

“Let’s Get Rollin” Atlantic County

Systems adoption of E-School Buses

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SAVEs

Bus electrification process



Renewable Energy Integrated Vehicle 2 Grid

H.S. 2019 GREENHOUSE GAS EMISSIONS (GHGe) reduction plan

2030 Goals Reduce GHGe 80% Reduce transportation pollution 100%

First Steps Measure 2019 baseline GHGe
Set GHGe reduction milestones and reduction measures

GHGe inventory

Building energy GHGe from fuel consumption **2,576 tons**

Employee commute GHGe from gasoline consumption 160 tons

Student commute GHGe from gasoline consumption 552 tons

School Bus **GHGe from diesel consumption 2,100 tons**

Solid waste Methane from the waste generated by staff and students

Wastewater GHGe from electricity consumed during treatment,

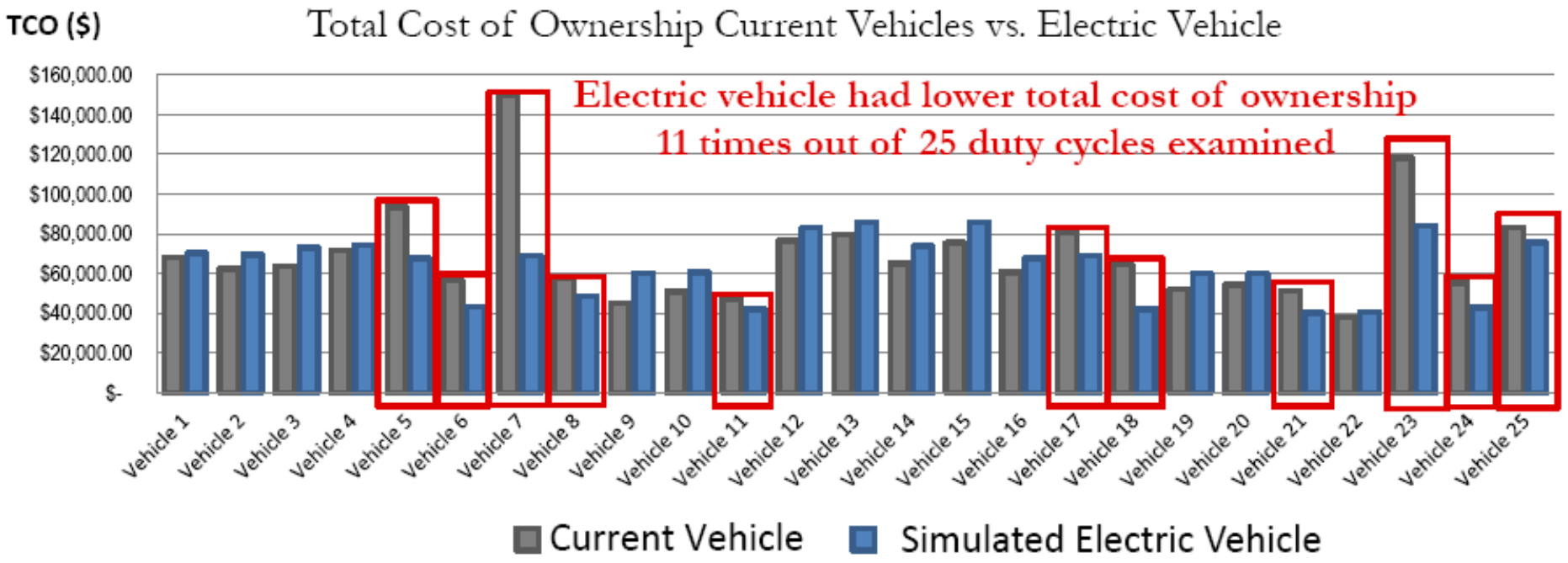
Water consumption GHGe from the energy used to distribute & treat water

Suitability Analysis for Vehicle and Energy systems - SAVEs

Process

1. Baseline fleet –**e**conomic, **e**nergy & **e**missions metrics
2. Set renewable energy milestones
3. Simulate routes, adopt EVs when predicted **TCO is lower**
4. Systemized procurement of EV, EVSE, Renewable Energy
5. Manage renewable energy EV charging
6. Verify EV economic, energy & emission savings
7. Achieve economic and energy milestones
8. Scale EV, EV charger, infrastructure adoption
9. Attain fleet economic and energy goals

SAVEs - Suitability Analysis for Vehicles and Energy system



Financial Savings: **16%** $233,559

Fuel Reductions: **64%** 45,346 gallons

GHG Emissions Reductions: **67%** 523 tons CO_2

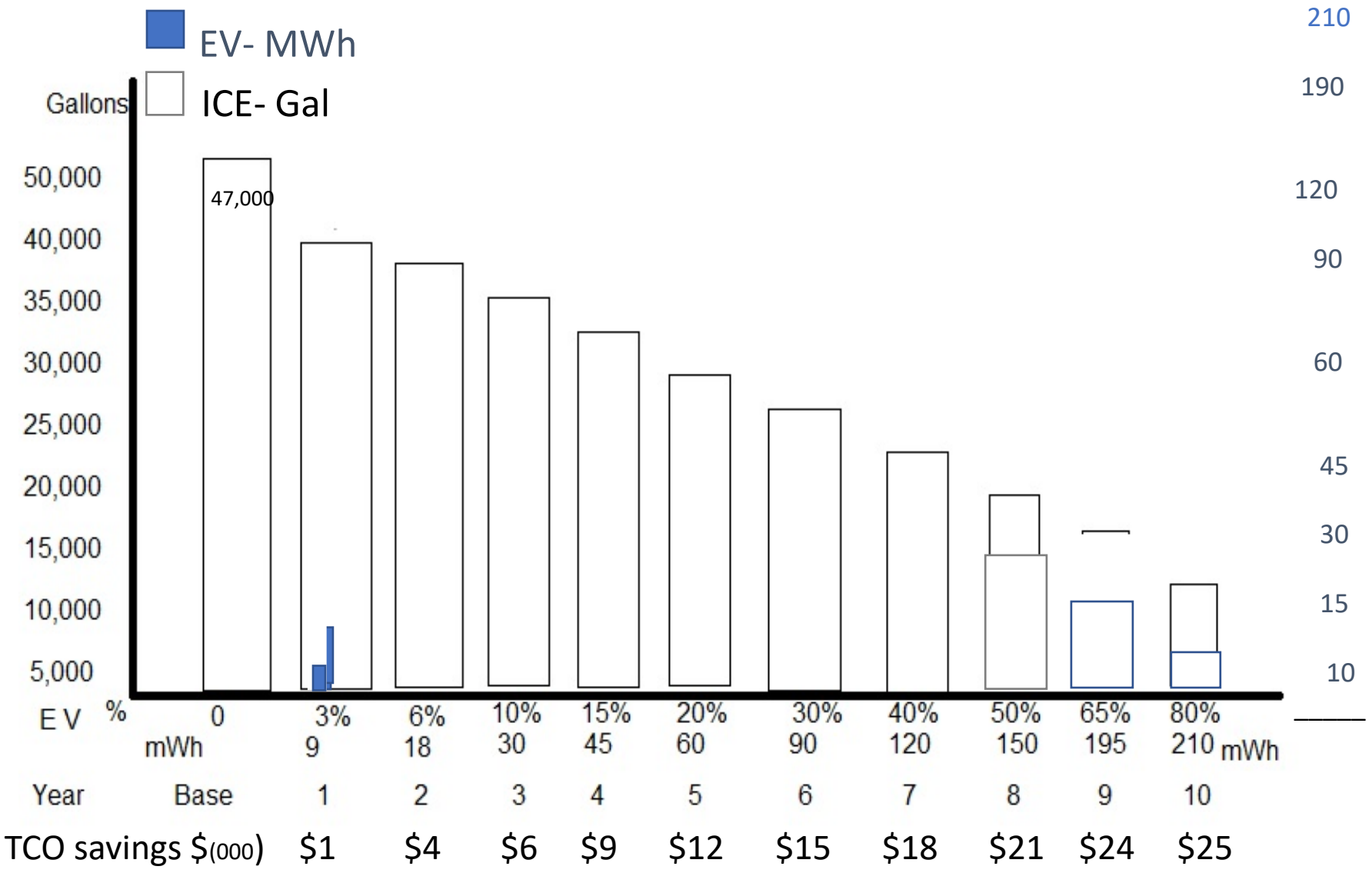
Duty cycles suitable for EV:

44%

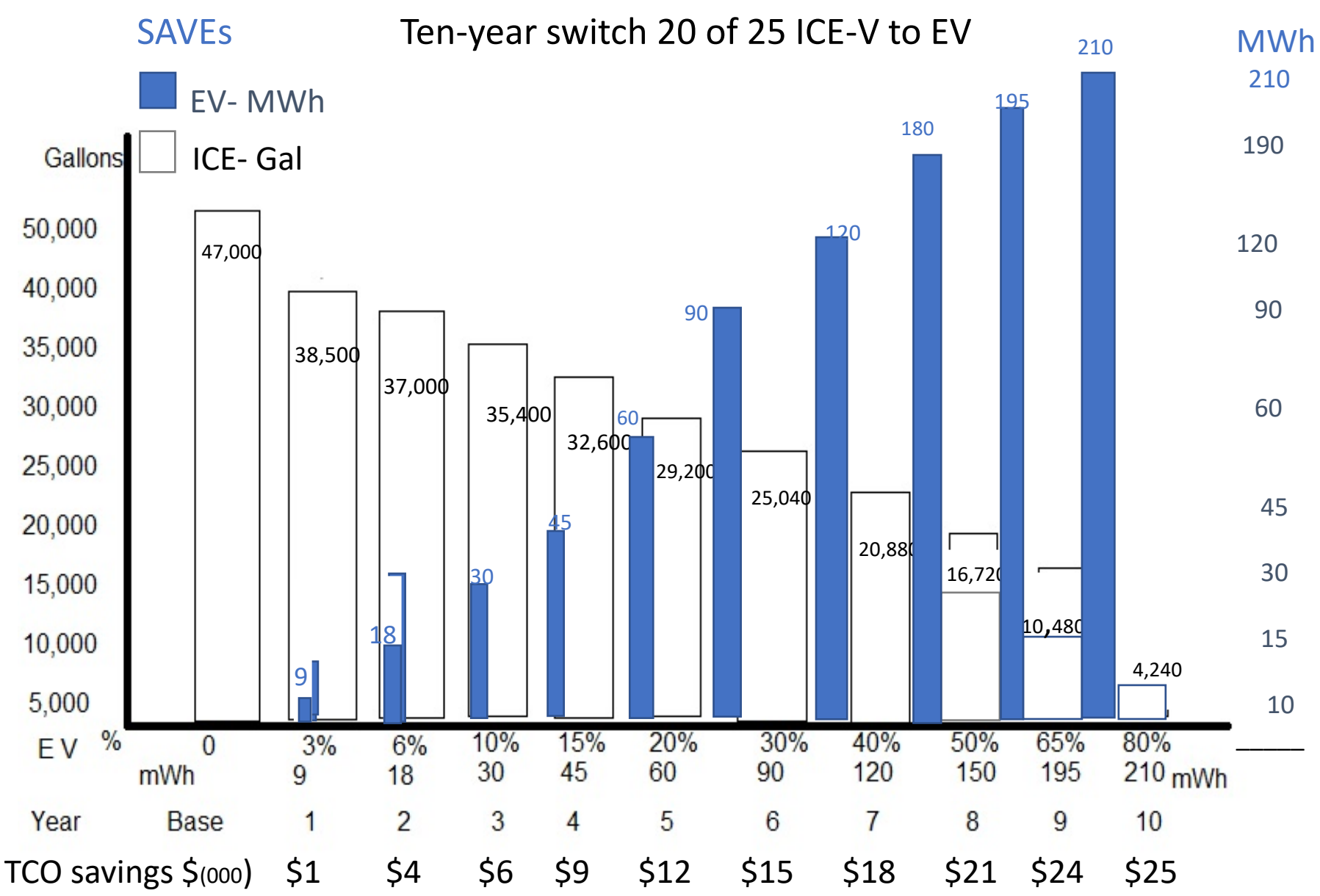
Avg. savings/vehicle assessed:

$9,342

Ten-year switch 20 of 25 ICE-V to EV



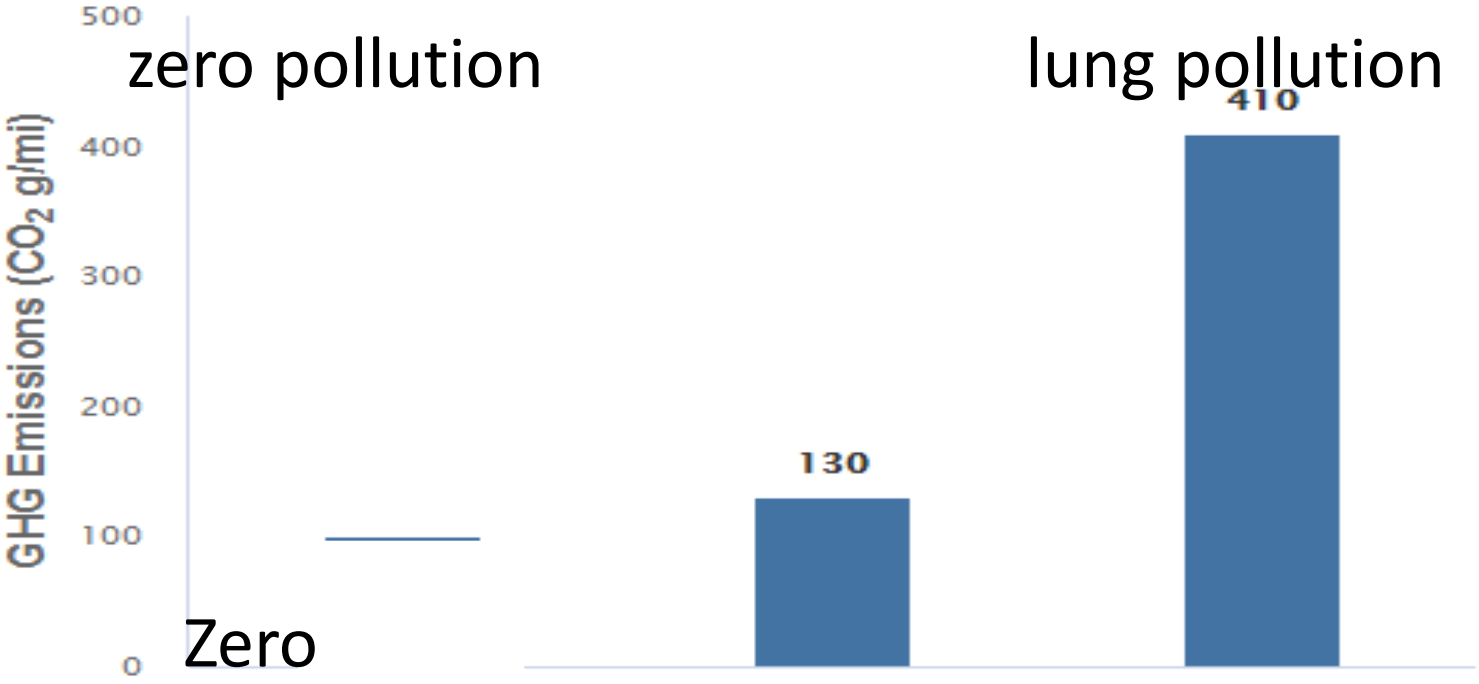
EV Ten-year TCO savings $135,000



EV Ten-year TCO savings $135,000

E Bus
zero pollution

Diesel bus
lung pollution



Zero

E Bus with Renewable energy

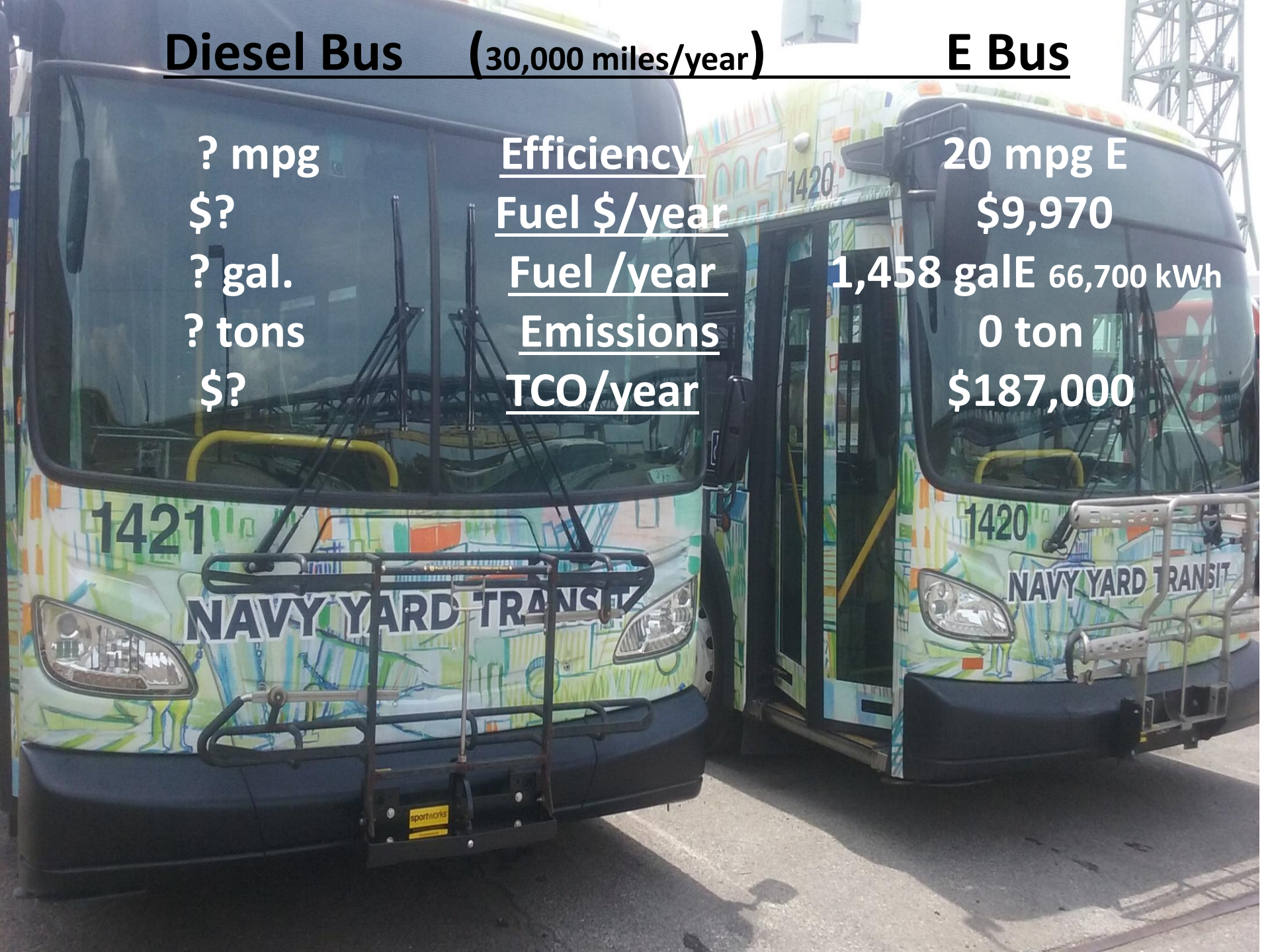
E Bus with grid energy

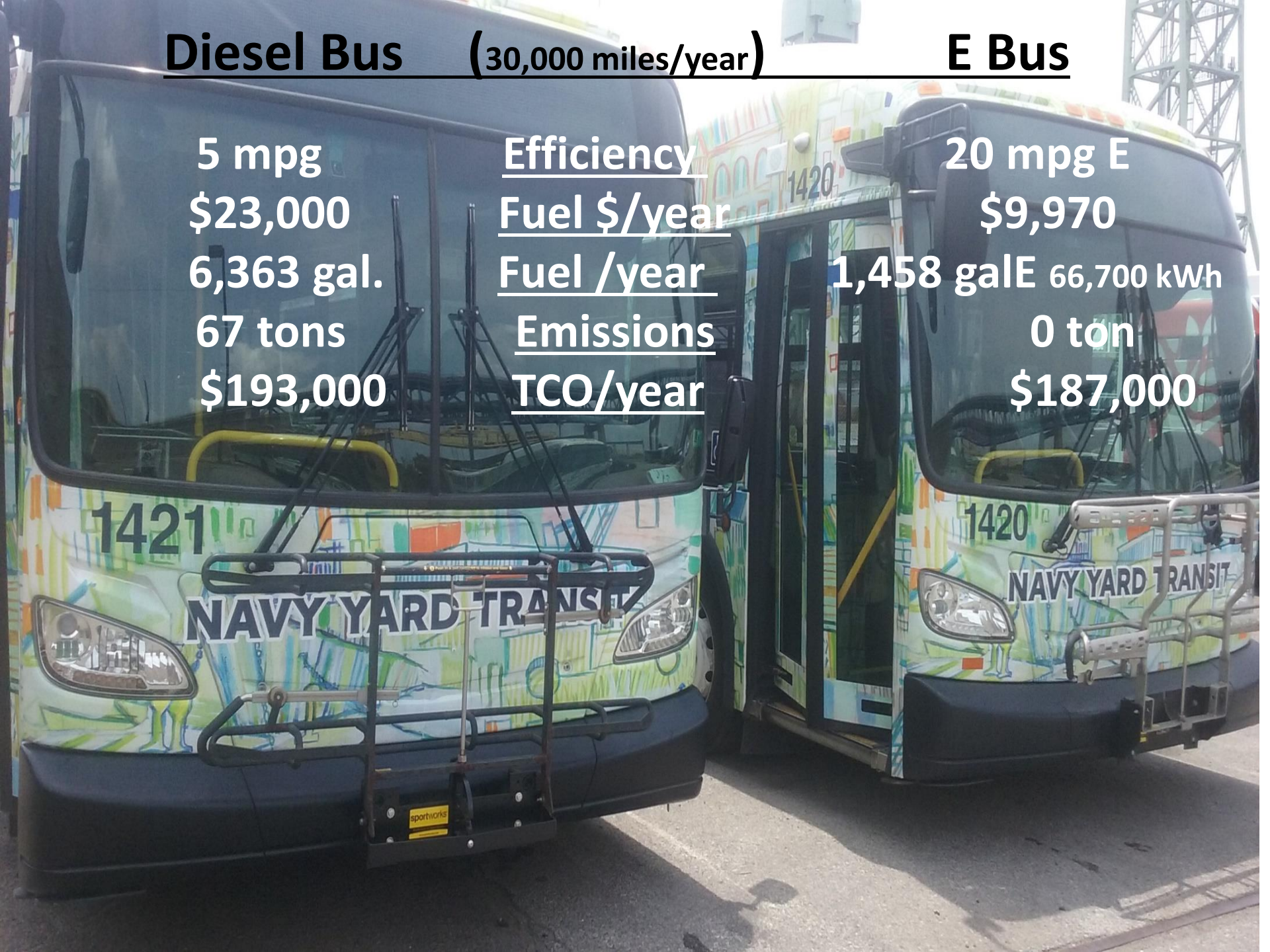
Diesel bus

Zero emissions with Solar 'fuel'

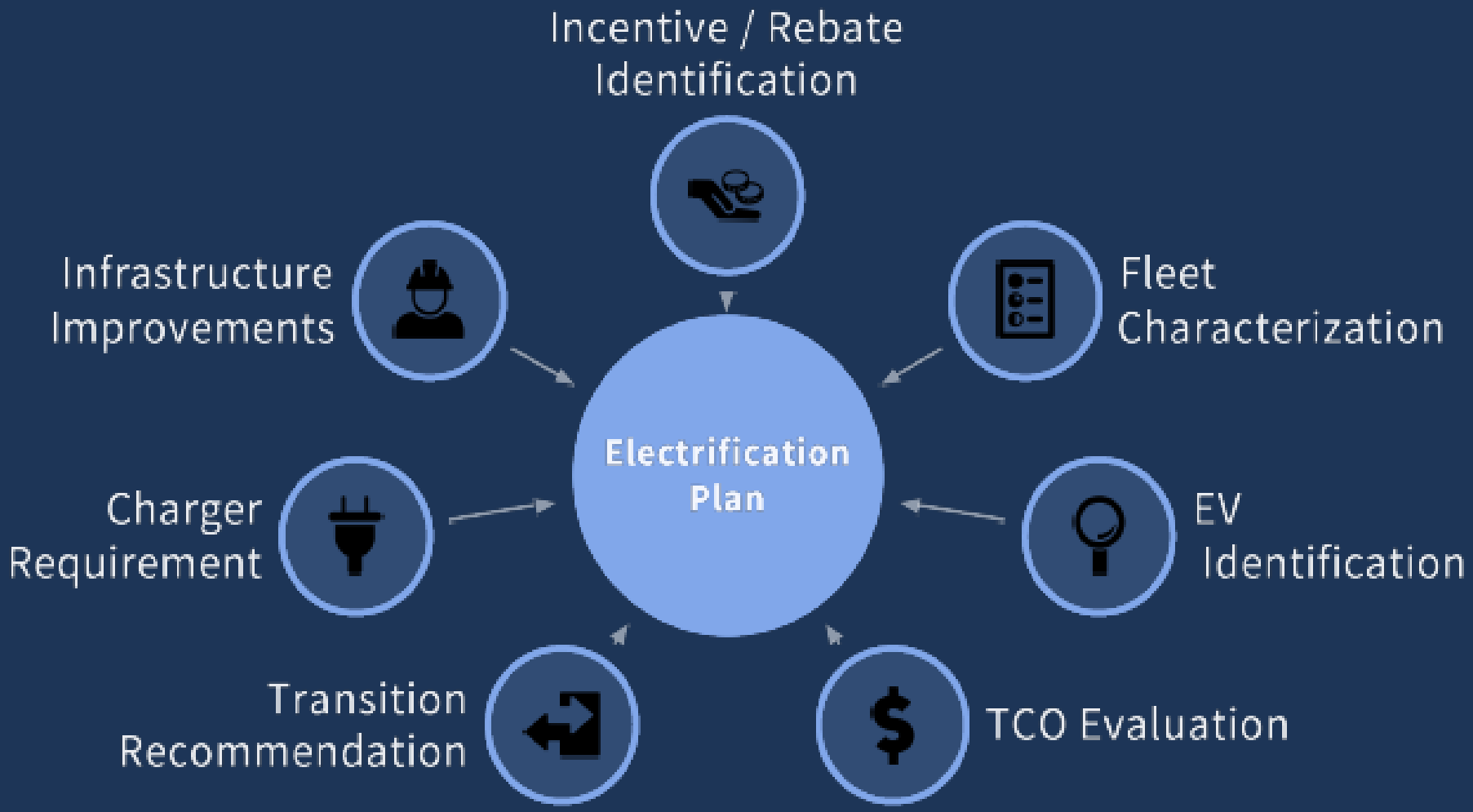
130 g/mi
This Car's Total Emissions with the Average US Electricity Mix

410 g/mi
Average New Gasoline Vehicle's Total Emissions


Diesel Bus (30,000 miles/year) E Bus
? mpg
Efficiency
20 mpg E
$?
Fuel $/year
$9,970
? gal.
Fuel /year
1,458 galE 66,700 kWh
? tons
Emissions
0 ton
$?
TCO/year
$187,000
1421
NAVY YARD TRANSIT
1420
1420
NAVY YARD TRANSIT


Diesel Bus (30,000 miles/year) E Bus
5 mpg
Efficiency
20 mpg E
$23,000
Fuel $/year
$9,970
6,363 gal.
Fuel /year
1,458 galE 66,700 kWh
67 tons
Emissions
0 ton
$193,000
TCO/year
$187,000
1421
NAVY YARD TRANSIT
1420
1420
NAVY YARD TRANSIT

Suitability Analysis for Vehicle & Energy systems (SAVEs)



E School Bus as a Service

One agreement covers

Planning and design

E Buses

Charging infrastructure

Grid interconnection

Managed charging

Renewable energy

Grid/Utility programs

Maintenance

Inspections

Repair

E Bus replacement

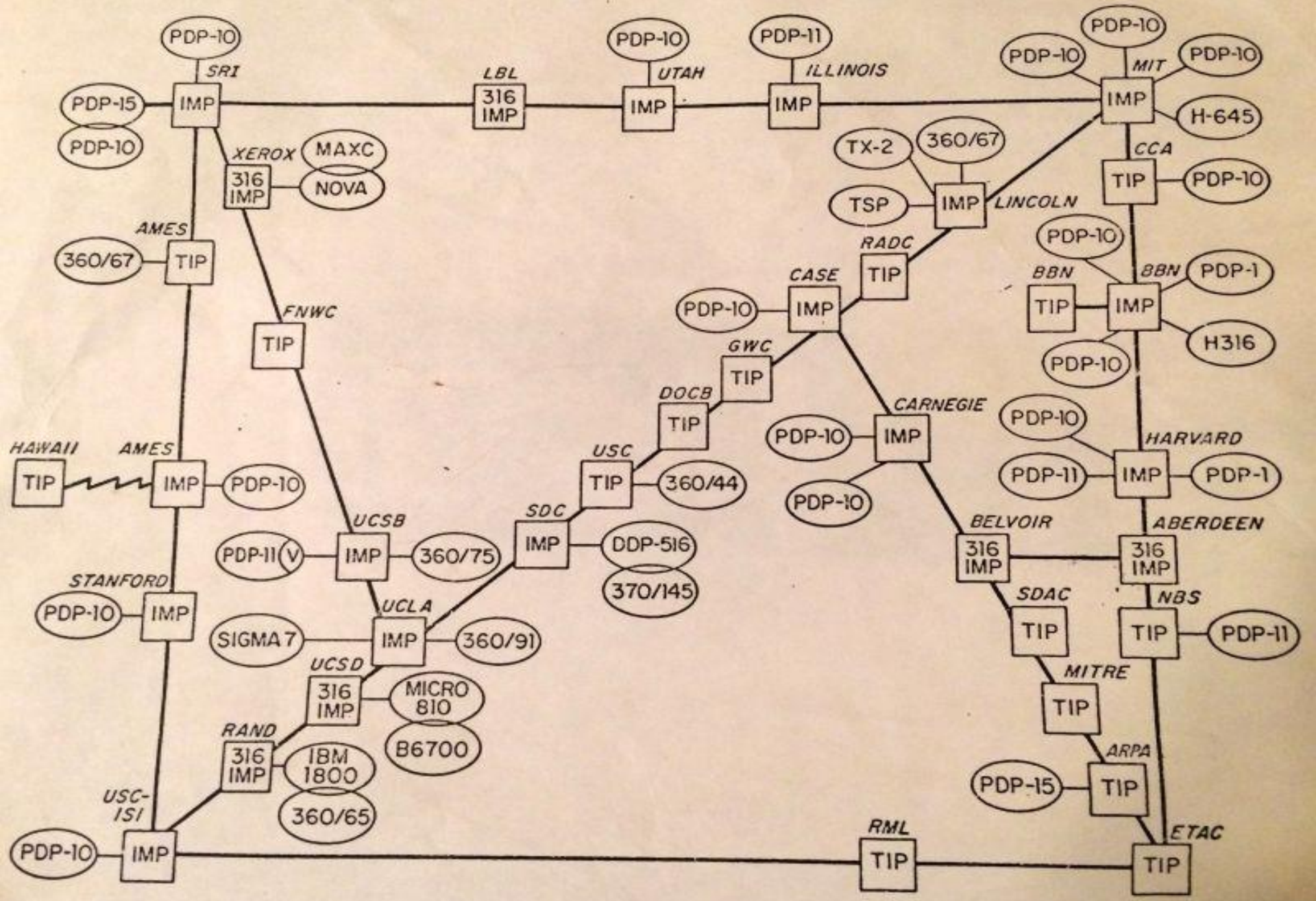
Measurement and verification of results



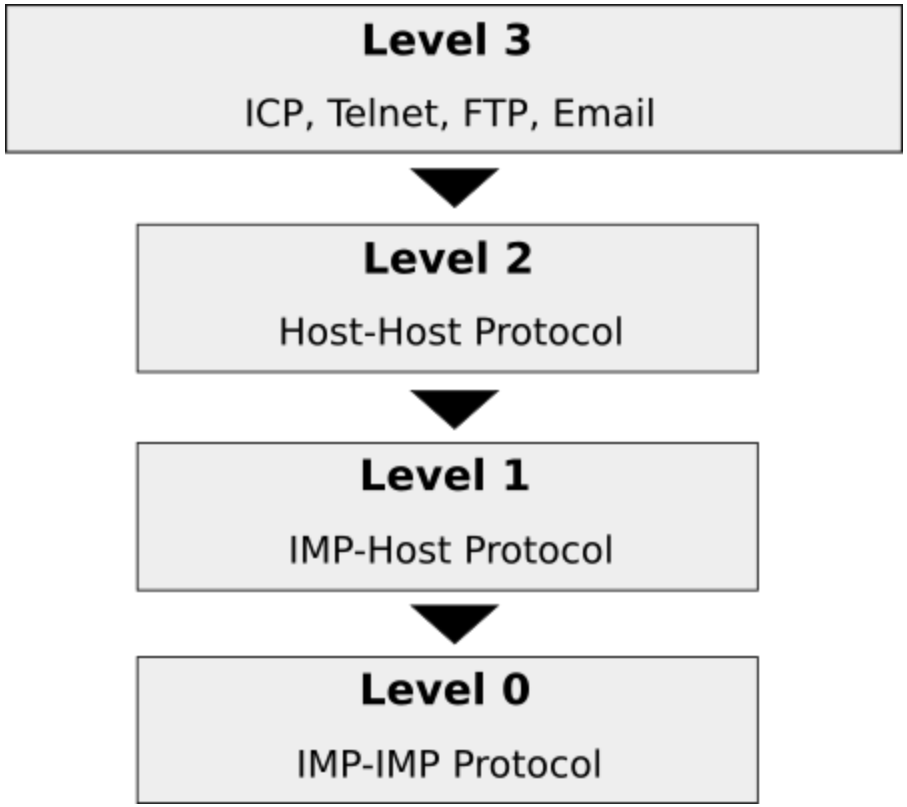
Renewable Energy Integrated Vehicle 2 Grid

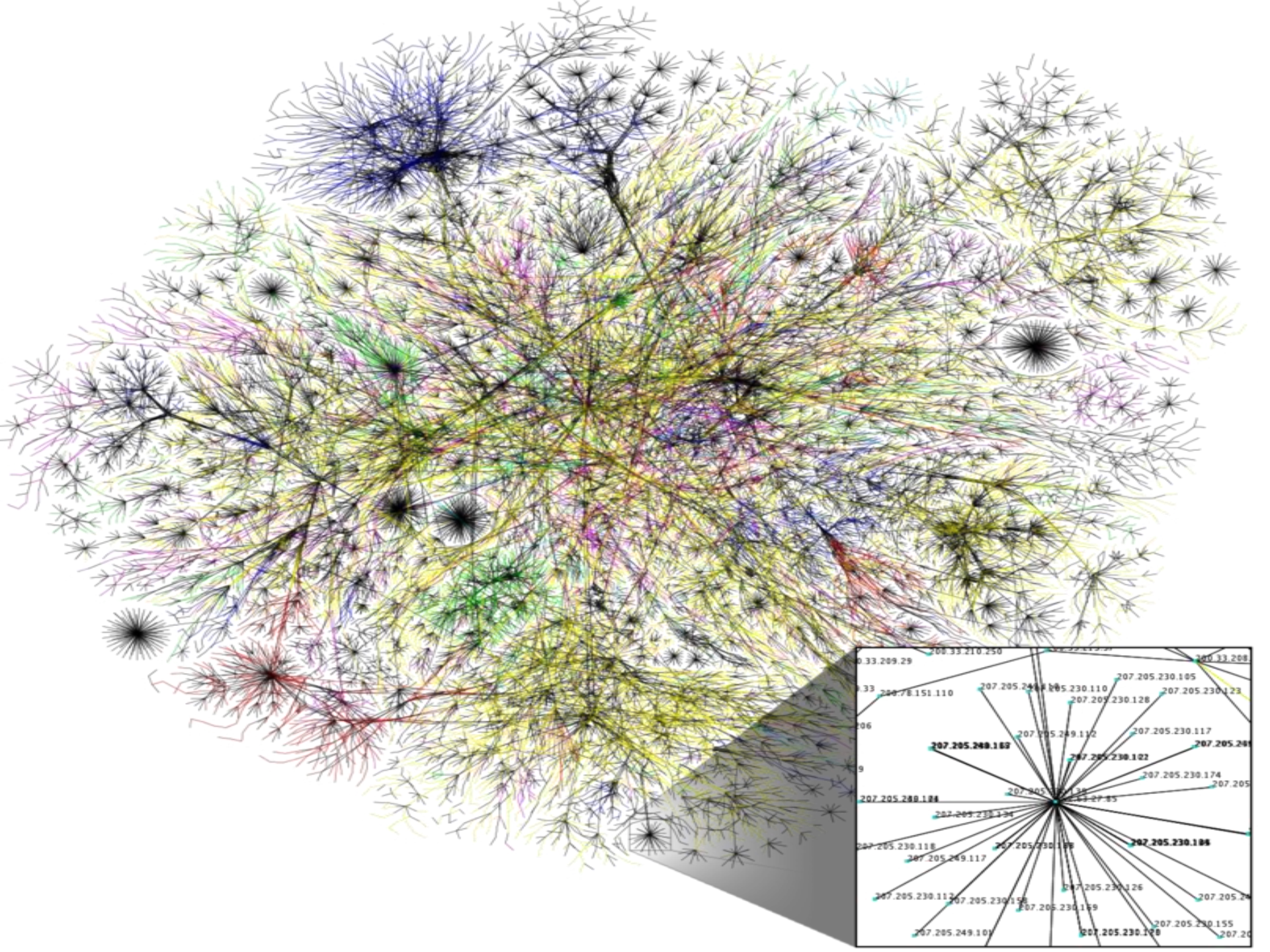
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ARPA NETWORK, LOGICAL MAP, MAY 1973

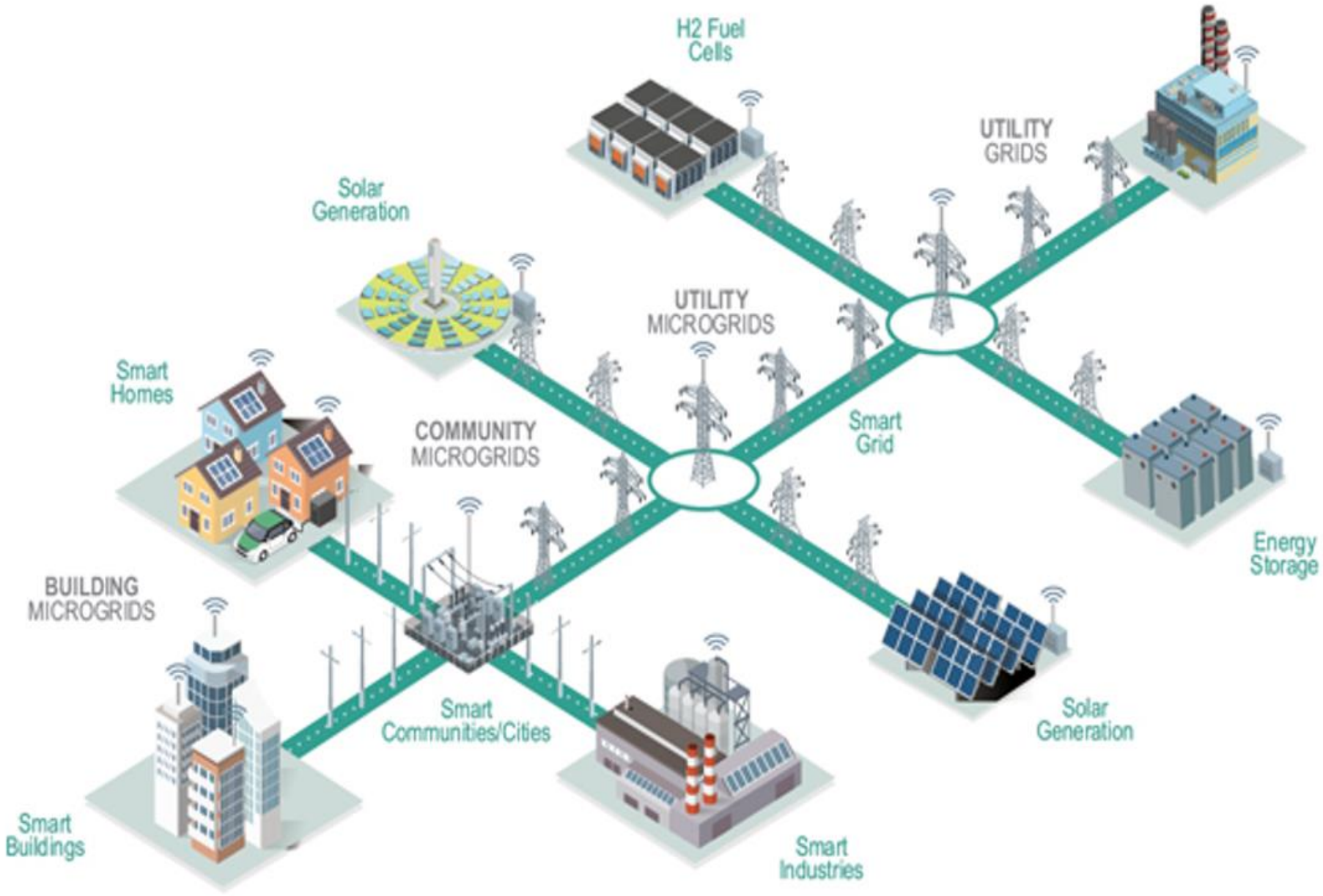


Out of ARPAnet came the Internet




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207.205.230.174
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207.205.249.101

The Grid of Grids





REIV2G Renewable Energy Integrated Vehicle 2 Grid

Contact REIV2G@gmail.com to discuss SAVEs for your fleet

S.E PA Chapter Head, US Department of Energy DRIVE Electric USA

REIV2G network managed charging of EVs from renewable energy

Integration of E Buses, EV chargers and shared EVs, Phila. Navy Yard

Member of Drive electric PA (DEPA) Electric Vehicle Coalition

EV and charging adoption education & outreach to municipal and corporate leaders.

Drive Electric Long Island committee member

Developed EV, EVSE integration plans for NYISO and PJM microgrids

Team building for NYSERDA municipal EVs submission

EV working group member for Sustainable Westchester NY

Campus strategic solar PV, EV grid integration

SAVEs suitability analysis, municipal/corporate EV integration. Solar to EVSE to grid modeling. Grant writing for renewables, EV, efficiency and grid integration projects.

2016-2018 PA. D.E.P. managed charging project in 5 PA counties

2014 to present EV, grid suitability analysis for large commercial REITs

2009 PA. municipal EV solar development Springfield Township, DELCO

2008-2011 Utility bill auditing and energy procurement for public and private sector