Harcuvar Project Presentation

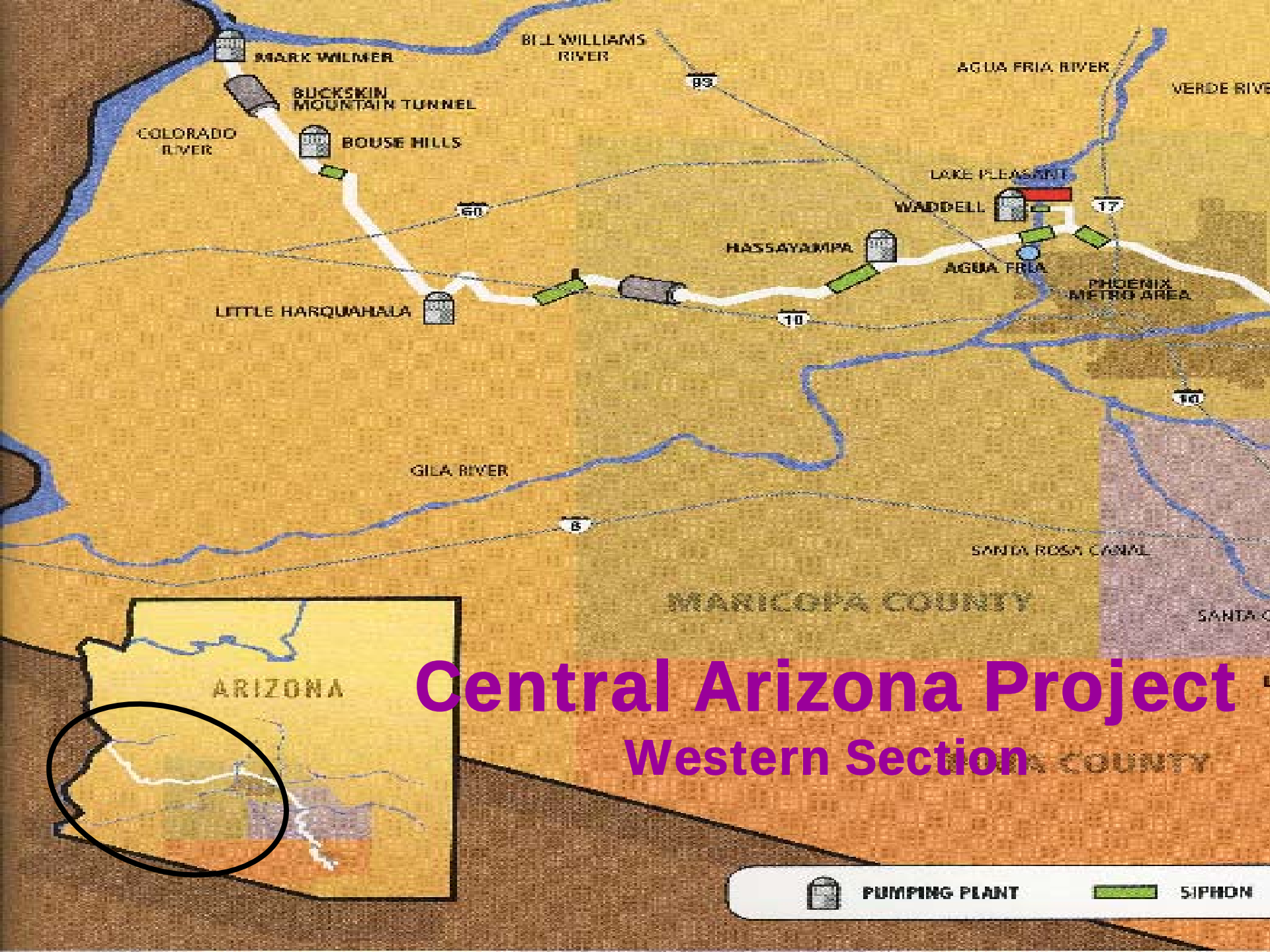
Arizona Corporation Commission

2008 BTA Workshop

May 22, 2008

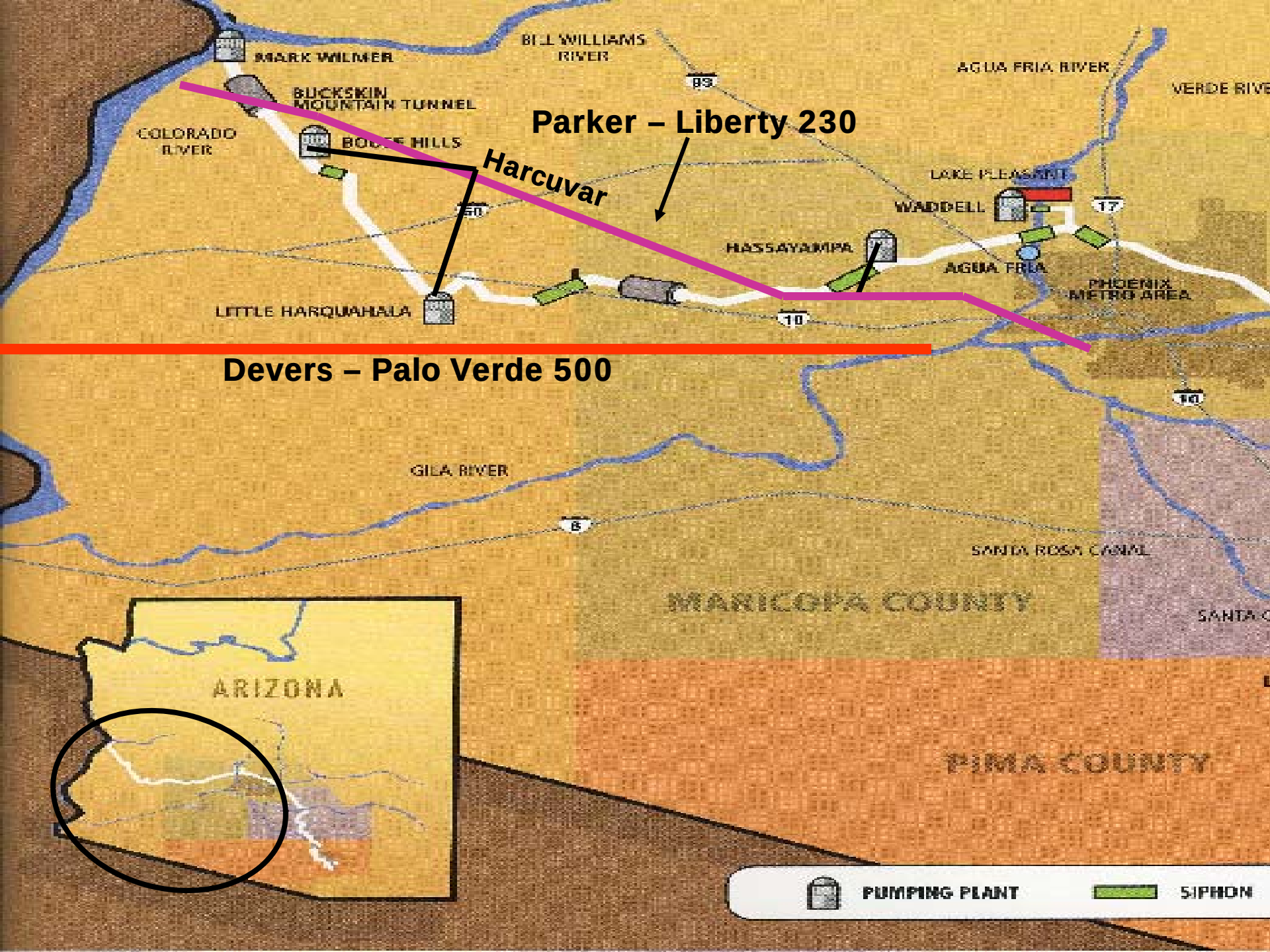
Harcuvar Project Genesis

- CAP's Desire to Improve System Reliability.
- SCE's Desire to Construct DPV2.



Central Arizona Project

Western Section


MARK WILMER
BIG WILLIAMS RIVER
AGUA FRIA RIVER
VERDE RIVE
BUCKSKIN MOUNTAIN TUNNEL
COLORADO RIVER
Parker – Liberty 230
Harcuvar
LAKE PLEASANT
WADDELL
HASSAYAMPA
AGUA FRIA
PHOENIX METRO AREA
LITTLE HARQUAHALA
Devers – Palo Verde 500
GILA RIVER
SANTA ROSA CANAL
MARICOPA COUNTY
ARIZONA
PIMA COUNTY
PUMPING PLANT
SIPHON

Harcuvar Project Benefits

- Central Arizona Project
  - Enhance Reliability of Project Operations
  - Provide Access to Future Resources
- Devers – Palo Verde No. 2
  - Enhance Project's Benefits to Arizona

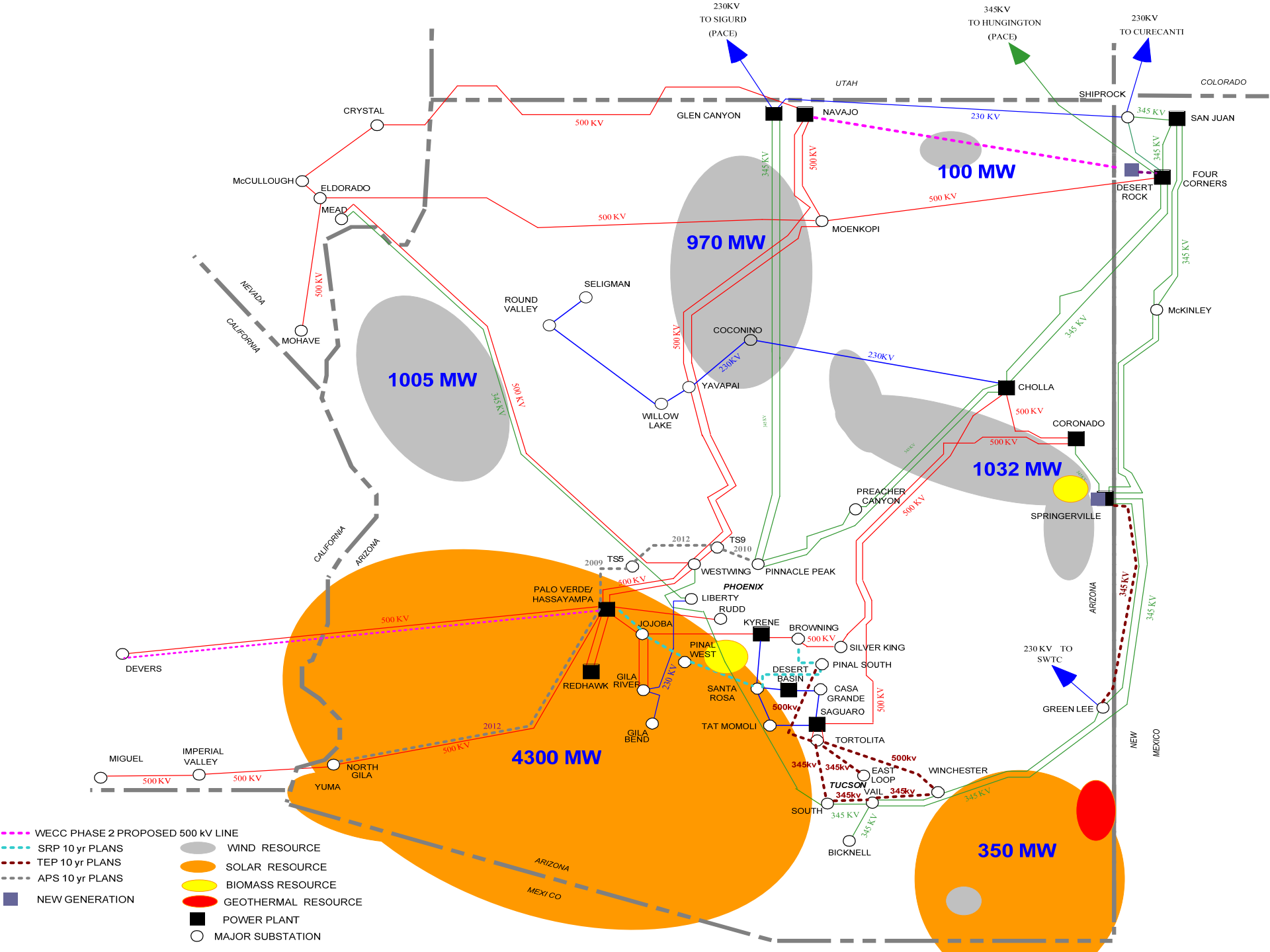
Harcuvar Project Benefits

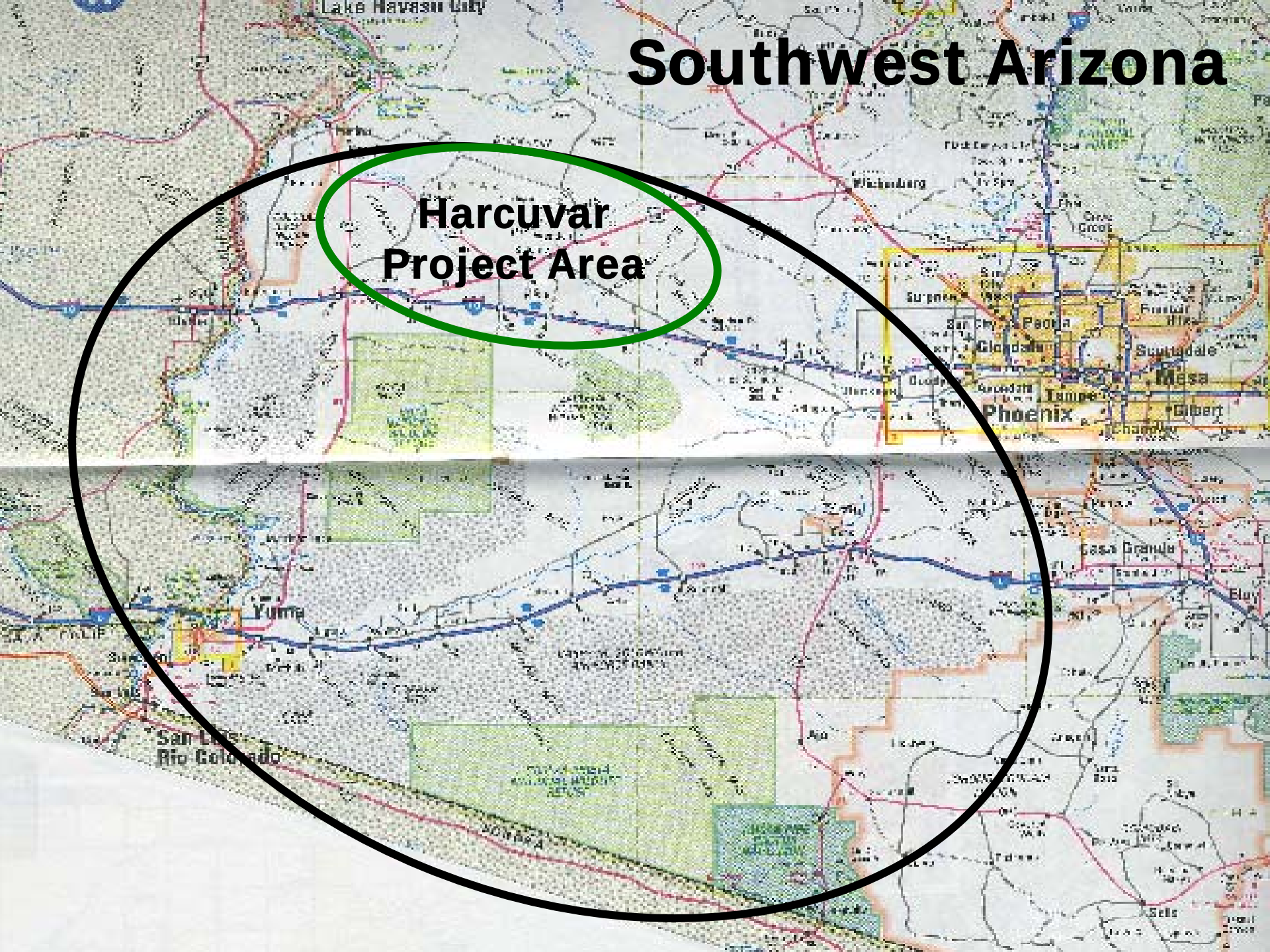
- Generator Benefits
  - Provide a Means for Generation Projects to Simultaneously Access
    - Palo Verde Hub
    - California ISO
    - WAPA's Transmission System
  - Afford Projects Multiple Points of Interconnection to the Grid – Per ACC Requirement.
  - Located in La Paz vs. Maricopa County (Emissions)
  - Local Access to Natural Gas (El Paso Lateral)

Harcuvar Project
Access for Renewables

Arizona Potential Renewable Generation

Black & Veatch Study Results


230KV
TO SIGURD
(PACE)
345KV
TO HUNGINGTON
(PACE)
230KV
TO CURECANTI
UTAH
COLORADO
SHIPROCK
CRYSTAL
GLEN CANYON
NAVAJO
SAN JUAN
100 MW
DESERT
ROCK
FOUR
CORNERS
McCULLOUGH
ELDORADO
MEAD
MOENKOPI
970 MW
SELIGMAN
ROUND
VALLEY
McKINLEY
NEVADA
CALIFORNIA
MOHAVE
COCONINO
1005 MW
YAVAPAI
CHOLLA
WILLOW
LAKE
CORONADO
1032 MW
PREACHER
CANYON
SPRINGERVILLE
CALIFORNIA
ARIZONA
TS9
2012
2010
TS5
2009
WESTWING
PINNACLE PEAK
PHOENIX
PALO VERDE/
HASSAYAMPA
LIBERTY
RUDD
KYRENE
BROWNING
SILVER KING
JOJOBA
PINAL
WEST
PINAL SOUTH
DEVERS
REDHAWK
GILA
RIVER
DESERT
BASIN
CASA
GRANDE
SANTA
ROSA
SAGUARO
GREEN LEE
230 KV TO
SWTC
GILA
BEND
TAT MOMOLI
TORTOLITA
MIGUEL
IMPERIAL
VALLEY
NORTH
GILA
4300 MW
EAST
LOOP
WINCHESTER
YUMA
TUCSON
VAIL
SOUTH
BICKNELL
350 MW
NEW
MEXICO
ARIZONA
MEXICO
500 KV
345 KV
230 KV
500kv
345kv
230KV
2012
2009
2010
WECC PHASE 2 PROPOSED 500 kV LINE
SRP 10 yr PLANS
TEP 10 yr PLANS
APS 10 yr PLANS
NEW GENERATION
WIND RESOURCE
SOLAR RESOURCE
BIOMASS RESOURCE
GEOTHERMAL RESOURCE
POWER PLANT
MAJOR SUBSTATION


Southwest Arizona
Harcuvar
Project Area
Lake Havasu City
Wickenburg
Surprise
Peoria
Glendale
Scottsdale
Mesa
Tempe
Phoenix
Gilbert
Casa Grande
Eloy
Yuma
San Luis
Rio Colorado
SONORA
Sells

Harcuvar Project Geographic Location

Project is Located Approximately 60 Miles West of the Palo Verde Hub.

Harcuvar Project Regional View

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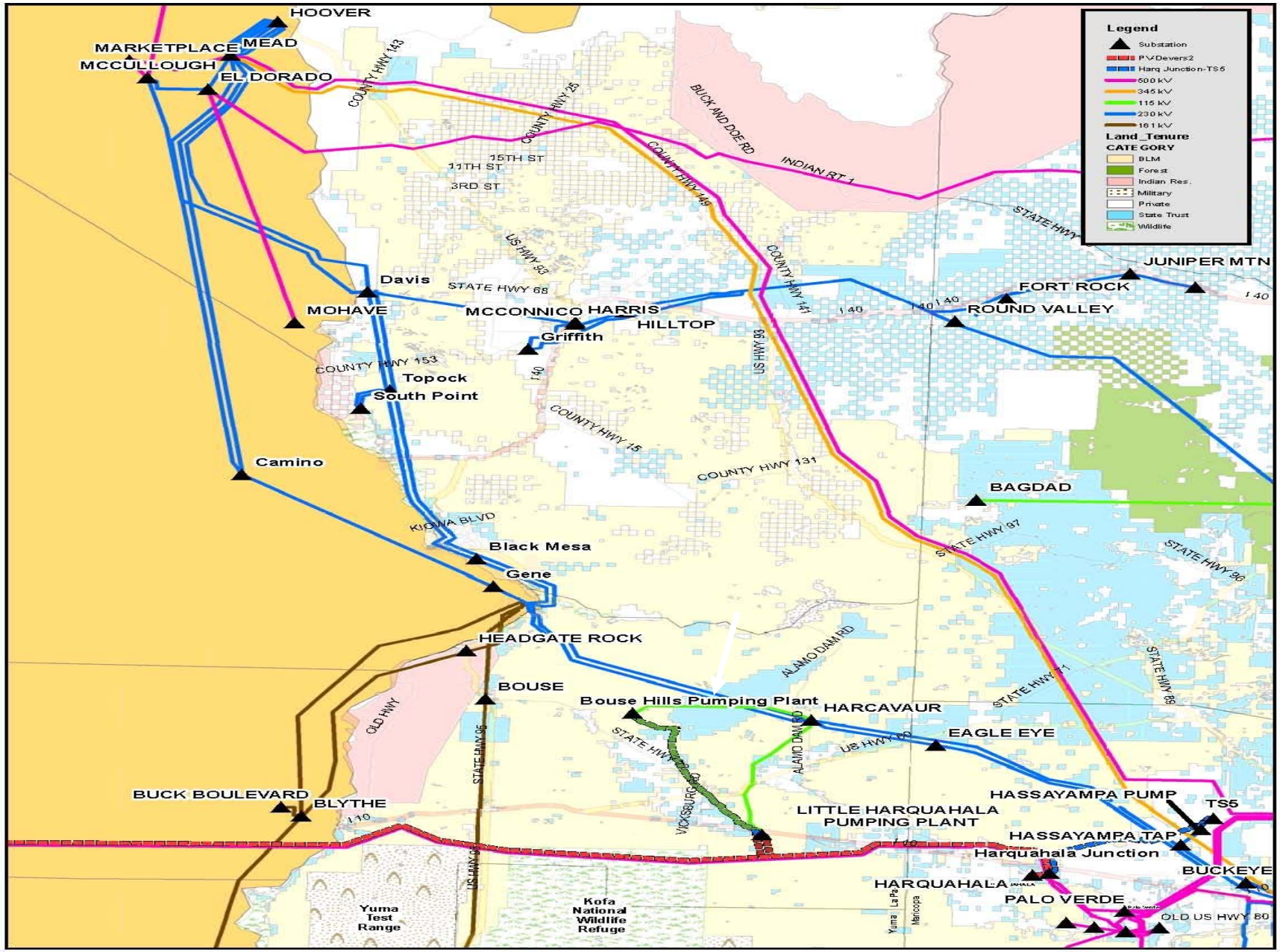

Harcuvar Generator Site
Planned and Possible Upgrades

DISCLAIMER:
K.R. Saline & Associates, P.L.C.
Do not warrant the accuracy or location of the facilities shown

Harcuvar Project Geographic Location

Harcuvar Project Detailed View

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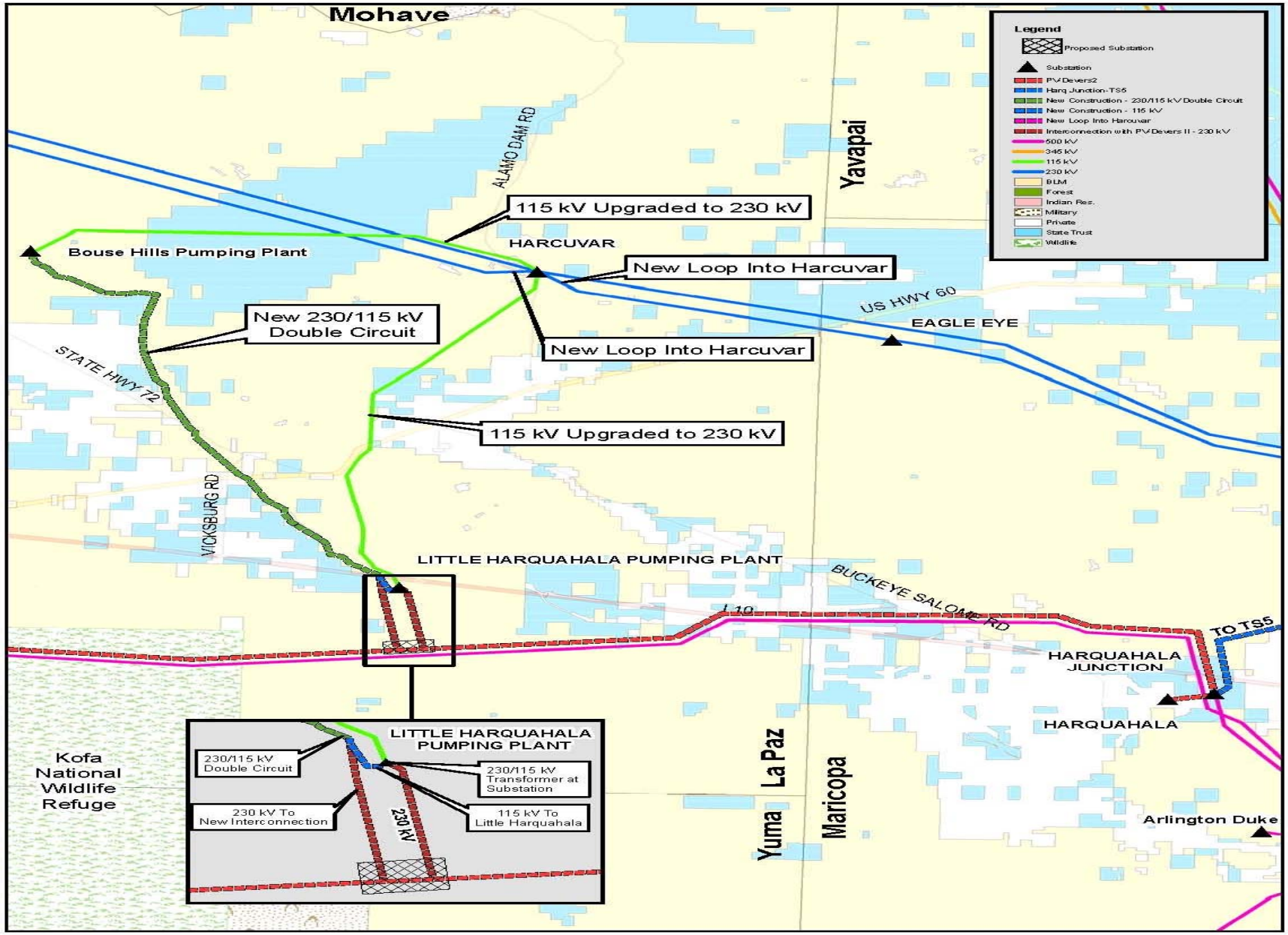
Mohave
Yavapai
Yuma
La Paz
Maricopa
Legend
Proposed Substation
Substation
PV Devers2
Harq Junction-TS5
New Construction - 230/115 kV Double Circuit
New Construction - 115 kV
New Loop Into Harcuvar
Interconnection with PV Devers II - 230 kV
500 kV
345 kV
115 kV
230 kV
BLM
Forest
Indian Res.
Military
Private
State Trust
Wildlife
ALAMO DAM RD
115 kV Upgraded to 230 kV
HARCUVAR
Bouse Hills Pumping Plant
New Loop Into Harcuvar
US HWY 60
EAGLE EYE
New 230/115 kV Double Circuit
STATE HWY 72
New Loop Into Harcuvar
115 kV Upgraded to 230 kV
VICKSBURG RD
LITTLE HARQUAHALA PUMPING PLANT
BUCKEYE SALOME RD
I-10
TO TS5
HARQUAHALA JUNCTION
HARQUAHALA
Kofa National Wildlife Refuge
LITTLE HARQUAHALA PUMPING PLANT
230/115 kV Double Circuit
230/115 kV Transformer at Substation
230 kV To New Interconnection
115 kV To Little Harquahala
230 kV
Arlington Duke
0 2.5 5 Miles
Harcuvar Generator Site
Planned and Possible Upgrades
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Harcuvar Project Components

- **Existing Project Components**
  - SCE's Palo Verde-Devers No.1 500 kV Lines.
  - Western's Liberty-Parker 230 kV Lines.
  - CAWCD's Little Harquahala and Bouse Hills 115 kV Lines (Right-of-Way).
  - Western/CAP Harcuvar Substation
  - CAP Bouse Hills and Little Harquahala Subs.
  - CAP Canal (Right-of-Way).

Harcuvar Project Components

- **New Facilities Required**
  - Planned Devers No. 2 500 kV Line.
  - Tie to the Devers 1&2 500 kV Lines at a Proposed “Salome” Substation.
  - Five Miles of New Transmission from the Salome Substation to CAP’s Existing Little Harquahala Substation.
  - Tie Between the Existing CAP Bouse Hills and Little Harquahala Substations (Which Would Follow the Existing CAP Right-of-Way).

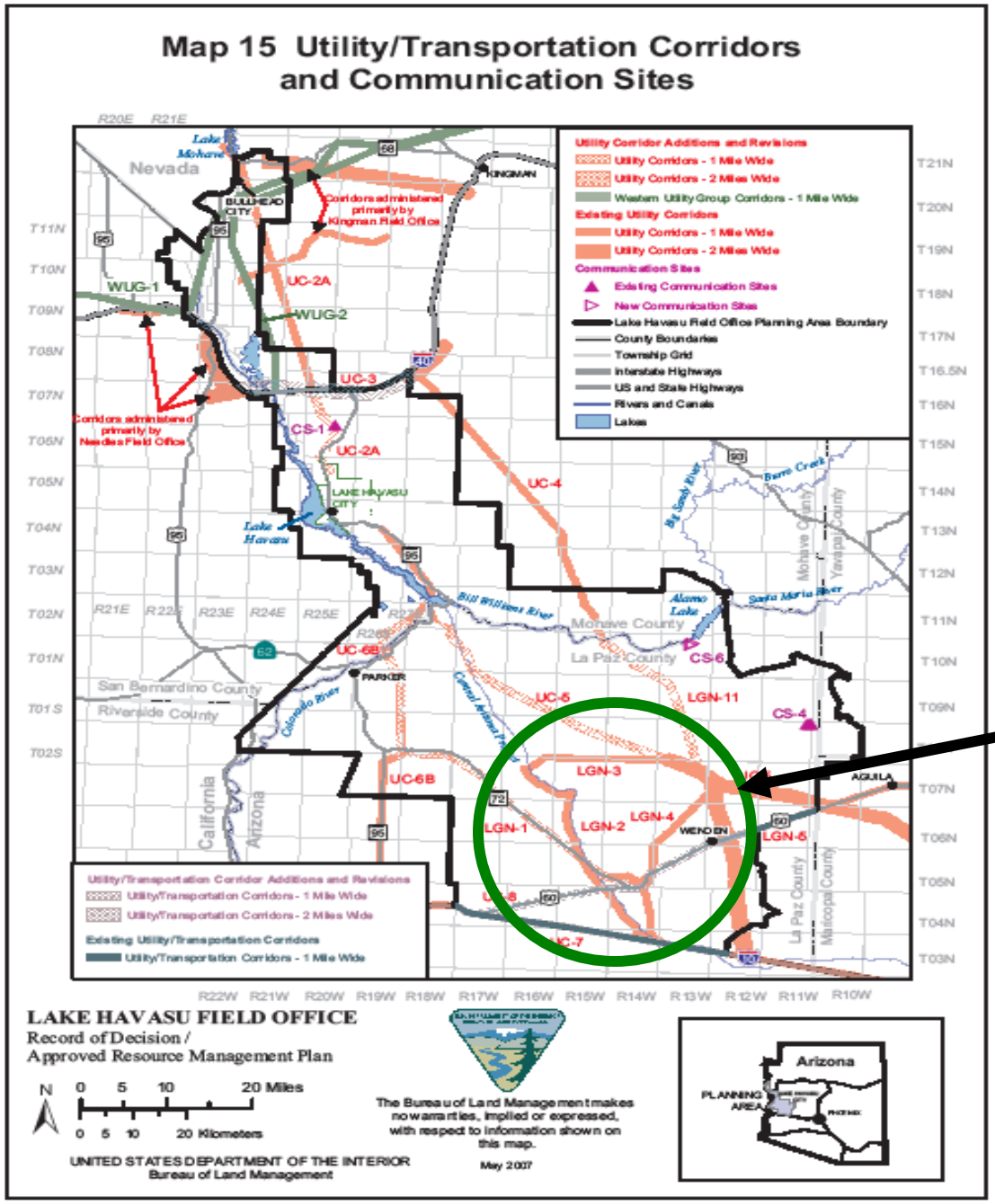
Harcuvar Project Components

- **Ultimate Project Build Out**
  - 230 kV Loop Between Harcuvar, Bouse Hills, Salome, and Little Harquahala Substations.
  - At Salome Loop in Both Devers 500 kV Lines.
  - At Harcuvar Loop in Both Western 230 kV Lines.
  - Bi-Directional Rights from Salome to PV Hub.

(Looping in the lines will enhance project reliability in the event of system contingencies.)

Harcuvar Project Permitting

Approximately 95% of the Project Resides Within Existing BLM Designated Utility Corridors.



Harcuvar Project

Harcuvar Project Feasibility Study

- Project Sponsor is the Central Arizona Water Conservation District (CAWCD).
- Technical Study Participants:
  - APS, CAWCD, SCE, SPPR, SRP, TEP, Western Area Power Administration and Metropolitan Water District.

Harcuvar Project Feasibility Study

- Study Process
  - Project Proposed to the SWAT CRT Committee.
  - Created Technical Study Team (9 Participants)
  - Agreed on Base Cases for Power Flow
  - Developed 8 Project Scenarios to Study
    - **Transmission** – Ranged from Simple 115 kV tie between Salome and Little Harquahala to Full 230 kV Loop with Additional Tie to Western's Bouse Substation.
    - **Generation** – Ranged from Zero to 1320 MW.

Harcuvar Project Feasibility Study

- Employed 2011 Heavy Summer and Heavy Autumn Cases.
- Maintained East-of-River at 10,500 MW.
- Analyzed N-0, N-1 and N-2 Contingencies.

Harcuvar Project Study Results

- **N-0**
  - One Overload – SCE 115 kV line – to be Upgraded.
- **N-1**
  - Devers Line Series Capacitors.
  - 2-161 kV lines – Existing RAS for Each.
  - West-of-Devers 230 kV lines.
- **N-2**
  - 3-230 kV and 1-500 kV line.
- Power Flow did not Solve for 4 Contingencies.
  - 2 Devers and 2 SWPL.

Harcuvar Project
Next Steps

June - August 2008 Timeframe

- Meeting of Existing Transmission Owners/Operators.
  - Bureau of Reclamation, CAWCD, CAISO, SCE, WAPA.
- Open Season for Project Participants.

Harcuvar Project
2008 BTA Presentation

QUESTIONS?

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