Managing Parking Facilities as Green Infrastructure

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Environmental issues...

**Impact of construction and operation:**
- Urban land consumption
- Water runoff and pollution
- Urban heat island/surface albedo
- Lifecycle energy and GHG emissions of construction and operations

**Impact on VMT and vehicle ownership:**
- Energy use
- Air pollution
- GHG emissions
- Noise
Green design and construction

**Land utilization/design**
- Reduced parking footprint (space size, layout efficiency, structures/underground)
- Multiple use of footprint – e.g., solar arrays
- Wrapped/integrated parking facilities
- Urban agriculture on structures

**Material reuse/recycling**
- Reuse of on-site materials
- Low impact/recycled materials
- Temporary structures; reconfigurable structures
LEED certified parking facility
# Green systems and operations

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Water</strong></td>
<td>- Stormwater capture, treatment, and recharge</td>
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<td></td>
<td>- Permeable pavement</td>
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<td>- Low water use/drought tolerant landscaping</td>
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<tr>
<td><strong>Energy</strong></td>
<td>- Natural ventilation and lighting</td>
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<td>- Efficient mechanical systems and lighting</td>
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<td>- On-site generation: solar panels, wind, geothermal</td>
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<td><strong>Microclimate/reflectivity</strong></td>
<td>- Landscaping (urban heat island)</td>
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<td>- Reflective pavement and shading structures (GHG)</td>
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<tr>
<td><strong>Maintenance materials and practices</strong></td>
<td>- Green maintenance materials</td>
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<td></td>
<td>- Maintenance that extends the life of the facility</td>
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Greening the act of parking

Less cruising
- Real-time space availability/parking guidance systems
- On-street pricing increases space availability and incentivizes use of off-street parking

Less queuing
- Real-time space availability/parking guidance systems
- Barrier-free arrangements
- Pay before exit

Greener vehicles
- Priority spaces for carpools, vanpools, low emissions vehicles, neighborhood electric vehicles, electric vehicle recharging, bicycles

Fewer parking events
- “Park once” and walk
- Intelligent pricing structure that reduced moved vehicles
Hooray for green parking?

No

Green parking is an oxymoron...

- VMT and vehicle ownership impacts outweigh benefits of “green” facilities
- Green parking is greenwashing, a distraction from core issue of SOV dependency

Perhaps

A transportation facility “of last resort”....

- Other travel modes used to full potential
- Shared parking has been optimized
- Pricing is in effect
Why so much parking...

- Drive alone mode share
- Code requirements
- Single use parking facilities
- Market norms
- Lack of parking management
- Undersupply anxiety
Parking is a significant land use

- Number of spaces in the U.S.: 730 million to 2 billion
- Urban land area devoted to parking (footprint): 5% to 19%
- CBD coverage (all parking area): 18% to 81%
Life cycle assessment of parking construction and operation

Categories of impact:
- Energy
- Greenhouse gases – CO$_2$, CH$_4$, N$_2$O, etc.
- Air pollution - CO, SO$_2$, NO$_x$, PM10, etc.

Estimates of life cycle impacts, U.S. parking:
- 690 – 1,800 PJ
- 63 – 150 Tg CO2e
- VOC – 490 – 1,900 Gg
Parking is oversupplied - commercial

Uptown Whittier peak occupancy and supply
Parking is oversupplied - residential

Occupancy counts at 7 Inland Empire multi-family complexes...

<table>
<thead>
<tr>
<th>Total # of Units</th>
<th>Supply</th>
<th>Demand</th>
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<tbody>
<tr>
<td></td>
<td>Code Requirement</td>
<td>Actual Supply</td>
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<tr>
<td></td>
<td>Total Supply</td>
<td>Supply per unit</td>
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<tr>
<td>2,506</td>
<td>4,949</td>
<td>1.97</td>
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Existing demand levels inflated…

Despite inflated supply – it is still less than demand.

- Underpriced parking
- Plentiful supply
- Land use pattern favors driving and parking
- Site design undermines alternative modes
- Other modes undersupplied/not competitive
Many places have enough parking now for the next 25 years, *right now*

“We will build no parking before its time”

Parking construction as the exception rather than the rule
Green parking reform, part 1

Use existing on- and off-street supply more efficiently

- Shared parking
- Price parking/unbundle parking costs
- Parking management and technology

Encourage travel by modes that do not require parking

- Denser, clustered land use
- Network of mixed land use zones
- Transit, walk, bike, TDM
- Road prioritization
- Road pricing
Green parking reform, part 2

Reduce household automobile ownership
- Housing in mixed use environments, linked to a network of mixed use clusters by transit
- Unbundle parking
- Temporary car rental

Reform minimum parking requirements
- Transition from demand based to deregulation
- Consider maximums if market overbuilds
- Allow in-lieu fees
- District-based supply concept

Finance
- Fair allocation of capital and operating costs on a district basis
- Revenue return to districts
- Market-based test for new supply
A typical progression in policy

**Initial steps...**
- Simple parking management – time limits, neighborhood permit parking, shared parking
- On-street pricing in busiest commercial areas; return some revenues to district
- Lower minimums to average demand
- Education; identification of local “champions”; build management capacity

**Advanced approaches...**
- Private/public management partnerships, integrated with traffic management
- Market-based on-street pricing; revenue return
- Lowered/eliminated minimum parking requirements
- Targeted, market-justified, shared structures
The secret life of a homeless car
The past...

He had many homes ... his owner's house and workplace, at the mall, the bowling alley, the funeral parlor, the hair salon, the shooting range...

Transit agencies even made spaces for him!
The glory years…

He never had to search.
He never had to pay.
He never spent a night on the street.

His arrogance grew: he had needs. Shade but no dirty trees. Room to avoid door dings. Suburban style parking in the core of town.
His strategy ...

He preyed on the fears of planners, engineers, developers, retailers, and employers:

ANARCHY!
HOMELESS CARS!
CARS ON THE STREET!
CARS ON YOUR FRONT LAWN!
The fall from grace...

The dirty secrets: traffic, energy, greenhouse gas emissions, urban heat islands, bad urban design, high development costs, low densities, unfairness for those without cars.
Spiteful responses

Portland-style this, Portland-style that!
Parking maximums!
Parking bans!
Parking charges!
Parking cash out!
Shared parking!
The deepest cut of all: parking spaces hijacked for parks…
Therapy, the talking cure, did not take...

“I am not superior to other modes of travel”

“I must pay for the real estate that I use”

“I must learn how to share (parking spaces and even myself)”
Many cars adjusted and found happiness...

but not him...
Goodbye...