

# Combined Heat & Power (CHP)

## U.S.DOE Pacific CHP Technical Assistance Partnership

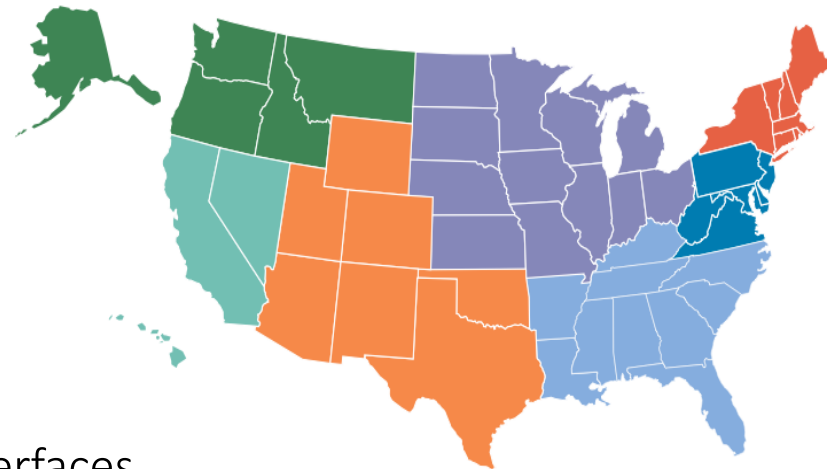
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# President's Executive Order 13624: 40GW of new CHP by 2020

- CHP TAPs are critical components of achieving the goal:
  - Regional CHP experts
  - Provide fact-based, un-biased information on CHP
    - Technologies
    - Project Development
    - Project Financing
    - Local electric and natural gas interfaces
    - State best practice policies
  - Vendor, fuel, and technology neutral



<http://eere.energy.gov/manufacturing/distributedenergy/chptaps.html>



# Who We Are: U.S. DOE Pacific CHP TAP

- Previous DOE Pacific Clean Energy Applications Center (CEAC)
- Regional Coverage for CA, NV, & HI
- Pacific CHP TAP Team consists of:
  - Center for Sustainable Energy Team Lead (CSE)
  - Valley Consulting (VC)
  - DE Solutions (DES)
  - Energy and Environmental Economics (E3)



# CHP Technical Assistance Partnerships

## Key Activities

- **Market Opportunity Analysis.**

Supporting analyses of CHP market opportunities in diverse markets including industrial, federal, institutional, and commercial sectors

- **Education and Outreach.**

Providing information on the energy and non-energy benefits and applications of CHP to state and local policy makers, regulators, end users, trade associations, and others.

- **Technical Assistance.**

Providing technical assistance to end-users and stakeholders to help them consider CHP, waste heat to power, and/or district energy with CHP in their facility and to help them through the development process from initial CHP screening to installation.



<http://eere.energy.gov/manufacturing/distributedenergy/chptaps.html>



U.S. DEPARTMENT OF ENERGY

**CHP Technical Assistance Partnerships**

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# What Is Combined Heat and Power?

CHP is an *integrated energy system* that:

- Is located at or near a factory or building
- Generates electrical and/or mechanical power
- Recovers waste heat for
  - heating,
  - cooling or
  - dehumidification
- Can utilize a variety of technologies and fuels

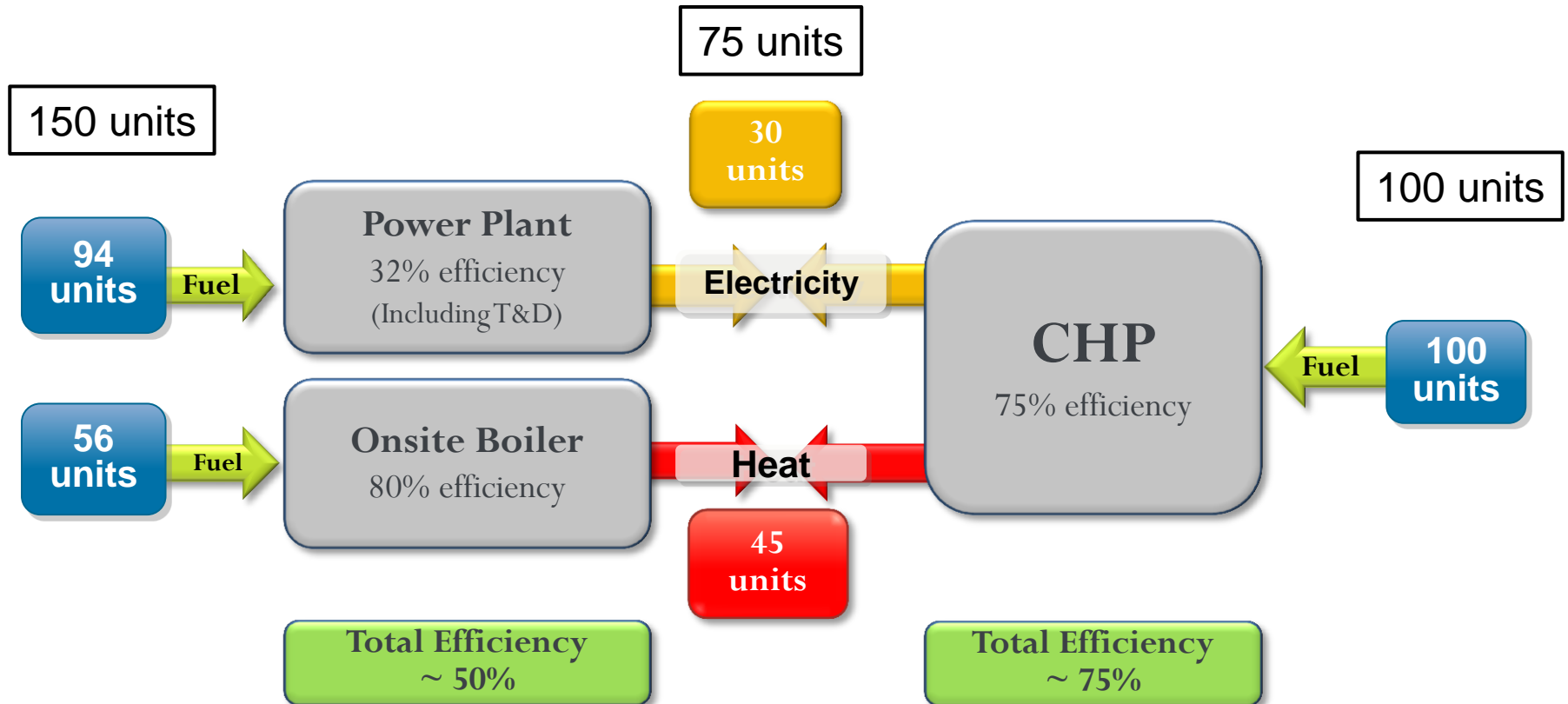


# What Are the Benefits of CHP?

- CHP is **more efficient** than separate generation of electricity and heating/cooling
- Higher efficiency translates to **lower operating cost**, (but requires capital investment)
- Higher efficiency **reduces emissions** of all pollutants
- CHP can also increase **energy reliability** and enhance power quality

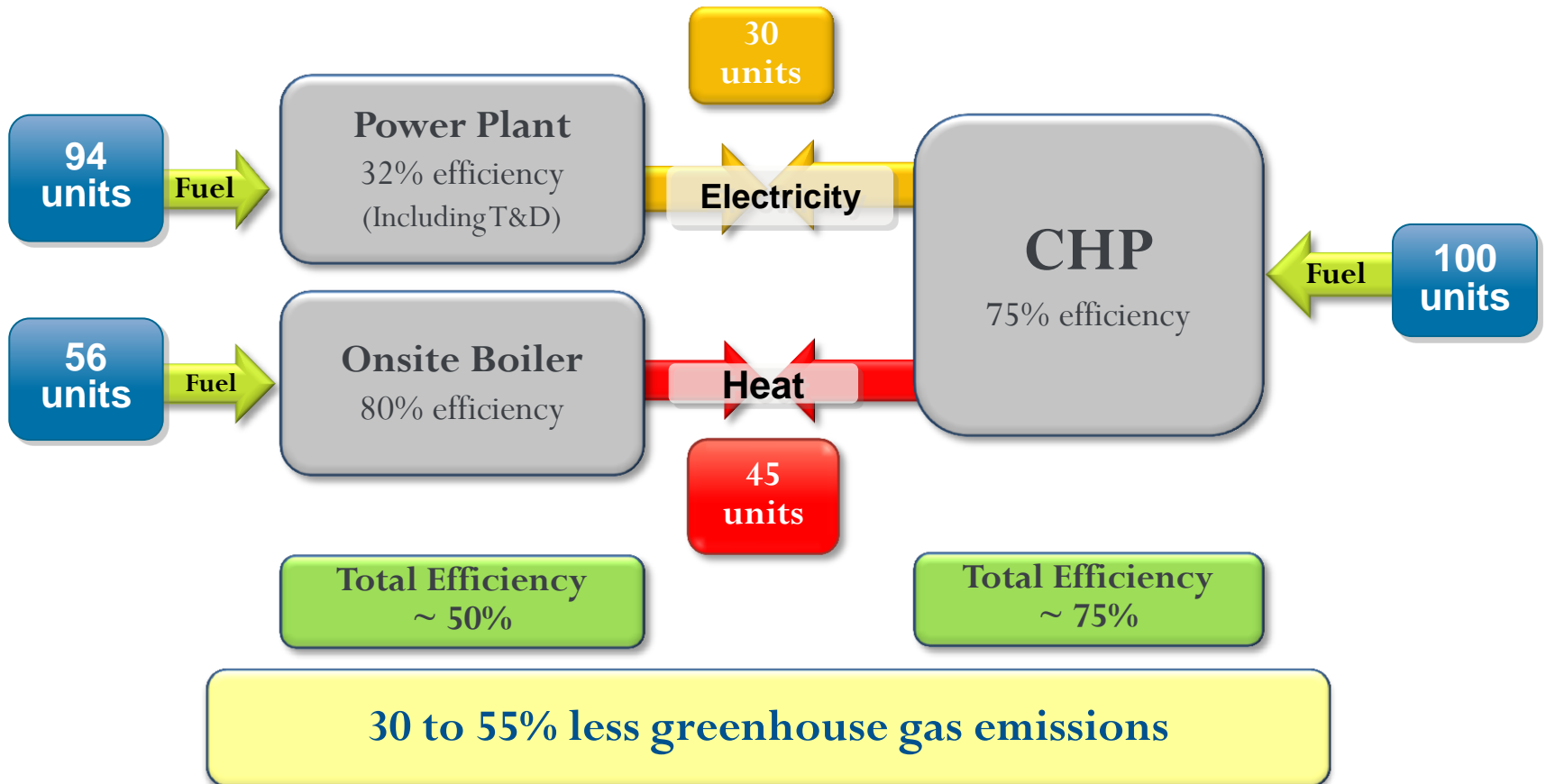


# CHP Recaptures Much of that Heat, Increasing Overall Efficiency of Energy Services.....





# .....and Reducing Greenhouse Gas Emissions



# Nevada Technical CHP Potential 1,318 MW

## Nevada Industrial CHP Technical Potential

SIC	Application	50-500 kW (MW)	.5-1 MW (MW)	1-5 MW (MW)	5-20 MW (MW)	>20 MW (MW)	Total MW
20	Food	3	4	17	0	0	24
24	Lumber and Wood	1	1	5	0	22	29
26	Paper	1	3	3	7	0	14
28	Chemicals	4	3	22	11	303	344
29	Petroleum Refining	0	1	9	0	0	10
32	Stone/Clay/Glass	0	0	0	16	0	16
39	Misc. Manufacturing	1	1	5	5	0	12
	<b>Total</b>	<b>19</b>	<b>15</b>	<b>63</b>	<b>39</b>	<b>325</b>	<b>461</b>

## Nevada Commercial CHP Technical Potential

SIC	Application	50-500 kW (MW)	.5-1 MW (MW)	1-5 MW (MW)	5-20 MW (MW)	>20 MW (MW)	Total MW
52	Retail	16	4	0	0	0	19
4581	Airports	1	1	2	0	24	28
5411	Food Stores	19	0	0	0	0	19
5812	Restaurants	19	1	3	0	0	22
6512	Commercial Buildings	25	62	23	0	0	110
6513	Multifamily Buildings	15	36	11	0	0	62
7011	Hotels	24	10	103	131	21	290
8062	Hospitals	8	7	33	0	0	49
8211	Schools	29	38	0	0	0	67
8221	College/Univ.	5	1	10	36	30	82
9100	Government Buildings	12	5	5	5	0	27
9223	Prisons	3	1	19	0	0	24
9711	Military	1	1	6	20	0	28
	<b>Total</b>	<b>195</b>	<b>169</b>	<b>225</b>	<b>193</b>	<b>75</b>	<b>857</b>

Source: ICF Internal Estimates (2013)



# Attractive CHP Markets



## Industrial

- Chemical manufacturing
- Ethanol
- Food processing
- Natural gas pipelines
- Petrochemicals
- Pharmaceuticals
- Pulp and paper
- Refining
- Rubber and plastics



## Commercial

- Data centers
- Hotels and casinos
- Multi-family housing
- Laundries
- Apartments
- Office buildings
- Refrigerated warehouses
- Restaurants
- Supermarkets
- Green buildings



## Institutional

- Hospitals
- Schools (K – 12)
- Universities & colleges
- Wastewater treatment
- Residential confinement



## Agricultural

- Concentrated animal feeding operations
- Dairies
- Wood waste (biomass)

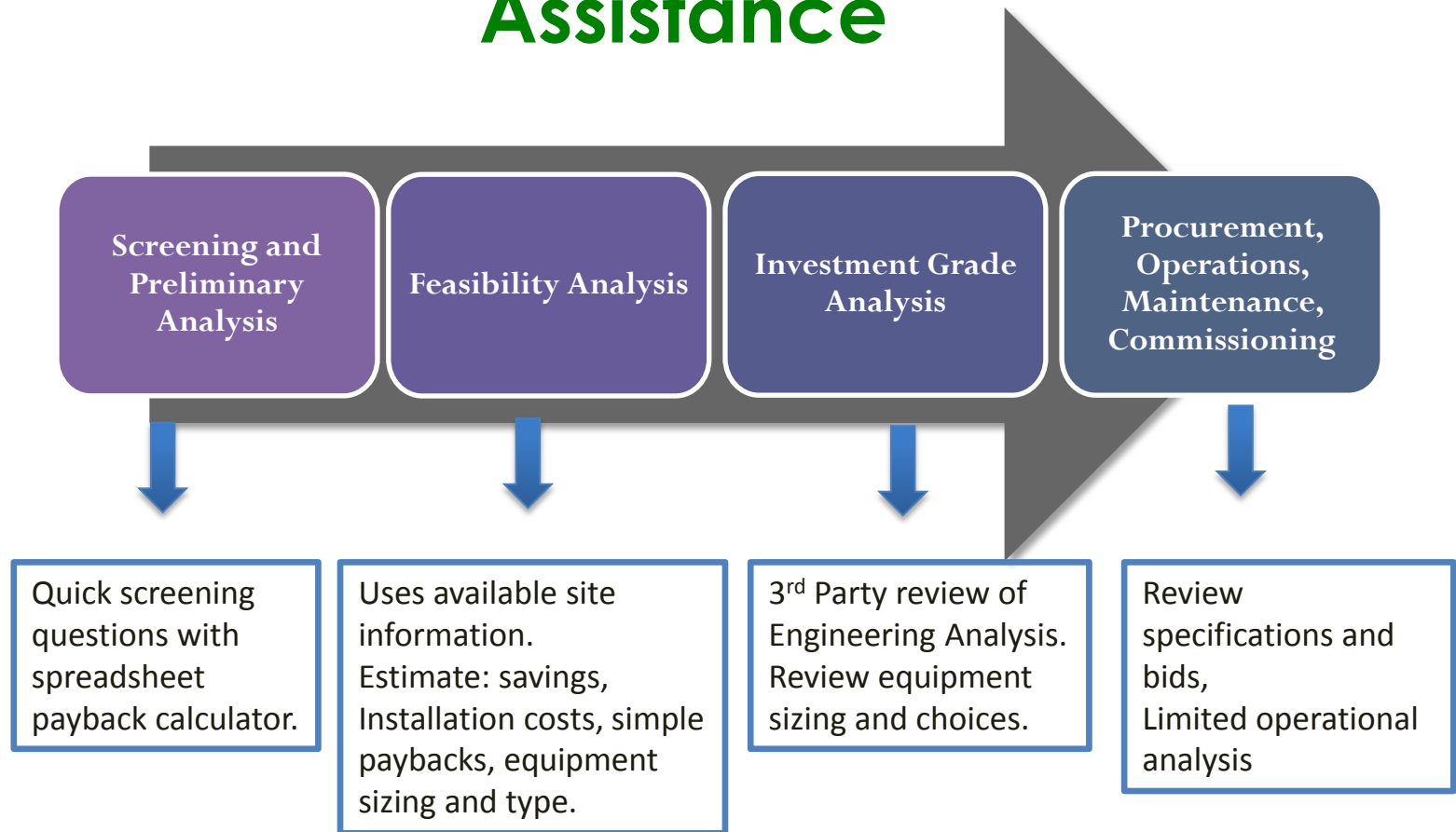


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# CHP TAP Project Development Technical Assistance



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**CHP**  
TECHNICAL ASSISTANCE  
PARTNERSHIPS

# Thank You

# Questions?

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