

7 *Adult-Only* Facts

- To avoid climate destabilization (**human extinction**), industrialized nations must reduce their GHG emissions by 80%, before 2030.
- Congress member Ocasio-Cortez: *The world is gonna end in 12 years if we don't address climate change.* Fox News made fun of that, but, roughly speaking, she's right; "our world" will end.
- Cars are by far the biggest category of GHG emission.

7 *Adult-Only* Facts

- On average, internal combustion engine cars last 15 years.
- We will NOT have great transit or a sufficiently-electrified fleet by 2030
- **We must reduce vehicle-miles-travelled**

Appropriate pricing of parking is the least costly way to significantly reduce vehicle-miles-travelled.

Eliminating the Harm of **Bundled-Cost or Bundled- Benefit Parking**

- Definitions of Parking Systems
- New System: *Dividend-Account Parking*
 - Motivations for change
 - An example of a demonstration project

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A Bundled-Cost Parking System

The most common of all parking systems. Erroneously called “free”

The **cost** of the parking is contained within some other payment, such as:

- Rent
- Train fare (at least 1 train station with so-called “free” parking)
- Price of consumer items, including food

A Bundled-Benefit Parking System

The 2nd most common of all parking systems. Erroneously called “free”

The parking is part of a benefit package being provided, such as:

- **Compensation for work**
- **Public education**
- **Public anything, such as a library or park**

The harm of a *Bundled-Cost* or a *Bundled-Benefit* car-parking system is that they take *money* from people without their knowledge or consent.

**These systems also
increase the choice to
drive alone.**

Sierra Club Resolution: Appropriate pricing of parking is the least costly way to reduce vehicle miles travelled.

***Bundled-Cost* or *Bundled-Benefit* car-parking systems should be replaced with **Dividend-Account** Parking systems.**

Dividend-Account Parking System

1. Value-priced baseline, with congestion pricing option
2. People for whom the parking is built will get the **earnings**, or “**dividends**” (AKA “**financial support**”)
3. Cars parked must be associated with an **Account**
4. Parking is shared with all drivers, as long as their car is recognized as being associated with an **Account**

From the California Democratic Party (CDP) Platform:

From: <https://www.cadem.org/our-party/standing-committees/body/CDP-Platform-2018.pdf>

(The 2018

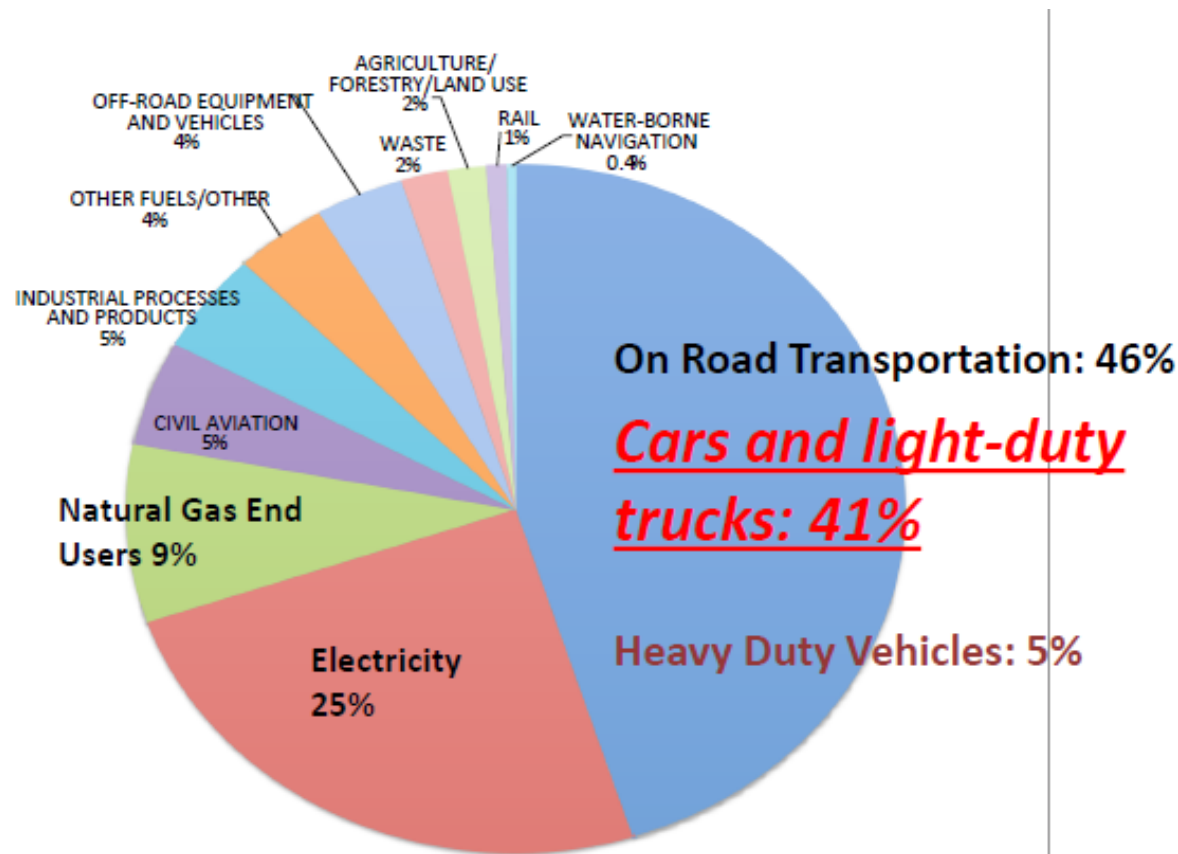
California Democratic Party (CDP) Platform)

Transportation

Work for **shared**, convenient and **value-priced** parking, operated with a system that **provides financial support** to those paying higher costs or getting a reduced wage, due to the cost of providing the parking

Motivation for Change, 1 of 7

1. Cars and Light-duty vehicles (LDVs) emit the most GHG of any category



Motivation for Change, 2 of 7

2. Fleet Efficiency **Will Not Come Soon Enough**, as shown in peer-reviewed report:

Air & Waste Management Association (AWMA) 2016 Paper
Climate-Stabilizing California Light-Duty-Vehicle (LDV) Requirements

Derives a set of **requirements** to ensure that our fleet of cars and light-duty trucks will achieve a **climate-stabilizing target**.

Motivation for Change, 3 of 7

AWMA 2016 & EUEC 2017 Paper

*Climate-Stabilizing California Light-Duty-Vehicle
(LDV) Requirements*

Problem Solution Overview

1. Get a science-based **climate-stabilizing target**
 - Percent reduction in emission from some baseline, for the target year
2. Derive the equation for level of driving, as a function of fleet efficiency and the **climate-stabilizing target**
3. Define a set of **requirements** resulting in fleet efficiency
4. Compute the required level-of-driving for the target year
5. Develop a set of **requirements** to get the needed driving reduction

Motivation for Change, 4 of 7

2. Fleet Efficiency **Will Not Come Soon Enough**, as shown in the peer-reviewed report:

AWMA 2016 & EUEC 2017 Paper

***Climate-Stabilizing California Light-Duty-Vehicle
(LDV) Requirements***

- **Fleet-Efficiency Requirements Included:**
 1. Programs to remove gas guzzlers
 2. Yearly Fractions of Sales that are Zero-Emission Vehicles (ZEVs, or Battery Electric)
 3. Corporate Average Fuel Efficiency (CAFÉ) for internal combustion engine cars sold, by year
 4. Target Year Percent of Electricity that is renewable

Motivation for Change, 5 of 7

- Two Solutions: *Heroic* and *Extra Heroic*

15 years of ZEV %, for two Cases								
First 5 Years			Middle 5 Years			Last 5 Years		
Year	Heroic	Extra Heroic	Year	Heroic	Extra Heroic	Year	Heroic	Extra Heroic
2016	4.0%	4.0%	2021	34.0%	90.0%	2026	95.0%	99.0%
2017	7.0%	12.0%	2022	48.0%	93.0%	2027	98.0%	99.0%
2018	12.0%	24.0%	2023	62.0%	96.0%	2028	99.0%	99.0%
2019	18.0%	40.0%	2024	76.0%	97.0%	2029	99.0%	99.0%
2020	24.0%	62.0%	2025	90.0%	98.0%	2030	99.0%	99.0%

Many prefer the “Extra Heroic” case because they want to believe we won’t need to reduce driving

However, the “Extra Heroic Case” percentages are not reasonable.

% Reduction in Per-Capita Driving, with Respect to 2005	
Heroic	32%
Extra Heroic	0%

Motivation for Change, 6 of 7

- Two Solutions: *Heroic* and *Extra Heroic*

% Reduction in Per-Capita Driving, with Respect to 2005	
Heroic	32%
Extra Heroic	0%

We must achieve a **significant reduction** in per-capita driving, by 2030, with respect to 2005, if we are going to **stabilize the climate at a livable level.**

Motivation for Change, 7 of 7

- A big part of the needed 32% reduction will need to come from car-parking reform.
- The first step will be a simplified demonstration project of a **Dividend-Account** Parking System at a work location.
- Such a proposal will now be presented.

San Diego County's Climate Action Plan Misadventures

- The Sierra Club proposed Dividend-Account parking, as a demonstration project for County employees
- The County argued it was infeasible
- Superior Court Judge Taylor ruled that the County failed to show it was infeasible
- The County appealed on a 3-2 vote
- This is the 2nd failed CAP for the County. The first was ordered rescinded on the same issue and resulted in a published Appellant Court Ruling

A Dividend-Account Parking System for Oceanside

**A System to Eliminate the Harm of Bundled-Benefit
Car Parking for City Employees
300 North Coast Highway**

- **Top-Level Outcome & Overview**
- **Calculations**
- **Who gets to use the system and how**
- **Overcoming problems and perceptions**
- **Outcomes of a new incentive**

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Top-Level Outcomes

- Employees that drive every day break even (Lose no money!)
- Employees that don't drive every day get paid to not drive (Make more money!)
- Fewer employees drive, reducing Greenhouse Gas (GHG) emissions (Less GHG!)

Overview

- Fully-automated parking system, operated for the financial gain of employees
 - Earnings = revenue minus expenses
 - All earnings go to employees
- Price is cost per minute
 - Such as 1.85 cents per minute (= \$1.11 per hour)
- An employee's **earnings** (“**Dividend**”) is proportional to their time spent at work

Calculations of an Employee's Earnings

- An employee's earning is proportional to time spent at work:

Definitions to Compute an Employee's Monthly Earnings	
T_{Employee}	The Employee's Monthly Time at the Work Site
$T_{\text{AllEmployees}}$	Total Monthly Time at the Work Site, All Employees
$E_{\text{AllEmployees}}$	Total Monthly Earnings from the Employee Parking

$$\text{Employee Earnings} = E_{\text{AllEmployees}} \times \left(T_{\text{Employee}} / T_{\text{AllEmployees}} \right)$$

Additional Payment so Those that Drive Every Day Will Lose No Money

Note: This is for an individual employee, “Joe”

Joe’s Parking Payment =

Joe’s Earnings – Price per Minute x Minutes Joe Parked + “ (Joe’s) Add In”

“Add In” is zero, unless it must take on a positive value so that Joe loses no money

Charge, Earnings, & Add-In, Payment *For Each Employee*

- **Charge**
 - Total Minutes Parked x Cost per Minute
- **Earnings**
 - As shown on earlier slide (proportional to employee's time spent at work)
- **Add-In**
 - Zero, unless **Charge** > **Earnings**
 - If **Charge** > **Earnings**, **Add-In** = **Charge** – **Earnings**
- **Payment** = **Earnings** – **Charge** + **Add-In**

Who Gets To Use Dividend-Account Parking

- **Anyone** (not necessarily an employee) driving a car registered in the system
 - There is a person with an account associated with the car
 - The car can be identified
 - RFID attached to the car
 - License plate reader (This will probably be selected.)
 - Any other method

Employee Behavior

Employees Must Park in Their Parking Lot if they Drive to Work Measures to Reduce “Cheating” = Parking in the Neighborhood

- Soft, pre-emptive measure: messaging
 - **Perceived integrity** is every employee’s responsibility
 - **Insufficient perceived integrity** can cost employees
 - Reduced chance of promotion
 - Smaller pay raises
 - More chance of terminated employment
 - Empty spaces in the employee parking garage cost all employees money
 - Parking free in the neighborhood will not be tolerated
 - The City wants to be a good neighbor: this is the reason for off-street parking ordinances
- Soft, pre-emptive measure: data collection
 - Operate the system for a time, perhaps even a year, before actually collecting or distributing money
 - Non drivers are identified, thanked, and asked to provide details as to how they are getting to work without driving
- Soft, In-Operational Mode: Non drivers are thanked and interrogated
- **Hard: cameras or RFID sensors can identify employees walking into the work perimeter from the neighborhoods**

Hard-to-Not-Drive Example

Fictional, Simplified Case with Pricing and Payout Considered per Day, [Page 1](#)

- Employment Center (factory and office)
- Outside Hemet, California
- 100 employees; parking lot has 100 spaces
- No Transit, 110 degree temperature with poor roads for biking, culture of not car-pooling
- Before installing
 - 99 drive
 - 1 bikes

Hard-to-Not-Drive Example

Fictional, Simplified Case with

Pricing and Payout Considered per Day, *Page 2*

- Dividend-Account Parking charges \$10/day
- After installing
 - 99 drive
 - 1 bikes
- Total collected each day: \$990
- Each employee gets \$9.90 earnings per day
- Each driver loses 10 cents per day
- The “crazy” bike rider gets \$9.90 per day extra

Hey, isn't this an improvement? I would say the “crazy” bike rider is earning his money!

If another employee bikes, the drivers would lose 20 cents per day and the bike riders would get \$9.80 per day. If the company president rented out the 2 extra spaces for \$10 per day, the drivers would lose nothing and the bike riders would get \$10 per day. Biking would increase by 100%! **What's wrong with that?**

Results of 3 Actions, Including Cash-out

Case (#1), Reference Patrick Siegman's article in Bicycle Pedestrian Federation

- Company: CH2M Hill
 - Location: Bellevue, WA (Seattle suburb)
 - Engineering Firm with 430 employees
- Actions
 - \$54/month (1995 \$'s), to not drive
 - Improved Transit
 - Improved Bike/Ped facilities

CH2M Hill Work Trips		
<i>Mode</i>	<i>Before</i>	<i>After</i>
Drive Alone	89%	54%
Carpool	9%	12%
Bus	1%	17%
Bike, Walk	1%	17%
	100%	100%

Since these changes are brought about by more than just cashout, this case is not used in the tabulation of cashout results (next chart)

**Money
Matters
!!!!**

Cash-Out Results

(11 Locations, 3 Groups, 1995 Dollars)

- Reference: *How to Get Paid to Bike to Work: A Guide to Low-traffic, High- Profit Development* by Patrick Siegman*. Published in *Bicycle Pedestrian Federation of America*, 1995.
- 3 Largest Responses
 - 38%, 36%, 31%
- 3 Smallest Responses
 - **15%**, 18%, 24%
- Responses are the change; car vacancy rates would be larger

* Patrick Siegman, of Nelson Nygaard



Impact of Financial Incentives on Parking Demand			
Location	Scope	1995 dollars per mo.	Parking Use Decrease ¹
Group A: Areas with little or no public transportation			
CenturyCityDistrict, West Los Angeles	3500 employees at 100+ firms	\$81	15%
Cornell University, Ithaca, NY	9000 faculty & staff	\$34	26%
San Fernando Valley, Los Angeles	1 employer, 850 employees	\$37	30%
Costa Mesa, CA		\$37	22%
Average for Group		\$47	23%
Group B: Areas with fair public transportation			
Los Angeles Civic Center	10000+ employees, several firms	\$125	36%
Mid-Wilshire Blvd., Los Angeles	1 mid-size firm	\$89	38%
Washington DC Suburbs	5500 employees at 3 worksites	\$68	26%
Downtown Los Angeles	5000 employees, 118 firms	\$126	25%
Average for Group		\$102	31%
Group C: Areas with good public transportation			
University of Washington, Seattle Wa.	50,000 faculty, staff & students	\$18	24%
Downtown Ottawa, Canada	3500+ government staff	\$72	18%
Bellevue, WA	1 firm with 430 employees	\$54	39% ²
Average for Group, but not Bellevue Washington		\$45	21%
Over All Average, Excluding Bellevue Washington			25%

¹ Parking vacancy would be higher! ² Not used, since transit & walk/bike facilities also improved.

Dividend-Account Parking

Money Flow Calculations

Simplifying Assumptions

1. All workers are at this location for 9 hours, each day they report to work (8 hours of work and 1 hour for lunch)
2. All workers work 8 AM to 5 PM
3. Evening hours are 5 PM to 9 PM
4. All workers that work on week-ends also work on week days, for a total of $7*9 = 63$ hours at the work location per week

Dividend-Account Parking

Money Flow Calculations

Notation Conventions	
Letters	Meaning
N	Number
DAP	Dividend Account Parking
VP	Value Priced
WE	Week End
WD	Week Day
WH	Work Hours, Meaning 8 AM to 5 PM
AH	After Hours, Meaning 5 PM to 9 PM

Dividend-Account Parking

Money Flow Calculations

Value Pricing Assumption: \$10 for 9 Hours

	Name	Computed Value	
	Price Per Minute	\$	0.0185
	Price Per Hour	\$	1.11
	1.8519	Cents Per Minute	
	\$ 1.11	Price Per Hour	

Dividend-Account Parking

Money Flow Calculations

Assumed Values, Used as Independent Variables

<u>Description</u>	<u>Name</u>	<u>Assumed</u>
Number of parking places	N_DAP	250
Number or employees	N_Emp	250
% employees that drive on week day & week end	%Drive	80
Value-price per 9 hours day (8 hours work + lunch)	VP_9Hrs	\$ 10.00
% employees that work on Sat. and on Sun.	%WE	20
Percent Parking Not Used by Workers, That is Used by Non-Workers		
Week Day, Work Hours	%NonWrkWDWH	50
Week Day, After Hours (5 to 9)	%NonWrkWDAH	30
Week End, Work Hours	%NonWrkWEWH	50
Week End, After Hours (5 to 9)	%NonWrkWEAH	30

Dividend-Account Parking

Money Flow Calculations

Computed values, Week Day & WE, for both 9 to 5 & Evening = 5-9. So this is per 7-day week.

Variable Descriptions to get Weekly Earnings and Weekly AddIns Required	Name	Computed Value
Number of employees that drive on a week day: $N_Emp * \%Drive / 100$	N_DrWD	200
Money for all employees on week day: $VP_9Hrs * N_DrWD$	\$_AIIE_WD	\$ 2,000.00
Number of employees that work on a week end: $N_Emp * \%WE / 100$	N_WrkWE	50.0
Number of employees that drive on a week end day: $N_WrkWE * \%Drive / 100$	N_DrWE	40
Money collected for all employees on week end day: $VP_9Hrs * N_DrWE$	\$_AllWE	\$ 400.00
Money per Week, for employees from WE and WDs: $5 * \$AIIE_WD + 2 * \$_AllWE$	\$_AIIE	\$ 10,800.00
Total Hours at location per week: $N_Emp * 9 * 5 + N_Emp * \%WE / 100 * 9 * 2$	HrsPerWeek	12150
Weekly earnings for employee at location 45 hours: $\$_AIIE * 45 / HrsPerWeek$	PerWeek45	\$ 40.00
Per Week AddIn for Employee at location 45 Hours per week = $5 * 10 - PerWeek45$	AddIn45	\$ 10.00
Weekly earnings for employee at location 63 hours: $\$_AIIE * 63 / HrsPerWeek$	PerWeek63	\$ 56.00
Per Week AddIn for Employee at location 63 Hours per week = $7 * 10 - PerWeek63$	AddIn63	\$ 14.00
The next 4 lines compute the weekly money generated by spaces not used by workers, Week Day Work Hours (8 to 5)		
Spaces available for non-workers, Work Day, Work Hours: $N_DAP - N_DrM-F$	S_4NW_WDWH	50
Spaces, NotWorkers, WorkDay WorkHrs: $S_4NW_WDWH * \%NonWrkWDWH / 100$	SNW_WDWH	25
Money from spaces not used by workers Per Day: $SNW_WDWH * VP_9Hrs$	\$NW_WDWH	\$ 250.00
Weekly \$, from spaces not used by workers, WD, WorkHrs: $5 * \$NW_WDWH$	W\$NW_WDWH	\$ 1,250.00

Dividend-Account Parking

Money Flow Calculations

Continued			
The next 4 lines compute the weekly money generated by spaces not used by workers Week Day After Hours (5 to 9)			
Spaces available for non-workers, Work Day, 5 to 9 or After Hours:	N_DAP	S_4NW_WDAH	250
Spaces, NotWorkers, WorkDayAfterHours:	$S_4NW_WDAH * \%NonWrkWDAH / 100$	SNW_WDAH	75
\$ from spaces not used by workers, WeekDayAfterHrs:	$4/9 * VP_9Hrs * SNW_WDAH$	\$NW_WDAH	\$ 333.33
Weekly \$, spaces not used by workers, WeekDayAfterHours:	$5 * \$NW_WDAH$	W\$NW_WDAH	\$ 1,666.67
The next 4 lines compute the weekly money generated by spaces not used by workers Week End Work Hours (8 to 5)			
Spaces available for non-workers, Week End Work Hours:	$N_DAP - N_DrWE$	S_4NW_WEWH	210
Spaces, NotWorkers, WeekEnd WorkHrs:	$S_4NW_WEWH * \%NonWrkWEWH / 100$	SNW_WEWH	105
\$ from spaces not used by workers Per Week-End Day:	$SNW_WEWH * VP_9Hrs$	\$NW_WEWH	\$ 1,050.00
Weekly \$, from spaces not used by workers, WE, WorkHrs:	$2 * \$NW_WEWH$	W\$NW_WEWH	\$ 2,100.00
The next 4 lines compute the weekly money raised by spaces not used by workers Week End After Hours (5 to 9)			
Spaces available for non-workers, Week End, 5 to 9 or After Hours:	N_DAP	S_4NW_WDAH	250
Spaces, NotWorkers, WorkDayAfterHours:	$S_4NW_WDAH * \%NonWrkWDAH / 100$	SNW_WDAH	75
Money from spaces not used by workers:	$4/9 * SNW_WDAH * VP_9Hrs$	\$NW_WDAH	\$ 333.33
Weekly \$, spaces not used by workers, WeekDayAfterHours:	$2 * \$NW_WDAH$	W\$NW_WDAH	\$ 666.67

Dividend-Account Parking

Money Flow Calculations

Calculation of the Totals			
<u>Variable and Variable Calculation Description</u>	<u>Name</u>	<u>Computed Value</u>	
Weekly Money Earned by the spaces not taken by workers:			
Weekly \$: $W\$NW_WDWH + W\$NW_WDAH +$ $W\$NW_WEWH + W\NW_WEAH	W\$NW	\$ 5,683.33	
Weekly Money required to pay all of the AddIn Amounts:			
Weekly \$, AddIn per week: $N_DrWD * AddIn45 +$ $N_DrWE * AddIn63$	AddInPerWeek	\$ 2,560.00	
Weekly Money Left Over After Paying Add Ins:			
Weekly \$ After Paying Add Ins from \$ from non-workers: $W\$NW - AddInPerWeek$	\$PerWeek	\$ 3,123.33	
Yearly \$ After Paying Add Ins from \$ from non-workers: $52 * \$PerWeek$	\$PerYear	\$162,413	

Dividend-Account Parking

Money Flow Calculations

3 Cases of Dividend-Account Parking						Baseline	Worse	Better
Oceanside Civic Center Garage								
% employees that drive on week day & week end						80%	85%	75%
% employees that work on Sat. and on Sun.						20%	25%	15%
% Parking Not Used by Workers, That is Used by Non-Workers								
				Week Day, Work Hours	50%	45%	55%	
				Week Day, After Hours (5 to 9)	30%	25%	35%	
				Week End, Work Hours	50%	45%	55%	
				Week End, After Hours (5 to 9)	30%	25%	35%	
Yearly Amount Left Over After Paying Add-Ins						\$ 162,413	\$ 125,242	\$ 210,374

Back up Slides

Measures to Get 32%

Estimated
Reduction

- Predictions, Regional Transportation Plans 10%
- Stop expanding most roads and all freeways 2%
 - No need, Eliminate congestion with less driving
- Reallocate freeway-expansion \$\$\$ to **transit** 2%
- **Payment methods, to increase fairness & choice**
 - Demonstration projects: Dividend-Account Parking
 - **Legislation**
 - Replace Bundled-Cost or Bundled-Benefit Parking 8%
 - Equitable and environmentally-sound road-use fees 8%
- **Smarter growth, complete streets, bike classes** 2%

32%

Climate Literacy

THEREFORE BE IT RESOLVED, that the California Democratic Party reinforces the need for all high school students to know, before they graduate, and elected officials to know, acknowledge, and address, as soon as possible, (1) both the existence of and the reason for anthropogenic climate change; (2) its potential for harm; (3) the difference between stabilizing the climate at a livable level and destabilization; (4) science-based, climate-stabilizing, GHG reduction targets; (5) the primary variables and considerations in identifying those targets and (6) the approximate amount of life style and technology change required to achieve those climate-stabilizing targets.

XXX Implementation Example

The City could have the vendor operate the system, for the first 10 years. Over those years, the vendor would be motivated to debug the system and continue to look for operational efficiencies. The vendor could receive 10% of the revenue, for the first 5 years; 5% of the revenue, for the next 3 years; and 2%, for the final 2 years. If 600 cars are parked for 8 hours, 200 days per year, at 50 cents per hour, then the yearly revenue would be \$480,000. The vendor would collect \$240,000 over the first 5 years, \$72,000 over the next 3 years, and \$28,800 over the last two years.

How Bad Could It Get?

Governor Brown to the Pope:

Humanity must

***Reverse
Course****

or

***Face
Extinction***

**** Must be quantified***

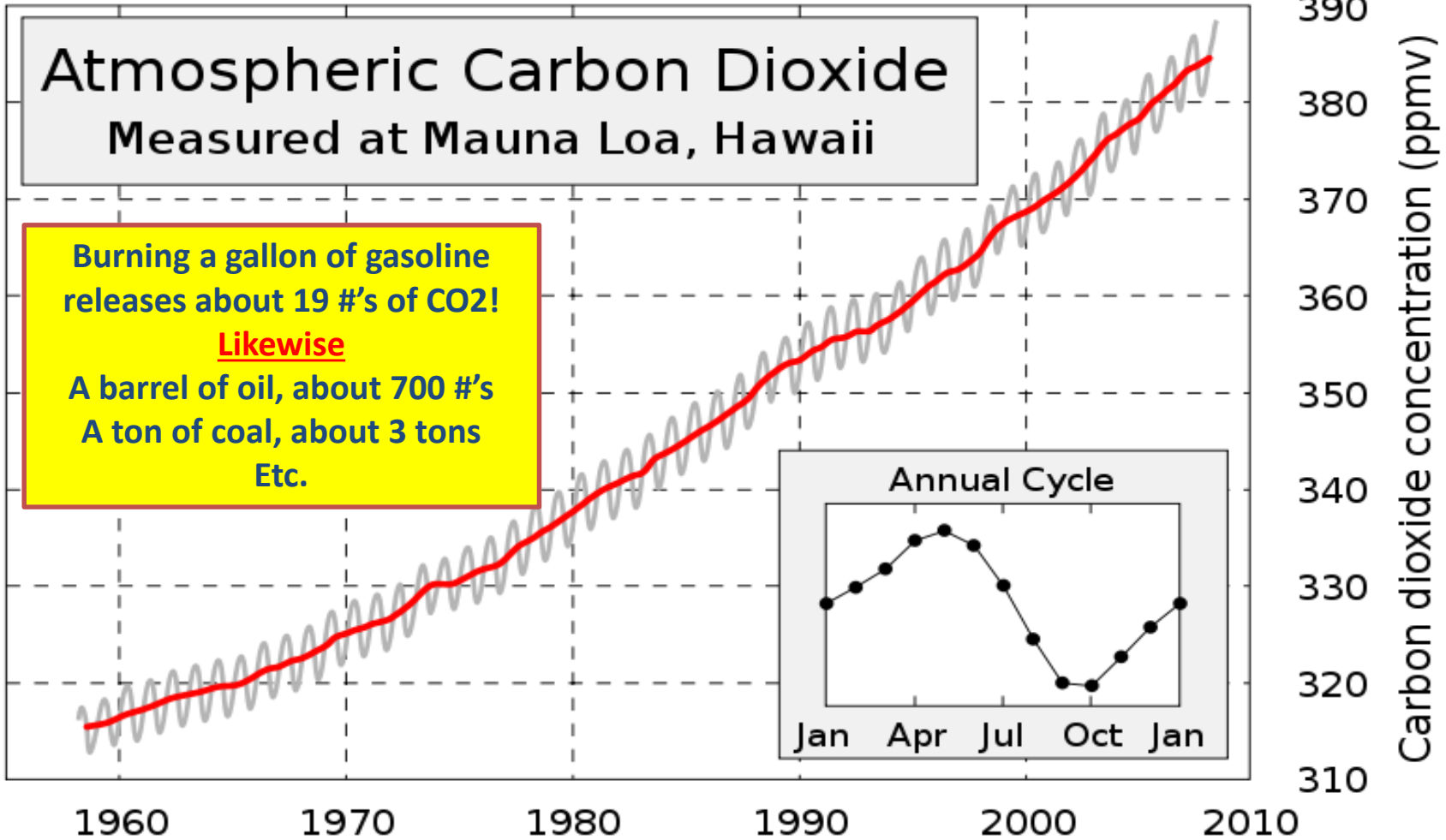
Climate Data

Currently
400 PPM!



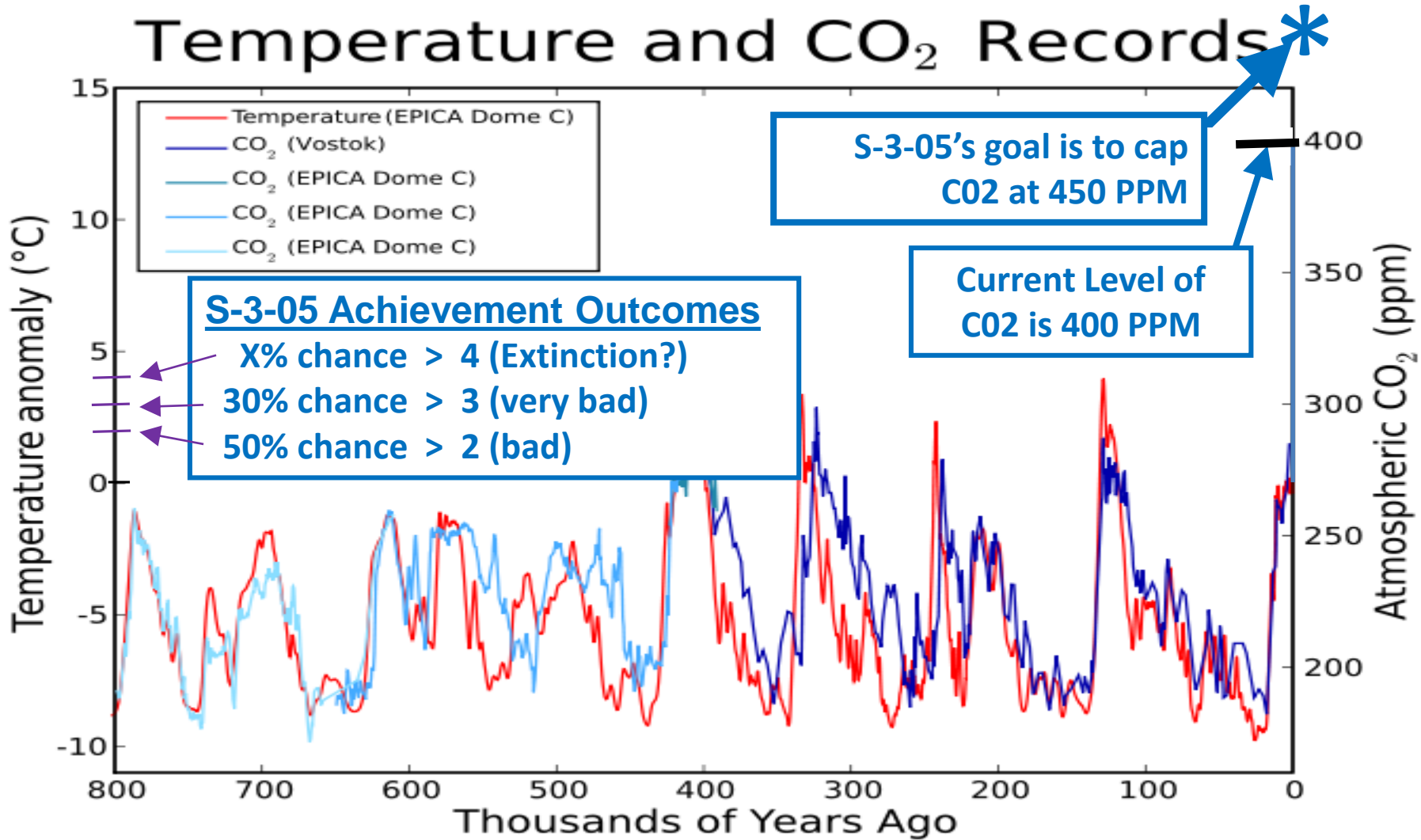
- Keeling Curve:

http://en.wikipedia.org/wiki/An_Inconvenient_Truth#Scientific_basis



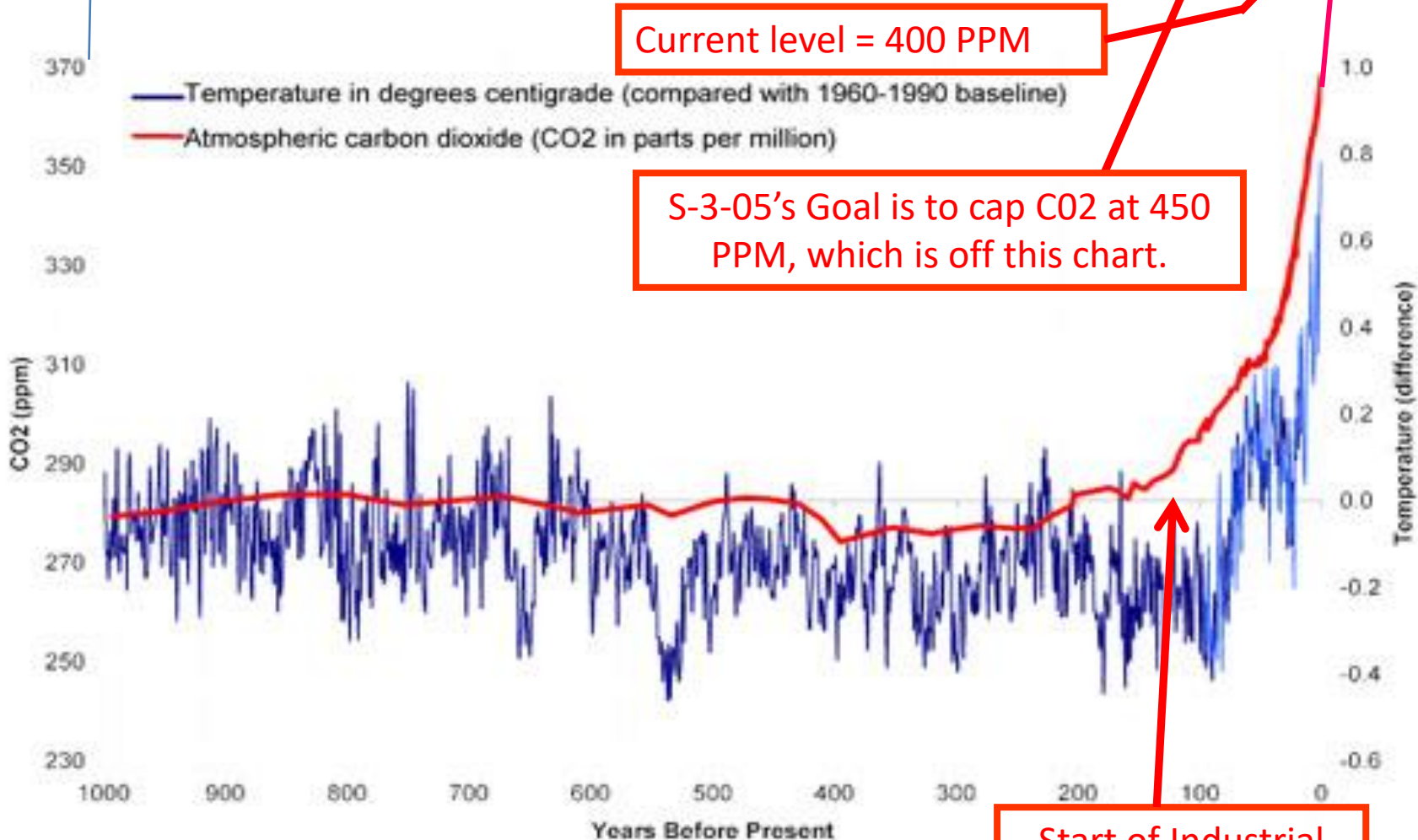
Our Climate Crisis

- From: http://en.wikipedia.org/wiki/An_Inconvenient_Truth#Scientific_basis



Our Climate Crisis

- Earth & Space Research (ESR) website:
http://www.esr.org/outreach/climate_change/mans_impact/man1.html



Fixing the Problem

We must *stabilize* the value of the earth's atmospheric $CO2_e$

$CO2_e$ Emissions

E_N

Natural: rotting, fire, digestion, respiration

+

E_A

Anthropogenic: combustion of fossil fuel, methane, other

+

E_{WFB}

Warming Feed Back: such as methane from melting permafrost

The **Warming Feed Back** term is the wild card. It must not become dominant.

Sequestration (Photosynthesis)

$>$ → Positive Slope

$=$ → Zero Slope

$<$ → Negative Slope

S

Growth of plants on Earth

If **Anthropogenic emissions** were to be sufficiently low (80% below 1990 levels has been allocated to developed countries), the slope would be zero, thus **capping** the value of the Earth's atmospheric $CO2_e$

Motivation for Change

- Fairness to individuals
 - Costs no longer hidden
 - Costs avoided or recovered, by not using parking
- Less driving, to reduce environmental harm
 - Motivates choosing alternative modes
 - Less driving to find parking
- Cost Effective Development
 - Less parking needed reduces land and building costs

Goals, 1 of 2

- One agency operates all parking
- Nearly all parking is shared
- Parking costs are effectively unbundled
 - From wages and rents
 - From costs of goods and services
- No change to how parking gets built
 - Generally, municipalities require & developers build

Goals, 2 of 2

- Priced right
 - Value Priced: Base price derived from costs
 - Driver demand determines a congestion price
- No need to search for parking
 - Directions to parking that meets user's needs
 - Accurate price predictions
- Each parking space's use is archived
 - Supports informed decisions
- Privacy and the needs of the disabled are supported

Definitions and Methods, 1 of 6

- Definition & Examples of ***Parking Beneficiary Group***
 - Owners
 - Private investors or governments operating public parking
 - Those losing money due to provided parking
 - Employees
 - Apartment renters or condominium owners
 - Hotel or restaurant patrons
 - Shoppers
 - Those offered specific parking
 - Driving-age students at a school with parking
 - Driving-age train riders using a station with parking

Definitions and Methods 2 of 6

- How to Effectively Unbundle the Cost or the Benefit
 - Price charged per minute
 - Base price rate established to cover all costs
 - Congestion price rate
 - Dynamically set as a function of occupancy rate
 - Charge is time average, if rate changes, while car is parked
 - Parking generally available to all drivers
 - Earnings distributed to members of Beneficiary Group
 - Calculation of individual's earnings depends on situation

Definitions and Methods, 3 of 6

- Calculation of monthly earnings
 - If parking is provided for several groups, each group's portion of the earnings is proportional to its original contribution to cost (Mixed use case)
 - Each beneficiary group's total is divided up among its members
 - Condominium owners: proportional to spaces effectively purchased
 - Renters: proportional to spaces effectively renting
 - Shoppers: proportional to money spent
 - Employees or students of driving age: proportional to time spent at work or school
 - Train riders of driving age: proportional to time spent on round trips

Definitions and Methods, 4 of 6

- For congestion pricing, *define Cluster of Parking*
 - 20 to 40 contiguous spaces nearly equal in desirability
 - Assigned the same price
- Pricing
 - Base price
 - Covers all costs $r_{BaselineHourly} = \frac{(r_{Investment} \times v_{Parking}) + c_{YOPD}}{(n_{HoursPerYear} \times f_{TO})}$
 - Report's Page 13 & 14 provides details
 - Congestion price, for each cluster

$$r_{HourlyRate} = r_{BaselineHourly} \times (B^{(30-V)/5}), \text{ for } V < 30; r_{BaselineHourly}, \text{ otherwise}$$

- B is nominally 2; adjusted to keep vacancy above 15%
- V is the vacancy % rate (Report's Eq. 2, Table 2, Pages 14 & 15)

Definitions and Methods, 5 of 6

- Pricing predictions
 - For any set of dates, start times, durations, and destinations
 - Availability of predictions
 - Broadcast into navigational units
 - Website or phone
- Help to find desired parking
 - Driver gives times and locations and stipulates . . .
 - Max price, to get space at minimum walk distance
 - Max walk distance, to get space at minimum price
 - Voice-activated navigational system for ease and safety

Definitions and Methods, 6 of 6

- Monthly statements
 - All parking charges and earnings
 - First, within state
 - Then, within nation
 - Finally, within North and South America
 - Customer selects presentation detail
 - Less detail for ease and more privacy
 - More detail to know and adjust parking decisions
 - Packaged with other statements
 - All utilities, transit use, road use

Implementation Plan, 1 of 3

- Prototype design
 - Most likely a Climate Action Plan Mitigation Measure
- Requirements document to support request for proposal (RFP)
- Winning proposal leads to design
 - Hardware selection and design
 - Software generation
- Prototype installation
 - Most likely a Climate Action Plan Mitigation Measure
 - Debug
 - Adjustments to satisfy stakeholders

Implementation Plan, 2 of 3

- Government agency develops and executes full installation strategy
 - To minimize impact on institutions
 - To maximize early success and driving reductions
 - Large employment centers with “free” parking
 - Train stations with large, “free” parking lots
 - Supported by new law that requires cooperation but very little effort, from . . .
 - Private and public institutions
 - Individuals

Implementation Plan, 3 of 3

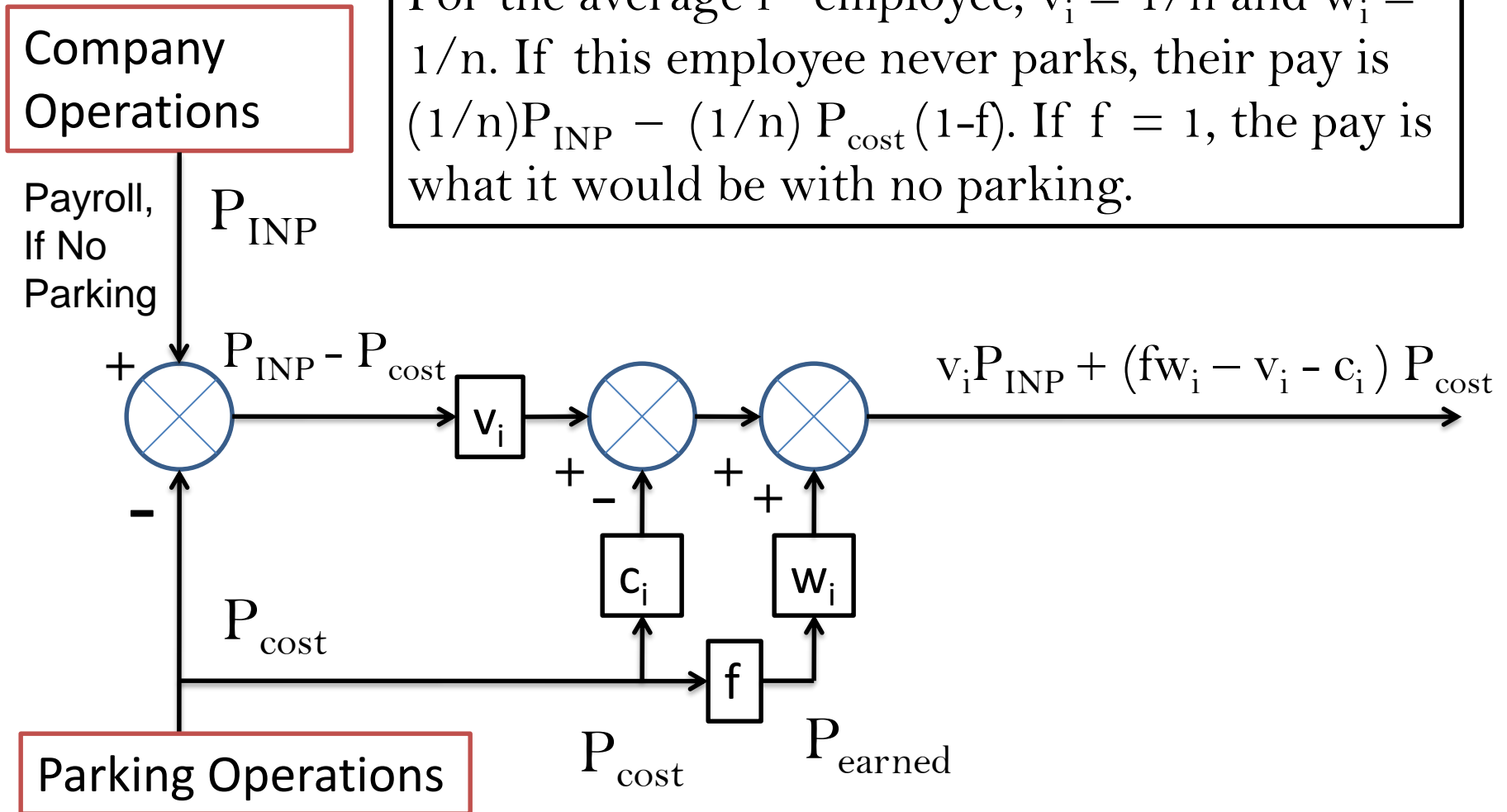
- Basis for a new law supporting installations
 - To provide equal protection of the law
 - Government has required parking for 50 years
 - Those driving less than average often lose money
 - Prototype will have demonstrated feasibility
 - Global warming considerations show subsidized parking to be a public nuisance
 - Global warming will likely cause a human catastrophe
 - Short term strategies are critical
 - Electric cars and getting most electricity from renewables will take decades
 - Properly pricing parking is relatively cheap and quick (5 years)

Unbundle Flow Diagram Definitions

Variable	Definition
P_{INP}	Company payroll if there were no parking costs
P_{cost}	Total parking cost. Price will be sized to recover this.
P_{earned}	Parking earnings equals parking cost minus collection cost
V_i	Employee value. Fraction of available pay. For the average employee, $1/n$
C_i	Fraction of parking cost paid. Zero, if the employee never parks.
f	Parking earnings divided by parking cost. Close to 1 for efficient collection
W_i	time worked divided by total time worked of all employees. If average, this is $1/n$.

Unbundle Flow Diagram

For the average i^{th} employee, $v_i = 1/n$ and $w_i = 1/n$. If this employee never parks, their pay is $(1/n)P_{\text{INP}} - (1/n)P_{\text{cost}}(1-f)$. If $f = 1$, the pay is what it would be with no parking.



Mike Bullock, 1 of 2

- Personal
 - Married, two daughters, 3 grand daughters, 1 grandson
 - Daughter Laura Bullock White (Berkeley)
 - Heidi Bullock (Oceanside)
 - Moved from Cupertino to Oceanside in April 2007
 - Oceanside home (1800 Bayberry Dr) and 4-plex (506 N. Ditmar)
 - Swims with and competes for Oceanside Swim Masters
- Education
 - BSEE, Lamar University
 - MSE, University of Texas at El Paso
- Professional
 - Lockheed Martin Systems Engineer, 1971 to 2007
 - Last 2 years, Space Based Infrared System (SBIRS, satellite to detect and track missiles)
 - 10 Years previous: Milstar (communication satellite)
 - Verification of antenna pointing accuracy
 - Antenna pointing calibration

Mike Bullock, 2 of 2

- Most Recent Activities
 - California Democratic Party
 - Delegate, 76TH AD
 - Elected member of the San Diego County Central Committee
 - CDP Resolutions and Platform