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Trends and Trajectory of Shared Mobility

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Overview

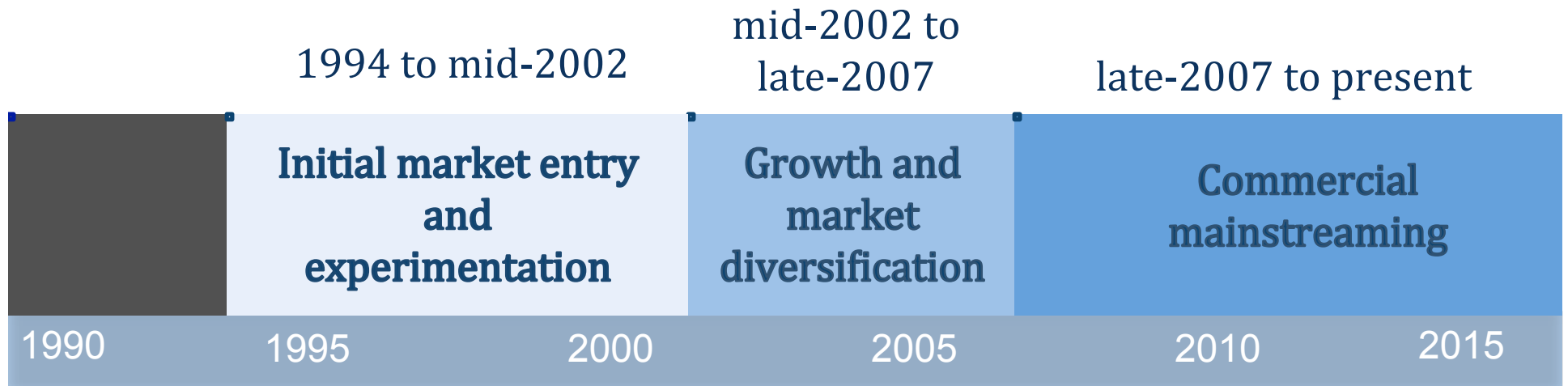
- Carsharing
 - History
 - Worldwide and North America Growth
 - Personal Vehicle Sharing
 - Autonomous Vehicles
- Public Bikes sharing
 - History
 - Worldwide and North American Growth
 - North American Operations
- Ridesharing / Ridematching
 - History and Current Status





CARSHARING

Carsharing Phases in North America



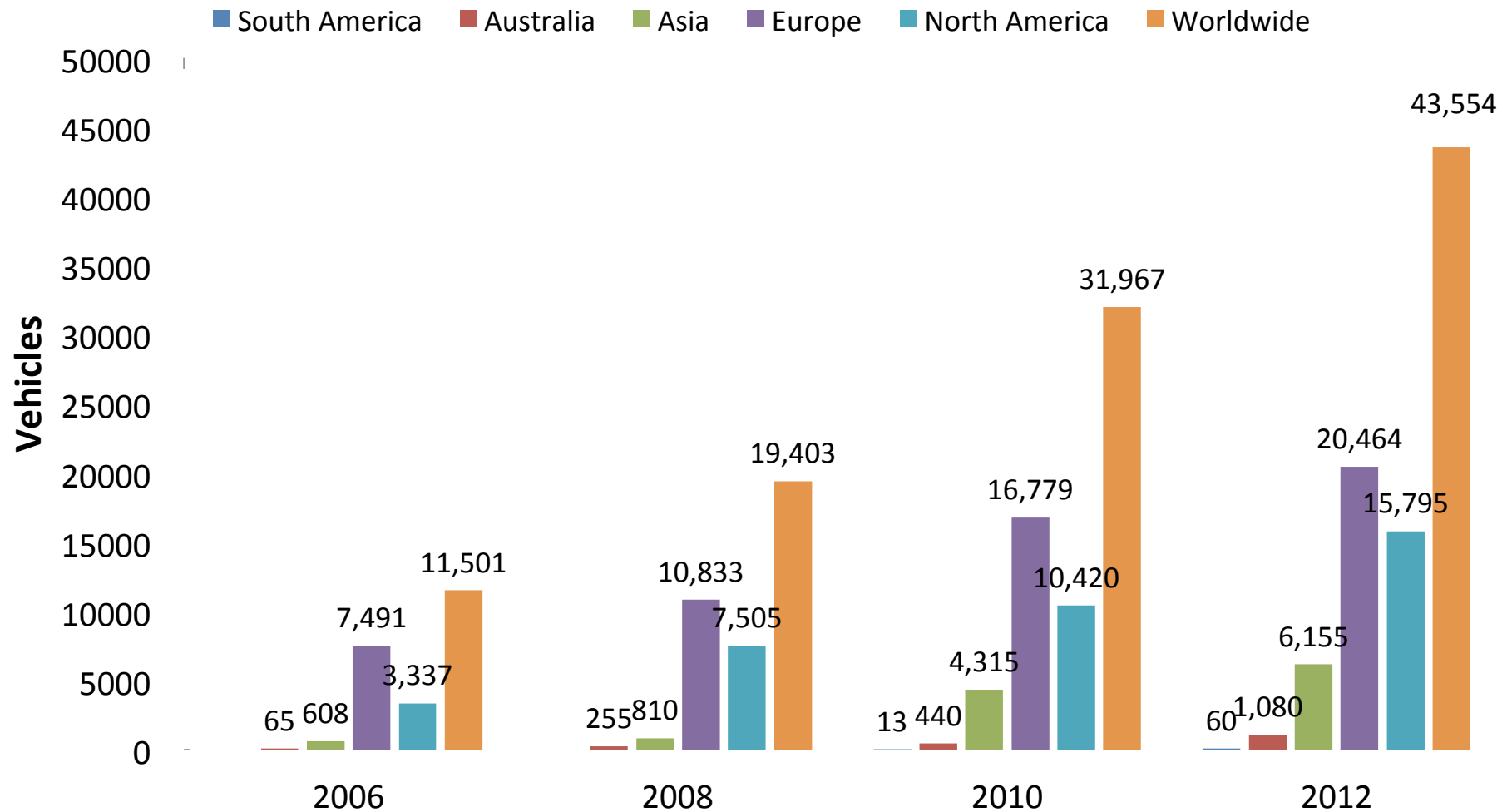
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Worldwide & Regional Membership (2006-2012)



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Worldwide & Regional Fleets (2006-2012)



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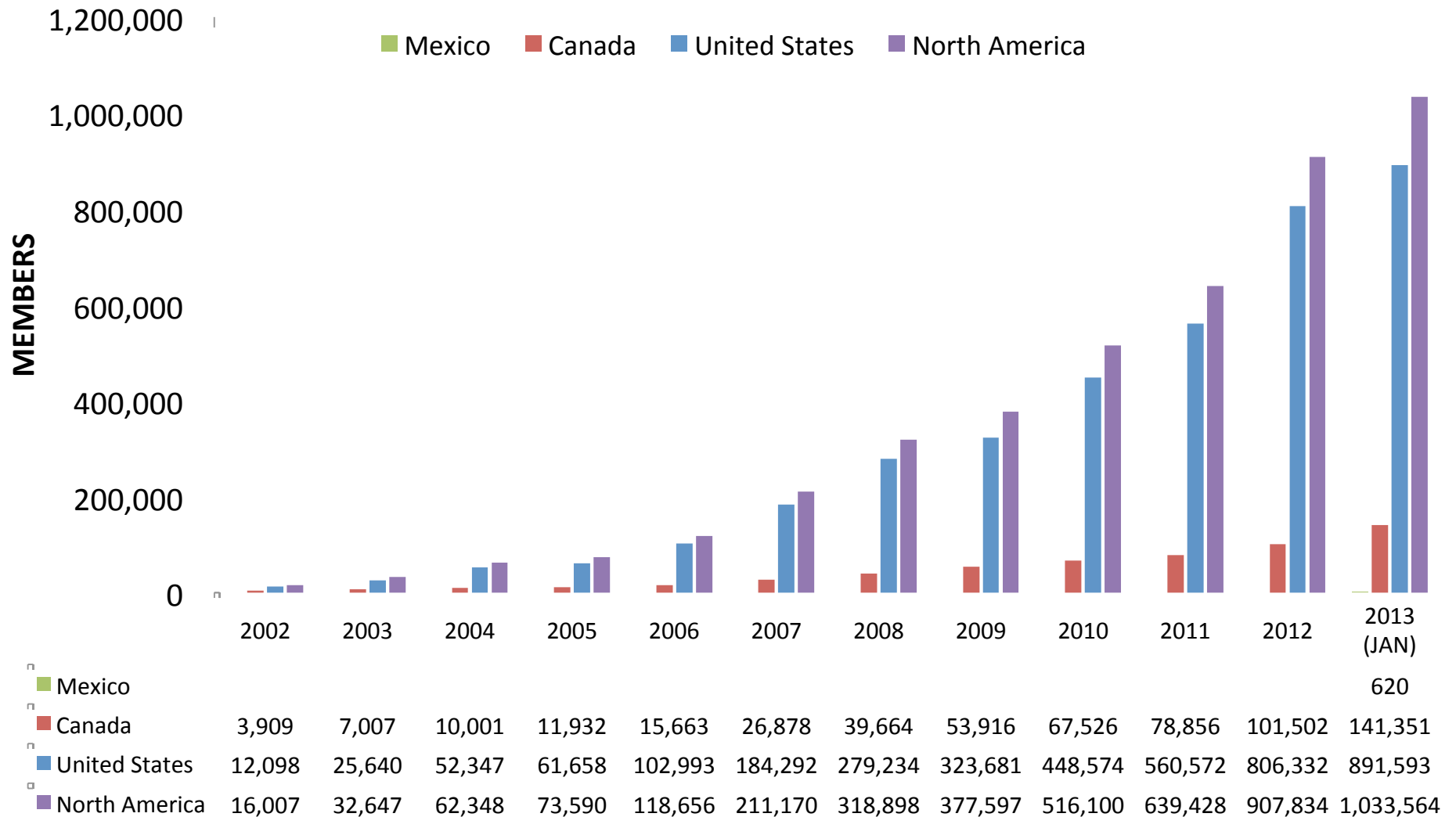
2012 Worldwide Census

	Members	Vehicles	Ratio
Asia	160,500	6,155	26.1
Australia	25,500	1,080	23.6
Europe	691,943	20,464	33.8
North America	908,584	15,795	57.5
South America	1,500	60	25.0
Worldwide	1,788,027	43,554	41.1



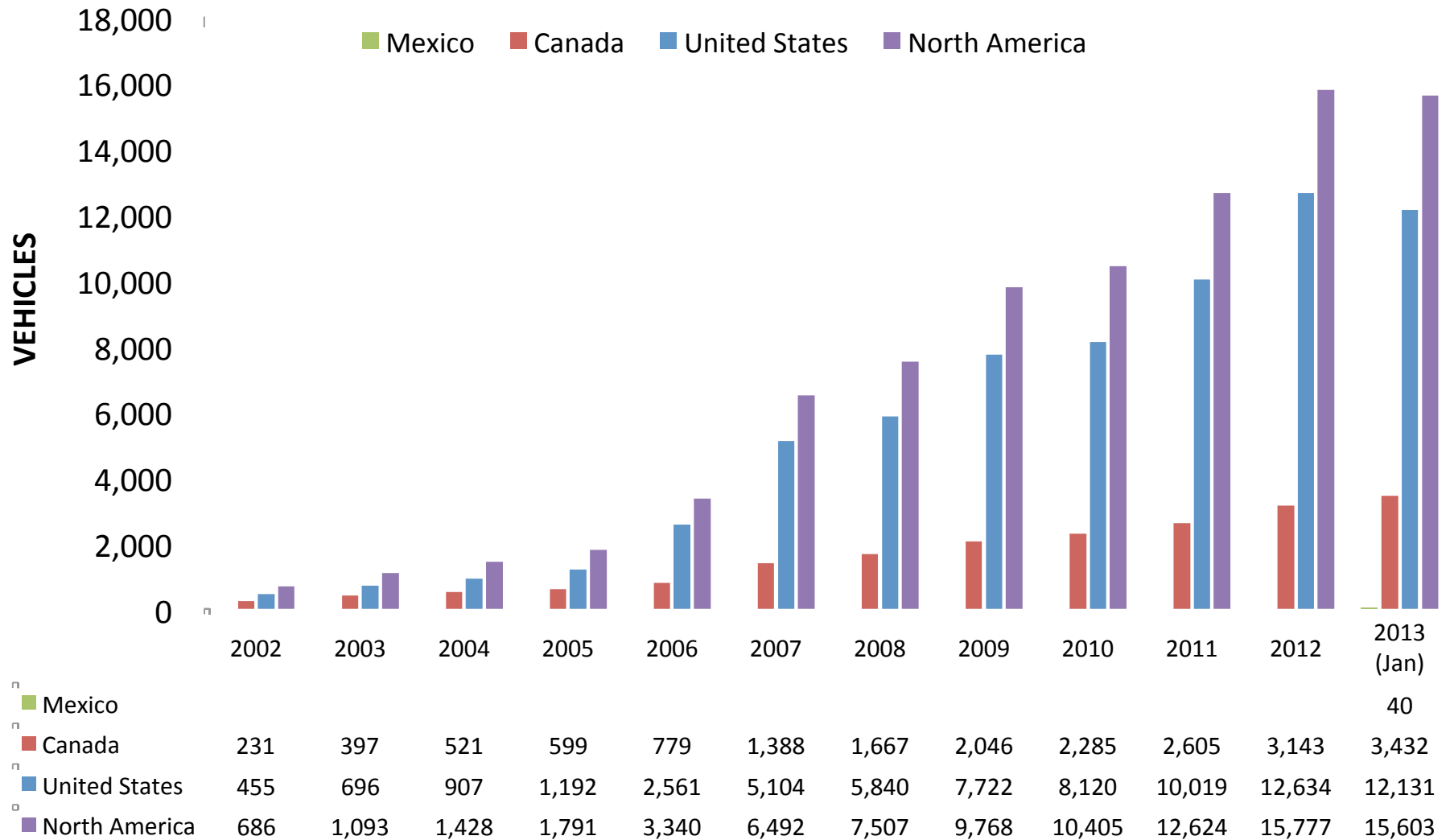
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North American Member Growth



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North American Vehicle Growth



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North American Vehicle Holdings: Key Findings

- Between 9 to 13 vehicles removed, including postponed purchase
- 4 to 6 vehicles/carsharing vehicle sold due to carsharing
- Largest shift: 1-car households becoming carless
- Second largest shift: 2-car households become 1-car households
- 25% sell a vehicle
- 25% postpone vehicle purchase



Source: Martin, Shaheen, Lidicker, 2010



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Carsharing Trends & Developments

- Continued membership growth
- Mergers and acquisitions
- Continued growth/expansion of multi-national operators, traditional car rental providers, automaker sponsored programs
- Notable developments in classic carsharing, one-way carsharing, and personal vehicle sharing



Personal Vehicle Sharing

Short-term access to privately-owned vehicles

- Personal vehicle sharing (PVS) models first seen in North America in 2001, eGOCarShare, RentMyCar
- Continues to increase in popularity
- North American PVS Operators (as of July 2013):
 - 9 operating (8 fully-active, 1 in pilot phase)
 - 3 planned
 - 8 defunct
- 37 worldwide
 - 32 fully active
 - 5 in pilot phase



4 Types of Personal Vehicle Sharing

- **Fractional Ownership**

- Individuals sub-lease or subscribe to vehicle owned by a third party

- **Hybrid P2P-Traditional Carsharing Model**

- Individuals access vehicles by joining an organization that maintains its own fleet of vehicles, but also includes private autos, throughout a network of locations

- **P2P Carsharing**

- Employs privately-owned vehicles made temporarily available for shared use by individual or members of P2P company

- **P2P Marketplace**

- Enables direct exchanges between individuals via Internet

Autonomous Vehicles



- Carsharing/Autonomous Vehicle Synergies
 - Platform for introducing autonomous vehicle technologies, building consumer demand/appeal/confidence (e.g., BMW's DriveNow electric vehicles)
 - Autonomous vehicle sharing potentially new model for carsharing companies (e.g., taxi-like services)
 - P2P autonomous vehicle sharing potentially lowers ownership costs of expensive, technologically-advanced vehicles
 - Self-charging (EVs), parking assist, and driver assist (e.g., carsharing in retirement communities)



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GoGet - Australia



- Testing a base Yaris with sensors (3 radar, camera)
- Collecting data to model “real” human behavior and usage scenarios (trip data)
- Research partner: University of New South Wales
- Understand possible usage patterns and demand in the longer term and how to best optimize the vehicle in carsharing
- Start with partially autonomous vehicle (human in control)
- Goal: First fleet buyer in Australia of fully autonomous vehicles (5 years)



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goget

A photograph of a public bike-sharing station. In the foreground, a row of white bicycles with black frames and handlebars is docked in a rack. The word "Hubway" is visible in green on the side of one of the bikes. The background is blurred, showing a city street with pedestrians, a yellow diamond-shaped traffic sign, and a blue and white vehicle. The text "PUBLIC BIKESHARING" is overlaid in a bold, orange, serif font across the middle of the image. A stylized, wavy line graphic is positioned to the left of the text.

PUBLIC BIKESHARING

Bikesharing Generations

- 1st Generation: Free Bikes (“White Bikes”)
 - Demonstration and provided increased mobility
- 2nd Generation: Coin-Deposit Systems
 - Emerged from a need to deter theft and incentivize return.
- 3rd Generation: Information Technology (IT) System
 - Provides real-time information; employs technology to assist in rebalancing demand
- 4th Generation: Demand-Responsive, Multi-Modal Systems
 - Mobile docking stations; smartcard integration with public transit; bike redistribution innovations; GPS tracking, touchscreen kiosks, and electric bikes



Worldwide Numbers: April 2013

- 539 cities with operating systems
- 462,880 bikes
- 22,750 stations

Source: Russell Meddin, 2013



U.S. Numbers: January 2013

- Data collection on-going; preliminary estimates:
- 884,442 Total Users (41,695 long-term users / 842,747 short-term users)
- 7,549 Bicycles / 800 Stations / 12,955 Docking Points
- Dock-to-bike ratio: 1.72
- Percentage Short-Term Users: 95.3%

Source: Shaheen and Cohen, 2013



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North American Program Launches (2007- May 2013)

			Capital Bikeshare		Bike Chattanooga	
			Chicago B-cycle		Charlotte B-Cycle	
			EcoBici		DecoBike Long Beach	
			Denver B-cycle		Houston B-cycle	
			Des Moines B-cycle		Kansas City B-Cycle	
	Bikala		Nice Ride MN		Nashville B-Cycle	
	SmartBike D.C.				Spokies	
2007	2008	2009	2010	2011	2012	2013
Tulsa Townies		BIXI Montreal		BIXI Toronto		Anaheim Bike Nation
				Boulder B-cycle		Citi Bike
				Broward B-cycle		Fort Worth B-Cycle
				Capital BIXI		Greenville B-Cycle
				DecoBike Miami		SLC Bike Share
				Golden Community Bike Share		
				Hawaii B-cycle		
				Madison B-cycle		
				Hubway		
				Omaha B-cycle		
				San Antonio B-cycle		
				Spartanburg B-cycle		

Source: Shaheen and Cohen, 2013

Business Models

Business Model	Definition	Example
Non-Profit	<ul style="list-style-type: none"> • Goal of covering operational costs and expanding service • Start-up and operational funding typically are supported by grants, sponsorships, and loans 	Denver B-cycle Denver, CO (Operational)
Privately Owned and Operated	<ul style="list-style-type: none"> • Owned and operated by a private entity • Operator provides all funding for equipment and operations • May have limited contractual agreement with public entities for rights-of-way 	DecoBike Miami, FL (Operational)
Publicly Owned and Operated	<ul style="list-style-type: none"> • Owned and operated by a public agency or local government • Agency subsidizes bikesharing with system revenue 	Golden Community Bike Share Golden, BC (Suspended)
Publicly Owned/ Contractor Operated	<ul style="list-style-type: none"> • Owned by a public agency or local government, responsible for funding and administering the system • Operations are contracted to a private operator 	Capital Bikeshare Washington, D.C. (Operational)
Street Furniture Contract	<ul style="list-style-type: none"> • Operator permitted to operate in a jurisdiction in exchange for advertising rights, generally with street furniture • System funded through advertising revenue 	SmartBike D.C. Washington, D.C. (Defunct)
Third-Party Operated	<ul style="list-style-type: none"> • Operated in partnership with local businesses in exchange for a percentage of the profit • Hybrid operation scheme that can be paired with other business model 	Chicago B-cycle Chicago, IL (Defunct)
Vendor Operated	<ul style="list-style-type: none"> • Operated by the same company that designs and/or manufactures the system equipment (the vendor) 	Bike Nation Anaheim Anaheim, CA (Operational)



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Current Bikesharing Innovations

- Integration of bikesharing with transit data
- Helmet dispensing options
- Dockless IT-based bikesharing
- Program reciprocity allowing visiting usage

Wilson Blvd + Barton St			Clarendon Blvd + Barton St		
38B	Westbound to: Ballston Station	0	77	Shirlington Station to Court House Metro	10
41	Court House Metro - Columbia Pike/Dinwiddie	3	41	Columbia Pike/Dinwiddie - Court House Metro	11
77	Court House Metro to Shirlington Station	16	38B	Eastbound to: Farragut Square	11
Barton St + Clarendon Blvd			M Court House		
41	Court House Metro - Columbia Pike/Dinwiddie	3	QR	New Carrollton	0
4B	Westbound to: Seven Corners	14	QR	Vienna	6
77	Court House Metro to Shirlington Station	16	QR	New Carrollton	8
Barton St + Clarendon Blvd			QR	New Carrollton	10
4B	Eastbound to: Rosslyn Station	9	QR	Vienna	15



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RIDESHARING / RIDEMATCHING

Phases of North American Ridesharing

World War II
car-sharing
clubs

Major
responses to
energy crises

Early
organized
ridesharing
schemes

Reliable
Ridesharing
Schemes

Technology-
enabled
ridematching



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Real-Time Ridematching Services



- Match drivers and passengers through a smartphone app just minutes before the trip is to take place
- Typically short, in-city trips
- Cashless payment through app, credit card on file
- Participants use rating system
- Differ from dispatch or e-hail models that do not require a destination



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- North American carsharing and public bikesharing organizations



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Bikesharing Impacts

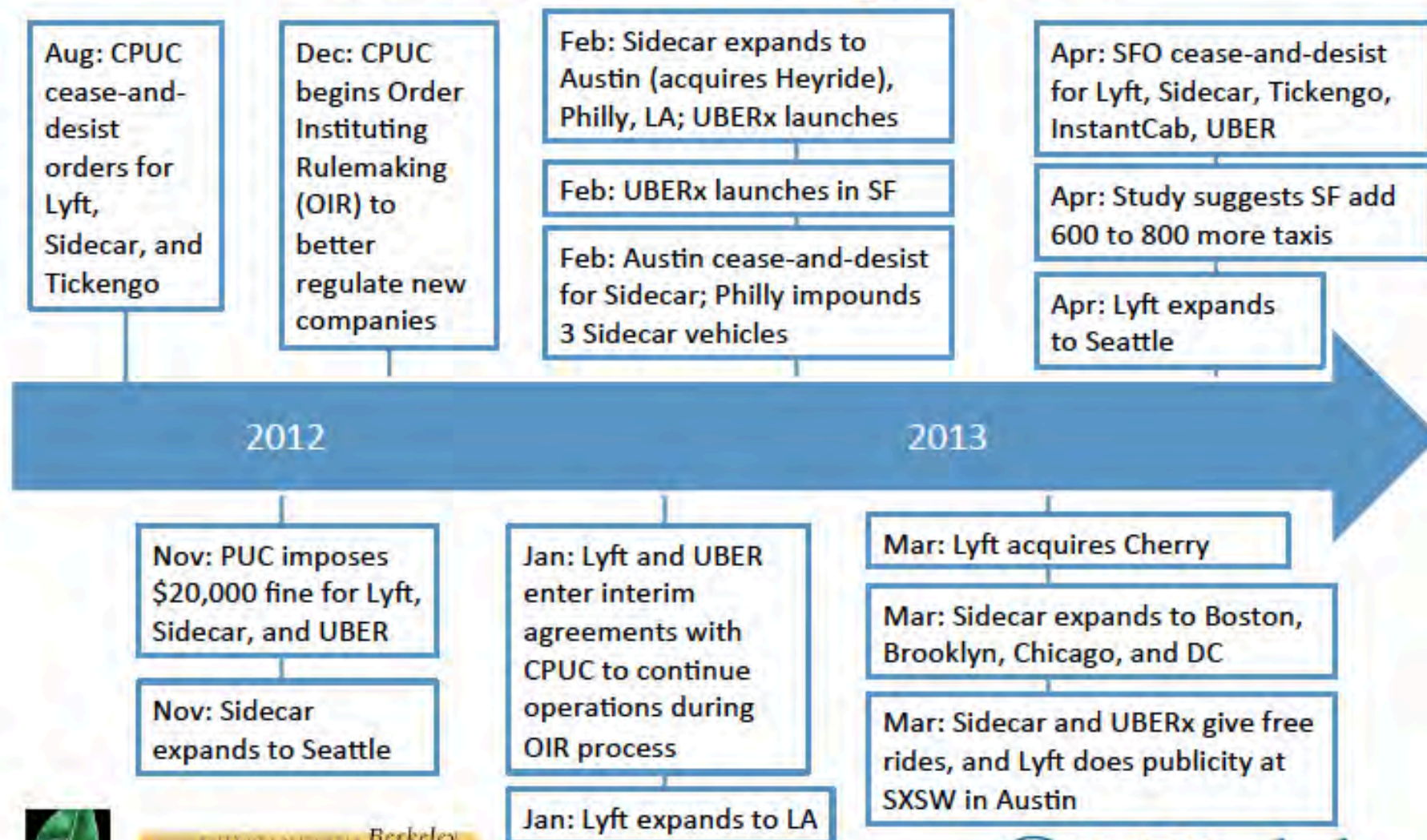
Canada	Year of Data	Trips per Day	Km per Day	CO ₂ Reduction (kg per Day)	Change in Vehicle Ownership	Respondents Driving Less Often
BIXI Montreal	2011	20,000 ⁵			-3.6% ⁶	36.3% ⁶
BIXI Toronto	2011				-2.0% ⁶	25.4% ⁶
United States	Year of Data	Trips per Year	Km per Year	CO ₂ Reduction (kg per Year)	Reduction in Vehicle Ownership	Respondents Driving Less Often
Boulder B-cycle	2011	18,500 ⁷		47,174 ⁷		
Capital Bikeshare (D.C.)	2011	1,249,454 ⁶			-2.1% ⁶	41.0% ⁶
Denver B-cycle	2011	202,731 ⁸	694,942 ⁸	280,339 ⁸		
New Balance Hubway (Boston)	2011	140,000 ⁹				
Madison B-cycle	2011	18,500 ¹⁰		46,805 ¹⁰		
Nice Ride Minnesota (Twin Cities)	2011	217,530 ⁶			-1.9% ⁶	52.4% ⁶
San Antonio B-cycle	2011	22,709 ¹¹		38,575 ¹¹		

Shaheen et al., 2013



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Recent Developments



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