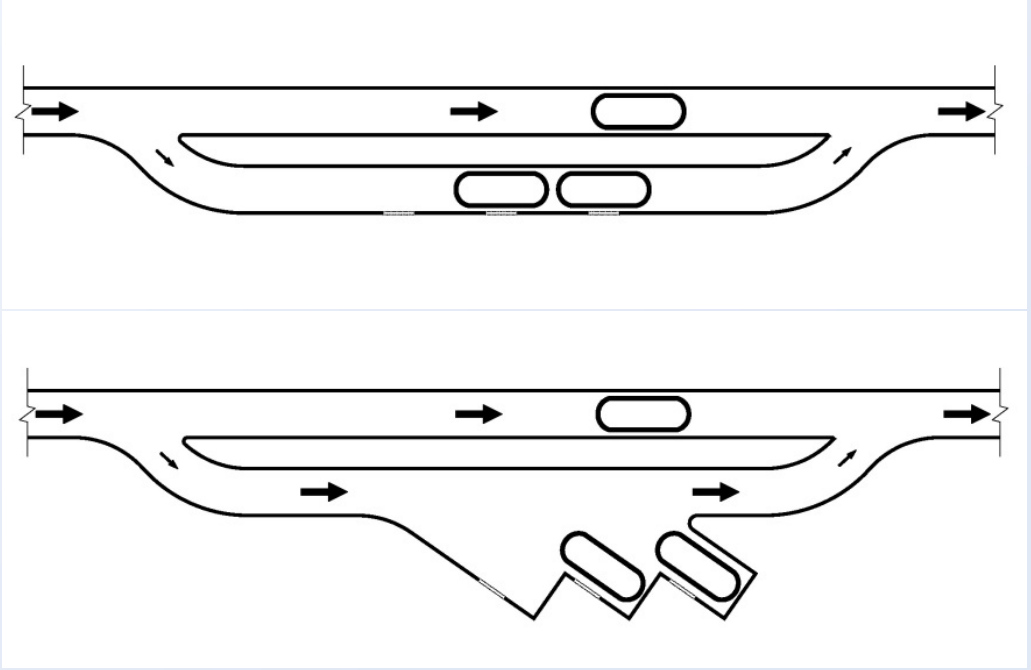
- Offline stations



ATN planning is different and requires new knowledge

- Corridor vs. network
- On demand vs. scheduled
- Offline stations
- Stations sized to demand



ATN planning is different and requires new knowledge

- Corridor vs. network
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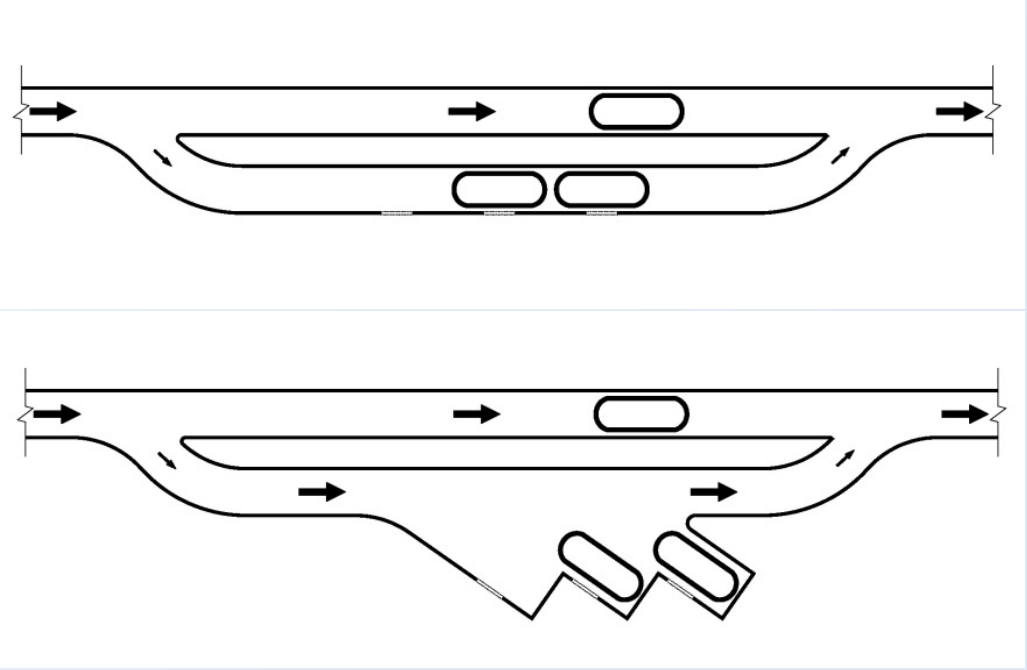
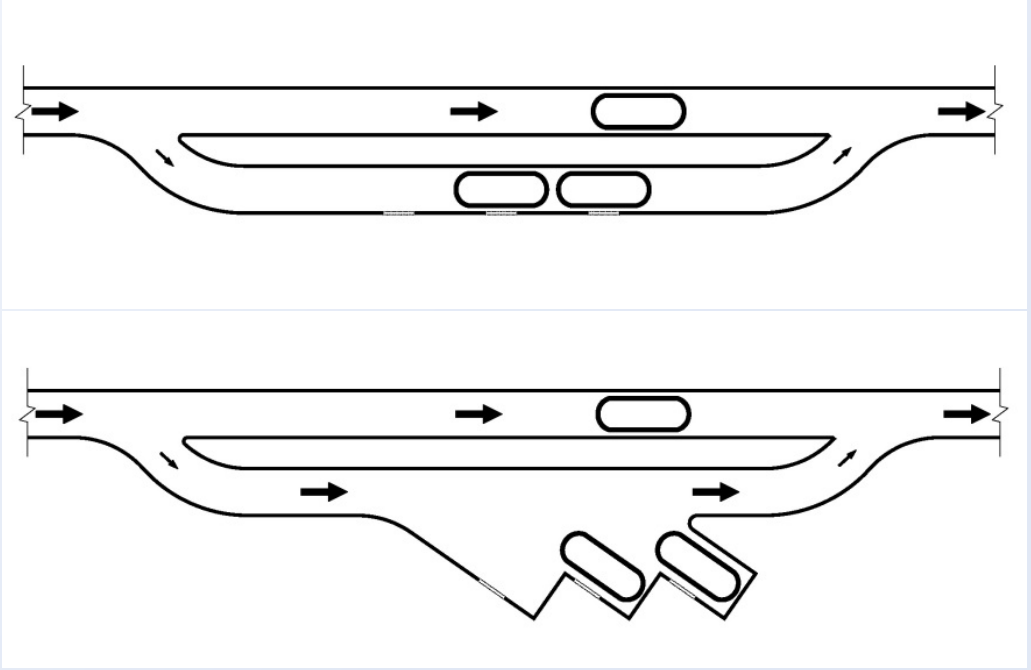
- Stations sized to demand
- Nonstop trips



ATN planning is different and requires new knowledge

- Corridor vs. network
- On demand vs. scheduled
- Offline stations
- Stations sized to demand
- Nonstop trips
- Headway defines capacity

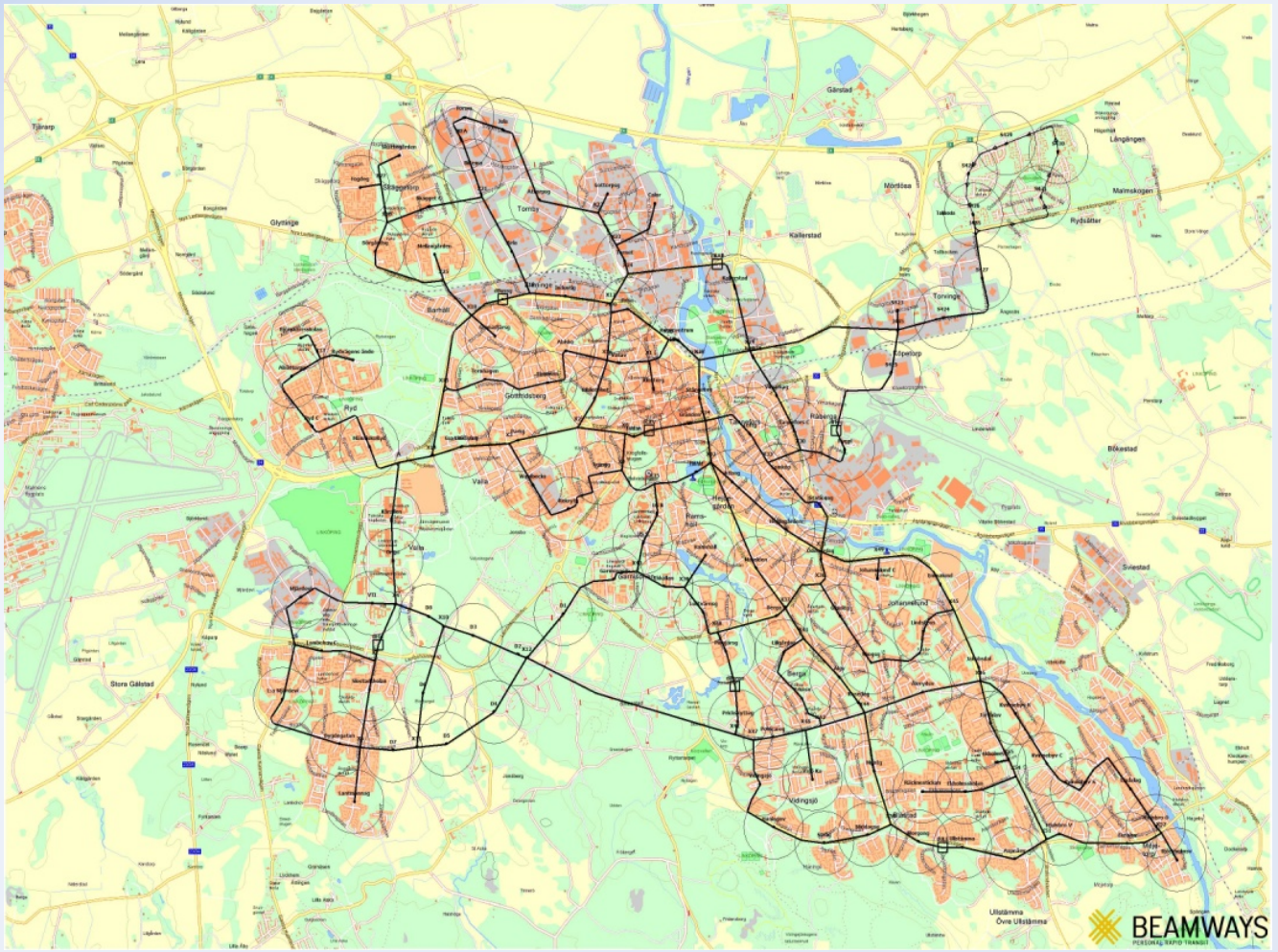


ATN must be advanced within the existing planning framework

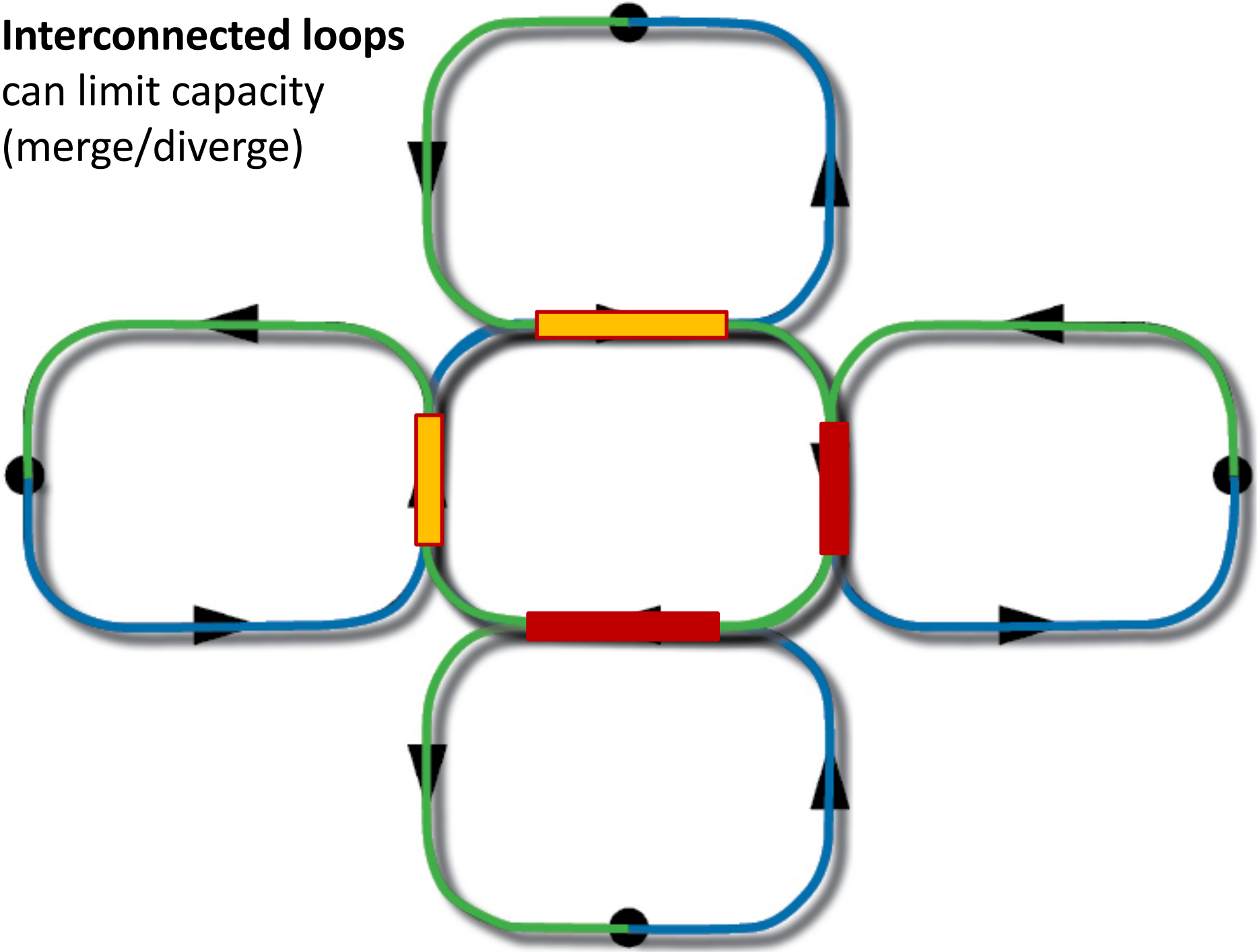
	Who Develops?	Who Approves?	Time Horizon	Content	Update Requirements
UPWP	MPO	MPO	1 or 2 Years	Planning Studies and Tasks	Annually
MTP	MPO	MPO	20 Years	Future Goals, Strategies, and Projects	Every 5 Years 4 years for nonattainment and maintenance areas
TIP	MPO	MPO/ Governor	4 Years	Transportation Investments	Every 4 Years
LRSTP	State DOT	State DOT	20 Years	Future Goals, Strategies, and Projects	Not Specified
STIP	State DOT	US DOT	4 Years	Transportation Investments	Every 4 Years

The Transportation Planning Process - Key Issues, FTA

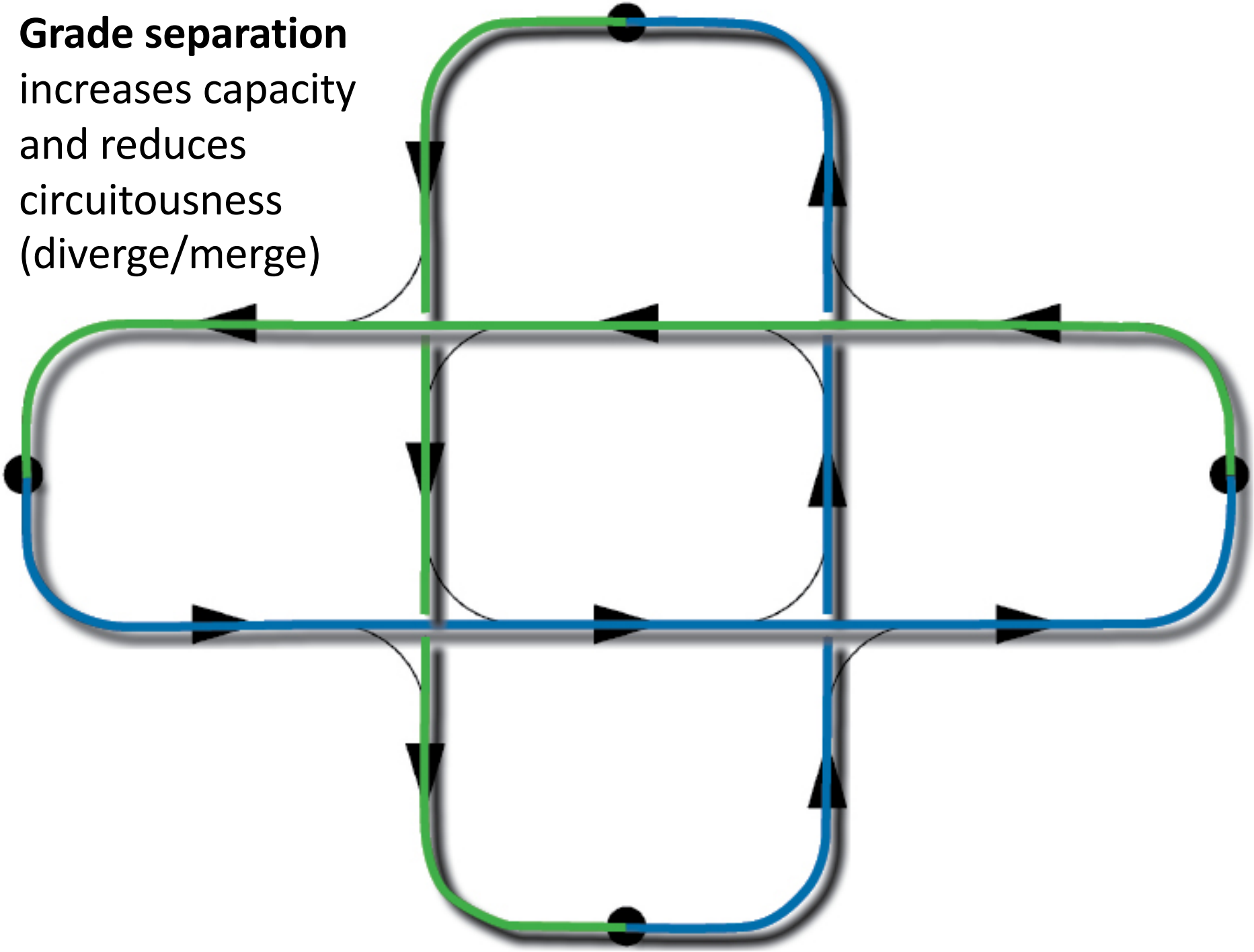
Think service areas, not corridors



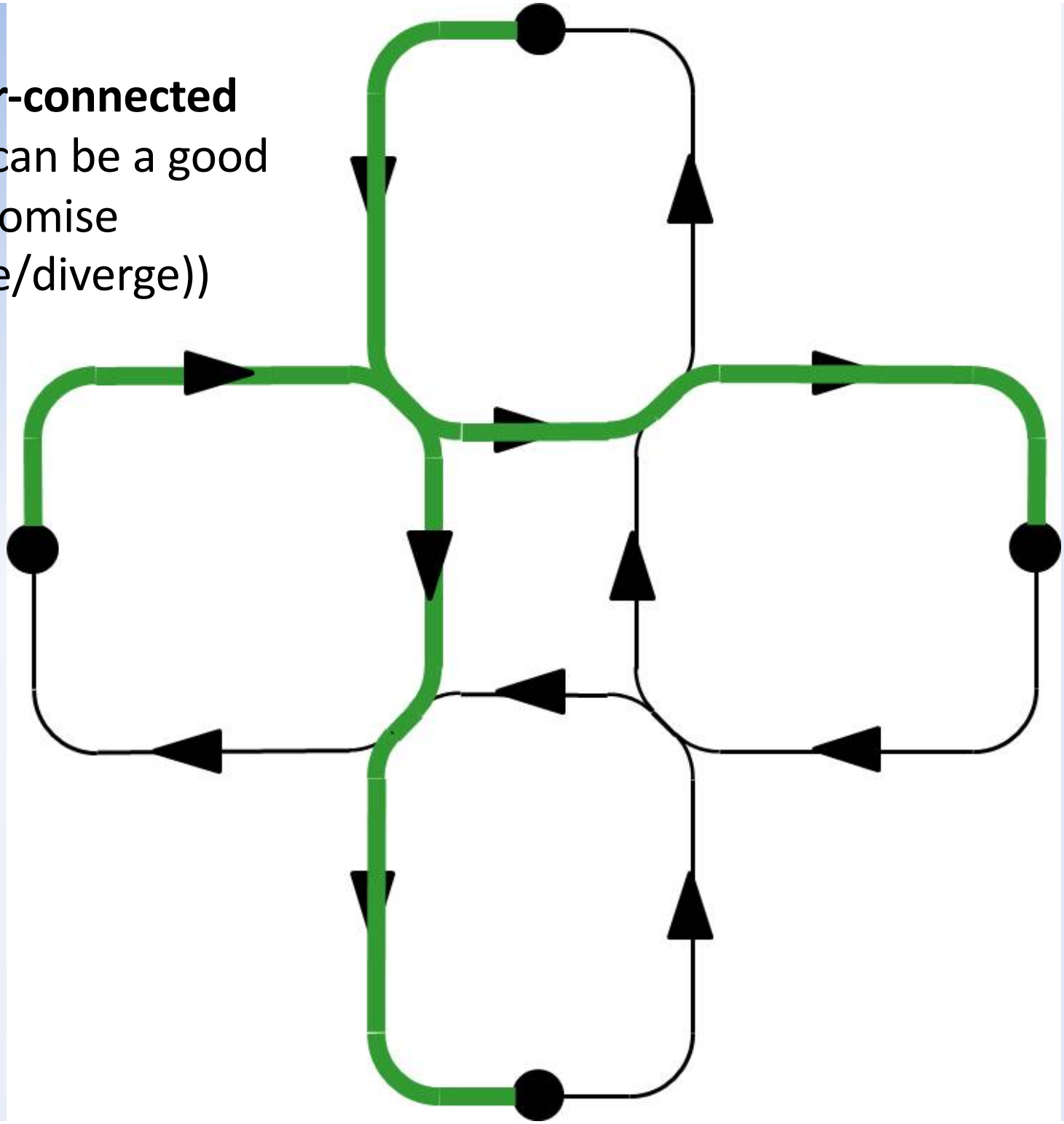
Interconnected loops
can limit capacity
(merge/diverge)



Grade separation increases capacity and reduces circuitousness (diverge/merge)



Corner-connected loops can be a good compromise (merge/diverge))



Procurement requires expert consultants and much supplier input due to complexity and uniqueness

- Rubber tires, battery power

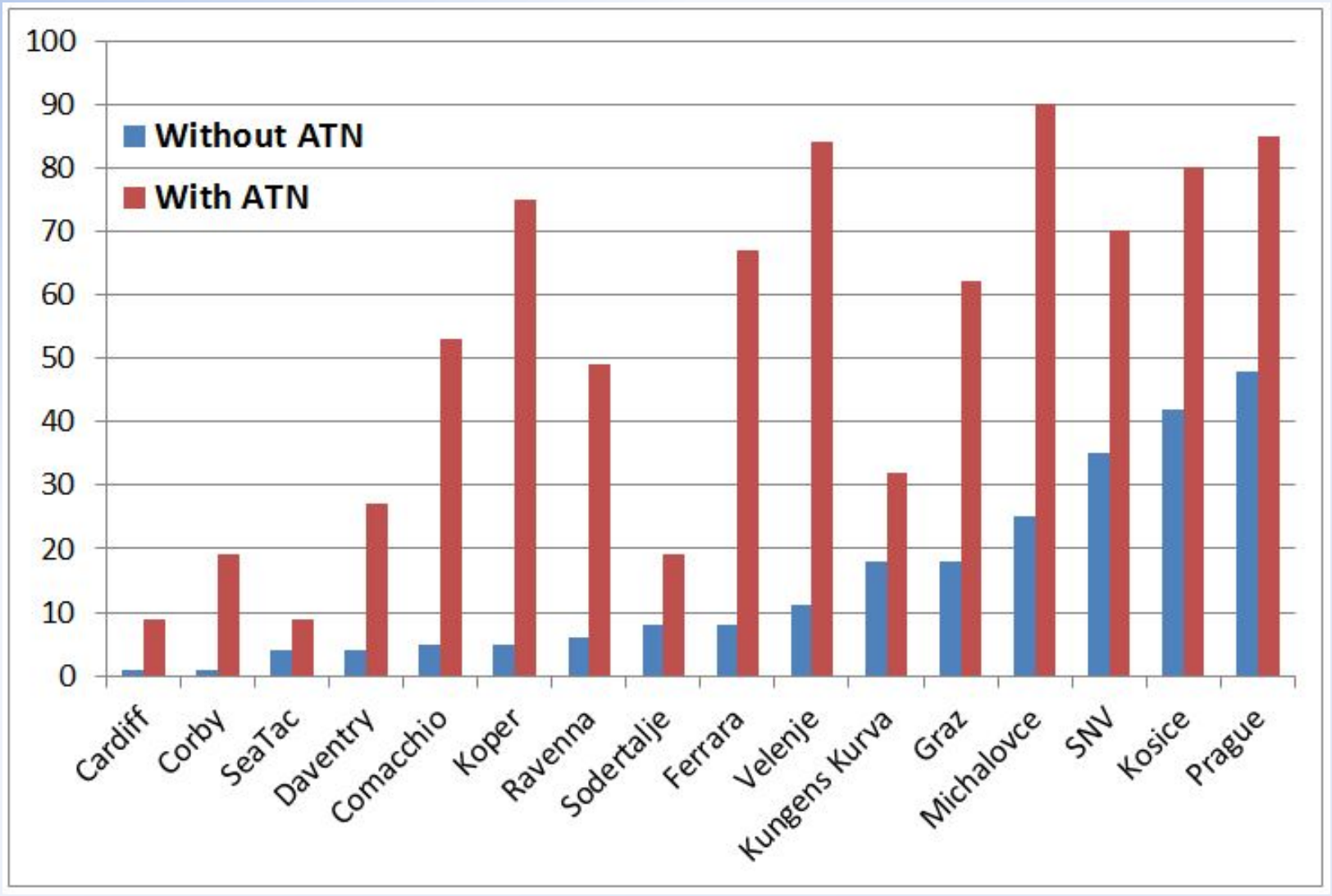
Steel rail, wayside power

Requires side walls

No side walls

Design/bid/build will not work!

ATN dramatically increases transit ride share



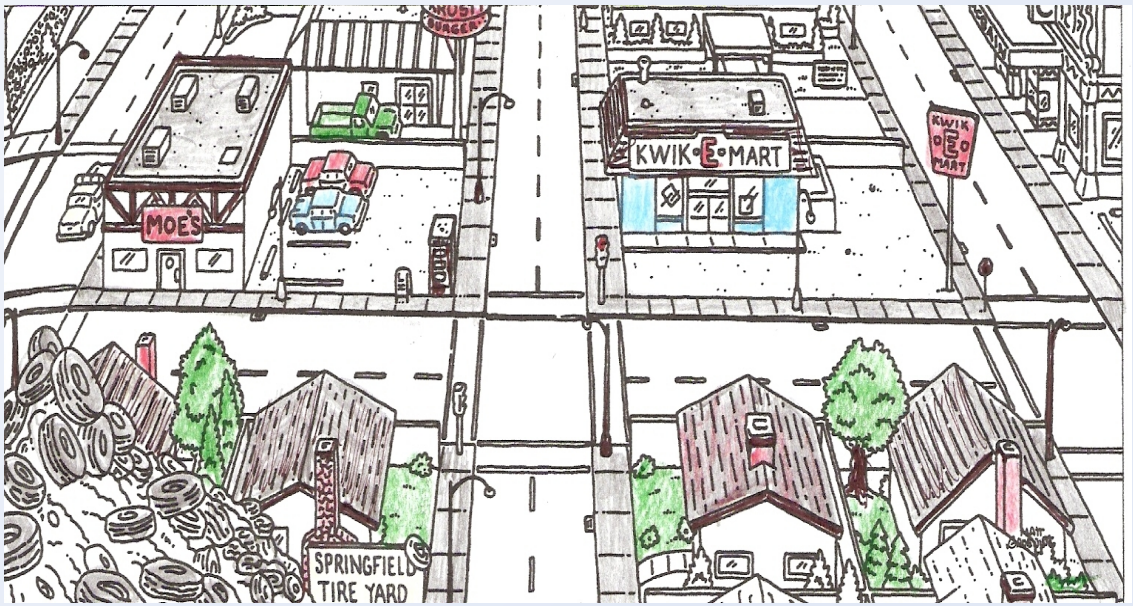
ATN could be a game changer:

- Dramatically increases transit ride share
- Can often cover its own operating costs
- Can sometimes also cover its capital costs

Government, Energy, and Technology – Ron Swenson

All levels of government are important and will be impacted

- USDOT and other Federal agencies
  - EPA, HHS, HUD, DOI, etc.
- STATE DOTS + other state agencies
  - Cal PUC and EQA
- MPOs
- Counties, cities, towns and other local units

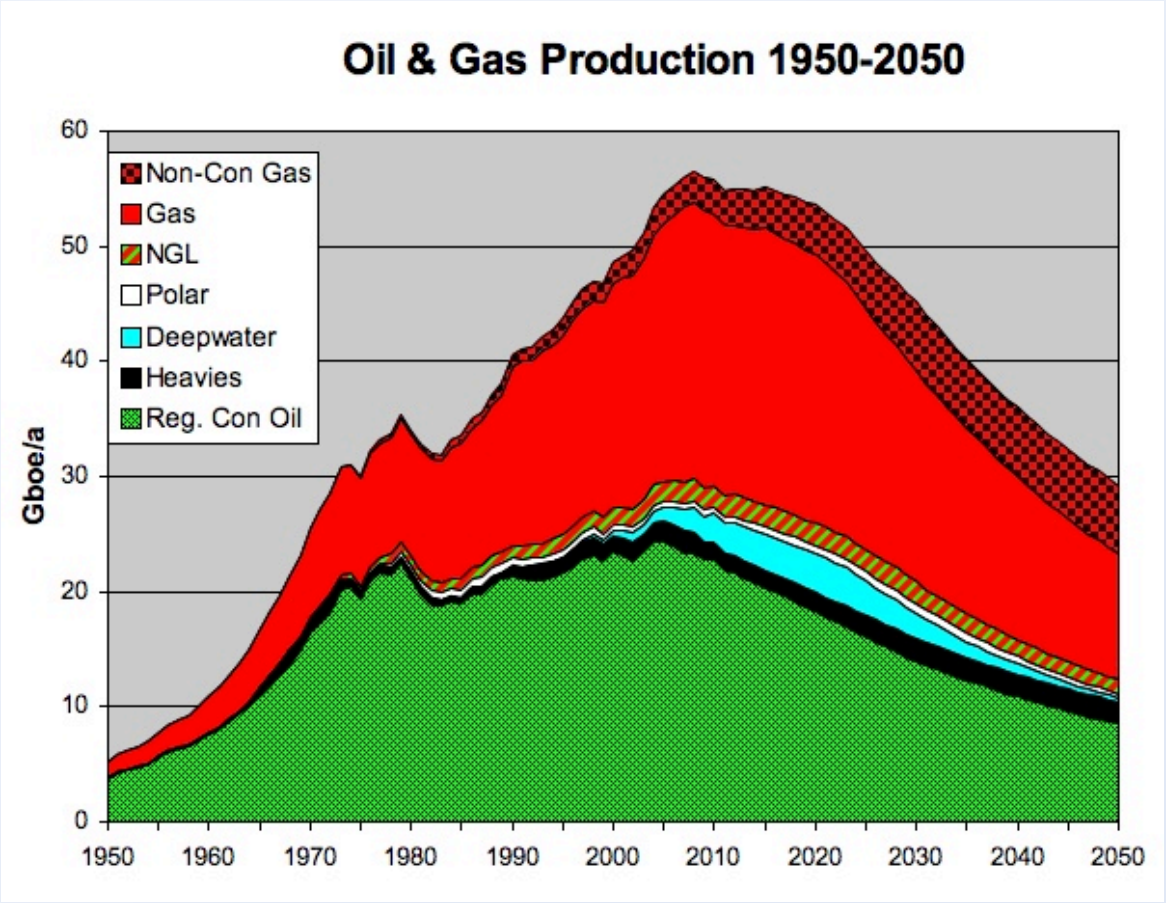


US-Swedish cooperation is synergistic, inter-disciplinary and multi-level

- USDOT and Swedish Ministry of Enterprise, and Communications
- KOMPASS and U.S. counterparts
- Two logs to make a fire
- Three to **make it roar!**

Use of solar power is blocked by hype about fracked oil and gas

- Fracking is just ‘scraping the bottom of the barrel’
- The reality is depletion



Solar power is sustainable

- Collection near use is a great advantage
- Collection on roofs is problematic
- Solar is ‘Made in America’

We can get a megawatt per mile with PV solar mounted ATN

- A desert is not required
- If it works in Uppsala, Sweden then it will work anywhere

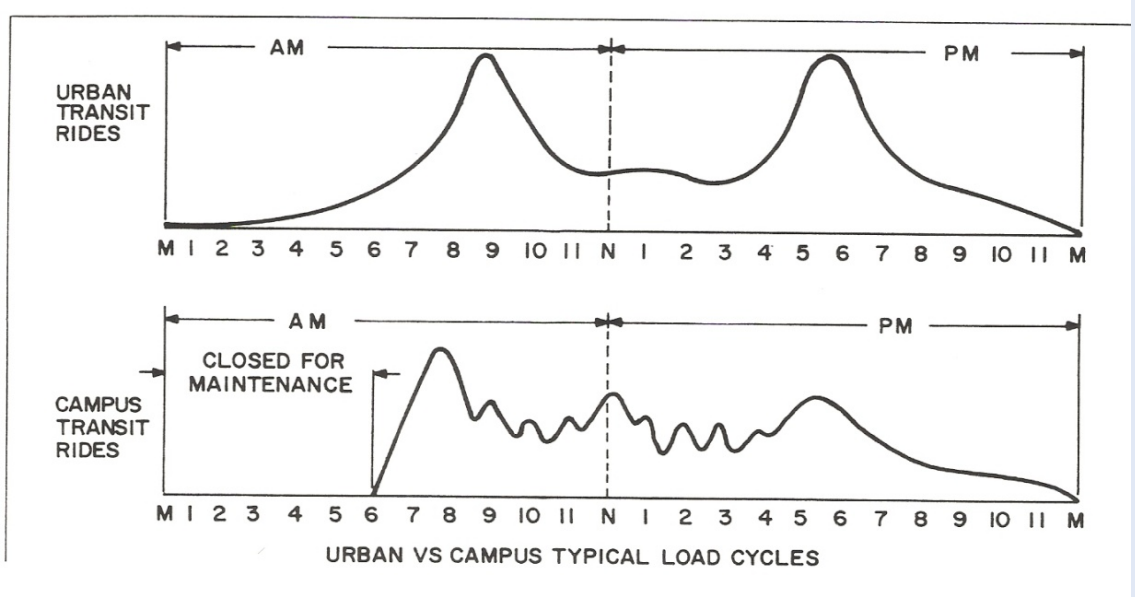
Recommendations – Lawrence Fabian

Airports generate landside traffic and GHG that can be reduced by ATN

- Statistics on airport district circulation are needed
- Planning guidance is needed to envision, configure, fund and implement
- A process for stakeholder cooperation is needed

MPOs need objective, land-use-oriented planning guidance

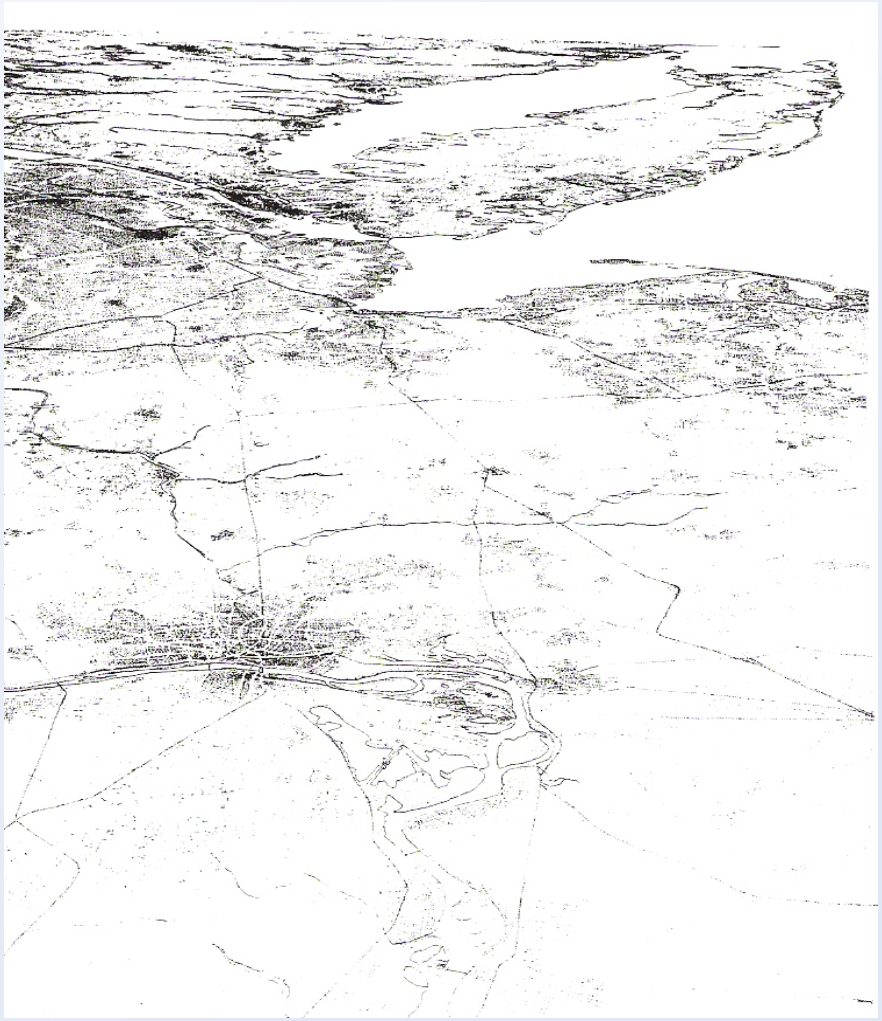
- ATN deployments are much more than debugging the system
- Urban residents need to be informed about ATN
- TRB manual on Transit Capacity and Quality of Service lacks future orientation
- Research and modeling is needed for ATN on ridership and last mile deployment



URBAN VS CAMPUS TYPICAL LOAD CYCLES

EPA officials need tools to assess the potential of ATN

- Modeling software and training to estimate GHG reductions
- Analysis and data to predict reductions in accidents
- Measures of benefits of noise reduction
- Role of ATN in shifts to car-free lifestyles and health benefits of walking and biking



Programs are needed to:

- Demonstrate capacity and scalability

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- Elicit local creativity

Programs are needed to:

- Demonstrate capacity and scalability
- Calibrate mode-split models
- Elicit local creativity
- Extend MPO modeling capabilities

The game is changing

Thank you!

Questions?

ATN/PRT has great potential

If system development continues as expected, PRT could theoretically become an effective tool to improve urban congestion, sustainability and livability. PRT offers a mode of service that could be more competitive with the private automobile than conventional public transportation systems and potentially attract more drivers from their cars. Further, PRT offers the potential to reduce the energy use, land use, and environmental impact of transportation allowing the implementation of more sustainable transportation solutions in today's congested infrastructure.

(Viability of Personal Rapid Transit In New Jersey Final Report 2007, 15)